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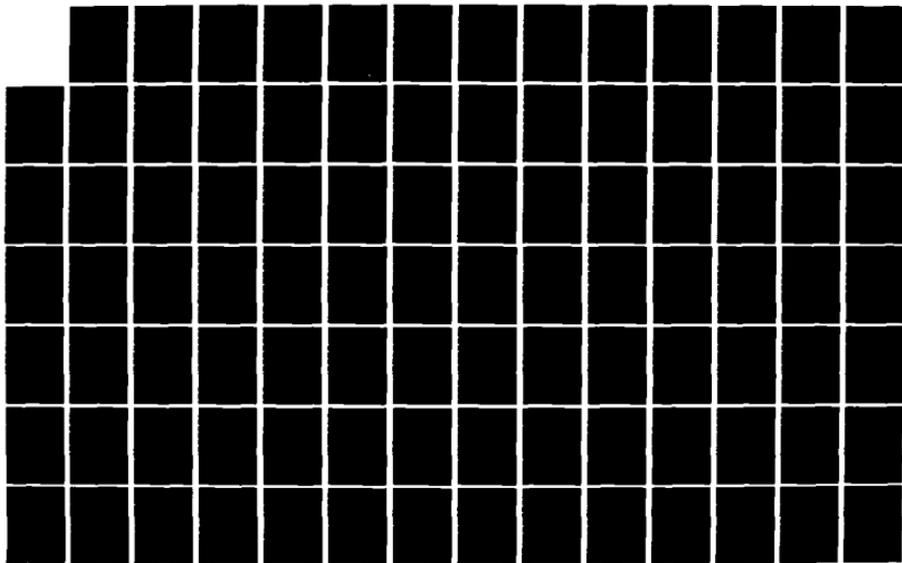
31M10 FUNCTIONAL BASIC SKILLS EDUCATION PACKAGE(U)  
APPLIED SCIENCE ASSOCIATES INC PITTSBURGH PA SEP 82  
DABT60-81-C-0006

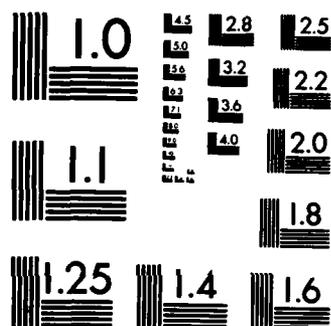
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**INSTRUCTOR TRAINING COURSE**

**COURSE MANAGEMENT PLAN FOR INSTRUCTOR TRAINING COURSE**

**31M10 Functional Basic  
Skills Education Package**

Contract No. DABT60-81-C-0006  
Sequence No. A022

Prepared for:  
Department of the Army  
U. S. Training Support Center  
Fort Eustis, Virginia 23604

Prepared by:  
Applied Science Associates, Inc.  
4616 Henry Street  
Pittsburgh, Pennsylvania 15213

September 1982

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The above course consists of 12 parts: Instructor Guide; Instructor Training Course; Student Guide for Instructor Training Course; Trainer Guide for Instructor Training Course; Course Management Plan for Instructor Training Course; Course Management Plan; Course Management Plan (Appendix B - Instructor Guide)(CONT'D)		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number)		
Learning/Teaching Strategies                      Learning Objectives Reading Comprehension                              Checkpoints Units and Lessons Listening Skills Scale Reading		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)		
The objective of this Functional Basic Skills Education Program (FBSEP) is to prepare students for the 31M "Multichannel Communications Equipment Operator" AIT and MOS by remediating those basic learning skills necessary for success in the AIT and MOS. The Course Management Plan provides complete directions for administering the Functional Basic Skills Education Program (FBSEP).		
The FBSEP course for 31M10 is a self-instructional, individualized package of units and lessons within units. Based on Screening and Diagnostics Tests, (CONT'D)		

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Block 18 continued: Instructor Guide (Appendix - Checkpoints); Course Management Plan (Appendix B - Instructor Guide - Checkpoints); Final Report (Critical Incident Study); Unit 1-9 Lessons (Student Guides); and Diagnostic Tests.

Block 20 continued: → students are assigned only to lessons which teach skills in which they are deficient. As a result, different students in the same FBSEP classroom work on different lessons at the same time. In addition to this individualized structure, the FBSEP course is unusual in that it teaches some skills and strategies rarely taught in traditional instruction. The nontraditional presentation of the FBSEP course necessitates a detailed plan for managing the course.

→ This plan has five major parts. The text of the Plan proper contains sections on: (1) the testing component of the course, (2) the Instructional component of the course, and (3) Future Modifications to the FBSEP.

In addition, there are two Appendices. Appendix A contains the entire Diagnostic Test Model. This presents full step-by-step directions for the test administrators on how to score the tests and interpret the results, as well as information useful to the course administrator on how the tests were developed, and which parts of the test relate to particular lessons.

Appendix B contains the entire Instructor Guide. This presents information on the purpose, development, and characteristics of FBSEP, the instructor's role, course administration, and student characteristics. The bulk of the Instructor Guide is devoted to individual Instructor Guides for each of the 29 lessons in the FBSEP course. These individual Instructor Guides describe the content and terminal and enabling objectives of each lesson.

The Diagnostic Test Model and Instructor Guide are available as separate manuals for use by the test administrators and instructors. They are included here to give a complete picture to the course administrator of the implementation of the course.

**COURSE MANAGEMENT PLAN FOR INSTRUCTOR TRAINING**

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## COURSE MANAGEMENT PLAN FOR INSTRUCTOR TRAINING

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### INTRODUCTION

The FBSEP course for 31M10 is a self-instructional, individualized package of units and lessons within units. Based on Screening and Diagnostic Tests, students are assigned only to lessons which teach skills in which they are deficient. As a result, different students in the same FBSEP classroom work on different lessons at the same time. In addition to this individualized structure, the FBSEP course teaches some skills and strategies rarely taught in traditional instruction. An Instructor Training Course has been developed to prepare instructors to take on the roles and tasks demanded by the unique characteristics of the FBSEP course.

The Instructor Training Course is a five-day modified self-instructional one. It is self-instructional in that trainees proceed through most lessons at their own pace. It is modified in that most lessons end with a group discussion, and a few lessons are instructor-directed and involve group interaction throughout. A Student Guide for Instructor Training provides the trainee with reading matter, instructions for examining FBSEP materials, and worksheets to fill out. A Trainer Guide for Instructor Training provides the trainer with detailed lesson plans for conducting the course. This Course Management Plan for Instructor Training provides information needed for setting up and managing the course and for evaluating its outcomes. It includes discussions of qualifications of the trainer and of FBSEP instructors, a course outline, required facilities, instructions for preparing to offer the course, and evaluation of the instructor-trainees and the course.

### QUALIFICATIONS OF PERSONNEL

#### Trainer Qualifications

Only one person is required for teaching the Instructor Training Course. That person should have the following qualifications:

1. Thorough familiarity with the FBSEP course - content and structure.
2. Skill and experience as a group facilitator.

Ideally, the trainer should be an experienced FBSEP instructor. If no experienced instructor is available, a BSEP administrator who is an experienced teacher, as well as being thoroughly familiar with the FBSEP course content and structure, can conduct the course.

#### FBSEP Instructor Qualifications

All instructors should be certified to teach at the secondary or post-secondary level. Post-baccalaureate training in adult education is highly desirable. The following kinds of courses are particularly valuable as preparation for teaching FBSEP:

- . Behavior Modification
- . Principles of Learning (reinforcement theory, etc.)
- . Instructional Design (the ISD model)
- . Adult Learning

The following two kinds of previous experience are highly desirable:

1. Experience teaching basic skills to adults.
2. Experience with competency-based, criterion-referenced instruction.

In addition, instructors should be committed to the kind of educational program in which the teacher is a facilitator/tutor/consultant to individual students, as needed, rather than a lecturer/recitation-leader/disciplinarian.

## COURSE OUTLINE

The Instructor Training Course is a 5-day course, assuming a 7-hour training day. It includes eleven lessons, most of them primarily self-instructional but ending with a group discussion. The table below lists the lessons, the subdivisions of each in terms of learning/teaching strategies, the maximum time which should be scheduled for each subdivision, and the maximum total time for the entire lesson.

Lesson	Title	Lesson Subdivisions	Maximum Time - Each Subdivision	Maximum Lesson Time
1	FBSEP Learning/ Teaching Strategies and Course Structure	Self-instruction Discussion	3 hours 1 hour	4 hours
2	Practice Exercises with a Sample FBSEP Lesson	Self-instruction Discussion	1-1/2 hours 1/2 hour	2 hours
3	Use of Audiotape and Videotape Equipment	Demonstration, Practice		1 hour
4	Relation of FBSEP to the 31M10 AIT Course	Tour Self-instruction Discussion	3 hours 1-1/2 hours 1/2 hour	5 hours
5	Knowledge of Equipment Required for Teaching FBSEP Unit VIII	Self-instruction	2 hours	2 hours
6	FBSEP Units I and II	Self-instruction Discussion	3 hours 1 hour	4 hours
7	FBSEP Units III and IV	Self-instruction Discussion	3-1/2 hours 1/2 hour	4 hours
8	FBSEP Units V, VI, VII, VIII, and IX	Self-instruction Discussion	3-1/2 hours 1/2 hour	4 hours

Lesson	Title	Lesson Subdivisions	Maximum Time - Each Subdivision	Maximum Lesson Time
9	Discussion Session on Administrative Problems	Self-instruction Discussion	1/2 hour 1/2 hour	1 hour
10	Effective Communications in FBSEP	Self-instruction Discussion	1/2 hour 1/2 hour	1 hour
11	Role Play	Group interaction	4 hours	4 hours

#### REQUIRED FACILITIES

##### Class Size

Instructor training may be offered to as few as one or as many as six persons at once. The upper limit is a function of several factors:

1. The kind of individual attention that is desirable during training becomes more difficult as class size increases.
2. Group discussions become unwieldy with larger class sizes, and some individuals participate little or not at all in a large group.
3. The role-play in Lesson 11 requires that each trainee take the role of instructor at least once. Since there are six role-playing situations, a class size larger than six would result in one or more trainees not having the opportunity to play the instructor role.

If only one instructor is being trained, Lesson 11, Role Play, may need to be modified. Either the instructor-trainee must play the role of "instructor" in all situations, with the trainer playing the role of "student;" or the instructor and trainer can discuss ways of dealing with the situations rather than actually playing the roles.

### Seating Arrangements

The room set aside for instructor training should provide comfortable seating and adequate writing space for all instructors. In order to facilitate group interaction, a long, rectangular table with seats around it is ideal. If this is not possible, chairs should be easily movable so that circles can be formed for discussion sessions.

### Equipment

The following pieces of equipment are needed in the classroom:

- At least one operational cassette tape recorder.
- At least one operational videotape player and monitor.

The room should also include a chalkboard with chalk and eraser.

### Training Materials

Each instructor-trainee must be provided with one Student Guide for Instructor Training Course (consumable) and one copy of the FBSEP Instructor Guide. The Student Guide for Instructor Training Course includes objectives, reading matter, instructions for proceeding through each lesson, and worksheets. The FBSEP Instructor Guide, the guide for conducting the FBSEP course, serves as the "textbook" for instructor training.

The person conducting the training (the trainer) must have a copy of the Trainer Guide for Instructor Training Course, which includes lesson plans and other information needed for teaching the course.

In addition, the following materials are used in one or more lessons of the course and must be readily accessible:

- Dictionary
- FBSEP Student Guides, Review Exercises, and checkpoints for all FBSEP lessons
- Audiotapes and videotapes used in FBSEP lessons
- 31M10 Soldier's Manual (FM 11-31M1/2)

- TMs used in the 31M10 AIT course. The following are recommended:

- TM 11-5820-461-12
- TM 11-5895-366-15
- TM 11-5895-453-14-2
- TM 11-5820-535-15
- TM 11-5805-371-14-2
- TM 11-5805-357-15
- TM 11-5805-358-14-2

Table I below lists specific media and materials required for each lesson:

Table I

Media and Materials Required for Each Lesson  
of the Instructor Training Course

Lesson	Student Guide for Instructor Training Course	Instructor Guide for FBSEP Course	Other Media and Materials Required for the Lesson
1	✓	✓	None
2	✓	✓	Each instructor-trainer needs: (1) Consumable set of material for Unit VI(VII), Lesson 1. This includes: <ul style="list-style-type: none"> <li>. Student Guide for the lesson</li> <li>. Checkpoint 1, Form A</li> <li>. Review Exercise</li> <li>. Checkpoint 1, Form B</li> </ul> (2) Functional BSEP Student Record Form (consumable) (3) Student Guide: Introduction to FBSEP for 31M10
3			Operational cassette tape player(s). Audiotapes (any) - one for each player. Operational videotape player and monitor. Videotapes (any) - one for each player.

Lesson	Student Guide for Instructor Training Course	Instructor Guide for FBSEP Course	Other Media and Materials Required for the Lesson
4	✓		<p>Soldier's Manual for 31M10 (FM 11-31M1/2)</p> <p>Two or more of the following TMs:            TM 11-5820-461-12            TM 11-5895-366-15            TM 11-5895-453-14-2            TM 11-5820-535-15            TM 11-5805-371-14-2            TM 11-5805-357-15            TM 11-5805-358-14-7</p> <p>One or more of the following videotapes from FBSEP Units III and IV.            Unit III, Lesson 2 - Practice Exercises            Unit III, Lesson 2 - Checkpoint            Unit IV, Lesson 3 - Practice Exercises            Unit IV, Lesson 3 - Checkpoint</p>
5	✓	✓	None
6	✓	✓	<p>One set of all FBSEP lesson materials for Units I and II for each instructor. This includes:            Student Guides            Review Exercises            Checkpoints - Form A and Form B            Audiotape of Word Lists for Unit I, Lesson 1            Soldier's Manual for 31M10            Dictionary</p>

Lesson	Student Guide for Instructor Training Course	Instructor Guide for FBSEP Course	Other Media and Materials Required for the Lesson
7	✓	✓	Audio and video playback equipment. One set of all FBSEP lesson materials for Units III and IV for each instructor. This includes: Student Guides (booklets) Checkpoints Review Exercises for Unit III, Lessons 2 and 3 Audiotapes for Practice Exercises and checkpoints Videotapes for Practice Exercises and checkpoints
8	✓	✓	One set of all FBSEP lesson materials for Units V, VI, VII, VIII, and IX for each instructor-trainee. This includes: Student Guides Review Exercises Checkpoints - Form A and Form B
9	✓		None
10	✓	✓	None
11	✓	✓	Descriptions of Instructor and Student roles for each Role-Play Situation. (See pp. 64-75 of the Trainer Guide for Instructor Training Course.) 5 copies of the Role-Play Checklist for each instructor.

In Lesson 11, the trainees playing the roles of "instructor" and "student" also require the following consumable materials (one each) for the six role-play situations:

<u>Situation</u>	<u>FBSEP Lesson</u>	<u>Specific Materials</u>	
#1	Unit II, Lesson 1	Student:	Student Guide, Section C
		Instructor:	Checkpoint 1, Form A Review Exercise Student Record Form
#2	Unit V, Lesson 1	Student:	Student Guide, Sections A and B
		Instructor:	Checkpoint 1, Form A Student Record Form
#3	Unit VI, Lesson 2	Student:	None
		Instructor:	Checkpoint 1, Form A Review Exercise Checkpoint 1, Form B Student Record Form
#4	Unit VII, Lesson 2	Student:	None
		Instructor:	Student Guide Checkpoint 1, Form A Student Record Form
#5	Unit I, Lesson 5	Student:	Checkpoint 1, Form A
		Instructor:	Student Record Form
#6	Unit IX, Lesson 3	Student:	None
		Instructor:	Student Guide

Lessons 6, 7, and 8 require instructors to examine complete sets of materials for each FBSEP lesson. Table II presents an inventory of all FBSEP materials.

Table II

## Inventory of FBSEP Lesson Materials

<u>Unit</u>	<u>Lesson</u>	<u>Lesson Materials</u>
I	1	Student Guide Review Exercise 1 Review Exercise 2 Checkpoint 1, Form A Checkpoint 1, Form B Checkpoint 2, Form A Checkpoint 2, Form B Checkpoint 3, Form A Checkpoint 3, Form B Checkpoint 4, Form A Checkpoint 4, Form B Checkpoint 5, Form A Checkpoint 5, Form B Checkpoint 6, Form A Checkpoint 6, Form B Audiotape: Word Lists
	2	Student Guide Review Exercise 1 Review Exercise 2 Checkpoint 1, Form A Checkpoint 1, Form B Checkpoint 2, Form A Checkpoint 2, Form B Dictionary
	3	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
	4	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
	5	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B

Table II (cont'd)

<u>Unit</u>	<u>Lesson</u>	<u>Lesson Materials</u>
I	6	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
	7	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
II	1	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
	2	Student Guide Review Exercise 1 Review Exercise 2 Checkpoint 1, Form A Checkpoint 1, Form B Checkpoint 2, Form A Checkpoint 2, Form B Soldier's Manual (FM 11-31M1/2)
	3	Student Guide Review Exercise 1 Review Exercise 2 Checkpoint 1, Form A Checkpoint 1, Form B
III	1	Student Guide Review Exercise Checkpoint 1, Form A/B (booklet) Audiotapes: Practice Exercises Checkpoint 1, Form A/B
	2	Student Guide Checkpoint 1, Form A/B (booklet) Videotapes: Practice Exercises Checkpoint 1, Form A/B
	3	Student Guide Checkpoint 1, Form A/B (booklet) Audiotape: Practice Exercise 1 Videotapes: Practice Exercise 2 Checkpoint 1, Form A/B

Table II (cont'd)

<u>Unit</u>	<u>Lesson</u>	<u>Lesson Materials</u>
IV	1	Student Guide Checkpoint 1, Form A (booklet) Checkpoint 1, Form B (booklet) Videotapes: Practice Exercises Checkpoint 1, Form A/B
	2	Student Guide Checkpoint 1, Form A (booklet) Checkpoint 1, Form B (booklet) Videotapes: Practice Exercises Checkpoint 1, Form A/B
	3	Student Guide Checkpoint 1, Form A (booklet) Checkpoint 1, Form B (booklet) Videotapes: Practice Exercises Checkpoint 1, Form A/B
V	1	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
VI, VII	1	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
VI	2	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
	3	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
VII	2	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B

Table 11 (cont'd)

<u>Unit</u>	<u>Lesson</u>	<u>Lesson Materials</u>
VIII	1	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
	2	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
	3	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
	4	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
IX	1	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
	2	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
	3	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
	4	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B

## PREPARING TO OFFER THE COURSE

Complete the following arrangements well before the first day of the Instructor Training Course.

1. Hire the instructors to be trained.
2. Select or hire the trainer who will conduct instructor training. Provide him/her with the Trainer Guide for Instructor Training Course.
3. Make arrangements with 31M10 AIT course officials for the tour in Lesson 4. The tour should be 2-3 hours long, be conducted by an AIT official or instructor, and include classrooms in Burkhardt and/or Moran Hall as well as the Willard Training Area.
4. Insure that there is one copy of the Student Guide for Instructor Training Course and one copy of the Instructor Guide for FBSEP for each instructor-trainee.
5. Procure all the materials listed in the Tables I and II.
6. Prepare one Instructor Evaluation Form for each instructor-trainee. (See p. 16.)
7. Arrange for use of a suitable classroom (See pp. 4-5), and equip it with audio and video playback equipment.
8. Inform the trainer and the instructors of the starting date, duration, and location of instructor training.

## EVALUATION

Each instructor is evaluated by the trainer at the end of each lesson, based on the following criteria:

1. All lessons: Completion of all enabling activities.
2. Lessons with worksheet: 80% correct completion of worksheet.
3. Lessons with group discussion: Participation in the discussion.

4. Lesson 3: Correct operation of playback equipment.
5. Lesson 11: No check marks in "No" column of role play checklists pertinent to the instructor's Role.

Complete directions for Instructor Evaluation can be found in the Trainer Guide for Instructor Training Course (pp. 12-14). The result (GO vs. NO GO) is recorded on an Instructor Evaluation Form (See p. 16). The minimum requirement for successful completion of the course is GO (either before or after remediation) in all eleven lessons.

Though there is no formal end-of-course test, it is recommended that the trainer meet with each instructor individually after the course is over. The purpose of the meeting is to discuss the lesson evaluations and the instructor's performance in role-play (Lesson 11). The trainer should reinforce the instructor's strengths and make suggestions for improvement of weaknesses, if any.

During the post-course meeting, each instructor should be encouraged to offer criticisms and suggestions for the Instructor Training Course. The suggestions and criticisms can be used as the basis for revising and strengthening the course.

Instructor Evaluation Form

Instructor's Name \_\_\_\_\_

Lesson	GO	NO GO	Comments	GO after Remediation
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				

**COURSE MANAGEMENT PLAN**

**31M10 Functional Basic  
Skills Education Package**

**Contract No. DABT60-81-C-0006  
Sequence No. A014**

**Prepared for:  
Department of the Army  
U. S. Training Support Center  
Fort Eustis, Virginia 23604**

**Prepared by:  
Applied Science Associates, Inc.  
4616 Henry Street  
Pittsburgh, Pennsylvania 15213**

**September 1982**

COURSE MANAGEMENT PLAN  
FOR  
31M10 FUNCTIONAL BASIC SKILLS EDUCATION PACKAGE

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September 1982

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## FOREWORD

This Course Management Plan provides complete directions for administering the Functional Basic Skills Education Program (FBSEP).

The FBSEP course for 31M10 is a self-instructional, individualized package of units and lessons within units. Based on Screening and Diagnostics Tests, students are assigned only to lessons which teach skills in which they are deficient. As a result, different students in the same FBSEP classroom work on different lessons at the same time. In addition to this individualized structure, the FBSEP course is unusual in that it teaches some skills and strategies rarely taught in traditional instruction. The nontraditional presentation of the FBSEP course necessitates a detailed plan for managing the course.

This plan has five major parts. The text of the Plan proper contains sections on: (1) the testing component of the course, (2) the Instructional component of the course, and (3) Future Modifications to the FBSEP.

In addition, there are two Appendices. Appendix A contains the entire Diagnostic Test Model. This presents full step-by-step directions for the test administrators on how to score the tests and interpret the results, as well as information useful to the course administrator on how the tests were developed, and which parts of the test relate to particular lessons.

Appendix B contains the entire Instructor Guide. This presents information on the purpose, development, and characteristics of FBSEP, the instructor's role, course administration, and student characteristics. The bulk of the Instructor Guide is devoted to individual Instructor Guides for each of the 29 lessons in the FBSEP course. These individual Instructor Guides describe the content and terminal and enabling objectives of each lesson.

The Diagnostic Test Model and Instructor Guide are available as separate manuals for use by the test administrators and instructors. They are included here to give a complete picture to the course administrator of the implementation of the course.

## INTRODUCTION

The objective of this Functional Basic Skills Educational Program (FBSEP) is to prepare students for the 31M "Multichannel Communications Equipment Operator" AIT and MOS by remediating those basic learning skills necessary for success in the AIT and MOS. Of course, not all incoming students assigned to the 31M AIT need remedial work in basic skills. The Screening and Diagnostic tests identify those students who do need remedial work. The necessary student qualifications for FBSEP are the same as those for the 31M AIT, in particular, normal color vision and an EL score of 95 or above.

The contents of this FBSEP are tailored to the requirements of the 31M AIT Course. Two important characteristics of the FBSEP course are that it is individualized and self-instructional. The student receives instruction only in those basic skills he/she is deficient in. Also, the student spends most of the class time interacting with instructional materials presented via print, audio, or video media. (Materials were developed to require a reading level no higher than sixth grade.) The instructor in FBSEP functions principally as a facilitator, directing the student's progress through the assigned lessons, and as a tutor, probing for problems in comprehension and clarifying them.

The Functional BSEP course designed for the 31M10 MOS has two major components:

1. A testing component.
2. An instructional component.

The testing component includes a Screening Test and a Diagnostic Test, both administered prior to entry into either BSEP or AIT instruction. The instructional component includes all materials and methods required to teach the FBSEP lessons and to monitor student progress. Table 1 lists all the documents pertaining to management of the FBSEP course. The management of the two components will be discussed in turn.

## I. MANAGEMENT OF THE TESTING COMPONENT

The purpose of the testing component is to determine who needs FBSEP instruction, and, for each student requiring it, what specific instruction (units and lessons) is needed. Testing also provides information necessary for management of the instructional component - when and for how long FBSEP instruction is to be provided for each student. The Diagnostic Test Model (Appendix A) provides detailed information and decision tables. A brief description is provided here.

Testing occurs in two stages, a Screening Test and a Diagnostic Test. It is essential that testing be completed prior to AIT course entry, i.e., before Wednesday of the first week of AIT instruction. Ideally, testing should be completed during the week prior to the one in which students are scheduled to begin the AIT course. This enables students who need only brief, front-loaded FBSEP to receive it on Monday and Tuesday, then to proceed to the AIT course on Wednesday, as scheduled. The testing will require two days, assuming a normal incoming class of 50.

### Screening Test

The Screening Test must be administered to all entering 31M students. It requires 2 to 2-1/2 hours of testing time, including a group-administered audiotape and vidoetape portion and additional self-administered questions. Screening Test scores are recorded on a Screening Test Record Form (See Appendix A, Diagnostic Test Model).

The Screening Test yields scores in each of nine units. There is a cutoff point (minimum passing score) in each unit. The units and the cutoffs are listed below.

<u>Unit</u>	<u>Title</u>	<u>Cutoff</u>
I	Reading Comprehension	12
II	Using a Table of Contents	7
III	Listening Skills	9
IV	Note-Taking for Demonstrations	7

Table 1

List of Documents Pertaining to Managing  
The Functional Basic Skills Educational Program

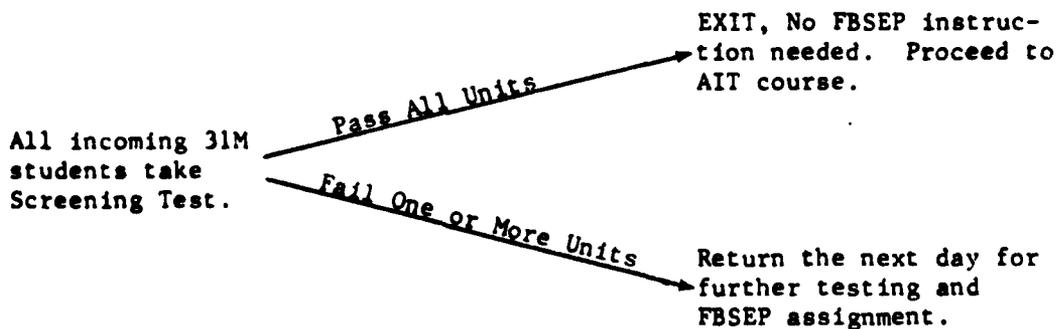
- A. Testing
  - 1. Diagnostic Test Model (Appendix A of this Plan)
  - 2. Screening Test (one booklet)
  - 3. Diagnostic Tests (six booklets)
  
- B. Instruction
  - 1. Course Management Plan for Functional BSEP
  - 2. Instructor Guide (Appendix B of this Plan)
  - 3. Student Guide
  
- C. Instructor Training
  - 1. Course Management Plan for Instructor Training
  - 2. Trainer Guide for Instructor Training Course
  - 3. Student Guide for Instructor Training Course

<u>Unit</u>	<u>Title</u>	<u>Cutoff</u>
V	Recognizing a Part of a Whole	4
VI	Locating Information in Tables	6
VII	Reading Cabling Diagrams	4
VIII	Diagnosing Equipment Malfunctions	6
IX	Scale Reading	6

Students whose scores are at or above the cutoff points in all units do not require FBSEP or any further testing. However, students scoring below cutoff on one or more units are required to return the next day for further testing and for assignment to appropriate FBSEP instruction.

The Screening Tests must be scored quickly so that the Companies can be notified early as to which students are to return for Diagnostic testing.

The diagram below summarizes the procedure for the Screening Test:



Students can be tested in groups of up to 25 with a single test administrator and one monitor, or in groups of up to 50 with a single administrator and two monitors. All the Screening Test items are in a single reusable booklet, to be used with a separate consumable answer sheet. Precise directions for administering and scoring the Screening Test, as well as information on materials and equipment, will be found in Appendix A.

### Diagnostic Test and FBSEP Assignment

The purpose of the Diagnostic Test is to determine the specific FBSEP lessons to which students are to be assigned. Lesson assignments are made in Units III, IV, and V based on Screening Test performance. Additional tests are used for this purpose in Units I, II, VI, VII, VIII, and IX. Units III, IV, and V will be discussed first.

Students whose only failing (below-cutoff) scores were in Units III, IV, or V of the Screening Test are assigned to FBSEP instruction without further testing. The procedures are described in detail in the Diagnostic Test Model (Appendix A) and are summarized below.

1. Unit V. There is only one lesson in Unit V. A score below the cutoff in Unit V on the Screening Test results in assignment to this lesson.
2. Units III and IV. Lesson scores, on which FBSEP prescriptions are based, are obtained by re-scoring the appropriate Screening Test items using Diagnostic scoring keys. The student is assigned to the lessons in which he/she scored below the lesson cutoff score.

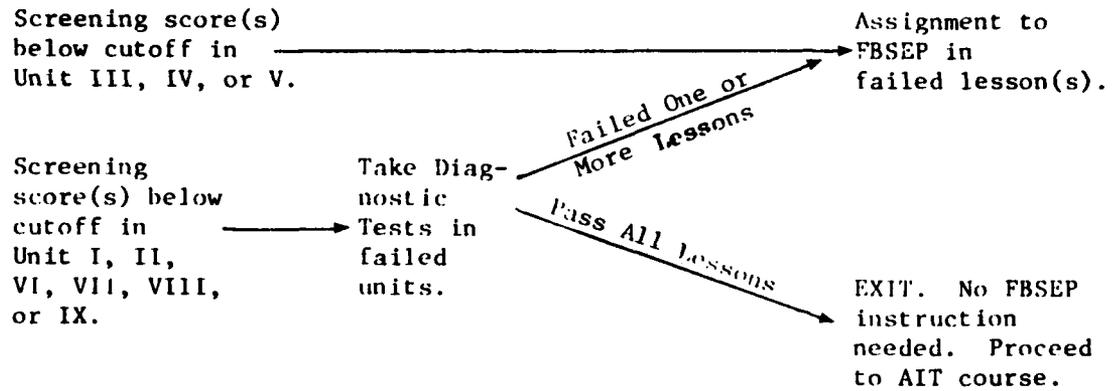
Students with Screening Test scores below cutoff in Units I, II, VI, VII, VIII, or IX must take the Diagnostic Tests for those units. For example, a student who scored below the cutoff on Units I and VIII of the Screening Test is given the Diagnostic Test for Units I and VIII only.

For each unit tested, the Diagnostic Test yields a score for each lesson in the unit. Cutoff points for individual lessons are found on the Diagnostic Test scoring sheet (Appendix A). A score below cutoff in a given lesson results in assignment to that lesson. Students are assigned to FBSEP instruction only in the lesson(s) failed on the Diagnostic Test, with two exceptions:

1. All students assigned to Unit IV are assigned to Lesson 1 in that unit. Lesson 1 is a prerequisite to both the other lessons in Unit IV.
2. All students who fail Lesson 3 and/or 4 in Unit I are assigned to Lesson 2 in Unit I, regardless of their Lesson 2 score. Lesson 2 is a prerequisite to Lessons 3 and 4.

Very rarely, a student who scored below cutoff in a given unit on the Screening Test will score at or above cutoff on all the lessons within that unit in the Diagnostic Test. Such students are not assigned to any FBSEP instruction in that unit.

The diagram below summarizes the Diagnostic Test procedure for students who have one or more scores below cutoff in the Screening Test.



Again, students can be tested in a group of up to 25 with one test administrator and one monitor. For groups up to 50, another monitor is required. The number of students taking the Diagnostic Test will be smaller than the number who took the Screening Test. The Diagnostic Tests are in six separate, reusable booklets (one each for Units I, II, VI, VII, VIII, and IX) to be used with separate consumable answer sheets. The time necessary for administering the Diagnostic Test will vary depending on how many of the units a student has to be tested on.

#### Writing FBSEP Prescriptions

As a result of the Screening and Diagnostic Tests, each student who fails one or more lesson tests is assigned to those FBSEP lessons. The FBSEP Information Sheet is used to aid in writing prescriptions. (See Appendix A for copies of the Information Sheet and the Prescription Form.)

Note that the FBSEP course is taught in two blocks:

Block 1 - Front-loaded - Units I, II, III, IV, V, VI, VII, and IX.

Block 2 - Prior to Week 5 of AIT - Unit VIII.

A student prescription is written by listing the assigned lessons, in the order given on the Information Sheet. For each lesson, the block, lesson title, and estimated time required is filled in. One copy of the prescription goes to the student's FBSEP instructor and one to the student. Each student's prescription is written immediately after completion of the Diagnostic Test Scoring. At this time the student is told when and where to report for FBSEP instruction.

## II. MANAGEMENT OF THE INSTRUCTIONAL COMPONENT

### Student Control Procedures

This section describes the student control procedures required to document and control student progression from diagnostic test phase through the FBSEP back into the 31M AIT course.

The student comes from the diagnostic test into FBSEP with a Prescription Sheet specifying which lessons the student must take. The FBSEP instructor receives the Prescription Sheet of each student and, after some introductory procedures (specified in Appendix B), gives each student their first lesson.

Given the two blocks of FBSEP instruction described in Section I, there are several possibilities for student assignment:

1. Some students will be assigned to front-loaded instruction (Block 1) only.
2. Some students will be assigned to integrated instruction (Block 2) only.
3. Some students will be assigned to a combination of instruction in Block 1 and Block 2.

We will consider movement between FBSEP and AIT first for front-loaded, then for integrated instruction.

Front-loaded FBSEP Instruction. We estimate that a student may be assigned to complete as little as 2 hours or as much as 200 hours of front-loaded instruction. Some students will be assigned to brief periods of front-loaded instruction, requiring no more than 2 full-time days (up to 14 hours of FBSEP). Such students, if identified in the week prior to AIT, can complete their front-loaded FBSEP lessons on Monday and Tuesday, then proceed to the AIT course on Wednesday, as originally scheduled. Movement of these students should be no problem. They will "belong" to FBSEP on Monday and Tuesday and move to the AIT course on Wednesday with their group. No delay in AIT entry is required.

Students requiring more than 2 days (14 hours) of front-loaded FBSEP instruction must delay their AIT course entry by one week or more, depending on the amount of FBSEP instruction needed. Assuming 35 hours available for instruction per week, the following delays in AIT entry are necessary:

<u>Number of Hours of Front-loaded FBSEP Required</u>	<u>Amount of Delay in AIT Entry</u>
14 or less	None
15-49	1 week
50-84	2 weeks
85-119	3 weeks
120-154	4 weeks
155-189	5 weeks
190-224	6 weeks

Since the amount of front-loaded instruction required by each student will be known as soon as the student's prescription has been written, specific plans for student movement between FBSEP and AIT can be made within a day after testing.

Integrated FBSEP Instruction. Unit VIII consists of four lessons with an estimated length of 1 hour each. Since all lessons are short, and since few students will require all the lessons, FBSEP instruction can take place while the student is enrolled in the fourth week of the AIT course. In no case will a student's progress through the AIT course be delayed by integrated FBSEP instruction. Students will receive FBSEP instruction during "dead time" in the AIT course, in an area set aside for this purpose at their training site (Willard).

The instructor records each student's progress through his/her prescription by filling out the FBSEP Student Record Form. (See Appendix B for a copy of the form.) On this form is recorded the unit and lesson numbers, the starting and completion time of the lesson and the checkpoint score(s).

When the student has completed all the prescribed lessons in Block 1 (front-loaded), the instructor gives the student a slip indicating that he/she has finished and can begin the AIT course. The student takes this slip to the FBSEP office and receives a pass to return to his/her company.

If the student is to take any of the Block 2 lessons (integrated into Week 4 of the 3IM course), the 3IM instructors at Willard are to be notified beforehand so the student can be released to the FBSEP instructors at the appropriate time. One day in Week 4 is set aside for Unit VIII (Block 2) instruction. The FBSEP instructors go to Willard, taking along the prescriptions and Student Record Forms of those students who are to receive Unit VIII lessons, and a supply of the lessons.

### Classroom Mangement

#### Student Loading Limits

Each student is assigned to one instructor for the duration of his/her FBSEP training. Not more than ten students should be assigned to a single instructor. The instructor is responsible for all aspects of the student's training: record keeping, distribution of lesson materials including tests (checkpoints), scoring checkpoints, tutoring, and dealing with any problems that may arise.

The student load is heaviest in the first two days of the FBSEP course. Students with few lessons complete their prescriptions and leave FBSEP.

#### Procedures

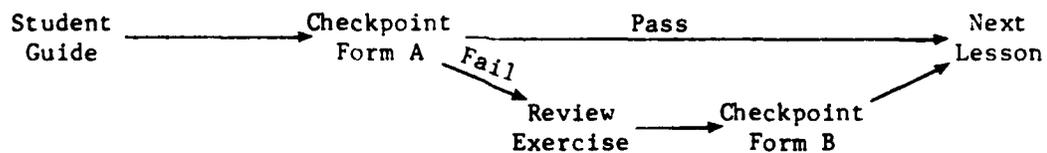
At the beginning of the first day of FBSEP for a new group of students, the instructor should explain the program, and distribute and discuss the handout, "Student Guide: Introduction to FBSEP." The instructor should also explain the FBSEP schedule (starting time, lunch time, dismissal) and classroom rules, e.g., student movement, getting a drink of water, etc. After dealing with questions, each student is given the Student Guide for his/her first lesson.

The procedure for most lessons is as follows:

1. The student proceeds through the Student Guide, doing the exercises and requesting help when needed.
2. When directed by the Student Guide to do so, the student requests a checkpoint (test), Form A.

3. The student completes the checkpoint and brings it to the instructor for scoring.
4. The instructor scores the checkpoint and provides feedback and tutoring, if needed. He/she then takes one of two actions, based on the score:
  - a. If the score is above cutoff, the student goes on to his/her next assigned lesson (and Steps 1-4 are repeated).
  - b. If the score is below cutoff, the student is given a Review Exercise for remediation, followed by Steps 5 to 9 below.
5. The student proceeds through the Review Exercise.
6. When directed by the Review Exercise to do so, the student requests a Checkpoint, Form B.
7. The student completes the checkpoint and brings it to the instructor for scoring.
8. The instructor scores the checkpoint and provides feedback and tutoring, if needed.
9. Whatever his/her checkpoint score, the student goes on to his/her next assigned lesson, and Steps 1 to 4 are repeated.

The diagram below summarizes the procedure for most lessons:



Detailed procedures for individual lessons, including exceptions to the procedure described above, are to be found in the Instructor Guide (Appendix B).

When the student has finished his/her last assigned lesson within the block, the instructor informs the BSEP I office, which provides the student with the necessary release.

### Materials, Facilities, and Equipment Requirements

Space will be needed to accommodate up to about 40 students, preferably with individual student desks. The existing BSEP facilities are appropriate. In addition, space at Willard will be needed for teaching the integrated portion of FBSEP (Unit VIII). Typically, about 20% of the number of students tested are assigned to one or more lessons in Unit VIII. These lessons are to be completed during one day set aside in the fourth week of the AIT course.

The instructors should have the following materials, facilities, and equipment:

1. Completed prescription sheets for all students assigned to the classroom; filing space in which to store them. The prescription sheets are filled out by the test administrator prior to the students' beginning instruction.
2. The Instructor Guide (See Appendix B).
3. An adequate supply of Student Guides, Review Exercises, and Checkpoints (tests) for all lessons in the FBSEP course; a place to store these materials. All these materials are consumable and will need to be replenished periodically.
4. A Student Record Form for each student assigned to the class.
5. Videotape players and TVs - one for every classroom is recommended. These should be equipped with earphones\*.
6. Cassette players - one for every classroom. These should be equipped with earphones\*.

### Dealing with Disciplinary Problems

Since instruction is individualized and functionally related to the 31M10 AIT course and MOS, disciplinary problems, such as disruptive behavior and malingering, should be minimal. Signs of lack of motivation or refusal to work can often be dealt with by a reminder that the more quickly the student completes his/her lessons successfully, the sooner will be his/her return to AIT.

Severe disciplinary problems should be dealt with by the standard procedures for BSEP I.

\*These are not needed at Willard.

### Student Achievement Records

The instructor uses two forms to track a student's progress through the course. The main form is the FBSEP Student Record Form (see Appendix B). For each lesson, the instructor records the following information on each student's Record Form (two copies, one for the instructor and one for the student):

- . Unit and lesson number.
- . Date and time of starting lesson.
- . Date and time of lesson completion.
- . All checkpoint scores.

Note that lesson completion should be checked off on the student and instructor copies of the FBSEP Prescription Sheet as well.

When the student has completed all lessons on his/her prescription, the instructor's copies of the Student Record Form and Prescription Form go into the permanent file.

### Learning and Teaching Strategies

Learning and Teaching strategies are described in detail in the Instructor Guide (Appendix B). They are outlined briefly here.

Instruction in FBSEP is individualized and self-paced. Students proceed through the lessons with little instructor intervention, and different students work on different lessons at the same time in the same classroom. The features of the lesson materials which make this possible include:

1. Explicit statement of learning objectives.
2. Self-instructional materials.
3. Frequent, built-in opportunities for student response.
4. Immediate feedback for all responses.
5. Criterion-referenced testing.

Teaching strategies involve primarily one-to-one interactions with students, usually initiated by the students. Instructors play the following roles:

1. Facilitator of the learning process, including:
  - a. Resource person
  - b. Motivator
  - c. Reinforcer
2. Tutor, including:
  - a. Diagnostician
  - b. Remediator
3. Manager, including:
  - a. Manager of material flow
  - b. Decision maker
  - c. Record keeper

#### Instructor Qualifications

Instructor qualifications fall into three categories: educational credentials, experience, and in-service training.

#### Educational Credentials

All instructors should be certified to teach at the secondary or post-secondary level. Post-baccalaureate training in adult education is highly desirable. The following kinds of courses are particularly valuable as preparation for teaching FBSEP:

- . Behavior Modification
- . Principles of Learning (reinforcement theory, etc.)
- . Instructional Design (the ISD model)
- . Adult Learning

### Experience

The following two kinds of previous experience are highly desirable:

- . Experience teaching basic skills to adults.
- . Experience with competency-based, criterion-referenced instruction.

### In-Service Training

All FBSEP instructors are expected to undergo the 5-day FBSEP Instructor Training Course. The document, Course Mangement Plan for Instructor Training gives particulars for setting up and managing the course and evaluating its outcomes. In addition, instructors should be committed to the kind of educational program in which the teacher is a facilitator/tutor/consultant to individual students, as needed, rather than a lecturer/recitation-leader/disciplinarian.

### Student Recycling

This section describes the recycling criteria and procedures applied to students who fail to demonstrate minimum level competency during tests administered upon completion of the Functional BSEP.

Competency in the Functional BSEP is measured by the checkpoint which a student takes upon completion of each lesson. If the student's score is below the specified cutoff point, the instructor provides tutoring to remediate the problem, then assigns a Review Exercise for additional practice. After completing the Review Exercise, the student takes a second checkpoint. This is scored and the student is given feedback and further tutoring, if needed. The student then goes on with his/her prescription.

There is no overall test of competency administered upon completion of the whole prescription. In cases where a student has failed the second checkpoint for most of the lessons in his/her prescription - and especially in cases where the prescription is a long one - this probably indicates that the student is deficient in decoding skills which were excluded from Functional BSEP. Such students might benefit from being cycled through BSEP I.

## Sequencing of Lessons

This section describes the sequencing of delivery for all lessons, identifies dependent lessons, and defines the interrelationships of these dependent lessons.

Before discussing the lessons, it will be helpful to describe the relationship between the Units and the 31M AIT course. With the exception of Unit VIII, all units are front-loaded. The skills they teach are needed either at the start of the 31M course or very early in the course, so these units must be taken before the student begins 31M training.

Unit VIII teaches skills that are needed in Week 5 of the 31M AIT course. Since it is desirable to present the material in Unit VIII as close as possible to the time when students will need to use the skills it teaches, Unit VIII is integrated into Week 4 of the AIT course. Students work on Unit VIII lessons during the normal dead time of their work in Week 4 of the AIT course.

Within these two time blocks (front-loaded and integrated), a great deal of flexibility is possible in the order in which students may take their lessons, since the majority of lessons are independent of one another and all units are independent of one another. That means that a student who is prescribed to take Units I, III, V, and IX, let's say, could do Unit V first, followed by Units IX, III, and I. Within a Unit, the order of the lessons is likewise free to vary, with only two exceptions:

1. Unit IV, Lesson 1 is a prerequisite to Unit IV, Lesson 2 and to Unit IV, Lesson 3. A student may be assigned IV-1 and IV-2, or IV-1 and IV-3, or all 3 lessons. In any case, the student must do Lesson 1 before the others.
2. Unit I, Lesson 2 is a prerequisite to Unit I, Lesson 3 and to Unit I, Lesson 4. (Note that Lesson 3 is not a prerequisite to Lesson 4, so a student might do Lesson 2 first, followed by Lesson 4, then Lesson 3.)

### III. COURSE UPDATING PROCESS

Since the FBSEP course is functionally related to skills taught in the 31M10 AIT course, the FBSEP course may need to be modified if changes occur in the AIT course. Three kinds of changes may occur in the AIT course: changes in sequence, changes in content, and changes in modes of course delivery. The effect of each type of change is discussed here.

#### Changes in AIT Sequence

Since most FBSEP instruction is front-loaded, most changes in AIT sequence alone have no effect on the FBSEP course. The one exception is Unit VIII, which is taught just prior to low-capacity equipment troubleshooting. If troubleshooting is moved up or back in the AIT course, Unit VIII should be moved accordingly.

#### Changes in AIT Content

Two kinds of changes in AIT content may occur: changes in equipment and consequently in the tasks taught, and changes in the references and other aids that students use to operate the equipment. Often, the two kinds of changes go together: New equipment or modifications to old equipment necessitate TM revision or substitution.

#### Changes in Equipment

Changes in equipment probably would have little effect on AIT prerequisites and hence on the FBSEP course, as long as new equipment retains the same basic attributes - controls and switches to be set, meters and other indicators to observe. One equipment modification that would affect FBSEP is conversion from analog indicators (meters) to digital indicators. Such a change would affect Unit IX only, as follows:

1. Lesson 1, Identifies Place Value, would remain important. In fact, it might even require expansion, to deal with place values other than those taught in the lesson, e.g., the thousands place or the hundredths place. Whether expansion is required would depend upon the nature of the digital readouts.
2. Lessons 2, 3, and 4, which deal with skills needed for reading meters, should be dropped from FBSEP if meters are eliminated from equipment.

If, at some time in the future, radically new ways of operating 31M equipment are developed, e.g., computer control, most FBSEP skills would still remain relevant. However, a new task analysis should be carried out to identify additional skills prerequisite to the new operations.

#### Changes in References

Changes in the references which soldiers use to do their job (TMs, Soldier's Manual, other printed matter) would probably have little effect on FBSEP. As long as the style of writing, the types and structures of tables and diagrams, and the organization of the references remain the same, all the FBSEP skills would still be relevant, without modification. However, some specific kinds of changes might affect specific units or lessons, as follows:

1. A change in the page-numbering and paragraph-numbering system in TMs and FMs would necessitate changes in Unit II, especially Lessons 1 and 3.
2. A change in the numerical system for designating tasks (task numbers) would affect Unit II, Lesson 2.
3. If the types of tables, especially the table headings in TMs, change markedly, Lessons 2 and 3 of Unit VI would require revision to conform to the new column headings. However, revisions in content of table entries would have no effect on FBSEP, as long as the structure and type of headings remain the same.
4. Marked changes in the troubleshooting charts used in the 31M MOS might affect the status of lessons in Unit VIII. Specifically, if the syntactic structure of sentences describing malfunctions (symptoms) were to change markedly, Lessons 3 and 4 might need to be revised substantially or eliminated. However, the current lessons continue to be applicable as written, so long as symptom descriptions in troubleshooting charts contain the components: equipment component, operator action, and symptom.

### Changes in Course Delivery

Currently, the 31M10 course is instructor-paced and controlled, with lectures and demonstrations as major modes of instruction. Units III and IV in FBSEP teach skills and strategies for learning from lectures and demonstrations. If the AIT course were changed to a very different format, e.g., individualized instruction using printed programmed materials combined with hands-on practice, Unit III, Lesson 1, would no longer be relevant and should be dropped. The rest of Unit III and all of Unit IV would still be relevant, provided that movies or videotapes of equipment operation were retained in the AIT course.

However, if all lectures and demonstrations, live and taped, are eliminated from the 31M10 course, both Units III and IV should be dropped from FBSEP.

If, for some reason, students are no longer expected to take notes in the AIT course, all of Unit IV should be eliminated from FBSEP.

### Summary of Course Updating

The table below lists the FBSEP units and lessons, along with the types of changes in the 31M10 AIT course which would necessitate changes or revisions in FBSEP.

<u>Unit - Lesson</u>	<u>Changes in the AIT Course Which Necessitate Changes or Elimination of Lessons</u>
I All	None. This unit teaches reading skills for reading the types of printed materials encountered in all Army materials, regardless of specific equipment and/or operations. Only major changes in the style of TMs and FMs would necessitate changes in FBSEP.
II 1,3	Changes in page-numbering and paragraph-numbering in TMs and FMs. Changes in structure of TMs (chapters and sections within chapters).
2	Changes in the task-numbering system.

<u>Unit - Lesson</u>	<u>Changes in the AIT Course Which Necessitate Changes or Elimination of Lessons</u>
III 1	Elimination of the lecture method of instruction.
2,3	Elimination of lectures and demonstrations (live or taped).
IV All	Elimination of demonstrations (live or taped). Elimination of requirement to take notes in AIT.
V 1	None. No matter what specific equipment soldiers operate, they still must be able to distinguish components and to recognize parts within a whole.
VI,VII 1	None.
VI 2,3	Marked changes in table headings.
VII 2	None. Changes in equipment, references, and course delivery are unlikely to affect the types of cabling diagrams used in the 31M MOS.
VIII 1,2	None. No matter how troubleshooting is carried out, reasoning skills for deciding whether something is wrong are prerequisite.
3,4	Changes in the structure of symptom descriptions in troubleshooting charts, such that the required reading skills change markedly.
IX All	Conversion to digital equipment. (Lesson 1 might need to be expanded, while Lessons 2, 3, and 4 would probably no longer be relevant.)

Note that any changes in FBSEP lessons must be accompanied by corresponding changes in the Screening and Diagnostic Tests. Major revisions to a lesson will require that new items be written to replace the original items for that lesson in both tests. Addition of new FBSEP lessons necessitates the development of new Screening and Diagnostic Test items. If FBSEP lessons are eliminated, the corresponding test items must be eliminated too.

The Tables of Test Specifications in the Diagnostic Test Model (Appendix A) indicates the specific test items corresponding to each unit and lesson. These tables can be used to determine which items need to be revised or discarded.

If test revisions result in changes in the number of items for a unit (Screening Test) or for a lesson (Diagnostic Test), cutoff points must be changed accordingly.

APPENDIX A

DIAGNOSTIC TEST MODEL

APPEND.  
A

DIAGNOSTIC TEST MODEL

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## DIAGNOSTIC TEST MODEL

### INTRODUCTION

A two-level test has been constructed for identifying students who lack one or more functional basic skills prerequisite to the 31M10 course and for assigning the students to the appropriate instruction (FBSEP). Prior to entering 31M10 training, all students take the Screening Test, which yields scores in each of the nine FBSEP units. Students who score above the cutoff in all units proceed directly to the 31M10 course. Students who score below the cutoff on any unit(s) are assigned the Diagnostic Tests in the unit(s). The Diagnostic Test for a given unit yields scores for each lesson within the unit. FBSEP instruction is prescribed for lessons in which students score below the cutoff in the Diagnostic Tests.

A two-level test such as this promises considerable savings in testing time. Students without deficiencies take only enough items to verify that they are competent in all units. Only students who are deficient in basic skills require further testing, and that only in units with deficiencies, not in all units. Thus, each student is exposed to the minimum number of questions necessary to make an accurate diagnosis.

The purpose of the Screening Test is to identify students who are deficient in functional basic skills and to identify, for such students, the units within which deficiencies lie.

The purpose of the Diagnostic Tests is to identify the specific FBSEP lessons in which remediation is needed and to prescribe appropriate instruction.

Thus, a student's performance on the Screening Test determines which units of FBSEP are deficient (if any) and which Diagnostic Tests are to be taken. Performance on the Diagnostic Tests determines which lessons in FBSEP are to be assigned to the student. The total test package is constructed so as to guarantee that deficiencies are detected and remediation is prescribed in the most efficient, economical way possible.

Each unit in the Screening Test, and each lesson in the Diagnostic Tests, has a cutoff point. All decisions are based on the student's score relative to the cutoff point for the unit or lesson. Figure 1 depicts the decision flow for each unit.

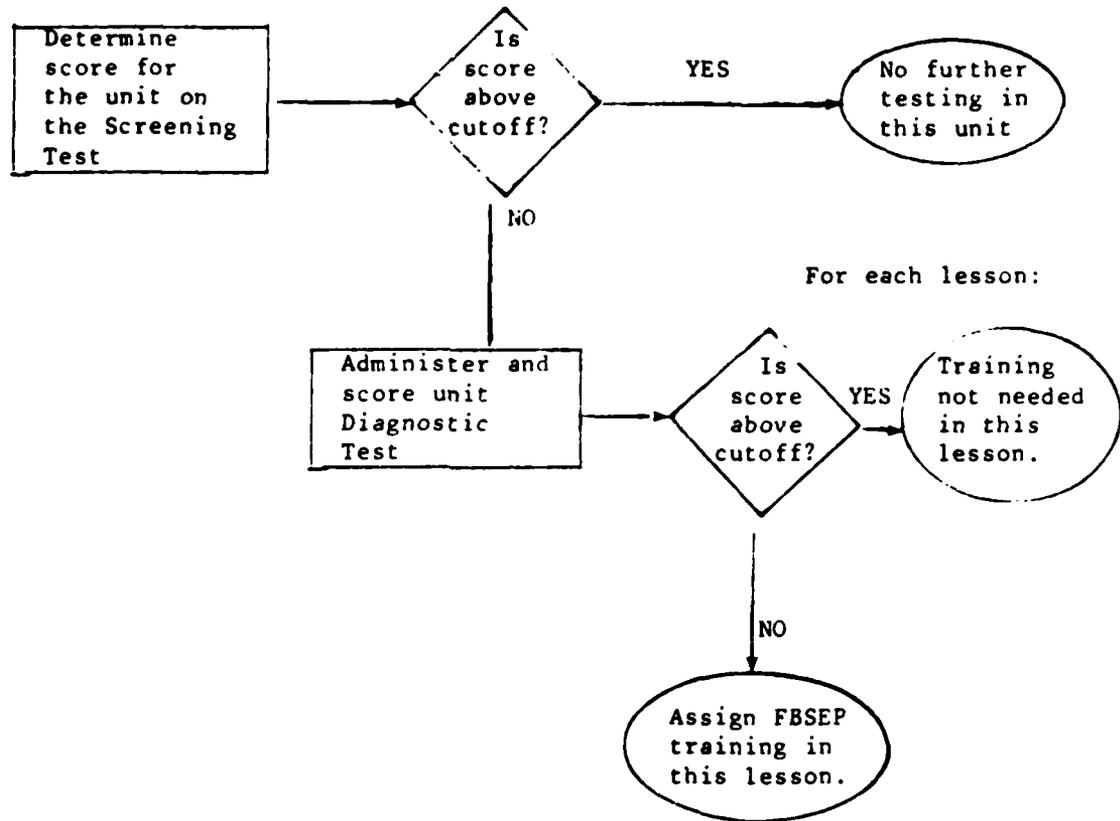


Figure 1. Use of Test Data for Lesson Assignment

A prescription is written for each student who scores below cutoff in one or more lessons. The prescription lists the assigned lessons in the order in which they are to be completed. It also shows the placement of the lessons relative to the AIT course, as well as the estimated time required for each one.

This Diagnostic Test Model (DTM) is designed to guide the test user in the administration and scoring of the tests, as well as the interpretation of the results. It is our belief that appropriate test usage rests on two kinds of information.

1. Technical information, e.g., information regarding test construction, reliability and validity, which provides the basis for understanding how the test works and for the interpretations and uses of test scores.

2. Explicit step-by-step instructions for use of the test, that is, for administration, scoring, and recording test performance, for writing FBSEP prescriptions, and for making predictions of AIT and FBSEP performance.

Consequently, this document is divided into four parts which serve different purposes and, sometimes, different users. Part I, Test Construction, describes the process of test development and includes tables of test specifications for all components of the tests. Part II, Technical Analyses, provides data on test reliability and validity, as well as relationships between test scores and FBSEP course performance. Part III, Administration and Scoring, includes explicit instructions for test use, from administration of the Screening Test through writing FBSEP prescriptions. Finally, Part IV, Predictive Functions of the DTM, provides decision tables and prediction tables for test score interpretation.

Thus, Parts I and II present primarily theoretical and background information which supports the test uses and interpretations described in Parts III and IV. Parts III and IV are more user-oriented. In fact, test administrators can probably skip Parts I and II entirely, if desired. However, readers who wish to understand the bases for the procedures described in Parts III and IV can find the answers in Parts I and II.

The primary consumer of the DTM is, of course, the test user. However, should changes in the FBSEP course become necessary in the future, e.g., additions to, or revisions of, the basic skills taught, the Screening and Diagnostic tests must be revised to measure the new or changed skills. Course designers will find Part I, Test Construction, especially the tables of test specifications, essential to test revision. Procedures for test revision, based on FBSEP course changes, are described more fully in the Course Management Plan.

## PART I. TEST CONSTRUCTION

### Item Development and Tryout

#### Item Construction

Analysis of the skills learned in the 31M10 course yielded a set of prerequisite competencies. (See the Functional BSEP Analysis Report, September 1981). Initially, six items were constructed to measure each of 74 skills.\*

The requirement for rapid scoring of numerous test papers necessitated the use of objective items. Multiple-choice format was chosen over other item formats (e.g., true-false, matching) because it is adaptable to measuring various types of skills at varying levels of complexity. The item writers were subject-matter experts in the competencies to be measured as well as being experienced in writing multiple-choice items.

They used the following guidelines:

1. The behavior required to answer the question must be the behavior described in the competency statement.
2. Each item must measure one, and only one competency. For example, an item measuring writing skill must not require a high degree of reading skill.
3. Insofar as possible, the content of the items was taken directly from 31M materials. If the use of actual 31M materials was not possible, as when they require technical knowledge taught in the 31M10 AIT course, materials as similar as possible in terms of content and structure were constructed.
4. To ensure items of high technical quality, all item writers adhered to the following sets of rules for writing multiple-choice items: Ebel (1965), Nunnally (1972), and Thorndike and Hagen (1977).

\* Additional, self-report items were constructed to measure the use of eleven strategies. None of these items were retained in the Screening and Diagnostic Tests.

To check adherence to the guidelines, each item was circulated among all the item writers, as well as other members of the project, for critique and, if necessary, revision. Judges also examined each item for possible problems in wording or structure, e.g., ambiguity, awkward sentences, possible bias. As an additional check before initial tryout at Fort Gordon, the items were administered under test-like conditions to 14 high school students having academic difficulties. Each student was interviewed following the test to identify items that were difficult to understand, ambiguous, or measuring skills other than those they were designed to measure. All such items were revised or discarded.

#### Initial Tryout

Because of the large number of items (510), the set was divided into two subsets (Form A/B and Form C/D), to be administered separately. Form A/B was administered to 95 and Form C/D to 68 students beginning the 31M10 course. The following indexes were computed for each item:

1. Index of item difficulty ( $P$ ) - the percentage of the examinees who answered the item correctly.
2. Index of item discrimination ( $\gamma_{pbi}$ ) - the correlation between the item score and the score on all six items measuring the same competency.

Items were retained as is, revised, or discarded on the basis of the following criteria:

1. Certain competencies were eliminated during verification of the competency analysis. All items measuring these competencies were discarded.
2. Items whose difficulty level was discrepant from the difficulty level of other items measuring the same competency were revised or discarded.
3. Items with low or negative correlations with other items measuring the same competency were revised or discarded.
4. Even if  $P$  and  $\gamma_{pbi}$  were satisfactory, distractors (incorrect alternatives) were revised under the following conditions:
  - a. The distractor was seldom or never chosen. In such cases, a more plausible distractor was constructed.
  - b. The distractor was chosen disproportionately often. In such cases, the distractor was reworded to make it somewhat less plausible.

Though many items required some degree of revision, usually slight, few items were actually discarded and replaced, and then only if careful examination resulted in the decision that the item was not sufficiently congruent with the competency. All items (both those retained and those rewritten or revised) were subjected to careful scrutiny by two judges before being deemed adequate.

### Construction of Screening and Diagnostic Tests

Next, the retained, revised, and new items had to be grouped into two levels - the Screening Test and the Diagnostic Tests. In order to accommodate to the nature of the units and at the same time fulfill the purposes of the tests, the following plan was used in constructing the Screening and Diagnostic Tests.

The Screening Test yields a score in each of the nine FBSEP units. In each unit, the test includes at least two items from each constituent lesson. For example, Unit VIII, "Diagnosing Equipment Malfunctions, includes four lessons. The Unit VIII component of the Screening Test includes eight items, two from each of the four lessons.

In the Diagnostic Tests, there are short tests for each lesson in the unit (usually 4-8 items), and each Unit Diagnostic Test yields a score for each lesson in the unit. For example, the Unit VIII Diagnostic Test includes sixteen items, four from each lesson, and each set of four yields a score for that lesson.

For most units, items were randomly assigned to the Screening and Diagnostic Tests, subject to the restriction that, for each lesson, the average difficulty of the items in the Screening Test be approximately equal to the average difficulty of the items in the Diagnostic Test.

The following units are exceptions:

1. Unit III, "Listening Skills," and Unit IV, "Note-Taking for Demonstration," each with three constituent lessons. The items in these units are based on a prior lecture or demonstration, which requires group administration. Group administration is not possible in the Diagnostic Test, which is individualized. Therefore, the following procedure was used. A total of 12 items were selected to measure each unit. All items are administered during the Screening Test, following a group-administered lecture and demonstration. The Screening score for each of these two units is based on all twelve items. If a student scores below the cutoff, the unit is rescored to yield a score in each constituent lesson.

Thus, although there is only one level of administration, there are two levels of scoring, the first yielding unit scores and the second yielding lesson scores, as for all other units.

2. Unit V, "Recognizing a Part of a Whole." This unit contains only one lesson. Since assignment of a student to the unit is equivalent to assignment to the lesson, all six items were placed in the Screening Test. Students scoring below the cutoff on this unit are assigned to the lesson; no Diagnostic testing is required.

Notice that all Screening Test scores are based on at least six items, and in most cases eight or more. This reduces the probability of incorrect identification of students as needing (or not needing) FBSEP, and ensures that all (and only) students who truly lack basic skills will be assigned to Diagnostic testing and, subsequently, to FBSEP. In the Diagnostic Tests, each lesson score is based on at least four items, a number sufficient for reasonably reliable placement in FBSEP lessons.

Tables I-1 and I-2 give the test specifications for the Screening and Diagnostic Tests. The tables show the units, their constituent lessons, and the specific items corresponding to each lesson in the Screening and Diagnostic Tests.

Table I-1  
Screening Test - Table of Test Specifications

<u>Unit</u>	<u>Lesson (Competency)</u>	<u>Number of Items</u>	<u>Item Numbers</u>
I  Reading Comprehension	1. Vocabulary	2	43-44
	2. Strategies for Reading Sentences	2	41-42
	3. Reading Negative Sentences	2	39-40
	4. Reading Sentences with Dependent Clauses	2	37-38
	5. Ordering One, Two, or Three Tasks	4	33-36
	6. Determining the Order of Tasks: Multiple Actions	2	31-32
	7. Understanding Lists and Paragraphs	2	29-30
Total, Unit I		16	29-44
II  Using a Table of Contents	1. Chapters and Sections	2	51-52
	2. Using a Task List to Find a Task Description	4	53-56
	3. Tables with Paragraph Numbers and Page Numbers	4	57-60
Total, Unit II		10	51-60
III  Listening Skills	1. Remembering Information Heard in Lectures	4	1-4*
	2. Remembering Information Seen in Demonstrations	4	5-8*
	3. Recognizing When Important Information is Missing	4	9-12*
Total, Unit III		12	1-12

Table I-1 (continued)

<u>Unit</u>	<u>Lesson (Competency)</u>	<u>Number of Items</u>	<u>Item Numbers</u>
IV Note-Taking for Demonstration	1. Basic Note-Taking Skills	12	73-84*
	2. Taking Notes to Show Sequence	4	81-84*
	3. Taking Notes to Show Relationships	8	73-80*
	Total, Unit IV	12	73-84
V Recognizing a Part of a Whole	1. Recognizing a Part of A Whole	6	45-50**
VI Locating Information in Tables	1. The Structure of Tables and Diagrams	2	67-68** *
	2. Interpreting Column Headings	2	63-64
	3. Locating Information in 31M Tables	4	61-62, 65-66
	Total, Unit VI	8	61-68 *
VII Reading Cabling Diagrams	1. The Structure of Tables and Diagrams	2	67-68**
	2. Identifying Connections in Simple and Complex Cabling Diagrams	4	69-72
	Total, Unit VII	6	67-72

Table I-1 (continued)

<u>Unit</u>	<u>Lesson (Competency)</u>	<u>Number of Items</u>	<u>Item Numbers</u>
VIII Diagnosing Equipment Malfunctions	1. Deciding Whether an Indication is Normal	2	17-18
	2. Deciding Whether There is Something Wrong Based on Two or More Indicators	2	19-20
	3. Finding Descriptions of Symptoms: One Indicator	2	13-14
	4. Finding Descriptions of Symptoms When There are Two or More Indicators	2	15-16
	Total, Unit VIII	8	13-20
IX Scale Reading	1. Labeling Place Value	2	27-28
	2. Numbering Scale Points	2	23-24
	3. Scales Divided into Tenths	2	25-26
	4. Comparing Scale Settings	2	21-22
	Total, Unit IX	8	21-28

\* Units III and IV have no separate Diagnostic Tests. If the unit score in the Screening Test is below cutoff, lesson scores are used for diagnosis and prescription.

\*\* Since Unit V contains only one lesson, the unit score on the Screening Test is used for both screening and diagnosis/prescription. There is no separate Diagnostic Test for Unit V.

\*\*\* The lesson, "The Structure of Tables and Diagrams," is the first lesson of both Unit VI and Unit VII. Therefore, it and its two items are listed twice in this table. In scoring the Screening Test, these two items are included in both the Unit VI and Unit VII scores.

Table I-2

Diagnostic Tests - Table of Test Specifications

A. Unit I. Reading Comprehension

<u>Lesson</u>	<u>Title</u>	<u>Number of Items</u>	<u>Item Numbers</u>
1	Vocabulary	4	1-4
2	Strategies for Reading Sentences	4	25-28
3	Reading Negative Sentences	4	17-20
4	Reading Sentences with Dependent Clauses	4	9-12
5	Ordering One, Two, or Three Tasks	8	13-16,21-24
6	Determining the Order of Tasks: Multiple Actions	4	29-32
7	Understanding Lists and Paragraphs	4	5-8
Total, Unit I		32	

B. Unit II. Using a Table of Contents

<u>Lesson</u>	<u>Title</u>	<u>Number of Items</u>	<u>Item Numbers</u>
1	Chapters and Sections	4	1-4
2	Using a Task List to Find a Task Description	8	5-12
3	Tables with Paragraph Numbers and Page Numbers	8	13-20
Total, Unit II		20	

Table I-2 (continued)

C. Unit VI. Locating Information in Tables

<u>Lesson</u>	<u>Title</u>	<u>Number of Items</u>	<u>Item Numbers</u>
1	The Structure of Tables and Diagrams	4	13-16
2	Interpreting Column Headings	4	1,3,4,8
3	Locating Information in 31M Tables	8	2,5,6,7,9-12
Total, Unit VI			

D. Unit VII. Reading Cabling Diagrams

<u>Lesson</u>	<u>Title</u>	<u>Number of Items</u>	<u>Item Numbers</u>
1	The Structure of Tables and Diagrams	4	9-12
2	Identifying Connections in Simple and Complex Cabling Diagrams	8	1-8
Total, Unit VII		12	

E. UNIT VIII. Diagnosing Equipment Malfunctions

<u>Lesson</u>	<u>Title</u>	<u>Number of Items</u>	<u>Item Numbers</u>
1	Deciding Whether an Indication is Normal	4	1,3,5,6
2	Deciding Whether There is Something Wrong Based on Two or More Indicators	4	2,4,13,14
3	Finding Descriptions of Symptoms: One Indicator	4	9,11,15,16
4	Finding Descriptions of Symptoms When There are Two or More Indicators	4	7,8,10,12
Total, Unit VIII		16	

Table I-2 (continued)

F. Unit IX. Scale Reading

<u>Lesson</u>	<u>Title</u>	<u>Number of Items</u>	<u>Item Numbers</u>
1	Labeling Place Value	4	1,5,9,15
2	Numbering Scale Points	4	2,4,7,10
3	Scales Divided into Tenths	4	3,8,14,16
4	Comparing Scale Settings	4	6,11,12,13
Total, Unit IX		16	

### Determination of Cutoff Points

The tests were administered to 155 students beginning the 31M10 course in order to determine cutoff points and assess reliability and validity. Each student took all the tests - the Screening Test and all Diagnostic Tests. Since none of these students were assigned to FBSEP, even if needed, we called this group the Control Group.

A cutoff point of 75% correct had originally been proposed for all units (Screening Test) and lessons (Diagnostic Tests). Table I-3 gives the mean, standard deviation, 75% correct point, and percent of Control Group students below 75% correct on each unit of the Screening Test. The majority of students scored above 75% on most units. Since the majority of students do not experience great difficulty in the 31M10 course, and therefore probably do not require FBSEP training, the results seemed reasonable, and the 75% cutoff points for Units I, II, III, V, VI, VII, and IX were retained. However, Units IV and VIII, in which over half the students scored below 75%, were examined more closely.

In Unit IV, two-thirds of the students scored below 75%. The use of 75% as a cutoff appears unreasonably high for the following reasons:

1. Note-taking is a skill required throughout the 31M10 course. If students scoring below 75% on the Screening Test lack adequate note-taking skills, then about two-thirds of 31M10 students should experience considerable difficulty throughout the AIT course. Yet the proportion of such students is well below two-thirds.
2. Note-taking is probably more difficult during the Screening Test than in the 31M classroom for several reasons. For example, the lecturer/narrator on videotape cannot pace his presentation in response to student cues such as signs of bewilderment; students cannot ask to have a point repeated or clarified, as they can in the classroom.

As a result, the Unit IV cutoff point was changed to 7 (58%). Twenty-eight percent of the students scored below this cutoff point.

In Unit VIII, the cutoff point of 75% correct was retained, despite the high percentage of students scoring below 75%, because troubleshooting (the skill to which Unit VIII is prerequisite) presents some degree of difficulty to most 31M10 students.

On the Diagnostic Tests, the 75% cutoff points were retained for all lessons.

Table I-4 gives the cutoff points to be used on all units of the Screening Test and all lessons of the Diagnostic Tests.

Table I-3  
Means, Standard Deviations, and 75% Correct Scores  
for Screening Test

Unit	Number of Items	75% Correct Point	Mean	SD	Percent of Students below 75% Correct
I	16	12	13.12	2.56	20.5
II	10	7	8.96	1.52	6.4
III	12	9	9.60	2.05	26.9
IV	12	9	7.66	2.23	66.7
V	6	4	5.50	1.04	5.1
VI	8	6	6.65	1.62	19.2
VII	6	4	5.12	1.20	10.3
VIII	8	6	5.27	1.71	55.6
IX	8	6	6.44	1.44	24.4

Table 1-4

## Cutoff Points on Screening and Diagnostic Tests

<u>Screening Test</u>			<u>Diagnostic Tests</u>		
<u>Unit</u>	<u>Number of Items</u>	<u>Cutoff Point</u>	<u>Lesson</u>	<u>Number of Items</u>	<u>Cutoff Point</u>
I	16	12	1	4	3
			2	4	3
			3	4	3
			4	4	3
			5	8	6
			6	4	3
			7	4	3
II	10	7	1	4	3
			2	8	6
			3	8	6
III	12	9	1	4	3
			2	4	3
			3	4	3
IV	12	7	1	12	7
			2	4	3
			3	8	6
V	6	4	1	6	4
VI	8	6	1	4	3
			2	4	3
			3	8	6
VII	6	4	1	4	3
			2	8	6
VIII	8	6	1	4	3
			2	4	3
			3	4	3
			4	4	3
IX	8	6	1	4	3
			2	4	3
			3	4	3
			4	4	3

## PART II. TECHNICAL ANALYSES

### Reliability

The Control Group was retested one week later for purposes of determining retest reliability. The conditions for retesting were the same as for testing, except that the sections of the Screening Test corresponding to Unit III, Lessons 1 and 2, and all of Unit IV were omitted. Most of Unit III and all Unit IV items are based on an audiotape and videotape presented during the testing session. Readministration of the tapes would probably have increased the students' ability to answer the questions over the original test session. Since use of the test-retest procedure to measure reliability assumes no change in examinee ability, this procedure was clearly inappropriate. For these units, split-half reliability was determined instead.

The following indexes of reliability were computed:

1. Screening Test
  - a. Units I, II, V, VI, VII, VIII, IX
    - (1) Retest reliability coefficient for each unit.
    - (2) Standard error of measurement (SEM) for each unit, based on retest reliability.
    - (3) Percentage of students who scored consistently above or below cutoff on test and retest for each unit.
  - b. Units III and IV
    - (1) Split-half (odd-even) reliability coefficient for each unit.
    - (2) SEM for each unit, based on split-half reliability.
2. Diagnostic Tests - Units I, II, VI, VII, VIII, IX, and Lesson 3 in Unit III.

With only 4 items in most lessons, computation of lesson reliability coefficients and SEMs was inappropriate. The major reliability question is: Are students consistently assigned (or not assigned) to lessons? To answer this question, the percentage of students who scored consistently above or below cutoff was computed for each lesson. Only students who had scored below cutoff in the corresponding unit on the first administration of the Screening Test were used in computing these indexes, since, in actual practice, only those students would take the Diagnostic Test.

All indexes of reliability are reported in Table II-1. Reliability coefficients tend to be low, due to both the small number of items per unit and restricted range of scores. (Most distributions of unit

Table II-1

Reliability of Screening Test Unit Scores  
and Diagnostic Test Lesson Scores

Unit	Number of Items	Reliability Coefficient*	SEM	Percentage of Consistent Classifications	Lesson	Percentage Consistent Classifications
I	16	.436	1.92	75	1	82
					2	75
					3	86
					4	75
					5	64
					6	57
					7	68
II	10	.193	1.37	83	1	62
					2	87
					3	87
III	12	.676	1.17		3	50
IV	12	.583	1.44			
V	6	.314	0.86	92**		
VI	8	.316	1.34	77	1	68
					2	64
					3	84
VII	6	.267	1.03	84	1	69
					2	54
VIII	8	.313	1.42	54	1	84
					2	77
					3	73
					4	75
IX	8	.417	1.01	76	1	70
					2	64
					3	70
					4	72

\* Retest reliability for Units I, II, V, VI, VII, VIII, IX; split-half reliability for Units III and IV.

\*\* Since Unit V contains only one lesson, the consistency of unit assignment is also the consistency of lesson assignment.

scores showed a marked negative skew, with the majority of students scoring near the ceiling. This is to be expected in minimum competency tests.)

The percentage of consistent classifications, the most meaningful reliability estimate for tests in which cutoff points determine placement decisions, ranges from 52% to 92% for unit scores and from 54% to 87% for lesson scores. Thus, well over half of the students were consistently judged as either needing or not needing FBSEP in most units, and well over half of those needing FBSEP were consistently assigned to lessons.

### Validity

Two kinds of validity are relevant to competency tests such as the FBSEP tests: content validity and criterion-related validity. Content validity is necessary to ensure that the tests are measuring the 31M10 prerequisites identified by the course analysis. Criterion-related validity is important because the Screening Test is intended to identify students who are likely to experience difficulty in the AIT course. Therefore, evidence is needed that test performance is predictive of AIT performance.

Content validity was built into the Screening and Diagnostic Tests through the test construction process, described in Part I. The content of the tests is best described by Tables I-1 and I-2, the Tables of Test Specifications. The remainder of this section deals with criterion-related validity.

### Criterion Measures

Measures of AIT course performance were obtained for the 155 Control Group students after they had completed the course. During the AIT course, two types of formal evaluation occur:

1. Performance tests of the skills learned during the week are given in Weeks 1, 2, 5, 6, and 10 of the 11-week AIT course. The tests are worth 100 points each, with 70 the minimum passing score. Students who score below 70 are remediated and retested.
2. An end-of-course (EOC) test is given in Week 11. It has 8 parts, each scored GO or NO GO. Students who score NO GO on any part are remediated and retested.

During verification of the competency analysis, two criterion measures were developed based on the weekly performance tests and EOC test. The same two measures were used for test validation. They are:

1. TESTSUM - The sum of scores on the five weekly performance tests. This is a continuous variable which can be used in computations of correlation coefficients and regression equations.
2. Membership in one of four criterion categories:
  - a. I - Highly successful students - those who score above 70 on all performance tests and receive GO on all parts of the EOC Test without remediation.
  - b. II - Moderately successful students - those who either score below 70 on one or more performance tests or receive one or more NO GOs on the EOC Test, but not both. Such students require some remediation to complete the course successfully.
  - c. III - Marginally successful students - those who score below 70 on one or more performance tests and also receive one or more NO GOs on the EOC test. Such students require considerable remediation to complete the course successfully.

A fourth category, academic failures, had originally been planned. This would include students who score below 70 on three performance tests and are reclassified or discharged for academic reasons. However, no students fell in this group, either during verification or in the Control Group. Therefore, this category was dropped.

Note that the two criteria are not independent in that performance test scores contribute to both TESTSUM and criterion group membership. Criterion group membership, which includes EOC Test performance as well as performance tests, is more comprehensive. However, it is a category variable and does not lend itself as well to correlational analysis.

#### Relationship of Test Scores to TESTSUM

142 of the Control Group students completed all five performance tests. Their TESTSUM ranged from 342 to 500, with a mean of 452.42 and a standard deviation of 34.54.

Table II-2 shows the incorrelations among unit scores on the Screening Test and the correlation of each unit with TESTSUM. The following units were positively and significantly related to TESTSUM, from highest to lowest:

Unit IV.	Note-Taking
Unit III.	Listening Skills
Unit I.	Reading Comprehension
Unit IX.	Scale Reading
Unit VI.	Locating Information in Tables
Unit VIII.	Diagnosing Equipment Malfunctions

The multiple correlation (R) of the Screening Test unit scores with TESTSUM was 0.466. Regarded as a predictive validity coefficient, this compares favorably with validity coefficients of published tests for predicting job performance.

Table II-3 gives beta weights (B), t-values for indicating the significance of each B, and  $b_{yx}$ , the regression coefficients in the regression equation for all units of the Screening Test. Only Units III and IV make significant independent contributions to the prediction of TESTSUM.

The regression constant ( $a_{yx}$ ) is 372.555. Therefore, the regression equation for predicting TESTSUM (T) from Screening Test unit scores ( $X_I, X_{II}, \dots, X_{IX}$ ) is:

$$\begin{aligned} \text{Predicted } T = & 1.73X_I - 4.09X_{II} + 3.93X_{III} + 3.54X_{IV} \\ & + 0.97X_V + 2.25X_{VI} - 1.00X_{VII} \\ & + 0.50X_{VIII} + 1.67X_{IX} + 372.55 \end{aligned}$$

The standard error of estimate is 31.58.

Another indication of the relationship between test performance and TESTSUM was computed as follows: On the basis of Screening and Diagnostic Tests scores, each 31M10 student is assigned to between zero and 29 FBSEP lessons. Though lesson assignment was not actually carried out for the Control Group, the number of lessons needed, based on test scores, was determined for each student. Mean TESTSUM was computed as a function of number of FBSEP lessons needed. The results are shown in Table II-4 and Figure II-1. The relationship is quite clear. Students who needed 0 to 2 FBSEP lessons achieved an average TESTSUM above the mean TESTSUM for all students, while students who needed 3 or more lessons achieved an average TESTSUM below the total mean.

In sum, Screening and Diagnostic Test scores show significant, positive correlations with AIT performance as measured by TESTSUM, the sum of AIT performance test scores.

Table 11-2

Table of Intercorrelations among Unit Scores on Screening Test and TESTSUM

Unit	I	II	III	IV	V	VI	VII	VIII	IX	TESTSUM
I Reading Comprehension		.40	.41	.30	.39	.37	.34	.37	.39	.29**
II Using a Table of Contents			.35	.14	.53	.37	.38	.16	.23	.06
III Listening Skills				.29	.10	.24	.29	.27	.35	.33**
IV Note-Taking for Demonstration					.15	.34	.30	.17	.29	.35**
V Recognizing a Part of a Whole						.37	.34	.18	.18	.09
VI Locating Information in Tables							.67	.21	.27	.23*
VII Reading Cabling Diagrams								.27	.26	.18
VIII Diagnosing Equipment Malfunctions									.43	.19*
IX Scale Reading										.26**

\* p < .05

\*\* p < .01

Table II-3

Beta Weights (B), and Regression Coefficients ( $b_{yx}$ ) for  
Predicting TESTSUM from Screening Test Unit Scores

	Unit	B	$b_{yx}$	t
I	Reading Comprehension	.12	1.73	1.27
II	Using a Table of Contents	-.16	-4.09	-1.57
III	Listening Skills	.22	3.93	2.42*
IV	Note-Taking for Demonstration	.21	3.54	2.49*
V	Recognizing a Part of a Whole	.03	0.97	0.30
VI	Locating Information in Tables	.10	2.25	0.90
VII	Reading Cabling Diagrams	-.03	-1.00	-0.31
VIII	Diagnosing Equipment Malfunctions	.03	0.50	0.28
IX	Scale Reading	.07	1.67	0.77

\*  $p < .05$

Table II-4

Relation between Number of FBSEP Lessons Needed and TESTSUM

Number of FBSEP Lessons Needed

	0	1	2	3	4	5	6	7	8 or More	Total
N	55	7	22	21	8	6	5	10	8	142
TESTSUM Mean	465.96	467.29	457.41	446.29	431.38	426.00	417.80	435.10	433.38	452.42
TESTSUM SD	31.07	29.18	25.53	35.97	37.12	17.31	34.58	45.73	34.19	34.54

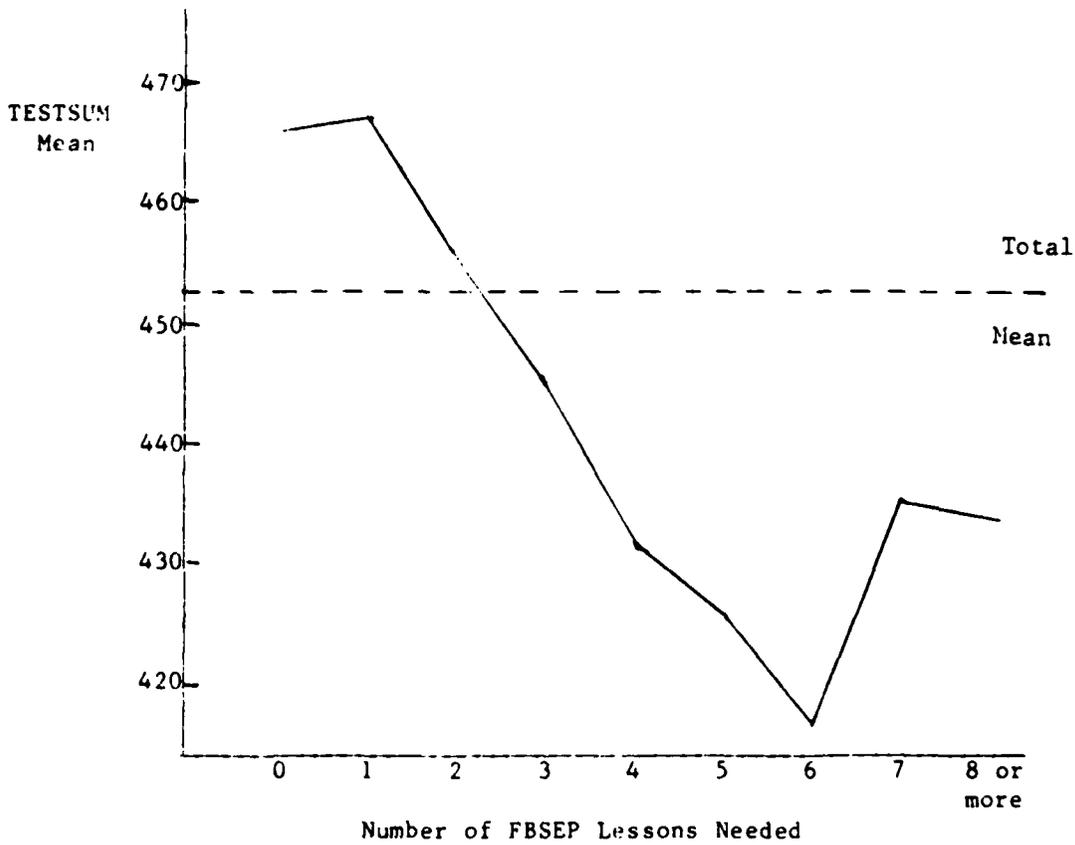


Figure II-1. Relation between Number of FBSEP Lessons Needed and TESTSUM

### Relationship of Test Scores to Criterion Categories

Complete course performance data (performance and EOC tests) were available on 137 of the Control Group students. Of these, 55 fell in Category I, 68 in Category II, and 14 in Category III.

An additional eleven students had left the course before completion for various reasons (e.g., TDP, reclassification), some of which may have been related to academic difficulties. We called this group Category IV.

Table II-5 shows the number of students in each criterion category as a function of the Screening Test score (above vs. below cutoff) in each unit. Chi squares were computed to determine whether the relationship between test scores and category membership was significant.\* The relationship was significant in Units I, III, IV, VI, and IX, but not in Unit VIII. This means that students who score above cutoff in Units I, III, IV, VI, or IX of the Screening Test are more likely to be highly successful in the 31M10 AIT course than students who score below cutoff.

Table II-5 is based on each unit score considered individually. What is the relationship between overall performance on the Screening Test and course performance? Overall Screening Test performance can be measured in terms of the number of units above cutoff on the Screening Test. Of the 148 students, 28 scored above cutoff on all nine units, 96 on six to nine units, and 24 on five units or less. Table II-6 shows the relationship between number of units above cutoff and criterion category membership. The Chi Square of 20.78 (df = 6) is significant at the .005 level. Thus, the higher the overall Screening Test performance, the greater the likelihood of a high level of success in the 31M10 course.

Students are assigned to needed lessons in FBSEP based on their Diagnostic Test scores. With few exceptions, the number of students who needed each individual lesson was too small to compute a measure of relationship to criterion category membership. However, it was possible to determine, for each student in the Control Group, the total number of lessons needed. This ranged from zero to 26. Eighty-five students needed no more than two lessons, 36, between three and five lessons, and 27, six or more. Table II-7 shows the number of students in each criterion category as a function of number of lessons needed. The relationship was highly significant ( $X^2 = 25.60$ ,  $df = 6$ ,  $p. < .001$ ). Thus, students who need (but do not get) many FBSEP lessons tend to be less successful in the AIT course than students who need few lessons.

\*  $X^2$  could not be computed for Units II, V, and VII because of low expected frequencies (less than 2.0) in several cells.

Table II-5

Relationship between Score on Each Unit of the Screening Test  
and Criterion Category Membership

Unit	Score on Screening Test	Frequency in Each Criterion Category				X <sup>2</sup>
		I	II	III	IV	
I	Above cutoff	45	56	12	5	8.92*
	Below cutoff	10	12	2	6	
II	Above cutoff	53	66	13	7	Not computed†
	Below cutoff	2	2	1	4	
III	Above cutoff	49	44	9	6	11.72**
	Below cutoff	6	24	5	5	
IV	Above cutoff	49	47	7	3	22.33**
	Below cutoff	6	21	7	8	
V	Above cutoff	54	64	13	10	Not computed†
	Below cutoff	1	5	1	1	
VI	Above cutoff	45	58	9	6	7.83*
	Below cutoff	10	10	5	5	
VII	Above cutoff	50	60	13	9	Not computed†
	Below cutoff	5	8	1	2	
VIII	Above cutoff	28	30	8	2	4.76
	Below cutoff	27	38	6	9	
IX	Above cutoff	48	49	6	6	9.57*
	Below cutoff	7	19	5	5	

\* p &lt; .05

\*\* p &lt; .01

† Low expected frequencies (less than 2) preclude computation of X<sup>2</sup>.

Table II-6

Criterion Category Membership as a Function  
of Number of Screening Test Units above Cutoff

Number of Units above Cutoff	Criterion Category				Total
	I	II	III	IV	
All	16	10	1	1	28
6 to 8	35	48	9	4	96
0 to 5	4	10	4	6	24
Total	55	68	14	11	148

Table II-7

Criterion Category Membership as a Function  
of Number of FBSEP Lessons Needed

Number of FBSEP Lessons Needed*	Criterion Category				Total
	I	II	III	IV	
0 to 2	42	36	4	3	85
3 to 5	6	22	6	2	36
6 or more	7	10	4	6	27
Total	55	68	14	11	148

\* Based on Screening and Diagnostic Test Scores.

In sum, all measures of Screening and Diagnostic Test performance were significantly related to performance in the AIT course, whether measured in terms of TESTSUM or criterion category membership. Thus, test scores have considerable validity for predicting success in the 31M10 course.

#### Relationship of Test Scores to Performance in FBSEP

After FBSEP lesson development had been completed, 235 students entering the 31M10 AIT course were tested and assigned to needed lessons, based on their test scores. This group was called the Experimental Group. One hundred-five of the 235 students were assigned to one or more FBSEP lessons. After they had completed their assigned lessons, it was possible to examine the relationship between their performance in FBSEP and their test scores.

The following measures of FBSEP performance were obtained:

1. Performance on the tests embedded within the lessons themselves (checkpoints). A score of 80% correct was generally required to pass a checkpoint. A student passed a lesson if he attained 80% correct on all lesson checkpoints, either without a Review Exercise (Form A) or after a Review Exercise (Form B).
2. Performance on retention tests (post-tests) administered one to two weeks after lesson completion. Again, a score of 80% correct was required to pass.

All lesson checkpoint scores for all assigned lessons were available for 81 of the 105 students assigned to FBSEP.\* Of these, 31 were assigned to 1 or 2 lessons, 26 to 3 to 5 lessons, and 24 to six or more lessons. Post-test scores were available for 76 of the 81. Table II-8 shows the number and percent of students passing each lesson and each post-test as a function of number of lessons assigned. In both cases, percent passing decreases as number of lessons increases. Since number of lessons assigned depends on Screening and Diagnostic Test performance, Table II-8 shows that students who did better on the tests (required few lessons) were more likely to pass the lessons and post-tests than students who did worse on the tests (required many lessons).

\* The remaining 24 students either did not complete all assigned lessons, or one or more of their checkpoint scores were missing.

Table II-8

FBSEP Performance as a Function of Number of Lessons Assigned

Number of Lessons Assigned*	Lesson Performance		Post-test Performance	
	Number of Students	Number (Percent) Passing All Lessons	Number of Students	Number (Percent) Passing All Post-tests
1-2	31	30 (97)	31	23 (74)
3-5	26	19 (73)	24	7 (29)
6 or more	24	11 (46)	21	1 (5)
Total	81		76	

\* Based on Screening and Diagnostic Test scores.

Lesson completion time was also examined in relation to lesson assignment. All FBSEP lessons are self-paced. Therefore, different students require different amounts of time to complete each lesson. In addition, since different students are assigned to different numbers of lessons, there is considerable variation in time required to complete all assigned lessons. Completion times for one or more lessons, were recorded during FBSEP instruction for 96 students. Table II-9 shows the number of students, median completion time, range of completion time, completion time range of the middle 60% of the students, and average time per lesson as a function of number of lessons for which completion times were available. For example, the last line of the table shows that two students had completion times recorded for 14 lessons. (These two student may have been assigned to more than 14 lessons, but times were recorded for only 14 of them.) Their median completion time for all 14 lessons was 31.0 hours, the range was 29.2 to 32.8 hours, and the average time per lesson was 2.2 hours. Since N was only two, no 60% range could be computed.

Table II-9 shows that average time per lesson is about one-and-a-half to two hours. Using this information, it is possible to extrapolate the table to numbers of lessons greater than 14. For example, we would expect that students assigned to all 29 lessons (i.e., below cutoff on all Diagnostic Tests) would require, on the average, about 43.5 to 58.0 hours to complete their assigned lessons.\* This falls far short of the 180 to 240 hours allowable for FBSEP instruction. Therefore, all students should be able to complete all assigned lessons in less than 180 hours, no matter how many lessons are assigned.

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\*  $43.5 = 29 \times 1.5$  hours  
 $58.0 = 29 \times 2.0$  hours

Table II-9

## Completion Time as a Function of Number of Lessons

No. of Lessons for Which Completion Times Were Recorded	Number of Students (N)	Time to Complete (Hours)			Average Time Per Lesson
		Median	Range **	60% Range***	
1	20	1.3	.4 to 5.5	.8 to 2.7	1.3
2	18	2.4	.5 to 12.3	1.0 to 6.1	1.2
3	19	6.3	1.3 to 11.7	3.0 to 9.5	2.1
4	8	7.8	2.0 to 10.3	3.1 to 9.9	1.9
5	9	9.4	2.8 to 14.7	5.3 to 13.9	1.9
6	7	8.0	3.8 to 12.8	4.5 to 11.3	1.3
7	2	11.6	7.6 to 10.6	--	1.6
8	3	11.8	8.7 to 10.0	--	1.5
9	1	7.8	--	--	0.9
10	3	19.6	14.3 to 20.9	--	2.0
11	2	18.2	13.2 to 23.3	--	1.7
12	1	20.6	--	--	1.7
13	1	24.9	--	--	1.9
14	2	31.0	29.2 to 32.8	--	2.2

\* This includes only lessons for which completion times were available.

\*\* Computed when  $N \geq 2$ .

\*\*\* computed when  $N \geq 7$ .

## PART III. ADMINISTRATION AND SCORING

### General Procedure

#### Screening Test

The Screening Test is administered to all students prior to entry in the 31M10 course. Students can be tested in groups of up to 25 with a single test administrator and one monitor, or in groups of up to 50 with a single administrator and two monitors. All the items are in a single reusable booklet, with a separate machine-scorable answer sheet. The test requires a maximum of 2.5 hours of testing time.

The instructions, printed on the front of the test booklet, are read aloud by the test administrator prior to the start of testing. The students listen to a taped lecture, watch a videotaped demonstration, and answer the items for Units III and IV as a group. Students then proceed through the rest of the test at their own pace.

Scoring of the Screening Test occurs in two stages: First, incorrect items are marked by passing the answer sheets through a scoring machine. Second, the scorers count the number of correct answers in each unit by referring to a scoring key. Each unit is marked off on the key. Students who score above the cutoff on all units are finished with testing. Students who score below the cutoff on any unit(s) are assigned to the Diagnostic Tests for those units, except for Units III, IV, and V. In the case of Units III and IV, a score below cutoff results in scoring of the constituent lessons in the Screening Test and assignment to appropriate FBSEP instruction; in Unit V, a score below the cutoff results in assignment to that FBSEP lesson.

#### Diagnostic Tests

The Diagnostic Test for any given student is an individualized package consisting of only the tests for units in which he/she scored below the cutoff on the Screening Test. The tests for all the lessons within a given unit are bound together in a single reusable booklet with separate answer sheet. Thus, there are six Diagnostic Test booklets, one for each unit except Units III, IV, and V. For example, a student who scores below cutoff on the Screening Test in Units VI and VII would be given two booklets, one for each of the two units. Instructions for taking the Diagnostic Tests are the same as for the Screening Test. Students proceed through the tests at their own pace.

Scoring of each Diagnostic Test is accomplished by means of a scoring key. The scorer uses a record sheet and an information sheet to fill out a FBSEP prescription assigning students to FBSEP lessons in which they score below the cutoff. Detailed instructions to be followed by scorers are found in the next section. Scoring keys can be found in Appendix B.

Instructions for Administration and Scoring  
of the Screening Test

A. General Instructions

Before students arrive, make sure that you have an adequate supply of the following materials:

1. Screening Test Booklets (one for each student).
2. Screening Test Answer Sheets (one for each student).
3. Blank sheets of paper (one for each student).
4. Well-sharpened number 2 pencils with erasers.
5. Operational tape recorder.
6. Operational videotape recorder and TV monitor.
7. Audiotape entitled "Movie Projector Lecture."
8. Videotape entitled "Movie Projector Demonstration."

B. Instructions for Administering the Screening Test

NOTE: All instructions for test administration that are enclosed within blocks are to be read aloud, word-for-word, to the students.

1. Seat students as far apart from one another as possible. Make sure all students can see the TV monitor clearly from where they are sitting. Make sure that each student has adequate space for writing.

2. After students are seated, read the following instructions aloud.

Today, you will be taking a test to measure some basic skills that are important for success in the 31M course. In a moment, I will distribute the test materials. Please do not open the test booklet or mark the answer sheet until I tell you to do so.

3. Distribute the following materials to each student:

- a. a Screening Test booklet.
- b. a Screening Test answer sheet.
- c. a blank sheet of paper.
- d. a pencil.

4. Read the following instructions:

Write your name, last name first, on the answer sheet in the space provided. Write today's date, which is \_\_\_\_\_.

5. Wait for students to fill in their name and the date, then say:

Look at the instructions on the cover of your test booklet. Please read these instructions silently while I read them aloud.

The instructions are printed below as they appear on the test booklet. Read them aloud:

This is a test of your ability in some skills that are important for learning in the 31M course. In order to do well in the course, you must be able to learn from lectures and from demonstrations, interpret equipment indicators, and read materials such as your Soldier's Manual and Army technical manuals. The questions in this test measure some of these important listening, watching, interpreting, and reading skills. They do not measure skills taught in the 31M course itself, but rather skills which help you to learn from the instruction in the course.

All the questions in the test are multiple choice. You must read each question, then choose the one answer which you feel is the best one and mark it on your answer sheet. Here are some instructions which will help you to earn your best score:

1. Read each question carefully before choosing an answer. Sometimes, people get questions wrong just through carelessness, not because they don't know the answer.
2. Read all of the answer choices carefully. Most questions have four choices. Some have only two or three.
3. Choose the answer which you feel is the best one, only one answer to each question.
4. On your answer sheet, find the answer space that has the same number as the question you are working on. For example, if you are working on question number 20, make sure that you use the answer space numbered 20 on your answer sheet.
5. Blacken the space under the letter of the answer you have chosen on the answer sheet. For example, suppose that, on question 20, you decide that the answer marked c is correct. Then you must blacken the space under c beside number 20 on the answer sheet, like this:

          a  b  c  d  
20.  o  o  •  o

Do not mark your test booklet.

6. Mark only one answer for each question. Do not mark two or more choices for any questions.
7. If you are not sure about an answer to a question, make the best choice that you can. There is no penalty for wrong answers. But do not guess wildly.

6. Ask whether there are any questions, and answer them.
7. Read the following instructions:

Do not open your test booklet until I tell you to do so. In the 31M course, you will often listen to lectures about equipment and how it works. In the first part of the test, you will listen to a taped lecture about operating a movie projector. Listen carefully so that you will remember what is in the lecture. Do not take notes. After the tape is over, wait for further instructions.

8. Play the tape entitled "Movie Projector Lecture." Make sure that all students can hear. (Appendix A contains a script of the tape.)
9. At the end of the lecture, turn off the tape recorder and say:

Open your test booklet to the first page, and answer questions 1 through 4. Then stop. Remember: Mark your answers on the answer sheet, not in the test booklet.

10. Give the students enough time to answer the first four questions. Monitor them closely to make sure that they are marking their answer sheets correctly and that no one goes on to the next part. When everyone has finished, say:

In the 31M course, you will often watch demonstrations showing you how to operate equipment. Now, you will watch part of a film about operating a movie projector. Watch the film closely, so that you will remember what is in the film. Do not take notes. When the film stops, wait for further instructions.

11. Play the videotape, Phase I, "Set Up." Make sure that all the students can see and hear. (Appendix A contains a script of the videotape. The script indicates the beginning and end of Phase I.)

12. Stop the tape at the end of Phase I. Say:

Open your test booklet to question number 5 and answer questions 5 through 8. Then stop.

13. Give the students enough time to answer questions 5 through 8. Monitor them closely to make sure that no one goes on to the next part. When everyone has finished, say:

During the next part of the film, I want you to take notes about what you see and hear. Use the blank sheet of paper for taking notes. Later in the test, you will use your notes to answer questions about the demonstration.

14. Before re-starting the videotape, make sure that all students have their blank paper and pencils ready to take notes.
15. Show the rest of the videotape (Phases 2 and 3)
16. Read the following instructions:

You will do the rest of the test on your own. There will be no more lectures or demonstrations. Now open your test booklet to question number 9, and answer all the rest of the questions in the test booklet.

17. Ask if there are any questions, and answer them. Tell the students to go ahead and complete the test.

During the rest of the test, monitor the students to make sure that they are working steadily through the booklet.

18. Collect booklets, answer sheets, students' notes on the videotape, and pencils when students have finished. (The notes can be discarded.)

C. Instructions for Scoring the Screening Test and Identifying Students Who Require Further Testing/Prescriptions

The Screening Test is used in order to identify students with deficiencies and to indicate in what broad areas (units) these deficiencies lie. A deficiency in a unit is defined as a score below the unit cutoff. Table III-1 summarizes the decision process for the Screening test. The table is followed by step-by-step instructions for scoring, identification of students who require further testing/prescriptions, and recording of results.

Instructions for Scoring the Screening Test:

1. Make sure that the scoring key for Side 1 of the answer sheet has been entered into the scoring machine.
2. Feed the answer sheets, with Side 1 up, into the machine, one at a time. The machine will enter a mark beside each incorrect answer.
3. Repeat Steps 1 and 2 for Side 2.
4. Use the Screening Test Scoring Key to obtain a score on each unit for each student. The items in each unit are marked on the scoring key. The unit score is the number of items answered correctly.
5. After all answer sheets have been scored, enter the names of the students and their scores on a Screening Test Record Sheet (see Table III-2). Be careful to place scores in the correct columns.
6. After unit scores for all students have been recorded, go down each unit column and circle the scores which are below the cutoff. (The cutoff point in each unit is given at the top of the column.)

(A sample Screening Test Record Sheet which has been correctly filled in is shown in Table III-3.)

7. Make arrangements to have all students with one or more circled scores return for further testing and/or FBSEP assignment.

Table III-1

Screening Test Decision Table

<u>Unit</u>	<u>Cutoff Point</u>	<u>Decision if Score Is At or Above Cutoff</u>	<u>Decision if Score is Below Cutoff</u>
I	12	No further testing or prescription in this unit ↓	Assign Unit I Diagnostic Test
II	7		Assign Unit II Diagnostic Test
III	9		Rescore, using Unit III Diagnostic Key
IV	7		Rescore, using Unit IV Diagnostic Key
V	4		Assign to FBSEP, Unit V, Lesson 1
VI	6		Assign Unit VI Diagnostic Test
VII	4		Assign Unit VII Diagnostic Test
VIII	6		Assign Unit VIII Diagnostic Test
IX	6		Assign Unit IX Diagnostic Test



Table III-3

## SCREENING TEST RECORD SHEET - SAMPLE

Name	Unit Cutoff	I 12	II 7	III 9	IV 7	V 4	VI 6	VII 4	VIII 6	IX 6
BARTH, T	7367	14	10	12	10	6	7	6	8	6
BOUCHARD, M	1733	(11)	8	12	7	6	7	6	(5)	8
CHAPPELL, C	4474	<del>12</del>	<del>9</del>	<del>12</del>	(6)	5	7	5	(5)	6
DEAL, W.	7591	16	9	12	12	6	6	5	6	6
FOUNTAIN FOUNTAIN, S	1296	(11)	10	(8)	7	6	6	5	6	7
GOODMAN, M	2709	15	10	12	10	6	7	6	8	8
GUTZELT, S	7713	15	9	11	10	6	8	6	8	6
HAYEMAN, D	3817	16	10	11	11	6	8	6	8	8
HAIR, M	4852	12	9	9	(4)	6	(5)	6	6	(3)
HAWORTH, J	7267	(9)	10	(3)	(7)	6	(5)	4	6	(3)
HORAN, T.	2175	16	10	10	8	6	8	6	7	6
JOHNSON, O	5962	16	10	10	8	6	8	6	(4)	7
JOHNSON, S.	5727	15	10	12	9	6	8	5	6	8
KEMP, P.	0587	12	8	9	(5)	6	7	6	6	7
KEY, T.	4791	16	10	12	9	6	8	6	7	6
MASON, L	7729	15	10	10	8	6	(5)	4	8	(4)
MOTON, S	0570	12	8	(5)	7	6	6	6	(5)	(4)
MCKINLEY, L.	1097	12	10	9	7	5	6	(3)	(4)	(4)
PERRY, M.	4353	13	9	10	7	6	7	(3)	(4)	6
PYKKONEN,	0226	13	10	9	9	6	7	5	7	(5)
SASSAMAN, W.	5927	16	8	11	8	6	7	6	7	8
STONE, M	8002	13	(6)	9	8	5	7	5	7	(4)
THOMAS, B	2056	12	8	12	11	5	8	6	(2)	8
WATSON, M.	0925	14	9	12	7	6	6	5	6	(5)

8. Prepare a Student Diagnostic Record Sheet (See Table III-4) for each student who is to return for further testing.

a. Fill in the student's name and the date.

b. In column (1), "UNIT," circle the numbers of the units in which the student scored below cutoff.

9. Prepare a package of Diagnostic Tests for each student. For example, the package for a student with II, VI, and VIII circled in the Unit column should include the Diagnostic Tests for Units II, VI, and VIII.

No Diagnostic Tests are used for Units III, IV, and V. Special instructions for diagnosis and prescription of lessons in Units III and IV are given below.

#### Instructions for Diagnosis and Prescription

The purpose of diagnostic testing is to determine the specific skill areas (lessons) within which deficiencies lie and to assign students to needed lessons. Table III-5 summarizes the diagnostic decision process. Below are step-by-step instructions for scoring, recording results, and writing prescriptions for FBSEP.

#### A. General Instructions

Before students arrive, make sure that you have an adequate supply of the following materials:

1. An individualized package of Diagnostic Tests for each student scoring below cutoff in one or more of Units I, II, VI, VII, VIII, IX.
2. Well-sharpened number 2 pencils with erasers.
3. A Diagnostic Record Sheet for each student, with units below cutoff circled in column (1).
4. Functional BSEP Prescription Sheets (one per student).

Also make sure that you have the following:

1. Diagnostic scoring keys.
2. Functional BSEP Information Sheet.

Table III-4  
STUDENT DIAGNOSTIC RECORD SHEET

Name _____		Date _____	
	Last	First	
(1) UNIT	(2) Lesson	(3) Cutoff Point	(4) Student's Score
(5) Check Here if Score is Below Cutoff			
I	1	3	
	2	3*	
	3	3	
	4	3	
	5	6	
	6	3	
	7	3	
II	1	3	
	2	6	
	3	6	
III	1	3	
	2	3	
	3	3	
IV	1	7†	
	2	3	
	3	6	
V	1	4	
VI	1	3	
	2	3	
	3	6	
VII	1	3	
	2	6	
VIII	1	3	
	2	3	
	3	3	
	4	3	
IX	1	3	
	2	3	
	3	3	
	4	3	

\* If the student scores 3 or 4 in this lesson, but scores less than 3 in Lesson 3 and/or 4, place a check mark in Column (5) for Lesson 2.

† If Unit IV is circled in Column (1), place a check mark in Column (5) for Lesson 1.

Table III-5

## Diagnostic Decision Table

<u>Unit</u>	<u>Lesson</u>	<u>Cutoff Point</u>	<u>Decision if Score Is at or Above Cutoff</u>	<u>Decision if Score Is Below Cutoff</u>
I	1	4	No instruction needed in this lesson.	Prescribe this lesson.
	2	4	If Unit I, Lesson 3 and 4 scores are also at or above cutoff, no instruction is needed in this lesson. <u>If Unit I, Lesson 3 or 4 score is below cutoff, prescribe this lesson first.</u>	Prescribe this lesson.
	3	4	No instruction needed in this lesson	Prescribe this lesson. Prescribe Unit I, Lesson 2 as a prerequisite, regardless of Lesson 2 score.
	4	4	No instruction needed in this lesson.	Prescribe this lesson. Prescribe Unit I, Lesson 2 as a prerequisite, regardless of Lesson 2 score.
	5	8	No instruction needed in this lesson.	Prescribe this lesson.
	6	4	No instruction needed in this lesson.	Prescribe this lesson.
	7	4	No instruction needed in this lesson.	Prescribe this lesson.
II	1	3	No instruction needed in this lesson.	Prescribe this lesson.
	2	6	No instruction needed in this lesson.	Prescribe this lesson.
	3	6	No instruction needed in this lesson.	Prescribe this lesson.

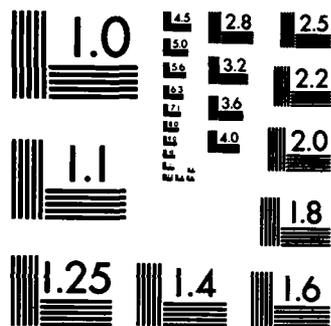
Table III-5 (cont'd)

<u>Unit</u>	<u>Lesson</u>	<u>Cutoff Point</u>	<u>Decision if Score Is at or Above Cutoff</u>	<u>Decision if Score Is Below Cutoff</u>
III	1	3	No instruction needed in this lesson.	Prescribe this lesson.
	2	3	No instruction needed in this lesson.	Prescribe this lesson.
	3	3	No instruction needed in this lesson.	Prescribe this lesson.
IV	1	7	No instruction needed in this lesson.	Prescribe this lesson.
	2	3	No instruction needed in this lesson.	Prescribe this lesson, to follow Unit IV, Lesson 1.
	3	6	No instruction needed in this lesson.	Prescribe this lesson. Make sure that Unit IV Lesson 1 has been prescribed to precede this lesson.
V	1	4	No instruction needed in this lesson.	Prescribe this lesson.
VI	1	3	No instruction needed in this lesson.	Prescribe this lesson.
	2	3	No instruction needed in this lesson.	Prescribe this lesson.
	3	6	No instruction needed in this lesson.	Prescribe this lesson.
VII	1	3	No instruction needed in this lesson.	Prescribe this lesson.
	2	6	No instruction needed in this lesson.	Prescribe this lesson.

Table III-5 (cont'd)

<u>Unit</u>	<u>Lesson</u>	<u>Cutoff Point</u>	<u>Decision if Score Is at or Above Cutoff</u>	<u>Decision if Score Is Below Cutoff</u>
VIII	1	3	No instruction needed in this lesson.	Prescribe this lesson.
	2	3	No instruction needed in this lesson.	Prescribe this lesson.
	3	3	No instruction needed in this lesson.	Prescribe this lesson.
	4	3	No instruction needed in this lesson.	Prescribe this lesson.
IX	1	3	No instruction needed in this lesson.	Prescribe this lesson.
	2	3	No instruction needed in this lesson.	Prescribe this lesson.
	3	3	No instruction needed in this lesson.	Prescribe this lesson.
	4	3	No instruction needed in this lesson.	Prescribe this lesson.





MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

B. Instructions for Administering the Diagnostic Tests

The Diagnostic Tests are administered as individualized packages, based on each student's performance on the Screening Test. The tests to be included in the package for each student are determined by consulting the Diagnostic Assignment Sheet. The units in which each student scored below cutoff are listed beside the student's name. Do the following:

1. Students who are assigned only to Units III, IV, and/or V require no further testing. FBSEP assignments are made on the basis of Screening Test performance (see "Special Instructions for Units III, IV, and V" below). Ask these students to wait until the other students have started working on their Diagnostic Test packages.
2. Students assigned to one or more of Units I, II, VI, VII, VIII, and IX should be given a pencil and their individualized Diagnostic Test packages containing a booklet and answer sheet for each unit assigned.
3. Students should be instructed to complete the tests in any order desired, then to bring all test materials to a scorer immediately after completion.

C. Special Instructions for Units III, IV, and V.

Units III, IV and V differ from other units in that both screening and diagnostic decisions are based on performance in the Screening Test. The following procedures are to be followed for scoring and recording the results in Units III, IV, and V:

1. Unit V. This unit has only one lesson. If the student scored below cutoff in this unit of the Screening Test, do the following:
  - a. Record the student's unit score in the Diagnostic Record Sheet, column (4).
  - b. Place a check mark in column (5).
2. Unit III.
  - a. Re-score the Unit III items on the student's Screening Test answer sheet, using the Unit III Diagnostic Scoring Key (See Appendix B) to obtain a score for each lesson.

b. Record the score for each lesson in column (4) of the student's Diagnostic Record Sheet.

c. For each score below cutoff, place a check mark in column (5).

3. Unit IV.

a. Re-score the Unit IV items on the student's Screening Test answer sheet, using the Unit IV Diagnostic Scoring Key (See Appendix B) to obtain a score for each lesson.

b. Record the score for each lesson in column (4) of the student's Diagnostic Record Sheet.

c. For each score below cutoff, place a check mark in column (5).

D. Instructions for Scoring the Diagnostic Tests and Recording Results

1. Score each Diagnostic Test, using the appropriate key, and enter lesson scores in column (4).

2. Compare each lesson score with the cutoff point for the lesson. If the lesson score is below cutoff, place a check mark in column (5) of the Student Diagnostic Record Sheet.

NOTE: the following two lessons need special attention:

a. Unit IV, Lesson 1. All students assigned to Unit IV are assigned to this lesson. If unit IV is circled in column (1), make sure that there is a check mark in column (5) for Lesson 1.

b. Unit I, Lesson 2. Students assigned to Lesson 3 or 4 or both in this unit must take Lesson 2 first. If there is a check mark in column (5) for Lesson 3 and/or 4, place a check mark in column (5) for Unit I, Lesson 2, regardless of the score on this lesson. Table III-6 shows a sample of a correctly completed Student Diagnostic Record Sheet.

TABLE III-6

STUDENT DIAGNOSTIC RECORD SHEET - SAMPLE

Name Haworth, J 7267 Date 27 July 82  
Last First

(1) UNIT	(2) Lesson	(3) Cutoff Point	(4) Student's Score	(5) Check Here if Score is Below Cutoff
<b>I</b>	1	3	3	
	2	3*		
	3	3		
	4	3		
	5	6		
	6	3		
	7	3		
<b>II</b>	1	3		
	2	6		
	3	6		
<b>III</b>	1	3	1	✓
	2	3	2	✓
	3	3	0	✓
<b>IV</b>	1	7†	1	✓
	2	3	1	✓
	3	6	0	✓
<b>V</b>	1	4		
<b>VI</b>	1	3	3	
	2	3	4	✓
	3	6	4	✓
<b>VII</b>	1	3		
	2	6		
<b>VIII</b>	1	3		
	2	3		
	3	3		
	4	3		
<b>IX</b>	1	3	3	
	2	3	4	
	3	3	1	✓
	4	3	3	

\* If the student scores 3 or 4 in this lesson, but scores less than 3 in Lesson 3 and/or 4, place a check mark in Column (5) for Lesson 2.

† If Unit IV is circled in Column (1), place a check mark in Column (5) for Lesson 1.

E. Instructions for Writing FBSEP Prescriptions

Each student's prescription is written by filling in a FBSEP Prescription Sheet immediately after completion of Diagnostic Test scoring (See Table III-7). The prescription is based on the check marks in column (5) of the student's Diagnostic Record Sheet. In addition, you will need to refer to the Functional BSEP Information Sheet (Table III-8).

Students are assigned to all lessons having check marks in column (5) of the Student Diagnostic Record Sheet. In rare cases, this column will have no check marks. If so, dismiss the student. No FBSEP instruction is indicated.

If one or more check marks are in column (5), follow the procedure below:

1. Enter the student's name and the date.
2. Find the first check mark in column (5) of the student's Diagnostic Record Sheet. This is the first lesson to be assigned.
3. Find the lesson on the Functional BSEP Information Sheet, and use that information to fill in the first row of the student's Functional BSEP Prescription Sheet, as follows:
  - a. In column (1), "Sequence," write the time at which instruction for the lesson is to be delivered. For example, if the lesson is Unit III, Lesson 2, which is in Block 1, you would write "Before AIT" in column (1). For Unit VIII, Lesson 3, in Block 2, you would write "Before Week 5" in column (1).
  - b. In the remaining columns of the Prescription Sheet, write the Unit number, lesson number, lesson title, and estimated time required.
4. Follow the same procedure for each of the other lessons having a check mark on the student's Diagnostic Record Sheet.
5. After all prescribed lessons have been entered, add the estimated time required for the lessons, and enter the sum at the bottom of column (5) of the Prescription Sheet.
6. Tell the student where and when to report for Functional BSEP instruction. Answer any questions the student may have.



Table III-8

Functional BSEP Information Sheet

This sheet provides information needed for writing student prescriptions. It lists all Functional BSEP units and lessons according to the time at which instruction is to be delivered, relative to the 31M10 AIT course. It also lists the estimated time required for each lesson.

Block 1: FRONT-LOADED FBSEP UNITS AND LESSONS. THESE ARE TO BE PRESCRIBED PRIOR TO STARTING THE AIT COURSE.

<u>Unit</u>	<u>Lesson</u>	<u>Title</u>	<u>Estimated Time Required (Hr:Min)</u>
I Reading Compre- hension	1	Vocabulary . . . . .	3:00
	2	Strategies for Reading Sentences . . . . .	4:45
	3	Reading Negative Sentences . . . . .	0:45
	4	Reading Sentences with Dependent Clauses . . . . .	1:00
	5	Ordering One, Two, or Three Tasks . . . . .	1:00
	6	Determining the Order of Tasks: Multiple Actions . . . . .	1:00
	7	Understanding Lists and Paragraphs . . . . .	1:10
II Using a Table of Contents	1	Chapters and Sections . . . . .	2:00
	2	Using a Task List to Find a Task Description . . . . .	2:00
	3	Tables with Paragraph Numbers and Page Numbers . . . . .	2:00
III Listening Skills	1	Remembering Information Heard in Lectures . . . . .	4:30
	2	Remembering Information Seen in Demonstrations . . . . .	3:00
	3	Recognizing When Important Information Is Missing . . . . .	1:45
IV Note- Taking for Demonstration	1	Basic Note-Taking Skills . . . . .	3:30
	2	Taking Notes to Show Sequence . . . . .	2:00
	3	Taking Notes to Show Relationships . . . . .	1:55

Table III-8 (cont'd)

<u>Unit</u>	<u>Lesson</u>	<u>Title</u>	<u>Estimated Time Required (Hr:Min)</u>
V Recognizing a Part of a Whole	1	Recognizing a Part of a Whole . . . . .	1:00
VI & VII	1	The Structure of Tables and Diagrams . . . . .	0:45
VI Locating Information in Tables	2	Interpreting Table Headings . . . . .	1:15
	3	Locating Information in 31M Tables . . . . .	1:25
VII Reading Cabling Diagrams	2	Identifying Connections in Simple and Complex Cabling Diagrams . . . . .	1:50
IX Scale Reading	1	Labeling Place Value . . . . .	1:00
	2	Numbering Scale Points . . . . .	0:25
	3	Scales Divided into Tenths . . . . .	0:30
	4	Comparing Scale Settings . . . . .	0:30

Block 2: FUNCTIONAL BSEP LESSONS TO BE PRESCRIBED BEFORE THE FIFTH WEEK OF THE AIT COURSE

<u>Unit</u>	<u>Lesson</u>	<u>Title</u>	<u>Required (Hr:Min)</u>
VIII Diag- nosing Equip- ment Malfunc- tions	1	Deciding Whether an Indication is Normal . . . . .	0:30
	2	Deciding Whether There Is Something Wrong Based on Two or More Indicators . . . . .	0:35
	3	Finding Descriptions of Symptoms: One Indicator . . . . .	0:45
	4	Finding Descriptions of Symptoms When There Are Two or More Indicators . . . . .	0:55

7. Make an extra copy of each Prescription Sheet. One copy is to be retained by the student and the other by the FBSEP staff.

Table III-9 shows a sample of a filled-in Prescription Sheet.



#### PART IV. PREDICTIVE FUNCTIONS OF THE DTM

Besides decisions concerning lesson placement in FBSEP, the DTM has a number of predictive functions as well. That is, given the student test scores and using information presented in Part II, it is possible to make predictions concerning the student's performance on the test, in FBSEP, and in the AIT course. The predictive functions are:

1. Identification of soldiers who lack prerequisite competencies required for entry into 31M10 training.
2. Identification of what specific prerequisite competency is below the minimum level required for entry into the 31M10 MOS training.
3. The amount of remediation that will be required for the student to achieve the minimum level of proficiency.
4. The extent to which the student has mastered prerequisite competencies after being exposed to remedial training.
5. A regression model (or equivalent) capable of predicting student probability of successful 31M10 AIT completion prior to and following exposure to remedial training, expressed in terms of confidence levels.
6. The regression model (or equivalent) shall also predict the likelihood of not enough time for individual students to complete the 31M10 Functional BSEP in 240 hours and 180 hours.

The six predictive functions are discussed in turn. Tables or other decision aids are presented for use in making predictions for individual students.

##### 1. Identification of Soldiers Who Lack Prerequisite Competencies

This, of course, is the purpose of the Screening Test. Students who score below cutoff in a unit are predicted to lack one or more competencies within that unit.

However, Screening Test unit scores are not perfectly reliable, as the reliability information of Part II of this document shows. Sometimes, students who possess all the component competencies score below cutoff, and sometimes students who lack one or more competencies score above cutoff. That is, a student's obtained score may differ somewhat from his/her true score.

Though true unit scores are not directly measurable, they can be estimated by computing confidence intervals around a student's obtained unit score. To do so, one must use the standard error of measurement (SEM) for the unit. The 95% confidence interval is given by the formula;

$$X \pm 2SEM,*$$

where X is the obtained score. This formula yields a range of scores within which students' true scores will fall in 95 cases out of 100.

Table IV-1 gives the SEM and 2SEM for each unit. To compute the 95% confidence interval for a given score, subtract 2SEM from the score, then add 2SEM to the score. For example, in Unit I, Lesson 1, 2SEM = 3.84. If a student scores 9 on this unit, the 95% confidence interval is  $9 \pm 3.84$ . Since,  $9 - 3.84 = 5.16$  and  $9 + 3.84 = 12.84$ , can be 95% confident that this student's true score is somewhere between 5.16 and 12.84.

## 2. Identification of Specific Competencies below the Minimum Level

Specific competencies are measured by the lesson scores of the Diagnostic Tests. Like the unit scores, they are not perfectly reliable. In fact, given the brevity of the lesson tests (4-8 items each), one would expect reliability coefficients to be quite low. A more meaningful measure of reliability of lesson scores is consistency of placement. That is, based on lesson scores, are students consistently assigned (or consistently not assigned) to the lessons?

The procedure for determining the consistency of lesson assignment was described in Part II of this document. Table IV-2 gives the percentage of consistent classifications for each lesson of Units I, II, V, VI, VII, VIII, and IX. Though consistency was not determined for most lessons of Units III and IV, the relatively high reliability of these units makes consistent classification probable.

\* More accurately, the formula should be "Estimated true score  $\pm 1.96SEM$ ," but the formula above yields approximately the same result.

Table IV-1

Standard Error of Measurement (SEM) and 2SEM  
for Each Unit of the Screening Test

<u>Unit</u>	<u>SEM</u>	<u>2SEM</u>
I	1.92	3.84
II	1.37	2.74
III	1.17	2.34
IV	1.44	2.88
V	0.86	1.72
VI	1.34	1.68
VII	1.03	2.06
VIII	1.42	2.84
IX	1.01	2.02

95% confidence interval for a student's unit score (X) is given  
by the formula:

$$\underline{X} + 2SEM$$

Table IV-2

Probability of Consistent Placement of Students Scoring  
below Cutoff in the Corresponding Unit\*

<u>Unit</u>	<u>Lesson</u>	<u>Probability of Consistent Placement</u>
I	1	.82
	2	.75
	3	.86
	4	.75
	5	.64
	6	.57
	7	.68
II	1	.62
	2	.87
	3	.87
III	3	
V	1	.92
VI	1	.68
	2	.64
	3	.84
VII	1	.69
	2	.54
VIII	1	.84
	2	.77
	3	.73
	4	.75
IX	1	.70
	2	.64
	3	.70
	4	.72

\* Probability of consistent placement could not be determined for Lessons 1 and 2 of Unit III and all lessons of Unit IV, due to inappropriateness of test-retest procedure for these lessons.

Table IV-2 can be used as follows. Given that a student has scored below cutoff on a unit of the Screening Test, the probabilities of his/her being consistently assigned to the lessons of the unit are given in the table. For example, a student who scored below cutoff on Unit II of the Screening Test has a .62 chance of being consistently assigned/not assigned to Lesson 1. This means that, whether his Lesson 1 score assigns him/her to the lesson or not, the chances are 62 in 100 that, were he/she to retake the Lesson 1 test, the same decision (assignment vs. non-assignment) would be made. The same kind of interpretation is possible for other lessons, using the appropriate probabilities from the table.

### 3. Amount of Remediation Required

FBSEP lessons are self-paced. Therefore, different students take different amounts of time to complete any given lesson. Nevertheless, there are several ways to estimate the amount of time that will be required by a student. The best estimate is obtained by adding the numbers in the "Estimated Time Required" column (column 5) of the student's FBSEP Prescription Sheet. Since the estimated time for each lesson represents the median time actually required by a group of FBSEP students, the sum approximates the time which would be required by the "average" student. However, it must be remembered that no student is truly "average," and deviations from these times are to be expected.

Another way to estimate the time required is to use the 60% range of completion times found for varying numbers of assigned lessons (See Table II-9). For any given number of lessons assigned (from one to six) the 60% range was found by determining the amount of time required by the middle 60% of students who had that number of lessons assigned. Data were insufficient to determine the 60% range for seven or more assigned lessons. However, it is possible to extrapolate beyond six lessons in the following way: the figures given in Table II-9 show that the lower limit of the 60% range is usually about 0.8 times the number of lessons assigned, while the upper limit is usually about 2.7 times the number of lessons assigned. These figures have been used to estimate 60% ranges for any number of lessons, from 1 to 29.

The results are shown in Table IV-3. The table is used as follows: Enter the table with the number of lessons to which the student has been assigned. When you say that the student will probably complete his/her FBSEP lessons within the range given for that number of lessons, you can expect to be right about 60 times out of 100. That is, about 60 out of every 100 students with that number of lessons assigned will complete all their lessons between the lower and upper limits of the 60% range. For example, a student who has been assigned to 12 lessons has a 60% chance of completing all 12 lessons in between 9.6 and 32.4 hours of instruction.

Table IV-3

60% Range of Time Required for Completion, In Hours,  
as a Function of Number of Lessons Assigned

<u>Number of Lessons Assigned</u>	<u>60% Range in Hours*</u>
1	0.8 to 2.7
2	1.0 to 6.1
3	3.0 to 9.5
4	3.1 to 9.9
5	5.3 to 13.9
6	4.5 to 11.3
7	5.6 to 18.9
8	6.4 to 21.6
9	7.2 to 24.3
10	8.0 to 27.0
11	8.8 to 29.7
12	9.6 to 32.4
13	10.4 to 35.1
14	11.2 to 37.8
15	12.0 to 40.5
16	12.8 to 43.2
17	13.6 to 45.9
18	14.4 to 48.6
19	15.2 to 51.3
20	16.0 to 54.0
21	16.8 to 56.7
22	17.6 to 59.4
23	18.4 to 62.1
24	19.2 to 64.8
25	20.0 to 67.5
26	20.8 to 70.2
27	21.6 to 72.9
28	22.4 to 75.6
29	23.2 to 78.3

\* Computed for 1 to 6 lessons; extrapolated for the rest,  
based on the formula; Range = .8N to 2.7N, where N is  
the number of lessons assigned.

#### 4. Predicting Success in FBSEP

Not all students assigned to FBSEP complete all their lessons successfully. Furthermore, students who are assigned to few lessons are more likely to pass them all than students assigned to many, as was shown in Part II, Table II-8. The data of that table are the basis for Table IV-4, (A) and (B). Table IV-4(A) is used to predict probability of passing all assigned lessons. Passing a lesson is defined as passing all lesson checkpoints (embedded tests), either without additional remediation (Form A) or after additional remediation (Form B). Table IV-4(B) is used to predict probability of passing all post-tests (retention tests) given one to two weeks after the end of FBSEP instruction.

To use these tables, enter each one with the number of lessons on the FBSEP Prescription Sheet. For example, a student who has been assigned to 4 lessons has a probability of .73 (73 chances in 100) of passing all four lessons. He/she has a probability of .29 (29 chances in 100) of passing all four post-tests.

#### 5. Predicting the Probability of Successful AIT Completion

Probability of successful AIT completion prior to exposure to remedial training can be predicted, on the basis of the predictive validity data presented in Part II, which related test performance to AIT performance. Screening Test unit scores can be entered into a regression equation for predicting TESTSUM, the sum of scores on the five performance tests of the AIT course. The number of Screening Test scores above cutoff can be used to predict probability of membership in each of four criterion categories:

- I. Highly successful AIT students.
- II. Moderately successful AIT students.
- III. Marginally successful AIT students.
- IV. Students who left the AIT course prior to completion.

More complete definitions of these categories can be found in Part II of this document.

Criterion category membership can also be predicted on the basis of number of FBSEP lessons prescribed (i.e., number of lesson scores below cutoff). Each of these three prediction functions will be described in turn.

Table IV-4

Probability of FBSEP Success as a Function  
of Number of Lessons Assigned

A. Probability of Passing All Assigned Lessons

<u>Number of Lessons Assigned</u>	<u>Probability of Passing All Lessons</u>
1-2	.97
3-5	.73
6 or more	.46

B. Probability of Passing All Post-tests Given One to Two Weeks Later

<u>Number of Lessons Assigned</u>	<u>Probability of Passing All Post-tests</u>
1-2	.74
3-5	.29
6 or more	.05

### Using Screening Test Scores to Predict TESTSUM

The regression equation for predicting TESTSUM from Screening Test unit scores is:

$$\begin{aligned} \text{Predicted } T = & 1.73X_I - 4.09X_{II} + 3.93X_{III} + 3.54X_{IV} \\ & + 0.97X_V + 2.25X_{VI} - 1.00X_{VII} + 0.50X_{VIII} \\ & + 1.67X_{IX} + 372.55. \end{aligned}$$

where:

$T =$  TESTSUM

1.73, -4.09, ...1.67 are the regression weights for Unit I, II, ...IX.

$X_I =$  student's score in Unit I

$X_{II} =$  student's score in Unit II

$X_{III} =$  student's score in Unit III, etc.

372.55 is a constant

A student's predicted TESTSUM is obtained by multiplying each of his/her unit scores by the regression weight for that unit, adding the products as required by the equation, then adding the constant 372.55.

To assist in the calculation of the predicted TESTSUM, all of the possible products of regression weight times unit score are presented for each unit in Table IV-5. This table can be used to predict a student's TESTSUM given the student's scores on the various units of the Screening Test. The steps to follow when predicting TESTSUM are:

1. Identify the student's score for each unit as measured by the Screening Test.
2. Locate each score in the appropriate column of Table IV-5.
3. Once a score for a unit has been located, look at the value to the immediate right of the score (in the next column). This is the score multiplied by the regression weight. You will have nine such products.

Table IV-5

Products of Unit Score Times Regression Weight  
for Each of Nine Units in the Screening Test

Score on Unit I	Product of Score x 1.73	Score on Unit II	Product of Score x -4.09	Score on Unit III	Product of Score x 3.93
0	0.00	0	0.00	0	0.00
1	1.73	1	-4.09	1	3.93
2	3.46	2	-8.18	2	7.86
3	5.19	3	-12.27	3	11.79
4	6.92	4	-16.36	4	15.72
5	8.65	5	-20.45	5	19.65
6	10.38	6	-24.54	6	23.58
7	12.11	7	-28.63	7	27.51
8	13.84	8	-32.72	8	31.44
9	15.57	9	-36.81	9	35.37
10	17.30	10	-40.90	10	39.30
11	19.03			11	43.23
12	20.76			12	47.16
13	22.49				
14	24.22				
15	25.95				
16	27.68				

Score on Unit IV	Product of Score x 3.57	Score on Unit V	Product of Score x 0.97	Score on Unit VI	Product of Score x 2.25
0	0.00	0	0.00	0	0.00
1	3.54	1	0.97	1	2.25
2	7.08	2	1.94	2	4.50
3	10.62	3	2.91	3	6.75
4	14.16	4	3.88	4	9.00
5	17.70	5	4.85	5	11.25
6	21.24	6	5.82	6	13.50
7	24.78			7	15.75
8	28.32			8	18.00
9	31.86				
10	35.40				
11	38.94				
12	42.48				

Table IV-5 (cont'd)

Score on Unit VII	Product of Score x -1.00	Score on Unit VIII	Product of Score x 0.50	Score on Unit IX	Product of Score x 1.67
0	0.00	0	0.00	0	0.00
1	-1.00	1	0.50	1	1.67
2	-2.00	2	1.00	2	3.34
3	-3.00	3	1.50	3	5.01
4	-4.00	4	2.00	4	6.68
5	-5.00	5	2.50	5	8.35
6	-6.00	6	3.00	6	10.02
		7	3.50	7	11.69
		8	4.00	8	13.36

4. Sum all of the products for the student.

Since two of the products will be negative rather than positive (those for Units II and VII), the easiest way to find the sum is as follows:

- a. First, add the products for Units I, III, IV, V, VI, VIII, and IX. (These are all the positive products.)
  - b. Second, subtract the product for Unit II.
  - c. Third, subtract the product for Unit VII. The result will be the sum of all nine products.
5. Finally, add the constant 372.55 to the sum of products. The result is the student's predicted TESTSUM.
  6. Round the predicted TESTSUM to the nearest whole number.

For example, consider a student whose unit scores on the Screening Test are as shown in column (2) below:

(1) <u>Unit</u>	(2) <u>Student's Score</u>	(3) <u>Product</u>
I	9	15.57
II	10	-40.90
III	3	11.79
IV	1	3.54
V	6	5.82
VI	5	11.25
VII	4	-4.00
VIII	6	3.00
IX	3	5.01

First, we find the student's Unit I score (9) in Table IV-5 under "Score on Unit I" and find, in the next column, that the product of his/her score times the regression weight is 15.57. The student's score in Unit II (10), has a product of -40.90. Similarly, we find the remaining products, from Units III through IX. The products are listed above, in column (3).

Next, we add the positive products from Units I, III, IV, V, VI, VIII, and IX:

$$15.57 + 11.79 + 3.54 + 5.82 + 11.25 + 3.00 + 5.01 = 55.98$$

We then subtract the Negative Unit II and Unit VII products in turn:

$$55.98 - 40.90 = 15.08$$

$$15.08 - 4.00 = 11.08$$

Finally, we add 372.55:

$$11.08 + 372.55 = 383.63.$$

The student's predicted TESTSUM is 383.63. Rounded to the nearest whole number, is 384. We estimate that, if this student enters AIT without remedial FBSEP training, the sum of his/her five performance test scores will be about 384.

Of course, not every prediction made by the equation is accurate. In fact, a certain amount of error is expected. The standard error of estimate is a measure of this expected error. For the regression equation above, the standard error of estimate is 31.58.

The standard error of estimate (31.58) can be used to compute a 95% confidence interval for a student's predicted TESTSUM by using the formula:

$$\text{Predicted } T \pm 2 \times 31.58$$

or

$$\text{Predicted } T \pm 63.16$$

The formula gives an upper and a lower limit between which we can be 95% confident that the student's TESTSUM will actually lie. This means that predictions made in this way will be correct in 95 out of 100 cases.

Consider the student whose predicted TESTSUM was 384. Using the formula above, we compute his/her 95% confidence interval:

$$384 \pm 63.16 = 320.84 \text{ to } 447.16.$$

We are 95% confident that this student's actual TESTSUM (assuming no remedial training) will be somewhere between about 321 and 447.

### Using Screening Test Scores to Predict Criterion Category Membership

Table IV-6(A) gives the probability of membership in each of the four criterion categories listed on page 62 as a function of number of Screening Test units above cutoff. For example, a student with six of the nine units above cutoff who is not remediated has a .36 probability of being highly successful in the AIT course (Category I), a .50 probability of being moderately successful (Category II), a .09 probability of being marginally successful (Category III), and a .04 probability of leaving the course prior to completion (Category IV).

### Using Diagnostic Scores (Number of FBSEP Lessons Needed) to Predict Criterion Category Membership

Table IV-6(B) gives the probability of membership in each criterion category as a function of the number of lessons prescribed for a student, but not delivered. For example, a student who needs 8 lessons but does not get them as a .26 probability of being highly successful in the AIT course (Category I), a .37 probability of being moderately successful (Category II), a .15 probability of being marginally successful (Category III), and a .22 probability of leaving the course prior to completion (Category IV).

Predictions of AIT success following exposure to remedial training are not possible at this time, due to lack of time to collect AIT performance data for students who have completed FBSEP.

### 6. Predicting Probability of FBSEP Completion Within 180 and Within 240 Hours

Table IV-3 shows that the estimated upper limit of the 60% range of completion times for all 29 lessons is far short of 180 hours. It is, of course, possible that an exceptionally slow student with a very long prescription may require longer than 180 hours or even 240 hours. However, it is extremely unlikely. We estimate the probability of insufficient time to complete FBSEP within 180 or 240 hours to be close to zero.

Table IV-6

Tables for Predicting Criterion Category Membership,  
Assuming No Remediation

A. Probability of Criterion Category Membership as a Function  
of Number of Screening Test Units above Cutoff

Number of Units above Cutoff	Criterion Category			
	I	II	III	IV
All 9	.57	.36	.04	.04
6 to 8	.36	.50	.09	.04
0 to 5	.17	.42	.17	.25

B. Probability of Criterion Category Membership as a Function  
of Number of Lessons Prescribed

Number of Lessons Prescribed	Criterion Category			
	I	II	III	IV
0 to 2	.49	.42	.05	.04
3 to 5	.17	.61	.17	.06
6 or more	.26	.37	.15	.22

### References

Ebel, R. L. Measuring educational achievement. Englewood Cliffs, NJ: Prentice-Hall, 1965.

Nunnally, J. C. Educational measurement and evaluation. 2nd ed. New York: McGraw-Hill, 1972.

Thorndike, R. L., Hagen, E. P. Measurement and evaluation in psychology and education, 4th ed. New York: Wiley, 1977.

APPENDIX A

SCRIPTS OF

MOVIE PROJECTOR LECTURE

MOVIE PROJECTOR DEMONSTRATION

## MOVIE PROJECTOR LECTURE

### Audio Script

This is a short lecture on the characteristics of the 16mm movie projector. Later, you will see a demonstration on how to set up and operate this kind of projector. Right now, however, you will hear some background information about the 16mm movie projector.

The particular movie projector we are working with is a sound projector. It is made up of three systems: the projection system, the film transport system, and the audio - or sound - system. I'll repeat that. The three systems are: ...

Now we'll talk a little about each of these systems.

The function of the projection system is to show a large, clear picture on the screen. The most important parts of the projection system are the lamp and the lenses. I'll repeat that. The most important parts of the projector system ...

The function of the film transport system is to move the film past the lens at a steady rate. Two important parts of the film transport system are the motor and the reels. The motor and the reels.

The function of the audio system is - of course - to reproduce the sound that is on the film. Two important parts of the audio system are the amplifier and the speaker. The amplifier and the speaker.

Let's talk now about the size of the film. Movie film comes in 3 widths: 8mm, 16mm, and 35mm. The movies you see in a theatre are usually 35mm. Educational film shown in the classroom are either 8mm or 16mm. The projector we are describing takes 16mm film. This next point is important. Remember that a projector that is made to show one size of film cannot be used to show a different sized film. The 16mm film projector can only take 16mm film.

The term "motion picture" isn't really accurate. The motion you see when watching a movie is actually an illusion. A film is made up of a very large number of still pictures, called "frames." Each frame is just slightly different from the frame before it. When these frames are projected at the correct speed, they give the illusion of smooth motion. The standard speed for a sound film is 24 frames per second. I'll repeat that: 24 frames per second.

Finally, let's talk about the physical characteristics and the capabilities of the particular 16mm projector that will be used in the demonstration.

The projector can be carried easily. The case has a carrying handle on top.

The speaker is located in the projector itself. It is not separate.

The projector also has several special capabilities.

First, it has a reverse function. This allows you to run the film in reverse and show the motion backward.

Second, it has a stop action function. This allows you to stop the film at a particular frame so you can study it.

That is the end of the lecture.

---

(At this point, students are directed to answer Questions 1-4 of the Screening Test.)

Title Movie Projector Demonstration

Program \_\_\_\_\_

Media Videotape

Time \_\_\_\_\_

Visual	Audio
M.S. Narrator.	This demonstration is on how to operate a movie projector. We'll break the procedure down into 3 phases.
C.U. Graphic.	The phases are: Set up. Automatic Threading. And Running the Film.
M.S. Projector. Narrator shows inside of cover.	For this demonstration, we are using a 16mm sound projector. Most projectors have the instructions inside the cover.
M.S. Narrator demonstrates steps. Step 1	Phase 1 has 5 steps: Step 1. Place the projector on a level and sturdy surface.
Step 2	Step 2. Plug the projector in.
Step 3	Step 3. Extend the reel arm. This is called the reel arm because it holds the reel of film. It will extend so far, then it will lock in place. You can hear the click. (Sound) Extend the other reel arm to the horizontal position. It will lock in place too. (Sound)
Step 4	Step 4. Place the reel of film on the front reel arm.
M.S. Points to lens.	You can tell the front by looking for the lens. The lens is at the front of the projector.
M.S. Positions reel. Tests it.	The reel will snap into place. Make sure it is secure.

Title Movie Projector Demonstration

Program \_\_\_\_\_

Media Videotape

Time \_\_\_\_\_

Visual	Audio
<p>M.S. Points to film coming off reel.</p>	<p>Position the reel of film so the film comes off the front of the reel, <u>NOT</u> the back.</p>
<p>M.S. Positions take-up reel.</p>	<p>I'll repeat that: Position the reel of film so the film comes off the front of the reel, <u>NOT</u> the back.</p>
<p>M.S. Positions take-up reel.</p>	<p>Then put the empty reel, or take-up reel, on the other reel arm. I'll repeat that name: the empty reel is called the <u>take-up</u> reel.</p>
<p>C.U. Turns on Volume Control.</p>	<p>Step 5. Turn on the Volume Control. That's the switch down in front here. Turn it to the ON position. That turns on the power.</p> <p>That is the end of Phase 1.</p>
<p>At this point, the test administrator turns off the VTR and directs the students to answer Questions 5-8 of the Screening Test.</p>	
<p>M.S. Narrator.</p>	<p>Now for Phase 2. Phase 2 is Threading the Projector. This is an automatic-threading machine which simplifies the threading.</p>
<p>C.U. Turns on motor/lamp switch.</p>	<p>Phase 2 has 5 steps:</p> <p>Step 1. Turn on the motor-lamp switch to Forward Position. I'll repeat that. This switch is called the motor lamp switch. Turn it to Forward Position. It is marked FWD and has the Number 1 because it is Step 1.</p>

Title Movie Projector Demonstration

Page 3 of 4

Program \_\_\_\_\_

Media Videotape

Time \_\_\_\_\_

Visual

Audio

M.S. Holds up leader.

C.U. End of leader.

C.U. Points to  
cutter.

C.U. Demonstrates  
procedure.

M.S. Points to Auto  
Load lever.

C.U. Positions it.

C.U. Inserts film.

M.S. Narrator behind  
projector.  
Demonstrates  
action.

C.U. Attaches leader  
to reel.

M.S. Narrator.

Step 2. Trim the leader. This white part is called the leader. Look at the end of it. The end may be ragged, or cut at an angle. If that's the case, the leader won't thread through the machine properly. You'll have to trim it.

The cutter is here, on the front of the projector. To trim the leader just insert it in the slot and press the cutter. The leader is now ready for threading.

Step 3. Push the Auto Load lever. That is the lever here. It's marked with the Number 3. Push it forward.

Step 4. Insert the film here where you see the Number 4. It will automatically thread through the machine.

Step 5. Allow at least 3 feet of leader to run through the end of the machine. Then turn off the motor-lamp switch.

Attach the leader to the take-up reel. Insert the end into the slot on the reel. Tighten it by turning the reel.

Now you're ready for Phase 3 - Running the Film.

Title Movie Projector Demonstration

Page 4 of 4

Program \_\_\_\_\_

Media Videotape

Time \_\_\_\_\_

Visual	Audio
C.U. Turns switch to lamp position.	Step 1. Turn the motor-lamp switch to Lamp position. That turns on the light.
C.U. Adjusts focus.	Step 2. FOCUS. The focus knob is here. Adjust the focus until you have a sharp picture.
C.U. Turns up volume.	Step 3. Adjust the volume. Then you're all set to show the film. (Sound of film.)
M.S. Narrator.	This concludes the procedure for operating the projector.
At this point, students are directed to complete the rest of the Screening Test, beginning with Item No. 9.	

APPENDIX B

ALL SCORING KEYS

APPENDIX  
B

SCREENING TEST - SCORING KEY

Unit III	1.	a	b	c	d	Unit IX	22.	a	b	c	d	Unit I	43.	a	b	c	d	Unit VI	64.	a	b	c	d
	2.	a	b	c	d		23.	a	b	c	d		44.	a	b	c	d		65.	a	b	c	d
	3.	a	b	c	d		24.	a	b	c	d		45.	a	b	c	d		66.	a	b	c	d
	4.	a	b	c	d		25.	a	b	c	d		46.	a	b	c	d		67.	a	b	c	d
	5.	a	b	c	d		26.	a	b	c	d		47.	a	b	c	d		68.	a	b	c	d
	6.	a	b	c	d		27.	a	b	c	d		48.	a	b	c	d		69.	a	b	c	d
	7.	a	b	c	d		28.	a	b	c	d		49.	a	b	c	d		70.	a	b	c	d
	8.	a	b	c	d		29.	a	b	c	d		50.	a	b	c	d		71.	a	b	c	d
	9.	a	b	c	d		30.	a	b	c	d		51.	a	b	c	d		72.	a	b	c	d
	10.	a	b	c	d		31.	a	b	c	d		52.	a	b	c	d		73.	a	b	c	d
	11.	a	b	c	d		32.	a	b	c	d		53.	a	b	c	d		74.	a	b	c	d
	12.	a	b	c	d		33.	a	b	c	d		54.	a	b	c	d		75.	a	b	c	d
Unit VIII	13.	a	b			34.	a	b	c	d	55.	a	b	c	d	76.	a	b	c	d			
	14.	a	b			35.	a	b	c	d	56.	a	b	c	d	77.	a	b	c	d			
	15.	a	b			36.	a	b	c	d	57.	a	b	c	d	78.	a	b	c	d			
	16.	a	b			37.	a	b	c	d	58.	a	b	c	d	79.	a	b	c	d			
	17.	a	b			38.	a	b	c	d	59.	a	b	c	d	80.	a	b	c	d			
	18.	a	b			39.	a	b	c	d	60.	a	b	c	d	81.	a	b	c	d			
	19.	a	b			40.	a	b	c	d	61.	a	b	c	d	82.	a	b	c	d			
	20.	a	b	c	d	41.	a	b	c	d	62.	a	b	c	d	83.	a	b	c	d			
Unit IX	21.	a	b	c	d	42.	a	b	c	d	63.	a	b	c	d	84.	a	b	c	d			

cont.

cont.

cont.

Note: These two items are scored in Both Unit VI and Unit VII.

DIAGNOSTIC TEST - UNIT I

SCORING KEY

Lesson 1	1.	a	b	c	d	Lesson 3	17.	a	b	c	d	
		o	●	o	o			18.	a	b	c	d
	2.	a	b	c	d			19.	a	b	c	d
		o	●	o	o			20.	a	b	c	d
	3.	a	b	c	d		21.	a	b	c	d	
		o	o	●	o		22.	o	o	●	o	
	4.	a	b	c	d		23.	a	b	c	d	
		o	o	o	●		24.	o	o	●	o	
Lesson 7	5.	a	b	c	d	Lesson 5	25.	a	b	c	d	
		●	o	o	o			26.	o	●	o	o
	6.	a	b	c	d			27.	o	o	●	o
		o	●	o	o			28.	a	b	c	d
	7.	a	b	c	d		29.	o	●	o	o	
		o	o	●	o		30.	●	o	o	o	
	8.	a	b	c	d		31.	a	b	c	d	
		o	o	o	●		32.	o	●	o	o	
Lesson 4	9.	a	b	c	d	Lesson 2	33.	a	b	c	d	
		●	o	o	o			34.	o	●	o	o
	10.	a	b	c	d			35.	a	b	c	d
		o	o	●	o			36.	o	o	●	o
	11.	a	b	c	d		37.	a	b	c	d	
		o	o	o	●		38.	o	o	o	●	
	12.	a	b	c	d		39.	a	b	c	d	
		o	o	●	o		40.	o	o	●	o	
Lesson 5	13.	a	b	c	d	Lesson 6	41.	a	b	c	d	
		o	o	●	o			42.	o	●	o	o
	14.	a	b	c	d			43.	a	b	c	d
		●	o	o	o			44.	o	o	o	●
	15.	a	b	c	d		45.	a	b	c	d	
		●	o	o	o		46.	o	●	o	o	
	16.	a	b	c	d		47.	a	b	c	d	
		o	o	●	o		48.	o	o	●	o	

Note: Questions 13-16 plus 21-24 yield scores for Lesson 5.

DIAGNOSTIC TEST - UNIT II

SCORING KEY

Lesson 1

1.	a	b	c	d				
	o	o	o	●	17.	a	b	c
	o	o	o	o		o	●	o
2.	a	b	c	d				
	o	o	o	●	18.	a	b	c
	o	o	o	o		o	o	●
3.	a	b	c	d				
	o	o	●	o	19.	a	b	c
	o	o	o	o		o	●	o
4.	a	b	c	d				
	●	o	o	o	20.	a	b	c
	o	o	o	o		o	●	o

Lesson 3 (cont'd)

Lesson 2

5.	a	b	c	d
	o	o	●	o
6.	a	b	c	d
	●	o	o	o
7.	a	b	c	d
	o	●	o	o
8.	a	b	c	d
	o	o	o	●
9.	a	b	c	d
	o	o	●	o
10.	a	b	c	d
	o	o	o	●
11.	a	b	c	d
	o	o	●	o
12.	a	b	c	d
	o	o	o	●

Lesson 3

13.	a	b	c	d
	o	o	●	o
14.	a	b	c	d
	o	o	o	●
15.	a	b	c	d
	●	o	o	o
16.	a	b	c	d
	●	o	o	o

DIAGNOSTIC TEST - UNIT III

SCORING KEY

NOTE: Use this template only when student's score on the Screening Test, Unit III is below cutoff point.

1.	a	b	c	d
	o	o	o	●
2.	a	b	c	d
	o	●	o	o
3.	a	b	c	d
	o	o	●	o
4.	a	b	c	d
	o	o	●	o
5.	a	b	c	d
	o	o	o	●
6.	a	b	c	d
	o	●	o	o
7.	a	b	c	d
	o	●	o	o
8.	a	b	c	d
	o	o	o	●
9.	a	b	c	d
	o	o	●	o
10.	a	b	c	d
	o	o	o	●
11.	a	b	c	d
	●	o	o	o
12.	a	b	c	d
	o	o	●	o

Lesson 1

Lesson 2

Lesson 3

DIAGNOSTIC TEST - UNIT IV - SCORING KEY

NOTE: Use this template only when student's score on the Screening Test, Unit IV is below cutoff point.

Note: The Lesson 1 score is the same as the Unit score on the Screening Test.

Lesson 1

Lesson 3

Lesson 2

73.	a	b	c	d
	o	●	o	o
74.	a	b	c	d
	o	o	●	o
75.	a	b	c	d
	o	o	o	●
76.	a	b	c	d
	o	o	●	o
77.	a	b	c	d
	●	o	o	o
78.	a	b	c	d
	o	o	o	●
79.	a	b	c	d
	o	o	o	●
80.	a	b	c	d
	o	●	o	o
81.	a	b	c	d
	o	●	o	o
82.	a	b	c	d
	o	●	o	o
83.	a	b	c	d
	●	o	o	o
84.	a	b	c	d
	o	o	●	o

DIAGNOSTIC TEST - UNIT VI

SCORING KEY

Lesson 2

	a	b	c	d
1.	●	o	o	o
	a	b	c	d
3.	o	●	o	o
	a	b	c	d
4.	o	●	o	o
	a	b	c	d
8.	o	●	o	o

Lesson 3

	a	b	c	d
2.	●	o	o	o
	a	b	c	d
5.	●	o	o	o
	a	b	c	d
6.	o	●	o	o
	a	b	c	d
7.	o	o	●	o
	a	b	c	d
9.	o	o	o	●
	a	b	c	d
10.	o	o	●	o
	a	b	c	d
11.	o	o	o	●
	a	b	c	d
12.	o	o	o	●

Lesson 1

	a	b	c	d
13.	o	o	●	o
	a	b	c	d
14.	o	o	●	o
	a	b	c	d
15.	o	o	●	o
	a	b	c	d
16.	●	o	o	o

DIRECTIONS TO SCORER

To score Lessons 2 and 4, position template so the arrow below is at the left edge of the student's Answer Sheet.

DIAGNOSTIC TEST - UNIT VII

SCORING KEY

	a	b	c	d
1.	●	○	○	○
	a	b	c	d
2.	○	●	○	○
	a	b	c	d
3.	○	○	●	○
	a	b	c	d
4.	●	○	○	○
	a	b	c	d
5.	○	○	●	○
	a	b	c	d
6.	●	○	○	○
	a	b	c	d
7.	●	○	○	○
	a	b	c	d
8.	○	●	○	○
	a	b	c	d
9.	○	○	●	○
	a	b	c	d
10.	○	○	●	○
	a	b	c	d
11.	○	○	●	○
	a	b	c	d
12.	●	○	○	○

Lesson 2

Lesson 1

DIAGNOSTIC TEST - UNIT VIII

SCORING KEY

Lesson 1

	a	b
1.	o	•
	a	b
3.	o	•
	a	b
5.	o	•
	a	b
6.	•	o
	a	b
7.	•	o
	a	b
8.	•	o
	a	b
10.	•	o
	a	b
12.	o	•

Lesson 2

	a	b		
2.	o	•		
	a	b		
4.	•	o		
	a	b	c	d
13.	o	o	•	o
	a	b	c	d
14.	o	o	o	•

Lesson 4

Lesson 3

	a	b
9.	•	o
	a	b
11.	•	o
	a	b
15.	•	o
	a	b
16.	o	o

DIRECTIONS TO SCORER

To Score Lesson 2, position template so Arrow #1 is at the left edge of student's Answer Sheet.

1



DIRECTIONS TO SCORER

To score Lesson 3, position template so Arrow #2 is at the left edge of student's Answer Sheet.

2



DIAGNOSTIC TEST - UNIT IX

SCORING KEY

Lesson 1

	a	b	c	d
1.	●	○	○	○
5.	●	○	○	○
9.	○	○	●	○
15.	○	●	○	○

Lesson 2

	a	b	c	d
2.	○	○	○	●
4.	○	○	●	○
7.	○	●	○	○
10.	○	○	●	○

DIRECTIONS TO SCORER:

To score Lesson 2, position template so arrow #1 is at the left edge of the Student's Answer Sheet.

Lesson 3

	a	b	c	d
3.	○	●	○	○
8.	●	○	○	○
14.	○	○	●	○
16.	○	○	●	○

DIRECTIONS TO SCORER:

To score Lesson 3, position template so arrow #2 is at the left edge of the Student's Answer Sheet.

Lesson 4

	a	b		
6.	○	●		
	a	b	c	d
11.	○	○	●	○
	a	b	c	d
12.	○	○	●	○
	a	b	c	d
13.	○	○	●	○

DIRECTIONS TO SCORER:

To score Lesson 4, position template so arrow #3 is at the left edge of the Student's Answer Sheet.

**COURSE MANAGEMENT PLAN  
APPENDIX B -- INSTRUCTOR GUIDE**

**31M10 Functional Basic  
Skills Education Package**

**Contract No. DABT60-81-C-0006  
Sequence No. A014**

**Prepared for:  
Department of the Army  
U. S. Training Support Center  
Fort Eustis, Virginia 23604**

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INSTRUCTOR GUIDE

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## INSTRUCTOR GUIDE

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### INTRODUCTION

#### Purpose of the Course

The 31M10 Functional Basic Skills Education Program (FBSEP) has been designed to prepare soldiers for AIT training and for successful performance in their units as Multichannel Communications Equipment Operators. In training and on the job, soldiers in the 31M MOS must install, operate, maintain, and troubleshoot complex communications equipment. In order to do this, they need certain technical skills, reading skills, and other learning skills. For example, they need skills for interpreting cabling diagrams in order to install radio and cable equipment. They need reading comprehension skills in order to use the performance steps, checklists, tables, and charts in their technical manuals (TMs). They need scale-reading skills in order to interpret meter readings on the equipment. They need listening and note-taking skills in order to learn from the lectures and demonstrations in the AIT course. Since these kinds of skills are not taught in the 31M10 course, they are prerequisites. That is, it is assumed that soldiers possess these technical, reading, listening, and other skills upon entry into the course. Many soldiers do, in fact, possess these skills to an adequate degree. Many others, however, do not. The purpose of FBSEP is to provide the latter group of 31M10 trainees with the prerequisites they need for success in the 31M10 course.

#### Background of the Course

The Army, as well as other branches of the Armed Services, has offered basic skill instruction for many years. However, until recently, the instruction has been geared to the development of general reading, writing, and arithmetic skills, much like those taught in school. However, in recent years, there has been a movement, in both military and civilian adult basic skill training, toward teaching of functional basic skills, i.e., skills that can be directly applied to adult occupations. For example, instead of reading stories, adult learners in functional basic skill programs may read job manuals or job application forms.

The FBSEP program for 31M10 has been designed to provide training in the basic skills that are directly and functionally related to training and performance in the 31M10 MOS. The content of instruction is generally taken or adapted from 31M materials, and the instruction itself clearly demonstrates the relevance of the content to the AIT course and the MOS.

Furthermore, because different students lack different prerequisites, FBSEP training has been designed so that each student receives instruction only in those skills he/she lacks. Two students may both be assigned to FBSEP, yet have none of their training in common. This goal has been accomplished by making the FBSEP training materials largely self-instructional. Thus, a FBSEP instructor may teach in a classroom in which no two students are working on the same lesson. Individualization of instruction also accommodates to other differences among students. For example, some students need more time to master a given skill than others. Self-instructional learning materials permit each student to proceed at his/her own pace. Some students need more practice and more help in going through the material than others. The FBSEP course has been designed to give each student as much practice or help as he/she needs.

#### Development of FBSEP for 31M10

Development of FBSEP went through a series of stages. The first stage was analysis of the 31M10 MOS and AIT course to identify prerequisite functional skills and learning strategies. This involved observing AIT course delivery, examining instructional materials, and analyzing AIT lesson plans. A large number of potentially important prerequisites were identified in this manner - far more than could (or should) be taught in FBSEP training.

The next stage of development was verification. The verification process had several purposes. They were to: (1) determine the reliability of the identification of prerequisites; (2) develop preliminary methods for measuring the prerequisites; (3) establish the level of performance of 31M10 AIT students on the prerequisites; and (4) relate performance on the prerequisites to performance in the AIT course. Most of the prerequisites which had been identified were found to be positively related to AIT performance; i.e., students who possessed the skills to a high degree did better in the course than students who lacked the skills or possessed them to a lower degree.

The next stage in FBSEP development was design of the FBSEP course. The purpose was to decide what skills to teach and in what order. Design followed directly from the results of verification. Skills which were easy for poor as well as good AIT students and skills which did not

relate to AIT performance were eliminated. The remaining skills were organized into groups of skills (units) and specific skills within units (lessons). The units and lessons were sequenced both with respect to the point in the AIT course where they are first needed and also in terms of their relationship to one another. Table 1 shows the units and lessons within units.

Occurring simultaneously with design of FBSEP was development of tests to identify students who lack prerequisite skills and to prescribe appropriate FBSEP instruction. A two-stage test was developed - a Screening Test and a Diagnostic Test. The Screening Test yields scores in each unit. Students who score below cutoff in one or more units are judged to need FBSEP. These students (and only these students) then take the Diagnostic Test(s) for the unit(s) in which they scored below cutoff, in order to identify the specific lessons in which instruction is needed.

The next stage in the development of FBSEP was the actual development of all lesson materials, i.e., training materials, Student Guides, media for instruction, tests, and Instructor Guides.

The final stage in development, validation, is yet to come. This final stage will answer the question: Does FBSEP succeed in teaching the skills it has been designed to teach? Validation will be accomplished by testing incoming 31M students, assigning those who lack prerequisite skills to the appropriate lessons, then administering lesson posttests to determine whether the students have acquired and retained the skills they have been taught.

### Learning/Teaching Strategies

FBSEP instruction has a number of characteristics which differentiate it from traditional classroom instruction. These include:

1. Explicit statement of learning objectives.
2. Self-instructional materials.
3. Frequent, built-in opportunities for student response.
4. Immediate feedback for all responses.
5. Criterion-referenced testing.

Let us discuss these in turn.

Table I

Units and Lessons

<u>Unit</u>	<u>Lesson</u>	<u>Title</u>
I Reading Comprehension	1	Vocabulary
	2	Strategies for Understanding Sentences
	3	Reading Negative Sentences
	4	Reading Sentences With Dependent Clauses
	5	Ordering One, Two, or Three Tasks
	6	Determining the Order of Steps: Multiple Actions
	7	Understanding Lists and Paragraphs
II Using a Table of Contents	1	Chapters and Sections
	2	Using a Task List to Find a Task Description
	3	Tables with Paragraph Numbers and Page Numbers
III Listening Skills	1	Remembering Information Heard in Lectures
	2	Remembering Information Seen in Demonstrations
	3	Recognizing When Important Information is Missing
IV Note-Taking for Demonstration	1	Basic Note-Taking Skills
	2	Taking Notes to Show Sequence
	3	Taking Notes to Show Relationships
V Recognizing a Part of a Whole	1	Recognizing a Part of a Whole
VI Locating Information in Tables	1	The Structure of Tables and Diagrams
	2	Interpreting Table Headings
	3	Locating Information in 3M Tables
VII Reading Cabling Diagrams	1	The Structure of Tables and Diagrams (Same as Unit VI, Lesson 1)
	2	Identifying Connections in Simple and Complex Cabling Diagrams

(continued on next page)

Table I (continued)

VIII Diagnosing Equipment Malfunctions	1	Deciding Whether an Indication Is Normal
	2	Deciding Whether There Is Something Wrong Based on 2 or More Indicators
	3	Finding Descriptions of Symptoms: One Indicator
	4	Finding Descriptions of Symptoms: Two or More Indicators
IX Scale Reading	1	Labeling Place Value
	2	Numbering Scale Points
	3	Scales Divided into Tenths
	4	Comparing Scale Settings

## Explicit Statement of Learning Objectives

Learning objectives - what the student is expected to be able to do after instruction - are stated explicitly and made available to both student and instructor in each lesson. In each lesson, the final goal of the lesson is explicitly stated as a terminal objective. And the various subgoals which the student must attain on the way toward the terminal objective are stated as enabling objectives. These terms are defined more precisely below.

Terminal objective - the behavior which the student is expected to exhibit at the end of the lesson.

Enabling objectives - behaviors students acquire as prerequisites to attainment of the terminal objective.

Objectives, both terminal and enabling, have three components: action, condition, and standard. They are defined as follows:

Action - the specific behavior.

Condition - the conditions under which the action is to be performed.

Standard - the means by which the performance is to be evaluated; the criterion the student must meet in order for his/her behavior to be judged acceptable.

The Instructor Guide for each lesson in FBSEP lists the terminal objective of the lesson, and all enabling objectives in the order in which they are attained. Each objective lists the action, condition, and standard of the objective. In the Student Guides, objectives are called Learning Goals, and they are written in a form that the students can understand.

## Self-Instructional Materials

Most student learning materials for each lesson are contained in the Student Guide for the lesson. Student Guides are designed to be used by students with minimal intervention by the instructor. Thus, each Student Guide contains: (1) all the material to be learned and (2) instructions for proceeding through the material. Both are written to be self-explanatory. The language has been kept simple so that even relatively poor readers should have little difficulty comprehending it. The instructions are explicit and easy to follow. In most lessons, most students will be able to use the Student Guides and attain the lesson objectives with little or no guidance.

### Frequent, Built-In Opportunities for Student Response

A new behavior being acquired needs to be strengthened and maintained through practice. Each Student Guide includes numerous exercises in which the student practices a new behavior(s) by answering questions. All students receive these built-in opportunities to practice. In addition, if a student's performance on a test (checkpoint) indicates that additional practice is needed (except those in Units III and IV), the instructor can provide it by prescribing a Review Exercise, also self-instructional. At least one Review Exercise is available for each lesson, to be assigned to students who need it.

### Immediate Feedback for All Responses

In most cases, students check their own answers to the exercises in the Student Guides and Review Exercises immediately after answering them. By verifying correct answers, students receive immediate reinforcement for their responses, hence for the learning which enabled the students to make the correct responses. In the case of incorrect responses, students can compare the correct answers with their own and receive immediate corrective feedback, which should increase the probability of correct responses in the future. Research in behavioral psychology has demonstrated the importance of immediate feedback for learning. The FBSEP materials are designed so that immediate feedback occurs regularly and often.

### Criterion-Referenced Testing

Though most of the exercises within lessons are self-correcting, each lesson contains at least one test which is corrected by the instructor. The tests are called checkpoints. Table 2 lists the checkpoints and where they are located within each lesson. They are designed to measure attainment of objectives, as stated in the Student and Instructor Guides. Tests which measure attainment of explicitly stated objectives are called criterion-referenced tests. All the FBSEP checkpoints are criterion-referenced. The students, as well as the instructor, know ahead of time what kinds of things they will be expected to do on a checkpoint, though, of course, they do not know exactly what questions will be asked.

### The Role of the Instructor in FBSEP

Obviously, the FBSEP instructor does not play the following roles common to traditional instruction: lecturer, leader of group recitations or discussions, source of most of the information needed in each

Table 2. Checkpoint List

<u>Unit</u>	<u>Lesson</u>	<u>Checkpoint(s)</u>	<u>Location</u>
I	1	Checkpoint 1, Form A Checkpoint 2, Form A Checkpoint 3, Form A	after Section A after Section B after Section C
I	2	Checkpoint 1, Form A Checkpoint 2, Form A	after Section B after Section D
I	3	Checkpoint 1, Form A	end of lesson
I	4	Checkpoint 1, Form A	after Section B
I	5	Checkpoint 1, Form A	after Section C
I	6	Checkpoint 1, Form A	after Section C
I	7	Checkpoint 1, Form A	after Section C
II	1	Checkpoint 1, Form A	after Section C
II	2	Checkpoint 1, Form A Checkpoint 2, Form A	after Section C after Section D
II	3	Checkpoint 1, Form A	after Section D
III	1	Checkpoint 1, Form A/B	after Section D
III	2	Checkpoint 1, Form A/B	after Section C
III	3	Checkpoint 1, Form A/B	after Section C
IV	1	Checkpoint 1, Form A/B	after Section E
IV	2	Checkpoint 1, Form A/B	after Section C
IV	3	Checkpoint 1, Form A/B	after Section C
V	1	Checkpoint 1, Form A	after Section E
VI	1	Checkpoint 1, Form A	after Section C
VI	2	Checkpoint 1, Form A	after Section C
VI	3	Checkpoint 1, Form A	end of lesson

Table 2. (continued)

<u>Unit</u>	<u>Lesson</u>	<u>Checkpoint(s)</u>	<u>Location</u>
VII	1	(Same as Unit VI, Lesson 1)	
VII	2	Checkpoint 1, Form A	after Section D
VIII	1	Checkpoint 1, Form A	after Section B
VIII	2	Checkpoint 1, Form A	after Section B
VIII	3	Checkpoint 1, Form A	after Section C
VIII	4	Checkpoint 1, Form A	after Section C
IX	1	Checkpoint 1, Form A	after Section C
IX	2	Checkpoint 1, Form A	after Section D
IX	3	Checkpoint 1, Form A	after Section C
IX	4	Checkpoint 1, Form A	after Section C

NOTE: For all lessons in Units III and IV, there are no alternate forms of the checkpoints. Therefore, after completing Review Exercises, students retake the same checkpoint.

lesson. The instructor does play the following roles: facilitator of the learning process, tutor, and manager. Each of these has several components or sub-roles. The roles are discussed below:

1. Facilitator of the learning process. This includes being:
  - a. a resource person. All students occasionally (and some students often) require help in order to understand the material being taught or the instructions to be followed in a Student Guide. In such cases, the instructor must be ready to provide whatever information or help is needed by the individual student.
  - b. a motivator. Students occasionally indicate by their behavior that they are uninterested or bored. In such cases, the instructor may need to provide an incentive to continue working, by pointing out the relevance of the material being learned or, perhaps, by just being encouraging and positive about the student's need and ability to master the material.
  - c. a reinforcer. Success is a powerful incentive for continuation of a learning effort. The lesson materials, through the self-correcting exercises, provide students with some tangible evidence of their own success (reinforcement). But for many students this is not enough. In such cases, and also in scoring checkpoints, which are instructor-corrected, the instructor provides the positive reinforcement which rewards past performance and encourages future efforts.
2. Tutor. When students experience difficulty in learning and need help beyond that provided by the self-instructional materials, the instructor provides one-to-one tutoring. This role involves being:
  - a. a diagnostician. By examining the student's responses on exercises and/or tests and by asking questions, the instructor determines the source of the difficulty. That is, he/she finds out precisely what the student does not understand and why. If the student misunderstands something, the instructor pinpoints the exact source of the misunderstanding.
  - b. a remediator. On the basis of the diagnosis, the instructor provides information and support to teach the skills that are lacking or clarifies the point which is not understood.

Since different students have trouble for different reasons and require different remediation, tutoring calls for a great deal of skill. This role is one where the instructor in FBSEP truly becomes a teacher in the best sense of the word.

3. Manager. With different students working on different lessons in the same classroom, management to ensure the smooth flow of instruction becomes a particularly important role. Management includes being:

a. a manager of material flow. The instructor must see to it that each student receives his/her prescribed lesson materials in the prescribed sequence. This includes Student Guides, Review Exercises when needed, and checkpoints.

b. a decision-maker. Instructors make decisions concerning individual students as well as other kinds of decisions. For individual students, instructors must make decisions such as:

- (1) Does this student need help now or not? Students are expected, generally, to seek help when they need it. However, some students either do not recognize that they need help or are reluctant to ask. The instructor must monitor students regularly and watch for signs of problems, e.g., a student with a puzzled expression, a student who seems to be making little or no progress. In such cases, the instructor may need to take the initiative and offer help.
- (2) After a checkpoint: Does this student need additional practice (a Review Exercise) or not?
- (3) At the end of a lesson: What should this student be assigned to do next?

Decisions (2) and (3) are based on students' prescriptions and on information in the Instructor Guides. The instructor must be able to use these guidelines accurately.

Decisions must also be made when several students need instructor attention simultaneously. In such cases, the instructor must decide which need is most urgent and/or can be met most quickly.

- c. a record keeper. Accurate records are vital to the success of FBSEP. For each student, records are needed of which lessons the student did, when he/she started and finished, and how well the student did (scores on checkpoints). Therefore, an important part of management is the regular maintenance and up-dating of records.

#### The Role of the Student in FBSEP

The role of the student in FBSEP is also different from the usual student role in traditional instruction. Far from being passive recipients of information, students in FBSEP are active processors of information. Students are also more responsible than in traditional instruction for managing and monitoring their own learning. Though the instructor decides what materials students are to work with (Student Guides, Review Exercises), students "teach" themselves via the materials, monitor their own performance on exercises, and decide when and if they need help from the instructor. These are roles most students are not accustomed to playing. Therefore, instructors are often called on to help students to acquire these roles. This means that an additional important role of the instructor in FBSEP is to help students to become independent, responsible learners.

#### Student Characteristics

The students in FBSEP are young men and women, most of them recent high school graduates or drop-outs. Most of them probably joined the Army in the hope of acquiring job skills which can be carried over into civilian life. They probably assume - with relief - that their experience with formal classroom instruction, especially in basic skills like reading and math, is over. For many, their high school (and possibly elementary school) experiences with basic skills were unpleasant and perhaps even strongly aversive. Those who experienced difficulty or were labeled "slow learners" may associate school with punishment and ridicule. Such students will hardly be overjoyed to find themselves in yet another basic skills educational program. Therefore, preparation of students for FBSEP and proper motivation are essential.

The FBSEP materials are designed to motivate students and provide incentives for learning. They do this in several ways. First, their format is sufficiently different from the usual classroom so that few negative responses to classroom instruction will carry over. Since students proceed at their own pace, they do not have to worry about being bored in a lesson that moves too slowly or being confused and falling behind in a lesson that moves too fast. In addition, by

checking their own answers to most exercises, students avoid the criticism they have come to fear for incorrect responses. Furthermore, the sequencing of instruction and frequent practice in each lesson make success highly likely, thus avoiding the failure which such students fear and providing incentive for continued effort.

Second, the FBSEP materials are obviously relevant to the tasks the students will be performing in the AIT course and in their MOS. Each Student Guide begins with an explanation of the relationship between the lesson and their future Army training and career. And the content of the lessons themselves is either taken from 31M10 materials or adapted from them. For example, the reading materials in Unit I, "Reading Comprehension" are about or from 31M10 equipment, field manuals, and technical manuals (TMs). So the nature of the material should make the lessons inherently motivating.

Nevertheless, the previous learning history of the students presents certain problems which necessitate careful monitoring by instructors. For example, though instructions for proceeding through each lesson are explicitly stated in the Student Guides, students may have trouble following the printed instructions - more likely because they do not bother to read them carefully than because they cannot understand them. In addition, students may tend to rush through exercises and/or not to make good use of the corrective feedback provided. The Introduction to FBSEP which each student receives upon entry in FBSEP explains the lesson structure and attempts to prevent some of these problems. Nevertheless, instructors will have to monitor students closely to make sure that students are working steadily but not rushing, are following instructions, are completing exercises when they come to them, and are checking their answers carefully.

Instructors must be especially careful to be warm, supportive, and encouraging in their interactions with students. In all probability, the students' interactions with teachers in the past have been largely unpleasant and negative. The students have come to think of teachers as cold, punishing, and critical. This is not conducive to learning. FBSEP instructors, in order to fulfill their role as facilitators of learning, must "accentuate the positive;" i.e., they must emphasize what students can do rather than what they cannot do. They must be sure to reward correct responses, while gently correcting wrong ones. They must express confidence in the students' ability to succeed and convey that confidence to the students. By so doing, they will make the FBSEP experience a pleasant one for themselves and their students; and they will increase the students' probability of success as learners not only in FBSEP but also in the AIT course and their future Army careers.

## Course Administration

Each student assigned to FBSEP receives a prescription based on his/her performance on the Screening and Diagnostic Tests. A FBSEP Prescription Sheet is shown on the next page. The student's prescription describes the specific lessons the student is to complete, and the sequence in which they are to be assigned. The first lesson listed is the first one assigned. When the student finishes it, the next one is assigned, etc.

When a new student enters the FBSEP program, he/she is first given a three-ring binder including an "Introduction to FBSEP." The student is to place his/her prescription inside the front cover. In addition, all lesson materials given to the student are inserted in the binder in the order in which the instructor provides them. In this way, each student gradually builds his/her own "textbook/workbook" as he/she progresses through the course.

After the student has read the Introduction to FBSEP, the instructor should make sure that he/she understands the structure of the program. At that point, the student is ready to begin the course. The steps are as follows, for front-loaded FBSEP instruction:

1. The instructor provides the student with the Student Guide for the first prescribed lesson, as well as any other media required to complete the lesson, e.g., audiotape, dictionary. The student then proceeds through the Student Guide.
2. In most lessons, the student is told to request a specific checkpoint, Form A, at the end of the lesson (a few lessons have more than one checkpoint). The student completes the checkpoint and brings it to the instructor for scoring.
3. The instructor scores the checkpoint and takes one of two actions, based on the student's score:
  - a. If the student's score is at or above a specified cutoff point,\* the student is provided with corrective feedback, then goes on to the next lesson (or to the next part of the same lesson if there are additional sections), and Steps 1-3 are repeated.
  - b. If the student's score is below the cutoff point, the instructor provides tutoring to remediate the student's difficulty, then assigns the appropriate Review Exercise for additional practice.

\*Cutoff points are given in the Instructor Guides for individual lessons.



After completing the Review Exercise, the student takes a second checkpoint, Form B. This too is scored immediately. The student is provided with corrective feedback, then proceeds to the next prescribed lesson (or next part of the same lesson), regardless of his/her checkpoint score, and Steps 1-3 are repeated.

4. As each lesson is completed, it is checked off on both the student's and the instructor's copies of the FBSEP Prescription Sheet.
5. After the student has completed all prescribed front-loaded lessons, he/she proceeds to the 31M10 AIT course.

For FBSEP lessons that are integrated with the AIT course (all of Unit VIII and Lesson 4 of Unit IX), the preceding steps are followed at the appropriate point in the AIT course.

Each student's progress through the FBSEP course is tracked by means of a FBSEP Student Record Form, shown on the next page. The instructor has one such form for each student in his/her classroom. As a new lesson is assigned, the instructor enters it in the "Unit-Lesson" column, along with the date and the time. Checkpoint scores are recorded in the appropriate columns. Only those checkpoints completed by the student are recorded; the remaining columns are left blank. For example, if a student scores above the cutoff point on checkpoint Form A of a lesson having only one checkpoint, only one score will be recorded for that lesson, under Checkpoint 1A. When the student completes the lesson, the date and time are written in the appropriate columns. Then the same procedure is followed for recording the next assigned lesson.

#### Required Facilities

Instructors need to have the following facilities for all lessons:

1. Completed prescription sheets for all students assigned to the classroom.
2. Instructor Guides for all lessons taking place in the classroom.
3. An adequate supply of Student Guides, Review Exercises, and checkpoints for all lessons taking place in the classroom.
4. A Student Record Form for each student assigned to the classroom.



In addition, some lessons have special needs. If these lessons are to take place in the classroom, the following additional facilities are required:

<u>Unit</u>	<u>Lesson</u>	<u>Section(s) of Lessons</u>	<u>Media Required</u>
I	1	A	Cassette tape player
	1	A	Audiotape of Word Lists I through V
I	2	B	Dictionary
II	2	All	Soldier's Manual for 31M10 (FM 11-31M1/2)
III	1	All	Audiotape player
	1	A,B,C	Audiotape: Practice Exercises
	1	After D	Audiotape: Checkpoint 1, Form A/B
III	2	All	Videotape player
	2	A,B	Videotape: Practice Exercises
	2	After C	Videotape: Checkpoint 1, Form A/B
III	3	All	Audiotape player
	3	All	Videotape player
	3	B	Audiotape: Practice Exercises I
		C	Videotape: Practice Exercises II
		After C	Videotape: Checkpoint 1, Form A/B
IV	1	All	Videotape player
	1	E	Videotape: Practice Exercises
	1	After E	Videotape: Checkpoint 1, Form A/B
	1	All	Blank paper for taking notes
IV	2		Videotape player
	2	C	Videotape: Practice Exercises
	2	After C	Videotape: Checkpoint 1, Form A/B
	2	C	Card Sets 1 and 2
	2	All	Blank paper for taking notes
IV	3	All	Videotape player
	3	C	Videotape: Practice Exercises
	3	After C	Videotape: Checkpoint 1, Form A/B
		All	Blank paper for taking notes.

### Structure of the Instructor Guide for Each Unit/Lesson

The rest of this Instructor Guide includes information needed for teaching individual units and lessons within units. There are nine sections, one for each unit. Within each unit, the Instructor Guides for individual lessons are arranged in the order in which lessons are prescribed.

The section for each unit begins with an Introduction to the Unit. This provides the instructor with an overview of the unit, including its purpose, the type of skills taught, and the relationship of the skills to the 31M10 AIT course. If there are special instructional requirements that distinguish the unit from others, they are described here.

Instructor Guides for individual lessons all follow the same format and include:

- TERMINAL OBJECTIVE: The behavior to be acquired.
- CONDITION: The conditions under which the terminal behavior is to be demonstrated.
- STANDARD: How well the terminal behavior is to be performed.
- ESTIMATED LESSON LENGTH: Estimated average time required, in hours, to complete the lesson.
- METHOD OF INSTRUCTION: A summary of the instructional materials required by all students.
- OTHER MEDIA AND SUPPORT MATERIALS: Additional materials needed, including material required by the instructor.
- REFERENCES: Sources of additional information relevant to the content of the lesson. However, these references are not needed in order to teach the lesson.
- LESSON STRUCTURE: Titles of the sections of the lesson, if the lesson is divided into sections.
- ENABLING OBJECTIVES: Listed by section, in the order in which they are attained. Each includes Action, Condition, and Standard.
- TESTING: A description of the checkpoint(s) in the unit, including cutoff points and actions to be taken by the instructor based on the student's score.

INSTRUCTIONAL GUIDELINES: Guidelines for teaching the lesson,  
monitoring student behavior, and tracking  
and recording student progress.

Scoring keys for all checkpoints (Forms A and B) follow the information  
listed above. Additional materials may be appended for lessons with  
special needs.

## Introduction to Unit I

### Reading Comprehension

The purpose of Unit I is to teach skills and strategies for reading comprehension, in the context of reading materials used in the 31M MOS. The instruction rests on several assumptions:

1. We assume that many adults who are poor readers lack a sufficient vocabulary to cope with their reading materials. Lack of understanding of the words in the material to be read obviously hinders comprehension.
2. We assume that many adults who are poor readers have developed bad reading habits, such as:
  - reading haphazardly and unsystematically.
  - trying to read technical material too fast.
  - skipping over "hard" sentences rather than working on them to figure them out.
  - keying on individual words, especially nouns and verbs, and not paying attention to relationships among the words, e.g., prepositions, conjunctions.

We assume that what these students need are strategies for reading systematically, for figuring out difficult sentences, and for considering all parts of a sentence in relation to one another.

Because of the complexity of the skills and strategies to be taught, Lessons 1 and 2, which lay the foundation, are relatively long. Because of their length, these lessons have checkpoints inserted within the lesson as well as at the end. Lesson 1 has six checkpoints, while Lesson 2 has two. In addition, in both lessons, students are expected to go to the instructor for specific kinds of information at various points within the lesson. For these reasons, students must be monitored especially closely in these lessons.

Lesson 1, "Vocabulary," provides instruction and practice on 96 words which occur frequently in 31M materials. They are not technical terms. The necessary technical terms are taught in the 31M course. They are non-technical terms which students must know in order to read the Soldier's Manual and TMs with understanding.

Lesson 2 teaches five "guidelines" (strategies) for comprehending sentences. Students practice using the guidelines on materials related to the 31M course. Many of the sentences they read have to do with the operation of radio equipment. It is important to keep in mind that the intent of the lesson is not to teach the content of these particular sentences, but to teach skills for comprehending such sentences when students encounter them in the 31M course.

Lessons 3 and 4 deal with particular kinds of sentences which poor readers have trouble with - negative sentences and sentences with clauses. Students continue to use the strategies learned in Lesson 2, as well as strategies specific to the types of sentences in these two lessons.

Most of the materials students have to read in the 31M course are procedural directions - step-by-step instructions for carrying out tasks. Some of the skills for reading procedural directions are those taught in Lessons 2 through 4. Skills for determining the sequence or order in which actions are to be carried out are taught in Lessons 5 and 6.

The last lesson, Lesson 7, teaches students to find their way about in larger units of printed material - lists and paragraphs.

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INSTRUCTOR GUIDE

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UNIT I. READING COMPREHENSION

Lesson 1. Vocabulary

- TERMINAL OBJECTIVE: Identifies meanings of words in context.
- CONDITION: Given a word embedded within a sentence taken or adapted from 31M reading materials.
- STANDARD: Student selects correct definition.
- ESTIMATED LESSON LENGTH: 3 hours
- INSTRUCTIONAL MATERIAL: Student Guide containing self-paced materials, exercises. Checkpoints. Audiotape of word pronunciation.
- OTHER MEDIA AND SUPPORT MATERIALS: Additional review exercise and checkpoints, scoring keys for checkpoints. Students need paper in order to complete review exercises. Script of audiotape.
- REFERENCES: None
- LESSON STRUCTURE: The lesson is divided into six sections. The first five sections (A through E) deal with similar objectives for the five distinct WORD LISTS.
- Section A. Word List I Activities  
(Student Guide, p. 4)
- Section B. Word List II Activities  
(Student Guide, p. 15)
- Section C. Word List III Activities  
(Student Guide, p. 25)
- Section D. Word List IV Activities  
(Student Guide, p. 36)
- Section E. Word List V Activities  
(Student Guide, p. 48)

Section F. Similar and Opposite Meanings  
(Student Guide, p. 63)

ENABLING OBJECTIVES:

Section A

1. Action: Defines WORD LIST I correctly.  
Condition: Given words from WORD LIST I and definitions  
Standard: Correctly matches the word and its definition.
2. Action: Completes puzzle by filling in correct words from WORD LIST I.  
Condition: Given a list of definitions for words from WORD LIST I.  
Standard: Selects the correct word for each definition.
3. Action: Uses WORD LIST I words correctly.  
Condition: Given sentences containing WORD LIST I words.  
Standard: Chooses which sentence uses a word correctly, and which uses a word incorrectly.

Section B

1. Action: Defines WORD LIST II correctly.  
Condition: Given words from WORD LIST II and definitions  
Standard: Correctly matches the word and its definition.
2. Action: Completes puzzle by filling in correct words from WORD LIST II.  
Condition: Given a list of definitions for words from WORD LIST II.  
Standard: Selects the correct word for each definition.

3. Action: Uses WORD LIST II words correctly.  
Condition: Given sentences containing WORD LIST II words.  
Standard: Chooses which sentence uses a word correctly, and which uses a word incorrectly.

#### Section C

1. Action: Defines WORD LIST III correctly.  
Condition: Given words from WORD LIST III and definitions  
Standard: Correctly matches the word and its definition.
2. Action: Solves word anagrams using words from WORD LIST III.  
Condition: Given the words from WORD LIST III with letters scrambled.  
Standard: Unscrambles each word and writes its definition.
3. Action: Uses WORD LIST III words correctly.  
Condition: Given sentences containing WORD LIST III words.  
Standard: Chooses which sentence uses a word correctly, and which uses a word incorrectly.

#### Section D

1. Action: Defines WORD LIST IV correctly.  
Condition: Given words from WORD LIST IV and definitions  
Standard: Correctly matches the word and its definition.
2. Action: Solves word anagrams using words from WORD LIST IV.  
Condition: Given the words from WORD LIST IV with letters scrambled.  
Standard: Unscrambles each word and writes its definition.

3. Action: Uses WORD LIST IV words correctly.  
Condition: Given sentences containing WORD LIST IV words.  
Standard: Chooses which sentence uses a word correctly, and which uses a word incorrectly.

#### Section E

1. Action: Defines WORD LIST V correctly.  
Condition: Given words from WORD LIST V and definitions  
Standard: Correctly matches the word and its definition.
2. Action: Solves word search using words from WORD LIST V.  
Condition: Given a grid of letters and definitions of WORD LIST V words vertically or horizontally positioned.  
Standard: Circles words from WORD LIST V.
3. Action: Uses WORD LIST V words correctly.  
Condition: Given sentences containing WORD LIST V words.  
Standard: Chooses which sentence uses a word correctly, and which uses a word incorrectly.

#### Section F

1. Action: Recognizes words with similar or opposite meanings.  
Condition: Given sentences containing selected words.  
Standard: Fills in or selects words with similar or opposite meanings.
2. Action: Manipulates root words into various forms.  
Condition: Given a root word and its definition, e.g., adjust.  
Standard: Defines or selects other forms of the word, e.g., readjust, adjustment.

TESTING:

Sections A through E contain five word tests (tests for Word Lists I, II, III, IV, and V). For each test, students listen to words on an audiotape and then choose the best definition from the list supplied. The purpose is to identify the specific words a student does not know and, therefore, needs to study and learn.

It should be noted that the 96 words in the Word Lists were systematically chosen from frequency lists of words used in the Soldier's Manual. Therefore, some of the words have very similar or the same meanings (e.g., indicate and designate). Section F of the Student Guide expands on the similar meanings of words.

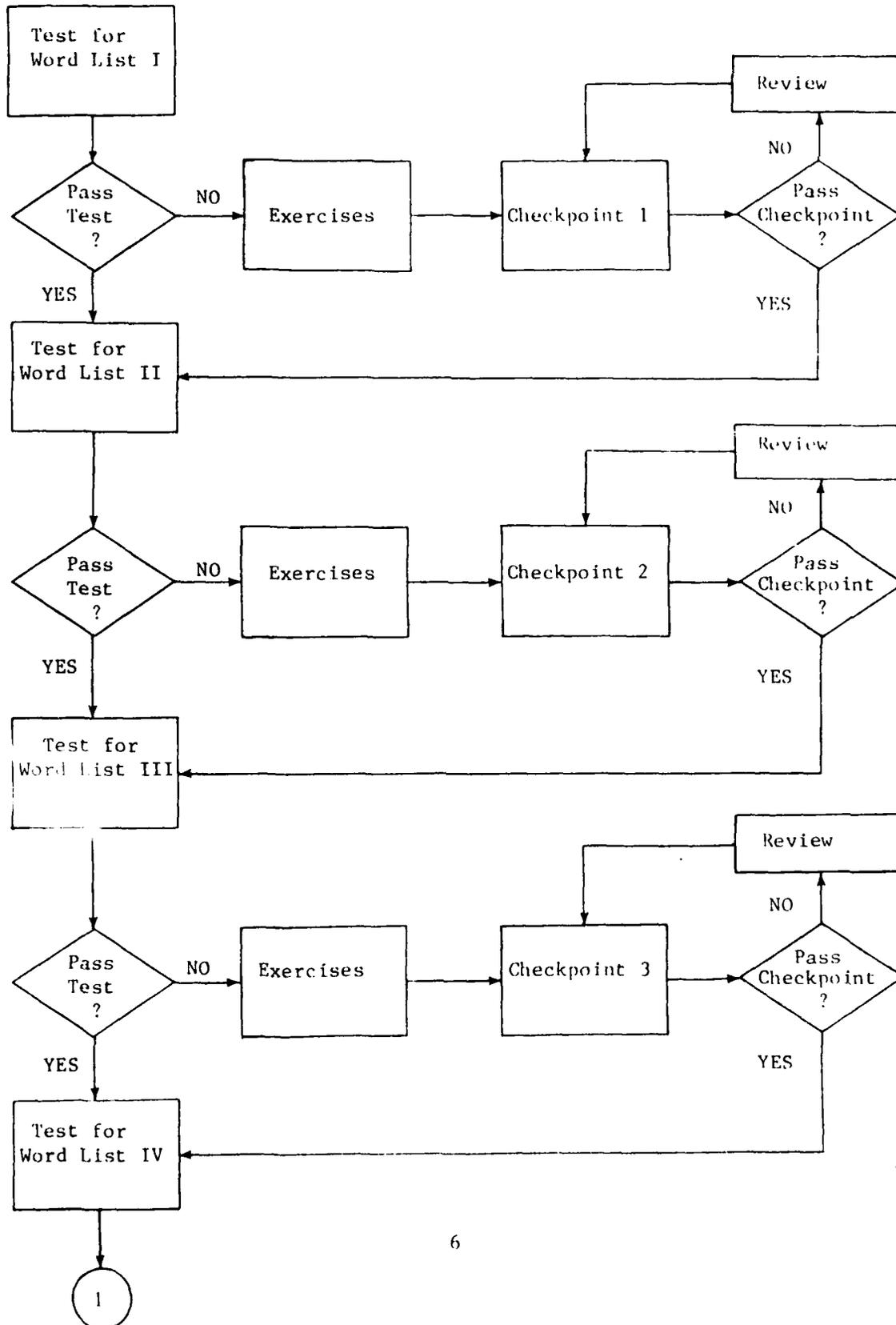
The student is directed to have each word test scored immediately upon completion. If a student is below cutoff on the word test, he completes exercises and a checkpoint using the words from that word test.

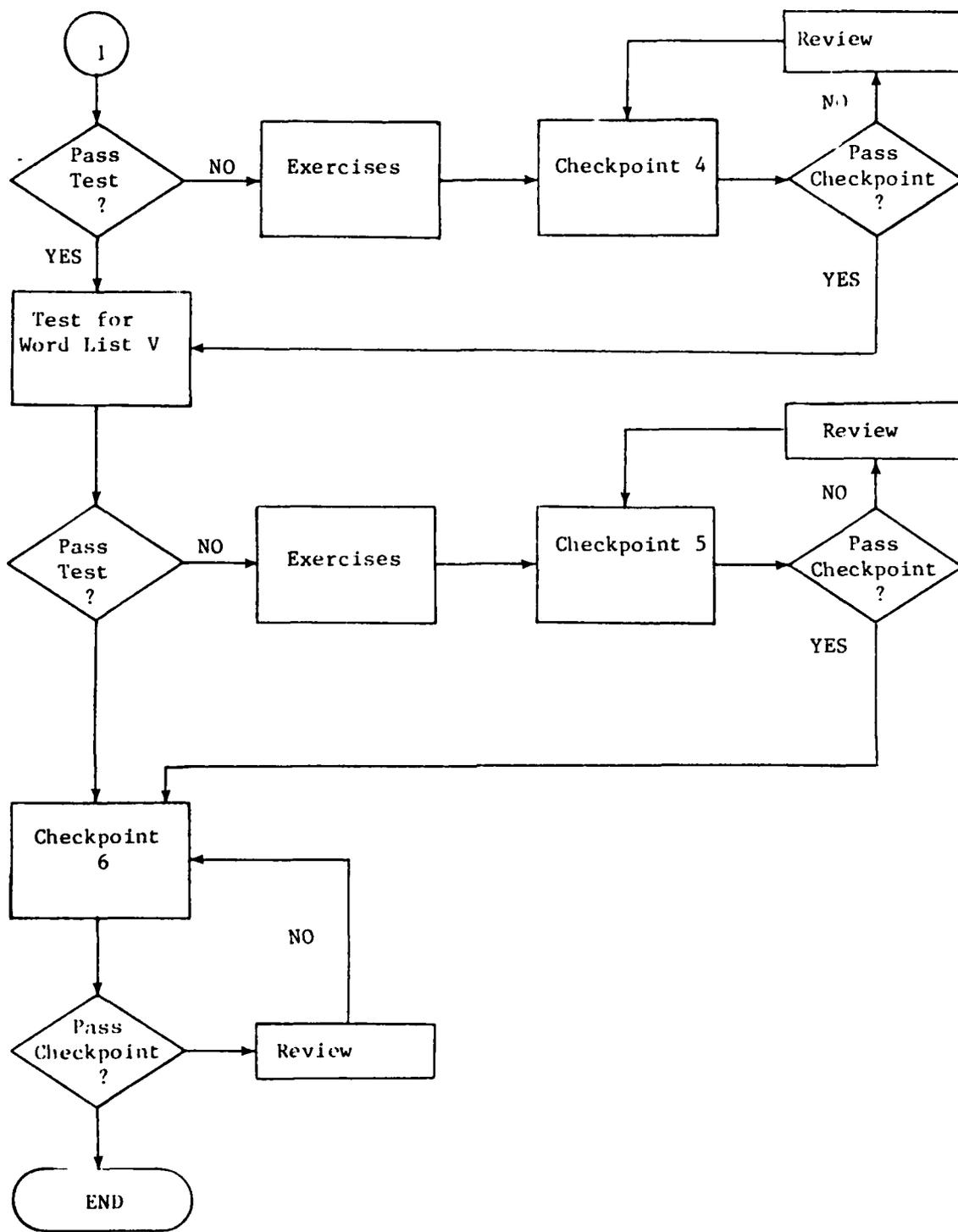
If a student is above cutoff on the word test, he proceeds to the next successive word test after reviewing any words he/she missed. thus, the general flow of students can be shown in a flowchart shown on the next two pages.

One student may progress through the lesson passing tests for WORD LISTS I, II, III, and V. This student would be required to complete exercises and checkpoint for only WORD LIST IV and the final checkpoint of the lesson. Another student may not pass any of the word tests and be required to complete the exercises and checkpoints for all of the WORD LISTS and the final checkpoint.

The word tests and checkpoints have varying numbers of items, so the cutoff points vary also. On page 7 are listed the cutoff points for the various word tests and checkpoints. A student must score at or above the cutoff to be considered passing any word test or checkpoint.

Flowchart Showing Progression  
of Students through UNIT 1, Lesson 1





TEST	NUMBER OF ITEMS	CUTOFF POINT
Test for WORD LIST I	15	13
Checkpoint 1, Forms A and B	15	13
Test for WORD LIST II	15	13
Checkpoint 2, Forms A and B	15	13
Test for WORD LIST III	20	17
Checkpoint 3, Forms A and B	20	17
Test for WORD LIST IV	20	17
Checkpoint 4, Forms A and B	20	17
Test for WORD LIST V	26	22
Checkpoint 5, Forms A and B	26	22
Checkpoint 6, Forms A and B	30	26

The Word List tests and Checkpoints 1 through 5 are all contained in Sections A through E of the lesson. Checkpoint 6 is found at the end of the lesson (after Section F). As you mark the Word List tests and checkpoints, underline the items missed and write the letter indicating the correct answer beside each item missed.

After you have scored each of the Word List tests, take the following actions, based on the student's score.

<u>Test</u>	<u>Score</u>	<u>Action</u>
WORD TEST I	15	Send student on to test for WORD LIST II.
	13 or 14	Have student read and study definitions he/she missed and then send the student on to test for WORD LIST II.
	12 or less	Have student complete exercises that follow the Word Test and then complete Checkpoint 1, Form A.
WORD TEST II	15	Send student on to test for WORD LIST III.
	13 or 14	Have student read and study definitions he/she missed and then send the student on to test for WORD LIST III.
	12 or less	Have student complete exercises that follow the Word Test and then complete Checkpoint 2, Form A.
WORD TEST III	20	Send student on to test for WORD LIST IV.
	17,18, or 19	Have student read and study definitions he/she missed and then send the student on to test for WORD LIST IV.
	16 or less	Have student complete exercises that follow the Word Test and then complete Checkpoint 3, Form A.

<u>Test</u>	<u>Score</u>	<u>Action</u>
WORD TEST IV	20	Send student on to test for WORD LIST V.
	17,18, or 19	Have student read and study definitions he/she missed and then send the student on to test for WORD LIST V.
	16 or less	Have student complete exercises that follow the Word Test and then complete Checkpoint 4, Form A.
WORD TEST V	26	Send student on to complete Checkpoint 6, Form A.
	22,23,24 or 25	Have the student read and study definitions he/she missed and then send the student on to Checkpoint 6, Form A.
	24 or less	Have the student complete the exercises that follow the Word Test and then Complete Checkpoint 5, Form A.

After you have scored each checkpoint\* take the following actions, based on the student's score.

<u>Checkpoint</u>	<u>Score</u>	<u>Action</u>
Checkpoint 1 Form A	15	Send student on to WORD TEST II.
	13 or 14	Have student read and study definitions he/she missed and then send student on to WORD TEST II.
	12 or less	Have student complete Review Exercise 1** and then complete Checkpoint 1, Form B.
Checkpoint 1, Form b	15	Send student on to WORD TEST II.
	14 or less	Have student read and study definitions he/she missed and then student on to WORD TEST II.

\* Note that a student completes Checkpoints 1, 2, 3, 4, or 5 only if he/she fails the associated Word List test. All students complete Checkpoint 6, Form A.

\*\* Review Exercise 1 is completed for non-mastery of all Form A checkpoints except Checkpoint 6, Form A.

<u>Checkpoint</u>	<u>Score</u>	<u>Action</u>
Checkpoint 2 Form A	15	Send student on to WORD TEST III.
	13 or 14	Have student read and study definitions he/she missed and then send student on to WORD TEST III.
	12 or less	Have student complete Review Exercise 1 and then complete Checkpoint 2, Form B.
Checkpoint 2, Form B	15	Send student on to WORD TEST III.
	14 or less	Have student read and study definitions he/she missed and then student on to WORD TEST III.
Checkpoint 3, Form A	20	Send student on to WORD TEST IV.
	17,18, or 19	Have student read and study definitions he/she missed and then send student on to WORD TEST IV.
	16 or less	Have student complete Review Exercise 1 and then complete Checkpoint 3, Form B.
Checkpoint 3, Form B	15	Send student on to WORD TEST IV.
	14 or less	Have student read and study definitions he/she missed and then student on to WORD TEST IV.
Checkpoint 4, Form A	20	Send student on to WORD TEST V.
	17,18, or 19	Have student read and study definitions he/she missed and then send student on to WORD TEST V.
	16 or less	Have student complete Review Exercise 1 and then complete Checkpoint 4, Form B.
Checkpoint 4, Form B	15	Send student on to WORD TEST V.
	14 or less	Have student read and study definitions he/she missed and then student on to WORD TEST V.

<u>Checkpoint</u>	<u>Score</u>	<u>Action</u>
Checkpoint 5, Form A	26	Send student on to Checkpoint 6, Form A.
	22,23,24, or 25	Have student read and study definitions he/she missed and then send student on to Checkpoint 6, Form A.
	21 or less	Have student complete Review Exercise 1 and then complete Checkpoint 5, Form B.
Checkpoint 5, Form B	26	Send student on to Checkpoint 6, Form A.
	25 or less	Have student read and study definitions he/she missed and then send student on to Checkpoint 6, Form A.
Checkpoint 6, Form A	30	Send student on to next lesson.
	26,27,28 or 29	Have student read and study definitions he/she missed and then send student on to next lesson.
	25 or less	Have student complete Review Exercise 2 and then complete Checkpoint 6, Form B.
Checkpoint 6, Form B	30	Send student on to next lesson.
	29 or less	Have student read and study definitions he/she missed and then send student on to next lesson.

The same review exercise (Review Exercise 1) is used to review after Checkpoint 1, Form A; Checkpoint 2, Form A; Checkpoint 3, Form A; Checkpoint 4, Form A; and Checkpoint 5, Form A. In all cases, the review exercise instructs the student to write down all words and their definitions that he/she missed on the checkpoint, then to study those words as well as other in that checkpoint. Therefore, the student will need to refer to his/her checkpoints. He/she should be shown the checkpoint so that the correct definitions of missed words can be copied. But, the checkpoints must be collected before the student is given Form B of the checkpoint.

If the student appears doubtful about which words are to be studied, point out the words that have been marked wrong on the checkpoint and the correct answer indicated.

The review exercise (Review Exercise 2) for Checkpoint 6, Form A requires the student to write down words and definitions missed on all previous WORD TESTS and checkpoints and to study all 96 words in the lesson before asking for Checkpoint 6, Form B. Once again, the student will need to refer to previous checkpoints but they must be collected by the instructor before the student completes Form B of Checkpoint 6.

#### INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

This lesson requires careful monitoring to make certain that students are following instructions precisely, especially at the start of the lesson. Make sure that students listen to the appropriate portions of the audiotape prior to each word test, and that students bring each word test to you for scoring, before going on to the next portion of the tape and next word test. Also check to see that they spend some time studying missed words on each word test.

During the rest of the lesson, check students periodically to make sure that they are completing all exercises as directed; and that they ask for checkpoints when requested to do so. Check students who are doing Review Exercises to make sure that they review the words prior to requesting the Form B checkpoints.

The script of audiotape, Unit I, Lesson 1 can be found after the checkpoint keys.

UNIT I - LESSON 1

Scoring Key for WORD LIST I and Checkpoint 1, Form A

Directions: On the student's test, underline the words missed by each student and clearly write the letter indicating the correct answer on the test.

<u>Word</u>	<u>Correct Definition</u>
1. appropriate	h. suitable or right for a certain person or purpose
2. component	d. part of a larger piece of equipment or system
3. detect	o. to notice if something is there
4. distribution	m. something spread out over a large area
5. electronics	i. related to radios, transistors, and communication equipment
6. gradually	a. a little bit at a time; moving slowly
7. insert	g. to put in
8. maximum	e. highest possible level
9. minimum	f. lowest possible level
10. orient	n. to turn to the required position
11. procedure	c. a particular way of doing something
12. proper	b. correct
13. range	j. how far something can be transmitted
14. terrain	k. type of countryside or land
15. vegetation	l. plants, trees, and other plant life

UNIT I - LESSON 1

Scoring Key for WORD LIST II and Checkpoint 2, Form A

Directions: On the student's test, underline the words missed by each student and clearly write the letter indicating the correct answer on the test.

<u>Word</u>	<u>Correct Definition</u>
1. adequate	d. enough for some purpose
2. clockwise	n. in the direction that hands of a clock move.
3. counterclockwise	m. in the opposite direction from the hands of a clock
4. depress	g. to push down
5. designate	a. to specify, name, or point out
6. energize	k. supply power for operation; start up
7. engage	l. to put in gear; to use; to interlock with
8. extend	h. to stretch out to fullest length
9. fault	b. a defect or flaw; something wrong
10. function	c. the expected action of something; to carry on normal work
11. horizontal	f. level, like the horizon ———
12. indicate	a. to specify, name, or point out
13. modification	j. a change in something
14. receptacle	i. an electrical socket or outlet
15. vertical	e. straight up and down

UNIT 1 - LESSON 1

Scoring Key for WORD LIST III and Checkpoint 3, Form A

Directions: On the student's test, underline the words missed by each student and clearly write the letter indicating the correct answer on the test.

<u>Word</u>	<u>Correct Definition</u>
1. approximately	s. almost exactly
2. automatically	k. acting without help from anything else
3. cable	h. a collection of wires carrying electrical current; to hook up those wires
4. capacity	e. ability of equipment
5. character	o. a letter or simple number
6. defective	d. lacking something; broken
7. exceed	b. to be greater than
8. excess	i. too much of something
9. index	c. an alphabetical list that helps in finding a certain part of a book
10. insure	q. to make certain
11. manually	t. by hand
12. monitor	m. to check on the operation of equipment without disturbing it
13. standard	p. a gauge or rule used in measuring something; a statement of how something is to be done
14. symptom	l. a sign that something is wrong
15. technical	r. special knowledge about a mechanical subject

(continued on the next page)

- |                   |  |
|-------------------|--|
| 16. terminal      | n. an end-point along a communication system |
| 17. transmit      | f. to send a message                         |
| 18. uncorrectable | g. cannot be made right                      |
| 19. vehicle       | j. a car, truck, or van                      |
| 20. visual        | a. by sight; can be seen                     |

UNIT I - LESSON 1

Scoring Key for WORD LIST IV and Checkpoint 4, Form A

Directions: On the student's test, underline the words missed by each student and clearly write the letter indicating the correct answer on the test.

<u>Word</u>	<u>Correct Definition</u>
1. action	d. a physical movement; a thing done
2. adjust	j. to re-position parts of equipment (usually slowly)
3. applicable	t. suitable to use
4. cause	o. to make something happen
5. caution	a. carefulness; a warning to be careful
6. configuration	g. grouping; outward shape, form, or figure
7. contaminate	b. to make something unfit for use or impure
8. deficiency	l. missing some necessary quality or activity
9. detach	s. to separate
10. effective	r. powerful; produces desired result
11. element	e. a necessary part of a piece of equipment
12. elevate	c. to lift up
13. exterior	q. the outside
14. extinguish	p. to go out, put out, or turn off
15. meter	r. an instrument used for measuring the amount of something

(continued on the next page)

- 16. mission i. the purpose for which something is done
- 17. process h. a series of actions needed to complete some product or goal
- 18. preliminary k. what is to be done first
- 19. preventive f. stopping something from happening
- 20. status m. the condition of something

UNIT I - LESSON 1

Scoring Key for WORD LIST V and Checkpoint 5, Form A

Directions: On the student's test, underline the words missed by each student and clearly write the letter indicating the correct answer on the test.

<u>Word</u>	<u>Correct Definition</u>
1. assign	h. appoint; give a task to do
2. authorize	b. give the power to do something
3. auxiliary	q. providing help; back-up
4. establish	w. to prove beyond doubt
5. interval	x. time between
6. location	y. a placement or position
7. maintenance	k. procedure for keeping equipment in working order
8. malfunction	e. failure to operate normally; something wrong
9. momentarily	a. for a short time
10. obstruction	n. blockage
11. operational	l. in working order; ready to perform
12. preset	r. to set beforehand
13. proficient	m. good at doing some task
14. readjust	f. to adjust again
15. reduce	g. to narrow down; to lessen
16. reference	u. where to find information
17. rotate	j. to turn around

(continued on the next page)

- |                   |   |
|-------------------|---|
| 18. seated        | c. in the correct space or place                  |
| 19. secure        | i. to fasten tightly                              |
| 20. select        | s. to choose                                      |
| 21. sequence      | t. ordering of steps to do something              |
| 22. serial number | v. identifying number                             |
| 23. site          | y. a placement or position                        |
| 24. slot          | o. a space into which something fits              |
| 25. suitable      | p. appropriate or correct to use for some purpose |
| 26. tension       | d. tautness; stretched until tight                |

UNIT I - LESSON 1

Scoring Key for Checkpoint 6, Form A

- |       |       |
|-------|-------|
| 1. b  | 16. b |
| 2. d  | 17. b |
| 3. d  | 18. d |
| 4. a  | 19. a |
| 5. b  | 20. d |
| 6. b  | 21. c |
| 7. d  | 22. a |
| 8. c  | 23. a |
| 9. d  | 24. d |
| 10. a | 25. b |
| 11. c | 26. c |
| 12. a | 27. b |
| 13. b | 28. c |
| 14. d | 29. a |
| 15. a | 30. d |

UNIT I - LESSON 1

Scoring Key for Checkpoint 1, Form B

1. h
2. l
3. a
4. c
5. g
6. o
7. i
8. k
9. j
10. b
11. m
12. n
13. f
14. e
15. d

UNIT I - LESSON 1

Scoring Key for Checkpoint 2, Form B

1. k
2. a
3. b
4. h
5. n
6. d
7. c
8. g
9. m
10. l
11. i
12. n
13. e
14. f
15. j

UNIT I - LESSON 1

Scoring Key for Checkpoint 3, Form B

1. b
2. j
3. m
4. p
5. f
6. q
7. s
8. l
9. r
10. d
11. a
12. h
13. e
14. i
15. c
16. g
17. o
18. n
19. k
20. t

UNIT I - LESSON 1

Scoring Key for Checkpoint 4, Form B

1. q
2. k
3. a
4. f
5. t
6. n
7. s
8. i
9. b
10. g
11. p
12. r
13. d
14. e
15. c
16. l
17. m
18. j
19. o
20. h

UNIT I - LESSON 1

Scoring Key for Checkpoint 5, Form B

- |       |       |
|-------|-------|
| 1. r  | 14. x |
| 2. t  | 15. s |
| 3. i  | 16. e |
| 4. c  | 17. p |
| 5. b  | 18. w |
| 6. a  | 19. q |
| 7. o  | 20. g |
| 8. u  | 21. f |
| 9. y  | 22. d |
| 10. l | 23. a |
| 11. n | 24. k |
| 12. h | 25. j |
| 13. m | 26. v |

UNIT I - LESSON 1

Scoring Key for Checkpoint 6, Form B

- |       |       |
|-------|-------|
| 1. d  | 16. c |
| 2. a  | 17. d |
| 3. b  | 18. a |
| 4. c  | 19. d |
| 5. d  | 20. c |
| 6. a  | 21. d |
| 7. c  | 22. c |
| 8. c  | 23. a |
| 9. d  | 24. d |
| 10. a | 25. a |
| 11. a | 26. b |
| 12. d | 27. b |
| 13. b | 28. a |
| 14. a | 29. a |
| 15. b | 30. c |

THE CONTENT OF THE AUDIOTAPE  
LBELED UNIT I, LESSON 1 IS FOUND  
ON THE FOLLOWING PAGES.

Unit I, Lesson 1  
Instructor Guide

WORD LIST I

1. appropriate

Find the appropriate TM before going on.

2. component

Each component of the radio set must fit in a certain place in the van.

3. detect

If you detect a tone, increase the volume.

4. distribution

In certain situations, you will need to have a wide distribution of the signal.

5. electronics

The shelf should contain only electronics equipment.

6. gradually

Turn the switch gradually to the left.

7. insert

Insert the cable into the connector.

8. maximum

The Q-123(W) meter registers at the maximum point.

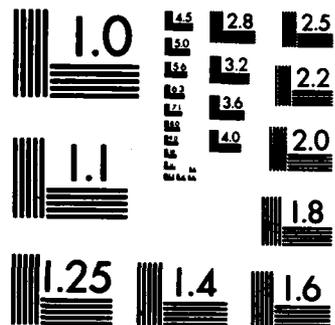
9. minimum

This is the minimum number of items required to place the AB-123 in working order.

10. orient

At this time, you must orient the antenna to the direction of the signal.





MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

WORD LIST I (cont'd)

11. procedure

This section describes the procedure to use when operating the DQG-324.

12. proper

If you do not get the proper result, you must find the problem.

13. range

The range of the signal must be determined before sending the message.

14. terrain

The vans are designed to travel on most types of terrain.

15. vegetation

Vegetation will not stop the radio signal.

WORD LIST II

1. adequate

Be sure you have an adequate amount of fuel for the trip.

2. clockwise

The switch will turn in a clockwise direction.

3. counterclockwise

Turn the knob in a counterclockwise direction.

4. depress

Depress the POWER button.

5. designate

You will designate a captain for the team.

6. energize

Now you must energize the transmitting radio terminal.

7. engage

Continue to shift up until you engage high gear.

8. extend

Extend the mast sections as far as possible.

9. fault

You must isolate the fault in order to fix it.

10. function

The function of the antenna is to help in the reception of the signal.

WORD LIST II (cont'd)

11. horizontal

Be sure the rack support bar is in the horizontal position.

12. indicate

The multimeter may indicate a minimum level.

13. modification

The manual describes the modifications which have been made to the equipment.

14. receptacle

Be sure the wire is firmly in the receptacle.

15. vertical

The needle on the meter should be nearly vertical.

WORD LIST III

1. approximately

The reading should be approximately 95.

2. automatically

It will automatically snap into place.

3. cable

The cable must be attached at this point.

4. capacity

The capacity of the equipment to send the signal can now be determined.

5. character

The name CD-583 is made up of five characters.

6. defective

The problem may be caused by defective operation of switches and controls.

7. exceed

The reading should not exceed 100.

8. excess

Check to see that there is not an excess amount of noise on the line.

9. index

Use the index of the TM to find the appropriate page.

10. insure

Insure the proper alignment is performed in the test.

WORD LIST III (cont'd)

11. manually

You should manually extend the antenna.

12. monitor

You should monitor the system to be sure the transmission continues.

13. standard

The standard is met when the system is in operation.

14. symptom

The buzzer sounding may be a symptom of something wrong.

15. technical

Use this manual to answer your technical questions about the equipment.

16. terminal

The terminal will send the signal to the receiver.

17. transmit

Stations transmit groups of frequencies.

18. uncorrectable

Some problems may be uncorrectable.

19. vehicle

Place the equipment in the transport vehicle.

20. visual

The purpose of visual inspection is to locate faults without testing circuits.

WORD LIST IV

1. action

The TM tells you what action to take if there is no signal.

2. adjust

You may need to adjust the dial to get the proper reading.

3. applicable

These steps are applicable in all types of weather.

4. cause

Troubleshooting will help you find the cause of the problem.

5. caution

Use caution when you are working with electricity.

6. configuration

The equipment should always be in this configuration.

7. contaminate

If it runs roughly, water may contaminate the gasoline.

8. deficiency

If there is a deficiency in the equipment, it will not work.

9. detach

Detach the ropes from the pole.

10. effective

In order to be an effective team, you must work together in a cooperative manner.

11. element

Each element of the generator performs an important task.

WORD LIST IV (cont'd)

12. elevate

Now you must elevate the antenna.

13. exterior

Connect the cable to the exterior of the case.

14. extinguish

The light should extinguish when the button is pushed.

15. meter

If the needle on the meter moves, the circuits are shorted.

16. mission

Your mission is to install and operate the radio.

17. process

This section describes the process of assembling the generator.

18. preliminary

Here is a list of preliminary electrical checks you must complete.

19. preventive

In order to avoid problems in the future, you should complete the preventive maintenance tasks.

20. status

During this task, you must determine the status of the equipment.

WORD LIST V

1. assign

The sergeant will assign you to a work group.

2. authorize

He will authorize the need for spare parts.

3. auxiliary

When you are out of gas, you must find the auxiliary fuel tank.

4. establish

You must establish which part is causing the problem.

5. interval

After an interval of 5 seconds, the light should come on.

6. location

Choose a location that is flat and sheltered.

7. maintenance

This section tells you how to perform general maintenance on the generator.

8. malfunction

A malfunction can delay your transmission for long periods.

9. momentarily

The buzzer should sound momentarily.

10. obstruction

If fuel is not getting through, check for an obstruction in the hose.

WORD LIST V (cont'd)

11. operational

Check to see that all parts are operational.

12. preset

Now you must preset the voltage on the 123-ABC.

13. proficient

By practicing, you will become proficient in the use of the transmitter.

14. readjust

During the process, it may be necessary to readjust the voltage.

15. reduce

In some situations, you may need to reduce the amount of power.

16. reference

Sometimes, another manual will be given as a reference.

17. rotate

Rotate the antenna until the signal is strong and clear.

18. seated

Be sure the bolt is well seated in place.

19. secure

Secure the base plate to the ground.

20. select

Select a location about 6 feet by 7 feet.

21. sequence

Follow this sequence of steps to determine the problem.

WORD LIST V (cont'd)

22. serial number

All of the components will have a serial number to help in identification.

23. site

Your team must locate a level site.

24. slot

The catch should fit neatly in the slot.

25. suitable

If the meter readings are suitable, no further maintenance is required.

26. tension

The guy wires will be under a great deal of tension when the process is complete.

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UNIT I. READING COMPREHENSION

Lesson 2. Strategies for Understanding Sentences

**TERMINAL OBJECTIVE:** Interprets sentences describing radio and radio equipment, task conditions, task standards, and performance steps.

**CONDITION:** Given sentences describing equipment or describing tasks, similar to sentences found in 31M10 reading materials.

**STANDARD:** Student answers questions concerning the content of the sentence and recognizes sentences which are or are not paraphrases of the original sentence.

**ESTIMATED LESSON LENGTH:** 4 hours, 45 minutes

**INSTRUCTIONAL MATERIAL:** Student Guide containing self-paced materials and exercises. Checkpoints. It is anticipated that this lesson may require considerable monitoring of student progress and considerable one-to-one tutoring.

**OTHER MEDIA AND SUPPORT MATERIALS:** Additional review exercises and checkpoints, scoring keys for checkpoints.

**REFERENCES:** Reading materials like those in this lesson are to be found in the Soldier's Manual, most of the TMs used by the 31M10 MOS, and the "Introduction to Multichannel Communications Equipment Operator Course" (202-31M20/A-F,-M).

LESSON STRUCTURE: The lesson is divided into four sections:

Section A. Types of 31M Reading Materials  
(Student Guide, p. 2)

Section B. Reading Descriptions of Equipment  
(Student Guide, p. 6)

Section C. Reading Task Conditions and Standards  
(Student Guide, p. 36)

Section D. Reading Performance Steps  
(Student Guide, p. 44)

There are two checkpoints in the lesson, one at the end of Section B and the other at the end of Section D.

ENABLING OBJECTIVES:

Section A

Action: Matches types of reading materials to types of information in the materials.

Condition: Given questions concerning equipment and performance of tasks.

Standard: Identifies the type of reading material in which answers to the questions are found.

NOTE: Section A introduces the student to different types of reading materials used in the 31M MOS. It is intended primarily as a motivator and advance organizer and does not teach comprehension skills.

Section B

1. Action: Uses the following five guidelines for comprehending the meaning of sentences.

1. Pay close attention to new terms and their definitions.
2. Do not skip over terms you do not understand. Find out what they mean before you go on.

If you do not understand a sentence the first time you read it, do the following:

3. Read the sentence again, slowly and carefully.
4. Read the sentence out loud.
5. Form an image (a picture in your mind) of what the sentence says.

Condition: Given the guidelines and examples showing how each is used.

Standard: Applies each guideline to new sentences.

2. Action: Answers questions concerning the content of sentences about radio concepts and radio equipment (literal comprehension).

Condition: Given sentences about radio concepts (e.g., modulation) and radio equipment (e.g., oscillator).

Standard: Correctly answers fill-in-the-blank and multiple-choice questions concerning the concepts and equipment.

NOTE: The student answers questions about sentence content with the sentence present. The intent is not to have students memorize the information in the sentences, but to provide practice in sentence comprehension.

3. Action: Recognizes paraphrases and non-paraphrases of sentences about radio concepts and radio equipment.
- Condition: Given a sentence about radio concepts or equipment, and given comparison sentences, some of which do and some of which do not say the same thing as the original sentence.
- Standard: Identifies each comparison sentence as having the same or a different meaning, or selects, from several comparison sentences, the one which has the same meaning as the original.

### Section C

1. Action: Answers questions concerning the conditions under which a task is performed.
- Condition: Given sentences describing the conditions for performing a task.
- Standard: Searches the sentence(s) to find answers to questions.
2. Action: Answers questions concerning the standards which must be met in performing a task.
- Condition: Given sentences describing the standards for performing a task.
- Standard: Searches the sentence(s) to find answers to questions.

NOTE 1: The conditions and standards used in the lesson are taken from the 31M10 Soldier's Manual, usually literally but sometimes with slight changes in wording.

NOTE 2: As in Section B, the intent is not for students to memorize the conditions and standards, but to provide practice in interpreting them.

NOTE 3: Students are expected to continue to use the five guidelines for comprehension introduced in Section B. See Enabling Objective 1 for Section B.

Section D

1. Action: Answers questions concerning the content of printed performance steps for single actions, which contain the following terms as well as others:

Operate  
Adjust  
Check  
Insure  
Monitor  
Momentarily  
Sequentially

Condition: Given performance steps in which the terms above as well as others are used.

Standard: Answers questions concerning what has to be done and how.

2. Action: Recognizes paraphrases and non-paraphrases of printed performance steps.

Condition: Given a sentence describing a performance step, and given comparison sentences, some of which do and some of which do not say the same thing as the original sentence.

Standard: Identifies each comparison sentence as having the same or a different meaning, or selects from several comparison sentences the one which has the same meaning as the original performance step.

NOTE: As in previous sections, students are not expected to memorize the information in the performance steps, but rather to interpret the information correctly, using the five guidelines (Section B, Enabling Objective 1) as needed.

TESTING:

This lesson contains two checkpoints. Checkpoint 1 at the end of Section B contains 10 questions measuring Enabling Objectives 2 and 3 of that section. Checkpoint 2 at the end of the lesson contains 10 questions measuring the enabling objectives of Sections C and D.

After you have scored Checkpoint 1, Form A, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	Student should continue with the lesson, beginning with Section C.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have the student go on to Section C of the lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe Review Exercise 1 followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to Section C of the lesson.

After you have scored Checkpoint 2, Form A, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have the student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe Review Exercise 2 followed by Checkpoint 2, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

## INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

This lesson may require more careful monitoring than most. Many BSEP students have well-established bad reading habits, such as:

Rushing through sentences instead of reading methodically.

Skipping over terms they do not understand.

Not following printed instructions to the letter.

A major purpose of this lesson is to change these habits. To do so, it is essential that students take the five guidelines seriously, learn how to use them, and apply them as needed. At various points, especially in Section B, students are told to do things like read a sentence out loud or go to the instructor for some specific purpose. Make sure that they do so. A student who simply sits at his/her desk flipping pages and writing answers is probably not following the instructions.

A possible problem with this lesson (as with others) is that students may try to get through it too fast. Reading comprehension requires slow, methodical, and active processing of each sentence by the student. If a student appears to be rushing, take steps to slow him/her down, by asking questions about the lesson, by checking to make sure that all instructions are being carefully followed, or by other measures that seem appropriate.

UNIT I - LESSON 2

Scoring Key for Checkpoint 1, Form A

1. a
2. c
3. b
4. a
5. They modify the amplitude of the carrier wave.
6. d
7. c
8. c
9. d
10. The speaker changes electric energy to sound.

UNIT I - LESSON 2

Scoring Key for Checkpoint 1, Form B

1. 40 miles.
2. a
3. c
4. A generator.
5. d
6. multiplex equipment.
7. b
8. a
9. amplitude modulation.
10. c

UNIT I - LESSON 2

Scoring Key for Checkpoint 2, Form A

1. 10 KW Generator Set, 5-pound sledge hammer, ground rod, ground strap, 8-inch flat tip screwdriver, 8-inch adjustable wrench, standard pliers.
2. TM 5-6115-275-14
3. She must determine the fuel supply and connect without causing damage to any connectors or the generator set.
4. 0855
5. d.
6. S
7. D
8. S
9. S
10. D

UNIT I - LESSON 2

Scoring Key for Checkpoint 2, Form B

1. ALFA terminal.
2. Basic issue tools, safety equipment.
3. Associated TMs, multichannel systems diagram.

NOTE TO THE INSTRUCTOR: Student may list "Multichannels systems diagram" in the answer to question 2 instead of question 3. That is O.K., as long as "Multichannel systems diagram" is included in either question 2 or question 3.

4. a.
5. 30 minutes.
6. D
7. S
8. c.
9. Receiver meter.
10. When the receiver meter reads in green area of scale.

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UNIT I. READING COMPREHENSION

Lesson 3. Reading Negative Sentences

TERMINAL OBJECTIVE: Interprets negative sentences.

CONDITION: Given a sentence in negative form, i.e., an instruction including terms such as "Do not," "none," "no," which tells what should not happen.

STANDARD: Student selects or states what should happen.

ESTIMATED LESSON LENGTH: 45 minutes

INSTRUCTIONAL MATERIAL: Student Guide containing self-paced materials and exercises. Checkpoint.

OTHER MEDIA AND SUPPORT MATERIALS: Additional review exercise and checkpoint, scoring keys for checkpoints.

REFERENCES: The sentences used in this lesson are performance steps extracted or adapted from ones found in the 31M Soldier's Manual and various TMs.

The lesson, being short, is not divided into sections. However, practice exercises are inserted at several points within the lesson.

PREREQUISITE: Unit I, Lesson 2.

ENABLING OBJECTIVES:

1. Action: Uses the five guidelines taught in Lesson 2 to comprehend negative sentences.

Condition: Given the guidelines and a reminder to use them in this lesson.

Standard: None.

2. Action: Decides whether specified actions or outcomes are or are not appropriate.
- Condition: Given instructions for actions stated in negative form.
- Standard: Correctly classifies each action or outcome as "all right" or "not all right."
3. Action: Decides which of several actions or outcomes is appropriate.
- Condition: Given instructions for actions stated in negative form and various positive interpretations.
- Standard: Selects the correct interpretation (action or outcome).

TESTING:

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT I - LESSON 3

Scoring Key for Checkpoint 1, Form A

1. Check the current level.
2. c.
3. Sgt. Smith will not receive a signal.
4. Yes.
5. b.
6. a.
7. d.
8. No.
9. a.
10. 50 or less.

UNIT I - LESSON 3

Scoring Key for Checkpoint 1, Form B

1. Not receive PCM signals.
2. 40 or less.
3. d.
4. Yes.
5. c.
6. a.
7. b.
8. c.
9. a.
10. Open air vent.

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UNIT I. READING COMPREHENSION

Lesson 4. Reading Sentences with Dependent Clauses

TERMINAL OBJECTIVE: Interprets sentences with clauses.

CONDITION: Given a sentence with one or more dependent clauses.

STANDARD: Student answers questions based on the sentence or recognizes paraphrases and non-paraphrases.

ESTIMATED LESSON LENGTH: 1 hour

INSTRUCTIONAL MATERIAL: Student Guide containing self-paced materials and exercises. Checkpoint.

OTHER MEDIA AND SUPPORT MATERIALS: Additional review exercise and checkpoint, scoring keys for checkpoints.

REFERENCES: Sentences such as those found in this lesson are to be found in various TMs and FMs relevant to the 31M MOS.

LESSON STRUCTURE: The lesson is divided into two sections:

Section A. Reading Sentences with Dependent Clauses That Start with When, As, While, Until, and If  
(Student Guide, p. 2)

Section B. Reading Sentences with Dependent Clauses That Start with Who or Whom, Which, That, and Where  
(Student Guide, p. 10)

PREREQUISITE: Unit I, Lesson 2.

ENABLING OBJECTIVES:

Note: These are the enabling objectives in both Section A and Section B.

1. Action: Uses the five guidelines taught in Lesson 2 to comprehend sentences with clauses.  
Condition: Given the guidelines and a reminder to use them in this lesson.  
Standard: None.
2. Action: Separates sentences into main clause and dependent clause(s).  
Condition: Given sentences with one or two dependent clauses.  
Standard: Places a vertical line correctly between the main clause and dependent clause or between two dependent clauses.
3. Action: Identifies the main clause and the dependent clause(s).  
Condition: Having separated a sentence into clauses.  
Standard: Identifies each clause as MAIN CLAUSE or DEPENDENT CLAUSE.
4. Action: Comprehends each clause in a sentence.  
Condition: Having separated the sentence into clauses.  
Standard: None
5. Action: Puts the clauses together to comprehend the entire sentence.  
Condition: Having comprehended each clause in the sentence.  
Standard: None

TESTING:

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT I - LESSON 4

Scoring Key for Checkpoint 1, Form A

1. b.
2. c.
3. temperature
4. Summer position.
5. a.
6. c.
7. a.
8. poor connections, broken cables, and similar defects.
9. a.
10. which machine is being operated.

UNIT I - LESSON 4

Scoring Key for Checkpoint 1, Form B

1. b.
2. c.
3. a.
4. Several
5. c.
6. Will not stay closed.
7. Record it on Form ABC.
8. a.
9. b.
10. a.

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UNIT 1. READING COMPREHENSION

Lesson 5. Ordering One, Two, or Three Tasks

TERMINAL OBJECTIVE: Determines sequence of two or three actions.

CONDITION: Given directions to perform two or three actions whose order is explicit or implicit.\*

STANDARD: Student selects the action to be performed first, second, or third, or selects a paraphrase giving the correct sequence of actions.

ESTIMATED LESSON LENGTH: 1 hour

INSTRUCTIONAL MATERIAL: Student Guide containing self-paced materials and exercises. Checkpoint.

OTHER MEDIA AND SUPPORT MATERIALS: Additional review exercise and checkpoint, scoring keys for checkpoints.

REFERENCES:

LESSON STRUCTURE: The lesson is divided into four sections:

Section A. The Order of Two Tasks  
(Student Guide, p. 2)

Section B. The Order of Three Tasks  
(Student Guide, p. 8)

Section C. Mixed Up Order of Tasks  
(Student Guide, p. 12)

Section D. Listing and Paraphrasing Steps  
(Student Guide, p. 21)

\* Explicit order means that events are listed in the statement in the order they occur. Implicit order means that events do not occur in the order they occur in a statement; the order is changed by words such as "before" and "after."

**ENABLING OBJECTIVES:**

**Section A**

- Action:** Identifies or lists what happens first and second.
- Condition:** Given directions telling the order of two tasks (explicit).
- Standard:** Identifies or lists which task comes first and which comes second.

**Section B**

- Action:** Identifies or lists what happens first, second, and third.
- Condition:** Given directions telling the order of three tasks (explicit).
- Standard:** Identifies or lists which task comes first, second, and third.

**Section C**

- Action:** Identifies or lists what happens first, second, and third.
- Condition:** Given directions telling the order of three tasks (implicit).
- Standard:** Identifies or lists which task comes first, second, and third.

**Section D**

- Action:** Lists or paraphrases what happens first, second, and third.
- Condition:** Given directions telling the order (explicit or implicit) of two or three tasks.
- Standard:** Identifies the correct order of events, or identifies a correct paraphrase of the directions.

TESTING:

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise and Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT 1 - LESSON 5

Scoring Key for Checkpoint 1, Form A

1. a.
2. c.
3. a.
4. b.
5. c.
6. a.
7. d.
8. b.
9. a.
10. b.

UNIT I - LESSON 5

Scoring Key for Checkpoint I, Form B

1. a.
2. c.
3. d.
4. c.
5. a.
6. b.
7. c.
8. c.
9. b.
10. c.

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UNIT 1. READING COMPREHENSION

Lesson 6. Determining the Order of Steps: Multiple Actions

- TERMINAL OBJECTIVE: Determines sequence: Multiple explicit\* relationships.
- CONDITION: Given directions to perform a sequence of actions (three to five), in which all actions are explicitly described in the correct order.
- STANDARD: Student answers questions concerning the order of actions.
- ESTIMATED LESSON LENGTH: 1 hour
- INSTRUCTIONAL MATERIALS: Student Guide containing self-paced materials and exercises. Checkpoint.
- OTHER MEDIA AND SUPPORT MATERIALS: Additional review exercise and checkpoint, scoring keys for checkpoints.
- REFERENCES: None
- LESSON STRUCTURE: The lesson is divided into three sections:
- Section A. Position of Tasks (Student Guide, p. 2)
  - Section B. Before and After (Student Guide, p. 7)
  - Section C. Directions in Simpler Form (Student Guide, p. 12)

\* Explicit order means that events are listed in the statement in the order they occur.

ENABLING OBJECTIVES:

Section A

1. Action: Chooses which task happens first, second, third, fourth and fifth.
- Condition: Given directions to perform a sequence of tasks (three to five), in which all tasks are explicitly described in the correct order.
- Standard: Selects the ordinal position of each task.

Section B

- Action: Chooses which task happens before or after another.
- Condition: Given directions to perform a sequence of tasks (three to five), in which all tasks are explicitly described in the correct order.
- Standard: Selects which task comes before or after a specified task.

Section C

- Action: Chooses which list best summarizes the directions given.
- Condition: Given directions to perform a sequence of tasks (three to five), in which all tasks are explicitly described in the correct order.
- Standard: Selects the list which best condenses and summarizes the directions.

TESTING:

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise and Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT 1 - LESSON 6

Scoring Key for Checkpoint 1, Form A

1. c.
2. a.
3. d.
4. b.
5. d.
6. c.
7. d.
8. a.
9. a.
10. d.

UNIT I - LESSON 6

Scoring Key for Checkpoint 1, Form B

1. d.
2. a.
3. b.
4. d.
5. b.
6. b.
7. d.
8. b.
9. d.
10. c.

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UNIT 1. READING COMPREHENSION

Lesson 7. Understanding Lists and Paragraphs

- TERMINAL OBJECTIVE: Identifies information about long lists and paragraphs.
- CONDITIONS: Given a list or paragraph describing a task or equipment.
- STANDARD: Student identifies similar information, information included or not included.
- ESTIMATED LESSON LENGTH: 1 hour, 10 minutes
- INSTRUCTIONAL MATERIALS: Student Guide containing self-paced materials and exercises. Checkpoint.
- OTHER MEDIA AND SUPPORT MATERIALS: Additional review exercise and checkpoint, scoring keys for checkpoints.
- REFERENCES: None
- LESSON STRUCTURE: The lesson is divided into two sections:
- Section A. Information in Lists  
(Student Guide, p. 2)
- Section B. Information in Paragraphs  
(Student Guide, p. 9)

ENABLING OBJECTIVES:

Section A

- Action: Answers questions about long lists of information.
- Condition: Given lists of information.
- Standard: Identifies a specific item in a list, a paraphrase of a specific item in a list, information included and not included in a list.

Section B

Action: Answers questions about long lists of information.

Condition: Given a paragraph.

Standard: Identifies information that is and is not contained in the paragraph, and chooses a paragraph that says the same thing.

TESTING:

The checkpoint at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise and Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT I - LESSON 7

Scoring Key for Checkpoint 1, Form A

1. d.
2. b.
3. a.
4. b.
5. a.
6. c.
7. d.
8. c.
9. a.
10. c.

UNIT I - LESSON 7

Scoring Key for Checkpoint 1, Form B

1. a.
2. d.
3. b.
4. d.
5. b.
6. b.
7. b.
8. d.
9. b.
10. b.

## Introduction to Unit II

### Using a Table of Contents

The purpose of Unit II is to teach students to use the various types of Tables of Contents (including Task Lists) they will need to deal with when finding information in the Soldier's Manual and Technical Manuals (TMs). While a simple Table of Contents may present little difficulty for most students, the Tables of Contents in the 31M10 publications have several unusual features which can be confusing, unless they are explained.

Unit II has three lessons. Lesson 1, Chapters and Sections, explains the basic parts of a simple Table of Contents, then presents examples in which the chapter headings are subdivided into sections, as is the case in most 31M10 publications. The 2-part page numbers used in military publications are also taught. Lesson 2, Using a Task List to Find a Task Description, introduces the student to the unusual organization of the Soldier's Manual. The Task Lists are presented as Tables of Contents with special characteristics. (Entries are identified by 10-digit numbers; they are not in strict numerical order; they are grouped by topic.) Strategies are taught for quickly scanning the lengthy Task Lists to find either a particular title or Task Number. Lesson 3, Tables with Paragraph Numbers and Page Numbers, teaches the student to use the most complex forms of Tables of Contents in which the chapters are subdivided into sections and the sections into paragraphs, each with its own 2-part page number and 2-part paragraph number.

Each lesson in Unit II contains a Student Guide, at least one checkpoint<sup>1</sup> (Form A) which measures attainment of the terminal objective, one Review Exercise<sup>2</sup> for students who do poorly on the checkpoint, and an additional checkpoint (Form B) parallel to the first. The Instructor Guide for each lesson includes scoring keys for both forms of the checkpoint.

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<sup>1</sup> Lesson 2 has two checkpoints.

<sup>2</sup> Lesson 3 has a special Review Exercise to teach students to read simple Roman numerals (used in numbering parts of Tables of Contents, etc).

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UNIT II. USING A TABLE OF CONTENTS

Lesson 1. Chapters and Sections

- TERMINAL OBJECTIVE:** Identifies two-part page numbers of entries in a table of contents.
- CONDITION:** Given a table of contents (similar to that in the Soldier's Manual) for locating task lists and task summaries for different categories of tasks.
- STANDARD:** Student identifies the page number on which information relevant to a specified section and chapter is located, or identifies the topic to be found on a specified page of a specified chapter.
- ESTIMATED LESSON LENGTH:** 2 hours
- INSTRUCTIONAL MATERIAL:** Student Guide containing self-paced materials and exercises. Checkpoint.
- OTHER MEDIA AND SUPPORT MATERIALS:** Additional review exercise and checkpoint, scoring keys for checkpoints.
- REFERENCES:** The Table of Contents (not the Task Lists) in the Soldier's Manual.
- LESSON STRUCTURE:** The lesson is divided into three sections:
- Section A. Recognizing Chapters and Sections  
(Student Guide, p. 2)
  - Section B. Using a Two-Part Page Number  
(Student Guide, p. 9)
  - Section C. Using a Table of Contents Like the One in the Soldier's Manual  
(Student Guide, p. 11)

ENABLING OBJECTIVES:

Section A

1. Action: Uses a simple table of contents.  
Condition: Given a table of contents with only chapter titles (no sections) and page numbers.  
Standard: Identifies chapter titles starting on a specified page number or page numbers of a specified chapter.
2. Action: Distinguishes chapter and section titles in a table of contents.  
Condition: Given a table of contents in which chapters are divided into sections and the sections carry page numbers.  
Standard: Identifies chapter titles, section titles, page numbers of specified titles (either chapter or section).

Section B

- Action: Identifies which part of a two-part page number refers to the chapter and which to the page.
- Condition: Given a two-part page number, or a page number and chapter number (in either order).
- Standard: States what the two-part page number means, or writes the two-part page number.

Section C

- Action: Coordinates specified chapter and section titles to find page numbers in a table of contents.
- Condition: Given part of a table of contents (like that in a Soldier's Manual) with two-part page numbers and chapters with identical section titles, and from which the chapter numbers were removed.
- Standard: Identifies page numbers of specified chapter-sections, and identifies chapter number from the page number.

TESTING:

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT II - LESSON 1

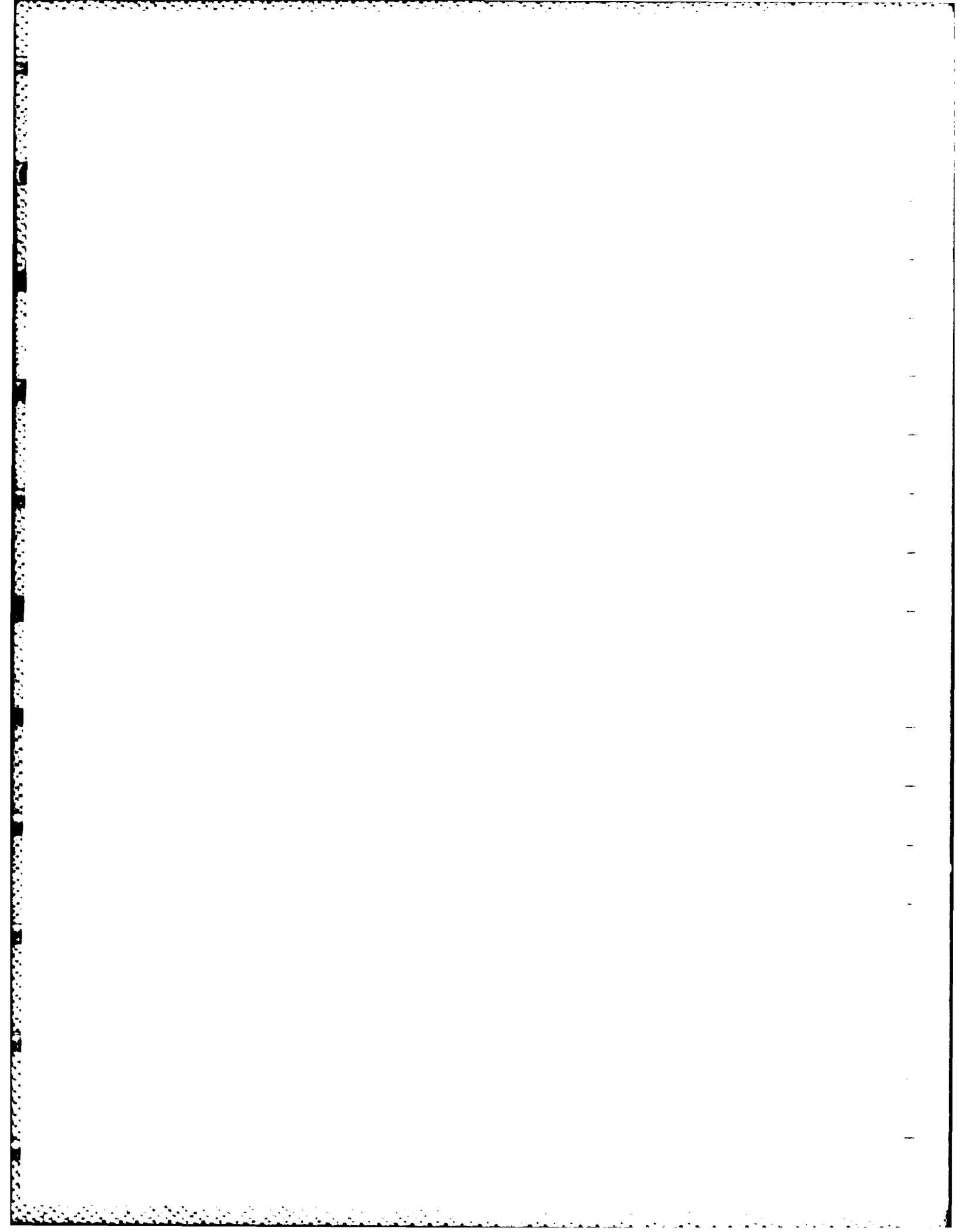
Scoring Key for Checkpoint 1, Form A

1. 5  
Explanation: If the student wrote a higher number, he/she was counting sections, not just chapters.
2. 4
3. What chapter is meant. (Answer need not be those exact words.)
4. 1-10  
Explanation: If the student wrote 3-157 or 5-211, point out that Zulu was asked for, not Zulu Level.
5. Tango Level (Answer should include the word Level.)
6. Golf Level
7. 2-106
8. 5-100
9. 3-79  
Explanation: If the student wrote 4-205, point out that he/she confused the chapter title with the section title.
10. 4-85  
Explanation: If the student wrote 5-100, point out that he/she did not carefully look at the chapter title that was given.

UNIT 11 - LESSON 1

Scoring Key for Checkpoint 1, Form B

1. 4-97
2. 5-83
3. 2-98
4. 3-207
5. Golf Level
6. Papa Level
7. 3
8. What chapter is meant. (Answer need not be those exact words.)
9. 5
10. 1-3



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UNIT II. USING A TABLE OF CONTENTS

Lesson 2. Using a Task List to Find a Task Description

- TERMINAL OBJECTIVE: Scans task list to identify page on which information is listed, using a focusing strategy.
- CONDITION: Given a task list for finding descriptions of specific tasks, each task name preceded by its task number, and given either a task name or task number.
- STANDARD: Student identifies the page number on which a specified task description is to be found.
- ESTIMATED LESSON LENGTH: 2 hours
- INSTRUCTIONAL MATERIAL: Student Guide containing self-paced materials and exercises. Checkpoint. NOTE: STUDENT NEEDS SOLDIER'S MANUAL FOR THIS LESSON.
- OTHER MEDIA AND SUPPORT MATERIALS: Additional review exercise and checkpoint, scoring keys for checkpoints.
- REFERENCES: *Soldier's Manual Task Lists.*
- LESSON STRUCTURE: The lesson is divided into four sections:
- Section A. Finding a Task List in the Soldier's Manual (Student Guide, p. 2)
  - Section B. Scanning a Task List to Find a Task Number (Student Guide, p. 5)
  - Section C. Scanning a Task List to find a Task Title (Student Guide, p. 13)
  - Section D. Using a Task List to Find a Page Number (Student Guide, p. 15)

ENABLING OBJECTIVES:

Section A

- Action: Uses Table of Contents to locate Task Lists in a Soldier's Manual.
- Condition: Given a Soldier's Manual and directions.
- Standard: Finds first page of both Task Lists in the Soldier's Manual.

Section B

- Action: Scans a Task List to find a particular task number.
- Condition: Given a task number and Task List (with numbers not in numerical order).
- Standard: Uses focusing strategy to find a task number.

Section C

- Action: Scans a Task List to find a particular task title.
- Condition: Given a task title and Task List.
- Standard: Uses focusing strategy to find a task title.

Section D

- Action: Uses a Task List to find a page number.
- Condition: Given a Soldier's Manual and a task number or title.
- Standard: Uses focusing strategies to find task number or title, then finds page number.

TESTING:

There are two checkpoints, one after Section C and one after Section D. Each contains 10 questions measuring the terminal objective. After you have scored each checkpoint, take the following actions, based on the student's score.

A. Checkpoint 1

Score

10 correct Student should go on to Section D of the lesson.

8 or less correct Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to Section D.

B. Checkpoint 2

Score

Action

10 correct End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.

8 or 9 correct Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.

7 or less correct Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe Review Exercise 1, Checkpoint 1, Form B, Review Exercise 2, and Checkpoint 2, Form B. Score each checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT II - LESSON 2

Scoring Key for Checkpoint 1, Form A

1. a. Chapter 2 Task List only.  
Explanation: All the Task Numbers in the Chapter 3 Task List (except one) start with 113-, so 031-503-1010 can't be in that Task List.
2. b. The first section of the number.
3. Disinfect Water for Drinking (Canteen)  
Explanation: In case the student couldn't find it, this Task List entry is on page 2-4.
4. Lead Physical Conditioning Activities  
Explanation: This Task List entry is on page 2-7.
5. Operate Repeater Set, Radio, AN TRC-113(V)  
Explanation: This Task List entry is on page 3-2.
6. Chapter 3  
Explanation: This Task List entry is on page 3-2.
7. Direct Operator's Daily Preventive Maintenance of Telephone Terminal Sets  
Explanation: The Task List entry is on page 2-8.
8. Chapter 2  
Explanation: This Task List entry is on page 2-8.
9. 113-593-4009  
Explanation: This Task List entry is on page 3-5.
10. 113-593-1012  
Explanation: This Task List entry is on page 3-7.

UNIT II - LESSON 2

Scoring Key for Checkpoint 2, Form A

1. 2-382  
Explanation: This Task List entry is found on page 2-8.
2. 2-172  
Explanation: This Task List entry is found on page 2-4.
3. 3-80  
Explanation: This Task List entry is found on page 3-2.
4. 2-315  
Explanation: This Task List entry is found on page 2-7.
5. 3-10  
Explanation: This Task List entry is found on page 3-1.
6. 3-243  
Explanation: This Task List entry is found on page 3-5.
7. 3-289  
Explanation: This Task List entry is found on page 3-7.
8. 3-34  
Explanation: This Task List entry is found on page 3-1.
9. 3-327  
Explanation: This Task List entry is found on page 3-8.
10. 3-299  
Explanation: This Task List entry is found on page 3-7.

UNIT II - LESSON 2

Scoring Key for Checkpoint 1, Form B

1. 113-593-1021
2. Operate Terminal Set, Telephone, AN/TCC-61  
Explanation: This entry can be found on page 3-3.
3. Encode and Decode Messages Using KTC-600, Tactical Operations Code.  
Explanation: This entry can be found on page 2-7.
4. Operate Terminal Telegraph-Telephone, AN-MCC-6.  
Explanation: This entry can be found on page 37.
5. Splint a Suspected Fracture.  
Explanation: This entry can be found on page 2-3.
6. 113-593-1007  
Explanation: This entry can be found on page 3-3.
7. 113-593-2006  
Explanation: This entry can be found on page 3-4.
8. 113-593-3016  
Explanation: This entry can be found on page 3-6.
9. 113-593-2005  
Explanation: This entry can be found on page 3-1.
10. Troubleshoot Repeater Set, Radio, AN/TRC-113(V).  
Explanation: This entry can be found on page 3-2.

UNIT II - LESSON 2

Scoring Key for Checkpoint 2, Form B

1. 3-296
2. 3-332
3. 3-44
4. 3-280
5. 3-241
6. 3-44
7. 3-80
8. 3-181
9. 3-237
10. 3-101

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UNIT II. USING A TABLE OF CONTENTS

Lesson 3. Tables with Paragraph Numbers and Page Numbers

- TERMINAL OBJECTIVE: Locates paragraphs when they are numbered by chapter.
- CONDITION: Given a table of contents from a manual in which paragraphs are numbered sequentially within each chapter (e.g., 3-9 means Chapter 3, paragraph 9).
- STANDARD: Student identifies the paragraph for a given topic, or the topic for a given paragraph, or the page on which a given paragraph is to be found.
- ESTIMATED LESSON LENGTH: 2 hours
- INSTRUCTIONAL MATERIAL: Student Guide containing self-paced materials and exercises. Checkpoint.
- OTHER MEDIA AND SUPPORT MATERIALS: Additional review exercise and checkpoint, scoring keys for checkpoints. Special review exercise (Review Exercise 2) on reading Roman numerals, scoring key for Review Exercise 2.
- REFERENCES: Selections from Tables of Contents used in this lesson were taken from the following TMs: 11-5803-382-12, 11-5805-357-15, 11-5805-367-12, and 11-5820-461-12.
- LESSON STRUCTURE: The lesson is divided into four sections:
- Section A. Recognizing Chapter, Section, and Paragraph Titles (Student Guide, p. 2)
  - Section B. Using a Two-Part Page Number (Student Guide, p. 9)
  - Section C. Using a Two-Part Paragraph Number (Student Guide, p. 11)
  - Section D. Using a Table of Contents with Paragraph and Page Numbers (Student Guide, p. 13)

ENABLING OBJECTIVES:

Section A

1. Action: Distinguishes chapter, section, and paragraph titles in a Table of Contents.  
Condition: Given a Table of Contents in which chapters are divided into sections and the sections are divided into paragraphs.  
Standard: Identifies chapters, sections, and paragraphs by title.
2. Action: Reads Roman numerals used in a Table of Contents.  
Condition: Given a Table of Contents in which sections are numbered with Roman numerals (not higher than X).  
Standard: Gives equivalent Arabic numbers for specified Roman numerals (between I and X).

Section B

- Action: Identifies which part of a two-part page number refers to the chapter and which to the page.
- Condition: Given a two-part page number, or a page number and a chapter number (in either order).
- Standard: States what the two-part page number means, or writes the two-part page number.

Section C

- Action: Identifies which part of a two-part paragraph number refers to the chapter and which to the paragraph.
- Condition: Given a two-part paragraph number, or a chapter number and a paragraph number (in either order).
- Standard: States what the two-part paragraph number means, or writes the two-part paragraph number.

ENABLING OBJECTIVES:

Section A

1. Action: Distinguishes chapter, section, and paragraph titles in a Table of Contents.  
Condition: Given a Table of Contents in which chapters are divided into sections and the sections are divided into paragraphs.  
Standard: Identifies chapters, sections, and paragraphs by title.
2. Action: Reads Roman numerals used in a Table of Contents.  
Condition: Given a Table of Contents in which sections are numbered with Roman numerals (not higher than X).  
Standard: Gives equivalent Arabic numbers for specified Roman numerals (between I and X).

Section B

- Action: Identifies which part of a two-part page number refers to the chapter and which to the page.
- Condition: Given a two-part page number, or a page number and a chapter number (in either order).
- Standard: States what the two-part page number means, or writes the two-part page number.

Section C

- Action: Identifies which part of a two-part paragraph number refers to the chapter and which to the paragraph.
- Condition: Given a two-part paragraph number, or a chapter number and a paragraph number (in either order).
- Standard: States what the two-part paragraph number means, or writes the two-part paragraph number.

Section D

Action: Identifies page numbers and paragraph numbers in a Table of Contents.

Condition: Given a Table of Contents like those in the TMs and a page number or paragraph number or title.

Standard: Identifies the corresponding title or page number or paragraph number.

TESTING:

The checkpoint at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise and Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

INSTRUCTIONAL GUIDELINES:

If student has trouble with Question 4 in Section A, assign the exercise on Roman numerals. Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT II - LESSON 3

Scoring Key for Checkpoint 1, Form A

1. 5-1
2. 3-8
3. 4-26
4. Checking unpacked equipment
5. 5-2
6. 1-4
7. 3-27
8. System troubleshooting
9. 6-1
10. 2-5

UNIT II - LESSON 3

Scoring Key for Checkpoint 1, Form B

1. 2-6
2. 1-4
3. Fdm system lineup
4. 1-2
5. 3-10
6. 3-34
7. Transmitting equipment
8. 4-3
9. 4-6
10. 4-5

UNIT II - LESSON 3

Scoring Key for Review Exercise 2

1. VI = 6
2. VIII = 8
3. IV = 4
4. III = 3
5. II = 2
6. V = 5
7. I = 1
8. XI = 11
9. X = 10
10. VII = 7
11. IX = 9

## Introduction to Unit III

### Listening Skills

The purpose of Unit III is to teach students techniques for remembering information heard in lectures or seen in demonstrations when it is not possible for them to take notes (as is sometimes the case). The Unit presents many opportunities for practicing listening and watching skills via audiotapes and videotapes.

Unit III has three lessons. Lesson 1, Remembering Information Heard in Lectures, gives students practice in listening carefully, in identifying important information, and in using a variety of encoding (remembering) strategies. An audiotape of brief lectures is used along with the usual paper and pencil materials. Lesson 2, Remembering Information Seen in Demonstrations, is similar in structure to Lesson 1. The focus here, however, is upon learning from watching as well as listening. The encoding strategy of visualizing is introduced. A videotape of several short demonstrations is used with this lesson. Lesson 3 is called Recognizing when Important Information is Missing. Often through a deficiency in listening or remembering, sometimes through a deficiency in the lecture, an important piece of information is not remembered. Students are sometimes not even aware of such gaps in their knowledge; obviously, a handicap in filling these gaps. Lesson 3 gives instruction and practice in recognizing when necessary information is missing. An audiotape and videotape are used.

Each lesson in Unit III contains a Student Guide, and a checkpoint which measures attainment of the terminal objective. Students who do poorly on the checkpoint take a review. The same checkpoint is then re-administered. The Instructor Guide for each lesson includes a scoring key for the checkpoint, a list of the audiotapes and/or videotapes used in the lesson, scripts of the tapes, and directions on how to facilitate the student's use of the tape playback equipment.

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INSTRUCTOR GUIDE

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UNIT III. LISTENING SKILLS

Lesson 1. Remembering Information Heard in Lectures

- TERMINAL OBJECTIVE: Uses retrieval strategies to recall lecture information in response to questions.
- CONDITION: Given the requirement to recall material from a lecture, when note-taking is not possible.
- STANDARD: Student uses appropriate strategies to retrieve the needed information.
- ESTIMATED LESSON LENGTH: 4 hours, 30 minutes
- INSTRUCTIONAL MATERIALS: Student Guide containing self-paced materials and exercises. AUDIOTAPE ("Practice Exercises - Unit III, Lesson 1"). Checkpoint. AUDIOTAPE ("Checkpoint 1 - Unit III, Lesson 1").
- OTHER MEDIA AND SUPPORT MATERIALS: Scoring key for checkpoint, scripts for audiotapes. NOTE: See page 4 for Special Instructions for using the audiotapes.
- REFERENCES: None
- LESSON STRUCTURE: The lesson is divided into four sections:
- Section A. Listening Carefully  
(Student Guide, p. 2)
  - Section B. Recognizing Important Points in a Lecture (Student Guide, p. 6)
  - Section C. Storing Information in Your Memory  
(Student Guide, p. 15)
  - Section D. Recalling Information from Your Memory  
(Student Guide, p. 34)

ENABLING OBJECTIVES:

Section A

- Action: Listens to and follows a series of step-by-step directions.
- Condition: Given a taped set of directions to draw various figures on a work sheet.
- Standard: Produces the required figures from oral directions.

Section B

1. Action: Identifies instructor's verbal signals of importance.  
Condition: Given a taped lecture and descriptions of verbal signals of importance.  
Standard: Identifies which signals were used.
2. Action: Identifies important information based on verbal signals of importance.  
Condition: Given a taped lecture and descriptions of verbal signals of importance.  
Standard: Identifies the most important information in the lecture.
3. Action: Uses organizers (categories) to identify important information in lectures.  
Condition: Given a taped lecture and a series of organizers (categories of important information).  
Standard: Recalls from the lecture items of information pertinent to each organizer.

Section C

1. Action: Relates new information to information already known.  
Condition: Given two sets of information (one representing information to be learned, one representing information already learned).  
Standard: Identifies relationships between the two sets of information.
2. Action: Paraphrases statements.  
Condition: Given brief statements of procedures and general information about radio communication.  
Standard: Rewords the statements but retains all important information.
3. Action: Groups (categorizes) information.  
Condition: Given statements of detailed information about radio equipment and categories.  
Standard: Identifies items of information belonging to each category.
4. Action: Converts information into questions and answers.  
Condition: Given a passage of detailed information about radio.  
Standard: Writes several questions and answers using information in the passage.

Section D

- Action: Recalls lecture information in response to questions.  
Condition: Given a short lecture.  
Standard: Uses the strategies taught in this lesson to recall the required information.

NOTE: Answers for some of the exercises can vary. It is difficult to have students check their answers to those Exercises. Therefore, for several of the exercises, students are directed to have the instructor check the answers. You will need only the Student Guide and the sample answers provided there to check most of those exercises.

For Exercise 7, however, you may need to refer to the script of the lecture for that exercise. (It is attached as part of the Instructor Guide.) The student is directed to convert statements from the lecture into questions and answers. Any factual statement in the lecture may be used.

#### SPECIAL INSTRUCTIONS FOR USING THE AUDIOTAPES:

In addition to the usual paper and pencil materials, this lesson uses two audiotapes of lectures. The Student Guide directs the student to ask you for the tape at the appropriate time. The tapes and when they are needed are as follows:

Practice Exercises - Unit III, Lesson 1 - Needed at the start of Section A, and in Sections B and C, but not in D.

Checkpoint 1, Form A/B - Unit III, Lesson 1 - Needed when the student starts the checkpoint.

When you give the student the first tape, make sure that he/she knows how to operate the cassette machine. Set the tape counter to zero. Point out the location of the counter to the student.

The Practice Exercises tape contains seven short lectures. Some of them the student will have to listen to more than once. The lesson directs the student to rewind the tape at the appropriate spots. STUDENTS MAY REWIND AUDIOTAPES THEMSELVES. Show the student how to rewind, stop, and restart the tape.

When the student has completed the lesson, make sure the tape is rewound to the beginning.

NOTE: Scripts of both audiotapes can be found following the checkpoint scoring key.

TESTING:

Checkpoint 1, Form A/B at the end of the lesson contains 10 questions measuring the terminal objective. Give the student the audiotape and the questions at the same time. Point out to the student that he/she may not look at the questions before hearing the tape. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Show the student which questions were answered incorrectly. Do <u>not</u> tell the student the correct answer, however. Have the student review the appropriate sections of this lesson. Have him/her take Checkpoint 1, Form A/B again, answering only the questions missed the first time. Score checkpoint again and explain any questions answered incorrectly. Then have the student go on to the next prescribed lesson. NOTE: There is no separate Review Exercise for this lesson.

INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT III - LESSON 1

Scoring Key for Checkpoint 1, Form A/B

1. c
2. b
3. a
4. c
5. d
6. b
7. b
8. d
9. c
10. a

Unit III - Lesson 1

Script for Practical Exercises

LECTURE #1

Listening to and Following Step-by-Step Directions

This is the lecture for Exercise 1 for Unit III, Lesson 1. Make sure you have a pencil ready.

I will give you some directions to make certain marks on your paper. After each direction, I will pause to let you perform the action. Then I'll give the next direction, and so on. I will give each direction only once. I won't repeat any direction.

Now turn to the next page in your Student Guide.

(Pause 2 sec.)

You should see a page with the letters A through P arranged in rows and columns.

Here are the directions. Step 1, Draw a square around the Letter E.

(Pause 2 sec.)

Next, draw a square around letter C.

(Pause 2 sec.)

Next, connect G and H with a line that runs from the middle of one letter to the middle of the other letter.

(Pause 2 sec.)

Next, draw a circle around the letter L.

(Pause 2 sec.)

Next, draw a circle around the letter J.

(Pause 2 sec.)

Next, connect the circles around L and J with a line. The line should not touch the letter K.

(Pause 2 sec.)

Next, draw a circle around the letter B.

(Pause 2 sec.)

Next, draw a triangle around the letter O. Draw it with one point facing the top of the paper.

(Pause 2 sec.)

Now draw a triangle around the letter F. Draw it with one point facing the bottom of the paper.

(Pause 2 sec.)

That is all the drawing you will do. Now, turn to the next page in your Student Guide and compare what you drew on your Work Page with the Answer Sheet. Stop this tape while you do that. Turn off the tape now.

LECTURE #2

Listening to and Following Step-by-Step Directions

This is Exercise 2 for Unit III, Lesson 1. Make sure you have a pencil and a blank piece of standard 8 1/2 X 11 paper ready.

(Pause 2 sec.)

I will give you some directions to draw certain shapes on your paper. After each direction, I will pause to let you perform the action. Then I'll give the next direction, and so on. I will give each direction only once. I won't repeat any direction.

Now, first, position your blank sheet of paper so that it is vertical. That is, the way you normally position paper to write on it.

(Pause 2 sec.)

Next, draw a vertical line down the middle of the paper. Exactly in the middle, from the top to the bottom.

(Pause 3 sec.)

Next draw a horizontal line across the middle of the paper. Exactly in the middle, from left to right.

(Pause 3 sec.)

Now your paper should be divided into 4 equal sections.

Next, go to the upper left of the paper and draw a triangle. Draw it so one point is pointing to the top of the paper and make it big enough so that it just about fills the whole upper left section.

(Pause 4 sec.)

Next, draw another triangle inside the first triangle. Draw it so one point is pointing down. Make this triangle big enough so it touches the sides of the first triangle.

(Pause 5 sec.)

Next, go to the upper right section of the paper and draw a circle. Draw it big enough to just about fill the whole upper right section.

(Pause 4 sec.)

Next, inside that circle draw a square. Make the square big enough so that its corners touch the sides of the circle.

(Pause 5 sec.)

Next, go to the lower left section of the paper and draw a square that is about 1 inch on each side. Estimate how big an inch is.

(Pause 4 sec.)

Next, inside that square draw a circle. Make the circle big enough so that it touches the square.

(Pause 4 sec.)

Next, go to the lower right section of the paper. Draw a triangle. Draw it so that one point is pointing to the bottom of the paper and make it big enough so that it just about fills the whole lower right section.

(Pause 4 sec.)

Next, draw another triangle inside the first triangle. Draw it so one point is pointing up. Make it big enough so that it touches the sides of the first triangle.

(Pause 5 sec.)

That is all the drawing you will do. Now turn to the next page in your Student Guide and compare what you drew with the drawing on the answer sheet. Stop this tape while you do that. Turn off the tape now.

LECTURE #3

Instructors' Signals of What is Important

This is Lecture #3 for Unit III, Lesson 1.

In this exercise, I will read a short description and will use some of the signals that instructors use to let you know what information is important.

(Pause 2 sec.)

This lecture is on Radio Communications. First, I'll tell you some general information about radio communications.

You should know that radio is the principal means of communication between and within tactical units.// Radio is also used for communication between: two or more aircraft in flight, and between aircraft and ground units.

(Pause)

// Another thing is that radio communication is highly adaptable to rapidly changing conditions. Communication with highly mobile units, such as ships, aircraft, and tanks, would be extremely difficult if radio communications were not available.

(Pause)

// We'll go into radio equipment in detail later. At this point we'll just say that a radio set consists essentially of a transmitter that generates radio frequency energy. You have the radio frequency energy sent out over a transmitting antenna and picked up by a receiving antenna and a receiver that converts the radio frequency waves into audio frequency or sound.

Now, I'm going to talk about the advantages of using radio. You will need to know this, so listen carefully.

Advantage #1. Radio facilities usually can be installed quickly.

// 2. Once installed, radio equipment is ready for use and does not require reinstallation.

// 3. Radio is mobile. It can be used by units operating in the air, or the sea, and in trucks and vans.

// 4. Radio lends itself to many modes of operation, such as voice, radiotelephone, and radiotelegraph.

5. Natural obstacles, such as minefields, or lands under enemy control do not limit radio to the same extent that they limit other means of communication. For example, in radio communications, usually no wire is used between the point where information originates and the point to which information is sent. Instead, the connecting link is electromagnetic waves in space. You'll want to remember that. Electromagnetic waves in space is the connecting link between two stations--  
Electromagnetic--I'll spell it-- E L E C T R O M A G N E T I C.

6. A radio operator may be located at some distance from the set he operates through the use of remote control equipment.

Now, let me repeat those advantages quickly to make sure you have got them.

1. Radio can be installed quickly.
2. Once it is installed, it does not need reinstallation.
3. Radio is mobile--you can move it around.
4. Radio lends itself to many modes of operation.
5. Obstacles don't stop the electromagnetic waves to the same extent as with other forms of communications.
6. The radio operator can be located away from the set.//

Those are the advantages of radio. There are some disadvantages to radio too, but we'll discuss those at another time.

That is the end of the lecture for Exercise 3. Now go to your Student Guide and answer the questions for this exercise.

STOP THE TAPE NOW.

LECTURE #4 (Used in Exercise 5, Parts 1-3)

Description of the AN/TRC-24\*

This is Lecture #4 for Unit III, Lesson 1. Listen to this short lecture. Then answer the questions in your Student Guide.

This is a short description of some of the characteristics of the radio set AN/TRC-24.

All configurations of the AN/TRC-24 radio set provide for multichannel, line of sight, two-way communication in the ultra high frequency range.

The AN/TRC-24 radio sets provide 399 operating channels in the low band range and 500 channels in the high band range. Some configurations of the radio set include both bands, others include either the high band or the low band.

The AN/TRC-24 radio set is intended mainly for use as a radio link in a communication network which includes carrier telephone and teletype-writer equipment.

The major components of the AN/TRC-24 radio set are installed in cases that are used for stack mounting. All operating controls, meters, and input and output connectors are located on the front panels of the various components.

The transmitting equipment of the radio set is made up of: Transmitter, Radio T-893/GRC, Power Supply, PP-2054/GRC, and the Amplifier-Oscillator AM-1957/GRC.

[Repeat]

\* Adapted from TM 11-5820-461-12

The combination of Receiver, Radio R-1148(P)/GRC and Amplifier-Converter AM-1955/GRC makes up the receiving equipment of the radio set. I'll repeat those components of the receiving equipment. They are:

The Receiver, Radio-R-1148(P)/GRC and Amplifier-Converter AM-1955/GRC.

The Antenna AT-903/G: I'll repeat that - Antenna AT-903/G - is a directional, horn-type antenna, used for both transmitting and receiving radio frequency energy.

The power supply for the transmitter is stacked on top of the radio T-893/GRC.

The power supply for the receiving equipment is provided by a self-contained power supply located in the lower rear deck of the receiver.

Now turn off the tape and answer the questions in your Student Guide.

LECTURE #5 (Used in Exercise 7)

Listening and Paraphrasing

This is Lecture #5 for Unit III, Lesson 1. Make sure you have a pencil ready.

Listen to statement #1.

Set the circuit breaker on the TCC-7 to the ON position.  
The associated glow lamp should light.

Now stop the tape and write your paraphrase in your Student Guide.  
(Pause)

Now listen to Statement #2.

One disadvantage of radio is that it is not very secure.  
The enemy can listen to your messages.

Now stop the tape and write your paraphrase in your Student Guide.  
(Pause)

Now listen to statement #3.

You will need a screwdriver to make this next adjustment. Adjust  
the high frequency control for a zero reading on the Test Meter.

Now stop the tape and write your paraphrase in your Student Guide.  
(Pause)

Now listen to statement #4.

Communication with highly mobile units, such as ships, aircraft, and tanks, would be extremely difficult if radio communications were not available.

Now stop the tape and write your paraphrase in your Student Guide.  
(Pause)

Now listen to statement #5.

There are two important switches on the Test Panel: The Measure Selective switch and the Measure Non-Selective switch. I'll repeat those names: The Measure Selective switch and the Measure Non-Selective switch. Whenever one of these switches is being used, the other switch should be in the OFF position.

Now stop the tape and write your paraphrase in your Student Guide. This is the last statement for this exercise, Exercise 5. After you finish writing your paraphrase, check your answers.

STOP THE TAPE NOW.

## LECTURE #6

### Grouping

This is Lecture #6 for Unit III, Lesson 1. Listen to this short lecture. Then answer the question in your Student Guide.

The Telephone Terminal Sets\* are contained in vans which can be transported by air or ground vehicle.

Fluorescent lights are mounted on the ceiling of the van to provide primary lighting.

The POWER ENTRANCE BOX, located on the outside rear wall of the van provides receptacles for making connections to a source of power.

The POWER DISTRIBUTION PANEL, located on the inside rear wall of the van, distributes power to the lights and equipment in the van.

The POWER ENTRANCE BOX also contains binding posts for connecting intercom lines to the van.

The SIGNAL ENTRANCE BOX is also located on the outside rear wall of the van. It provides receptacles for connecting telephone lines.

The main purpose of the Telephone Terminal Sets is to: Transmit or send messages over cable.

Now turn off the tape and answer the question in your Student Guide.

After you have answered the question, you will be directed to  
rewind the tape to the start of this exercise and listen to it again.

STOP THE TAPE NOW.

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\* Information is taken from TM 11-5805-358-14-2, Terminal Sets,  
Telephone, AN/TCC-60, and AN/TCC-69.

Unit III, Lesson 1  
Instructor Guide

LECTURE #7 (Used in Exercise 11)

Making Up Questions

This is Lecture #7 for Unit III, Lesson 1. Listen to this short lecture. Then answer the question in your Student Guide. This lecture should sound familiar. You heard it earlier when you did Exercise 5.

This is a short description of some of the characteristics of the radio set AN/TRC-24.

All configurations of the AN/TRC-24 radio set provide for multichannel, line of sight, two-way communication in the ultra high frequency range.

The AN/TRC-24 radio sets provide 399 operating channels in the low band range and 500 channels in the high band range. Some configurations of the radio set include both bands, others include either the high band or the low band.

The AN/TRC-24 radio set is intended mainly for use as a radio link in a communication network which includes carrier telephone and teletype-writer equipment.

The major components of the AN/TRC-24 radio set are installed in cases that are used for stack mounting. All operating controls, meters, and input and output connectors are located on the front panels of the various components.

The transmitting equipment of the radio set is made up of: Transmitter, Radio T-893/GRC, Power Supply, PP-2054/GRC, and the Amplifier-Oscillator AM-1957/GRC.

[Repeat]

The combination of Receiver, Radio R-1148(P)/GRC with Amplifier-Converter AM-1955/GRC makes up the receiving equipment of the radio set. I'll repeat those components of the receiving equipment. They are:

The Receiver, the Radio-R-1148(P)/GRC, and the Amplifier-Converter AM-1955/GRC.  
set.

The Antenna AT-903/G. I'll repeat that - Antenna AT-903/G - is a directional, horn-type antenna, used for both transmitting and receiving radio frequency energy.

The power supply for the transmitter is stacked on top of the radio T-893/GRC.

The power supply for the receiving equipment is provided by a self-contained power supply located in the lower rear deck of the receiver.

Now turn off the tape and answer the questions in your Student Guide.

UNIT III - LESSON 1

Script for Checkpoint 1, Form A/B

LECTURE #1

A river crossing is a very difficult operation. This lecture will cover points which require special attention for success of a tactical river crossing at night. We will discuss 3 major points; 1) the advantages of a night river crossing, 2) points to consider about lighting when crossing a river under blackout conditions, and 3) the disadvantages of a night river crossing.

First we will discuss the advantages of a night river crossing.

There are several reasons why you might want to cross a river at night. One is to surprise the enemy. Another is to keep an attack going--to follow the enemy. A third is when the enemy has air superiority over the crossing area, or there is open land by the river so that you could be easily attacked while crossing during daylight.

(pause 1 sec)

Next we will discuss point 2, lighting considerations under blackout conditions.

The best natural light condition is a quarter-moon behind your units. A moon behind you lights the terrain in front of you. It also reduces the enemy's ability to see your attack.

To aid soldiers in night river crossings, several night vision devices are available. Two examples are: infrared binoculars, and starlight scopes.

Artificial light can be used. However, the use of artificial lighting must be carefully timed in order to prevent discovery. Artificial lighting aids include flashlights and vehicle lights.

(pause 1 sec)

Finally, our third point, the disadvantages of night river crossings. We have said that surprise may be gained by night crossings. There are, however, some disadvantages to making a night river crossing. There is more confusion in crossing a river at night. Also, night river crossings are less efficient. Night crossings require more control and coordination for effective movement. Extra measures must be taken to prevent vehicle accidents. Preparing the site and assembling rafts and bridges require more time at night.

(pause 1 sec)

When making a decision on whether to cross at night, commanders in charge of river crossing operations must weigh the advantage of surprise against the disadvantages of reduced speed and the need for extra controls.

In this lecture we discussed: first, the advantages of a night river crossing; second, some lighting considerations under blackout conditions; and third, the disadvantages of a night river crossing.

That is the end of the lecture.

Stop the tape and answer the questions on the Checkpoint.

## UNIT III - LESSON 1

### Script for Checkpoint 1, Form A/B

#### Lecture 2\*

This lecture is on the procedure for adjusting the Transmitter Amplifier Gain on the PQT-37 telephone terminal.

You will be working with 3 different panels: the Test Panel, the Subgroup Panel, and Modem 2.

First, on the TEST PANEL, set the MEASURE SELECTIVE switch to the 37 KC position.

Then, on MODEM 2, set the Channel 2 SEND-MEASURE switch to the SEND position.

The next step is to check the FINE TUNE adjustment on the TEST PANEL.

The test meter should show the maximum right-hand deflection all the way to the right.

The next step is to slide the SUBGROUP PANEL forward in the mounting rack. This is necessary to reach the ...

... TRANSMITTER AMPLIFIER GAIN control. Using a screwdriver, turn the control until ...

... you get a reading of zero on the test meter.

Then secure the SUBGROUP PANEL back in its mounting rack.

Now, go to the Test Panel and reset the MEASURE SELECTIVE switch to OFF.

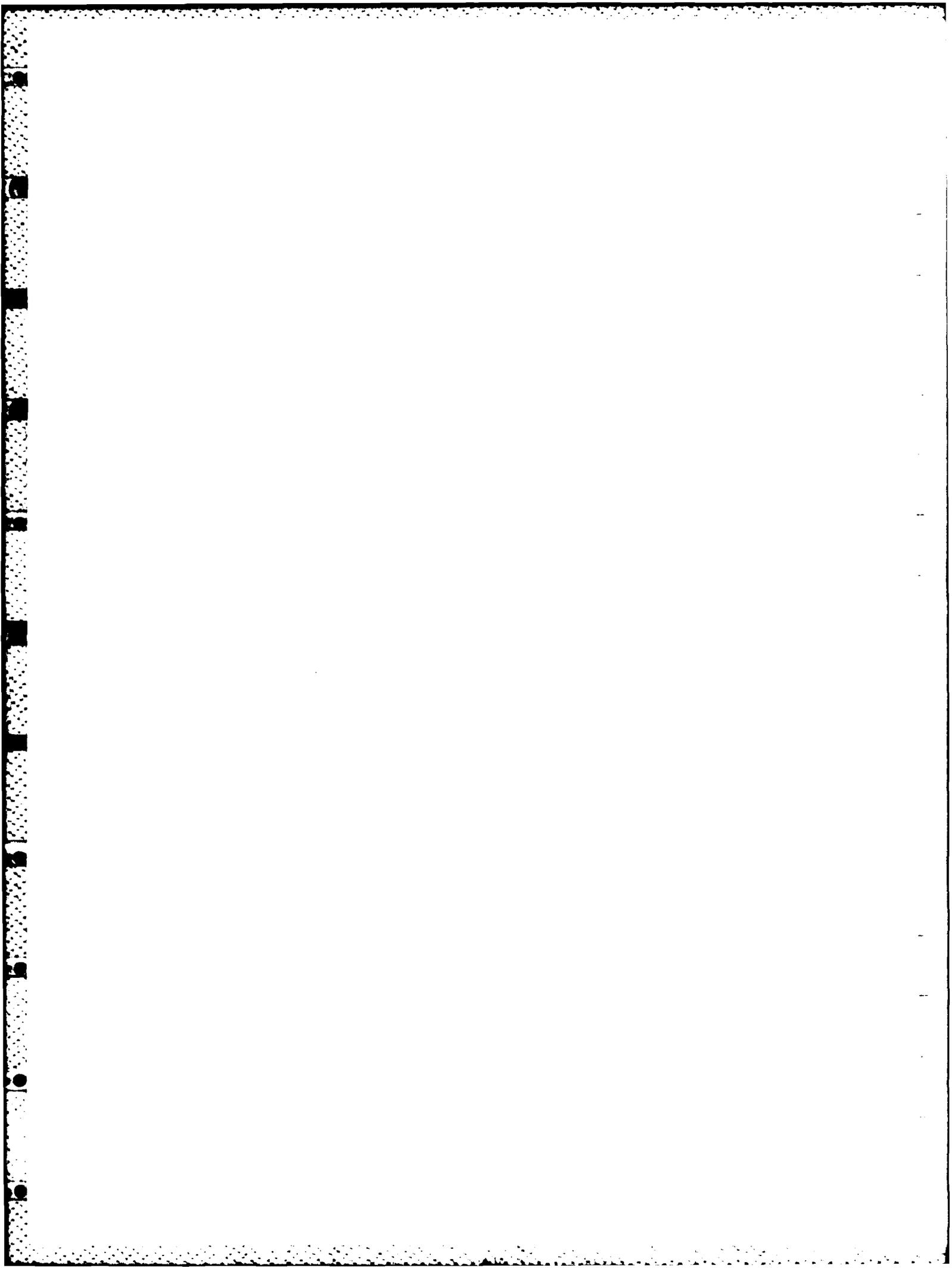
Finally, remove the TEST PANEL measure cord plug from the TRANSMITTER AMPLIFIER OUT jack which is on the GROUP PANEL.

This completes the TRANSMITTER AMPLIFIER GAIN adjustment for the PQT-37 telephone terminal.

Stop the tape and answer the questions on the Checkpoint.

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\* Adapted from the Unit IV, Lesson 2 Post-test video script.



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INSTRUCTOR GUIDE

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UNIT III. LISTENING SKILLS

Lesson 2. Remembering Information Seen in Demonstrations

TERMINAL OBJECTIVE: Uses retrieval strategies to recall demonstration information for response to questions on performance of steps.

CONDITION: Given a demonstration and the requirement to recall steps in the procedure and other information in the demonstration, when note-taking is not possible.

STANDARD: Student uses appropriate strategies to retrieve the required information and answer the questions.

ESTIMATED LESSON LENGTH: 3 hours

INSTRUCTIONAL MATERIAL: Student Guide containing self-paced materials, exercises. VIDEOTAPE ("Practice Exercises - Unit III, Lesson 2"). Checkpoint. VIDEOTAPE ("Checkpoint 1 - Unit III, Lesson 2")

OTHER MEDIA AND Scoring key for checkpoint. Outlines of videotape scripts. NOTE: See page 3 for Special Instructions.

REFERENCES: The demonstrations shown in the videotapes are of selected procedures in operating the AN/TCC-7.

LESSON STRUCTURE: The lesson is divided into three sections:

- Section A. Selecting and Organizing What to Remember (Student Guide, p. 2)
- Section B. Storing Information in Your Memory (Student Guide, p. 9)
- Section C. Recalling Information from Your Memory (Student Guide, p. 23)

ENABLING OBJECTIVES:

Section A

1. Action: Identifies instances of specified types of statements.  
Condition: Given a videotaped demonstration (which the student may repeat).  
Standard: Identifies instances of the following types of statements:
  - . Purpose of procedure
  - . Names of switches, meters, jacks, etc.
  - . Locations of switches, meters, jacks, etc.
  - . Actions performed
  - . Order of steps (actions) in the procedure
  - . Indications when a step is done correctly

Section B

1. Action: Visualizes location of switches, meters, etc.  
Condition: Given a videotaped demonstration (which the student may repeat).  
Standard: Indicates on blank diagrams, locations of specified switches, meters, etc. Or labels parts of a diagram corresponding to the equipment demonstrated. Or indicates where on the equipment front panel the procedure starts and where it ends.
2. Action: Organizes information presented in a demonstration into related categories.  
Condition: Given a videotaped demonstration (which the student may repeat), statements from the demonstration and category headings.  
Standard: Arranges statements under appropriate headings.
3. Action: Paraphrases information presented in a demonstration.  
Condition: Given a videotaped demonstration (which the student may repeat) and statements from the demonstration.  
Standard: Rephrases statements into his/her own words.

4. Action: Selects most appropriate memorizing strategy for a situation.
- Condition: Given examples of four or five different learning situations (e.g., procedure; factual information; lists of dials, switches, etc.).
- Standard: Selects the memorizing strategy recommended for the given situation.

### Section C

- Action: Selects the most appropriate recall strategy for a situation.
- Condition: Given examples of information students have already memorized in this lesson.
- Standard: States the appropriate recall strategy.

### SPECIAL INSTRUCTIONS FOR USING THE VIDEOTAPES:

In addition to the usual paper and pencil materials, this lesson uses two videotapes of demonstrations. The Student Guide directs the student to ask you for the tapes at the appropriate time. The two videotapes and when they are needed are as follows:

Practice Exercise - Unit III, Lesson 2 - Needed first in Section A, on page 4, and in Section B, but not in Section C.

Checkpoint 1, Form A/B - Unit III, Lesson 2 - Needed when the student starts the checkpoint.

When you give the student the videotape, make sure he/she knows how to stop and start the tape player. Since students may need to watch a demonstration more than once, it is especially important that they know how to rewind the videotape without damaging it. After demonstrating how to rewind, supervise the students the first time they do it on their own. Show the students where the counter is located. The machine will automatically rewind the tape for a short distance, so when the tape is started again, the last few seconds the student saw will be repeated.

When the student has completed the lesson, make sure the tape has been rewound to the beginning so it will be ready for the next student.

NOTE: Outlines of the scripts of both videotapes can be found following the Checkpoint Scoring Key.

TESTING:

Checkpoint 1, Form A/B at the end of the lesson contains 10 questions measuring the terminal objective. Give the student the videotape and the questions at the same time. Point out to the student that he/she may not look at the questions before viewing the tape. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Have the student review the appropriate section(s) of this lesson. Then re-administer Checkpoint 1, Form A/B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

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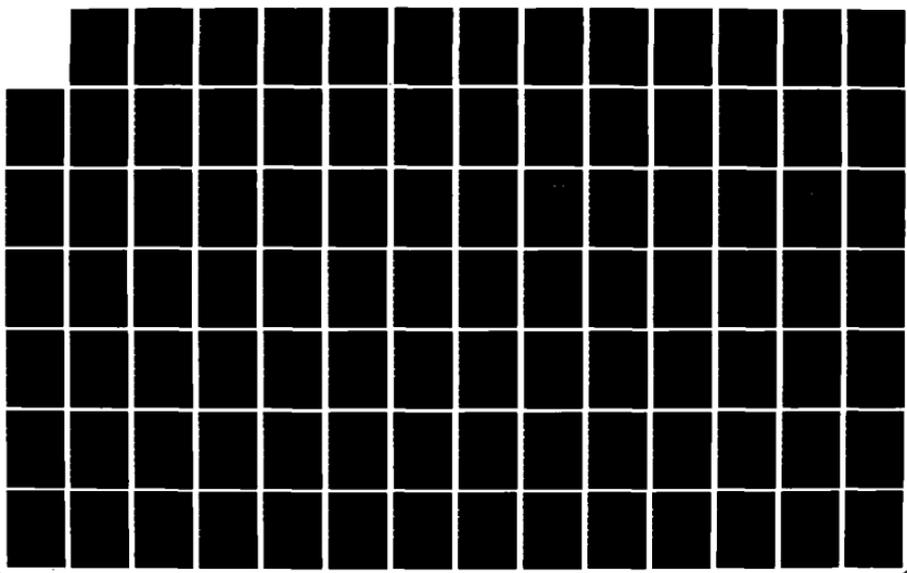
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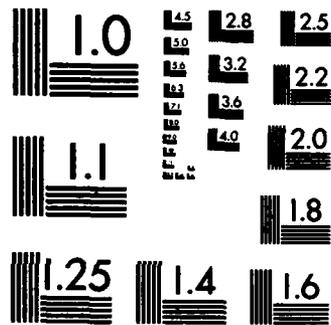
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UNIT III - LESSON 2

Scoring Key for Checkpoint 1, Form A/B

1. a
2. c
3. d
4. b
5. d
6. a
7. c
8. b
9. d
10. b

UNIT III - LESSON 2

Outline of Script for Videotape

"Practice Exercises - Unit III, Lesson 2"

Topic: Procedures (3) in the Transmit Line-Ups for the AN/TCC-7 Telephone Terminal.

- I. Making the 200 Volt Control Adjustment on the PP-827, Power Supply
  1. Location of PP-827, Power Supply.
  2. Set 115 Volt AC Power switch on PP-827 to ON position.
    - a. Alarm sounds.
    - b. After a few seconds, Alarm stops.
  3. On the Test Panel, set Measure switch to the 200 Volt Adjust position.
  4. On the Test Panel, make sure both the Measure Selective switch and Measure Non-Selective switch are OFF.
  5. On the Power Supply, use a screwdriver to adjust the 200 Volt Control Adjust.
    - a. Turn the control slowly clockwise.
    - b. Keep turning until Test Meter (on the Test Panel) reads zero.
  6. On the Test Panel, return the Measure switch to Transmission position.

FADEOUT

II. Setting the 1 kilocycle (KC) control.

1. 1 KC control located inside the Test Panel.
2. Slide Test Panel forward on mounting rack for access to internal controls.
3. Set Measure Non-Selective switch to Check 1 KC position.
4. Connect Test Panel [measure cord] plug into the 1 KC jack at the bottom left of the panel.
5. Use a screwdriver to adjust the 1 KC control.
  - a. Adjust the internal [1 KC] control until Test Meter reads zero.
  - b. You may have to turn the 1 KC control either clockwise or counterclockwise.
6. Push Test Panel back into place in the mounting rack.

FADEOUT

III. Checking the High Frequency (HF) Control

1. [On the Test Panel] set the Measure Non-Selective switch to the Check HF position.
2. Put the measure cord plug into the HF jack.
3. Use a screwdriver to adjust the HF control.
  - a. Turn the HF control until the [Test] Meter reads zero.
  - b. You may have to turn the [HF] control either left or right.
4. Set the Measure Non-Selective switch to OFF.

UNIT III - LESSON 2

Outline of Script for Videotape

"Checkpoint 1 - Unit III, Lesson 2"

Topic: Presetting the Test Panel and Carrier Supply Panel of the AN/TCC-7 Telephone Terminal.

I. Test Panel

1. Slide Test Panel forward in rack for access for internal adjustments.
2. Use a screwdriver to adjust the High Frequency (HF) control.
  - a. HF control is located in the lower left-hand corner of the Test Panel.
  - b. Turn the HF control to the full counterclockwise position.
  - c. Then turn the HF control three-quarters of a turn clockwise.
3. Use a screwdriver to adjust the 65 kilocycle (KC) Transmit control on the inside of the Test Panel.
  - a. Turn the 65 KC Transmit Control to the full counterclockwise position.
  - b. Then turn the control three-quarters of a turn clockwise. (Like the HF control.)
4. Adjust the 1 Kilocycle (KC) control located next to the 65 KC control.
  - a. Set the 1 KC control three-quarters of a turn from the full counterclockwise position.
5. Push Test Panel back into position in mounting rack.
6. Connect the [measure cord] plug jack into the Channel Out jack.

FADEOUT

## II. Carrier Supply Panel

1. Slide Carrier Supply Panel forward for access to internal controls.
2. Start at the left of the panel. Set the 68 Kilocycle (KC) alarm Cutoff switch to OFF.
3. Turn the 120 KC Alarm Cutoff switch to OFF.
4. Set the 12 and 28 Send switch to OFF.
5. Set the Carrier Sync switch to the Local (or down) position.
6. Use a screwdriver to adjust the 12 KC control.
  - a. Turn the 12 KC control to the full counterclockwise position.
  - b. Then turn the control three-quarters of a turn clockwise.
7. Use a screwdriver to adjust the 28 KC control.
  - a. Set the 28 KC control at three-quarters of a turn from the full counterclockwise position.
8. Use a screwdriver to adjust the 68 KC control, which is located inside the Carrier Supply Panel.
  - a. Set the 68 KC control at three-quarters of a turn from the full counterclockwise position.
9. Push the Carrier Supply Panel back in the mounting rack.

FADEOUT

UNIT III - LESSON 2

Outline of Script for Videotape

Post-test or Checkpoint 1, Form B

- I. Transmit Line-up for AN/TCC-7.
  - A. Adjusting the Gain Control.
    1. Go to Test Panel.
    2. Set Measure Selective switch to Check Gain position.
    3. Slowly adjust Fine Tune Control.
      - a. You should get a maximum right-hand deflection on the Test Meter. (That means indicator needle on meter should be as far right as possible.)
    4. Use screwdriver to adjust the Gain Control.
      - a. Turn Gain Control until the indicator on the Test Meter goes to zero.
    5. Remove the measure cord plug from the HF jack.
    6. Reset Measure Selective switch to OFF.

FADEOUT

- B. Adjusting the Orderwire Transmitter Amplifier Output.
  1. Set the Measure Non-Selective switch to the Orderwire Transmitter Amplifier Out position.
  2. Connect the Test Panel measure cord to the Transmitter Amplifier Out jack on the Orderwire Panel.
  3. Slide the Orderwire Panel forward to get at inside controls.

4. On the Test Panel, press and hold the attenuator [instructor pronounces it antenuator] 10 and 20 dB (decibel) push buttons.
  - a. While holding the buttons, do the next 3 steps.
5. On the orderwire Panel, set the Send Orderwire switch to ON.
6. With a screwdriver, adjust the Transmitter Gain Control.
  - a. This control is on the inside of the Orderwire Panel.
  - b. Turn the control clockwise.
  - c. Turn until the Test Meter on the Test Panel reads +5.
7. Reset the Send Orderwire switch to OFF.
8. Release the attenuator buttons.
9. Push the Orderwire Panel back into position.
10. Reset Measure Non-Selective switch to OFF.

FADEOUT

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INSTRUCTOR GUIDE

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UNIT III. LISTENING SKILLS

Lesson 3. Recognizing When Important Information Is Missing

TERMINAL OBJECTIVE: Uses controlling strategies to recognize a deficiency in a lecture or demonstration or in listening which warrants a request for clarification.

CONDITION: Given a lecture or demonstration.

STANDARD: Student identifies an item of information missing, yet needed for complete understanding.

ESTIMATED LESSON LENGTH: 1 hour, 45 minutes

INSTRUCTIONAL MATERIAL: Student Guide containing self-paced materials and exercises. AUDIOTAPE ("Practice Exercise 1 - UNIT III, Lesson 3"), VIDEOTAPE ("Practice Exercise 2 - Unit III, Lesson 3"). Checkpoint. VIDEOTAPE ("Checkpoint 1 - Unit III, Lesson 3")

OTHER MEDIA AND SUPPORT MATERIALS: Scoring key for checkpoint, script for audiotape, outlines of videotape scripts. NOTE: See page 2 for Special Instructions for using the tapes.

REFERENCES: None

LESSON STRUCTURE: The lesson is divided into three sections:

Section A. How to Tell When Information Is Missing  
(Student Guide, p. 2)

Section B. Practice in Listening for Missing Information (Student Guide, p. 8)

Section C. Practice in Watching for Missing Information (Student Guide, p. 14)

ENABLING OBJECTIVES:

Section A

- Action: Identifies gaps in information which need to be filled.
- Condition: Given statements of procedures, some of which contain gaps in information (i.e., essential information is missing).
- Standard: Identifies the statements which contain gaps and identifies the missing information.

Section B

- Action: Identifies gaps in information which need to be filled.
- Condition: Given a series of brief audiotaped lectures, some of which contain gaps in information.
- Standard: Identifies the lectures which contain gaps and identifies the missing information.

Section C

- Action: Identifies gaps in information which need to be filled.
- Condition: Given a series of brief videotaped demonstrations, some of which contain gaps in information.
- Standard: Identifies the demonstrations which contain gaps and identifies the missing information.

SPECIAL INSTRUCTIONS FOR USING THE AUDIO AND VIDEO TAPES:

In addition to the usual paper and pencil materials, this lesson uses one audiotape of lectures and two videotapes of demonstrations. The Student Guide directs the student to ask you for the tapes at the appropriate time. Tapes and when they are used are as follows:

Practice Exercise I - Unit III, Lesson 3 (audio) - Needed in Section B.

Practice Exercise II - Unit III, Lesson 3 (video) - Needed in Section C.

Checkpoint 1, Form A/B - Unit III, Lesson 3 (video) - Needed when the student starts the Checkpoint.

When you give the student the audiotape, make sure he/she knows how to operate the cassette machine. The student may need to listen to parts of the tape more than once. STUDENTS MAY REWIND AUDIOTAPES. Make sure the student knows how to rewind, stop, and restart the audiotape. Set the tape counter to zero before the student begins. Point out the location of the tape counter to the student.

When the student has completed use of the audiotape, make sure that it is rewound to the beginning and ready for the next student.

When you give the student the videotape, make sure he/she knows how to stop and start the tape player. Since students may need to watch a demonstration more than once, it is especially important that they know how to rewind the videotape without damaging it. After demonstrating how to rewind, supervise the students the first time they do it on their own. Show the students where the counter is located. The machine will automatically rewind the tape for a short distance, so when the tape is started again, the last few seconds the student saw will be repeated.

When the student has completed the lesson, rewind the tape to the beginning so it will be ready for the next student.

NOTE: The script for the audiotape and outlines of the scripts for both videotapes can be found following the Checkpoint Scoring Key.

#### TESTING:

Checkpoint 1, Form A/B at the end of the lesson contains 10 questions measuring the terminal objective. Give the student the videotape and the questions at the same time. Point out to the student that he/she may not look at the questions before viewing the tape. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.

7 or less correct    Have the student review the appropriate section(s) of this lesson. Then re-administer checkpoint 1, Form A/B. Score checkpoint again when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT III - LESSON 3

Scoring Key for Checkpoint 1, Form A/B

1. c

2. d

3. b

4. c

5. c

6. d

7. a

8. d

9. d

10. d

Unit III, Lesson 3

Practice Exercises I (Section B)

This is the tape for Practice Exercises I for Unit III, Lesson 3.  
This is Lecture 1.

I am going to read some instructions. Listen carefully to each step. I will say each step twice.

Your sergeant gives you these instructions for starting a generator, which you have never seen before.

Step 1. Place the circuit breaker in the off position.

[Repeat]

Step 2. Place the remote-local switch in the local position.

[Repeat]

Step 3. Turn the voltage adjusting knob all the way to the left.

[Repeat]

Step 4. Set the voltage selector switch to the correct setting.

[Repeat]

Step 5. Pull the choke control all the way out.

[Repeat]

Step 6. Press the start-stop switch to start until the engine starts, then release.

[Repeat]

Now stop the tape and go to your Student Guide. Answer the questions there.

Script for Unit III, Lesson 3 Practice Exercises I (Section B)

This is Lecture 2 for Unit III, Lesson 3.

I am going to read some instructions. Listen carefully to each step. I will say each step twice.

These are the directions for loading a roll of paper in a teletype machine.

Step 1. Place the roll of paper on the spindle.

[Repeat]

Step 2. Unroll about one foot of paper by pulling on the loose end.

[Repeat]

Step 3. Take hold of the loose end of the paper. Fold the corners toward each other to make a point.

[Repeat]

Step 4. Go to the handle at the left of the platen. Pull the handle all the way toward you.

[Repeat]

Step 5. Push the point of the paper into the slot behind the platen.

[Repeat]

Step 6. Grasp the point of the paper as it comes through the other side of the slot and pull about 6 inches of paper through the slot.

[Repeat]

Now stop the tape and go to your Student Guide. Answer the questions there.

Script for Unit III, Lesson 3 Practice Exercises I (Section B)

This is Lecture 3 for Unit III, Lesson 3.

I am going to read some instructions. Listen carefully to each step. I will say each step only once.

- Step 1. Set the circuit breaker to the ON position.  
The indicator light should come on.
- Step 2. Set the power switch to the ON position. The alarm will sound.
- Step 3. Wait several seconds and the alarm should go off. If the alarm does not stop, turn the alarm cut-off switch toward the indicator light. That will turn off the alarm. Then continue with the adjustment.
- Step 4. Set the Measure switch to the 150 Volt position.
- Step 5. Turn the 150 Volt adjust control clockwise until the test meter reads zero.
- Step 6. Return the Measure switch to the vertical position.

Now stop the tape and go to your Student Guide. Answer the questions there.

Script for Unit III, Lesson 3 Practice Exercises I (Section B)

This is Lecture 4 for Unit III, Lesson 3.

I am going to read some instructions. Listen carefully to each step. I will say each step only once.

The following procedure provides adjustment of the passage of the 1 kilocycle and the 68 kilocycle signals through the transmitter.

Step 1. Request the distant terminal to send a 1 kilocycle test signal.

Step 2. Set the Transmitter multimeter selector switch to the 1 KC (or kilocycle) IN position. Then set the multimeter selector switch to the 68 KC IN position. The multimeter should read in the green area for both settings of the switch.

Step 3. If necessary, adjust the INPUT level control.

Step 4. Go back to the transmitter multimeter selector switch and put it in the 1 KC MOD position. Then put it in the 68 KC MOD position. The multimeter should read in the green area for both positions.

Now stop the tape and go to your Student Guide. Answer the questions there.

UNIT III - LESSON 3

Outline of Script for Videotape

"Practice Exercise II - Unit III, Lesson 3" (Section C)

Topic: Procedures (5) on the AN/TRC-24 radio set.

I. Doing the Supply Voltage Check on the AN/TRC-24.

1. Go to the Power Supply. Turn the 115 Volt AC switch to the ON position.
2. Check the supply voltage on the AC Volt meter.

[Omitted information: What the meter reading should be.]

FADEOUT

II. Setting the Low Power Alarm on the AN/TRC-24.

1. Go to the transmitter. Set the Test switch to the Forward Power position.
2. Adjust the Plate Control until the Test Meter reads about 10.
3. Use a screwdriver to set the Threshold Adjust control.
  - a. Turn the Control Counter clockwise.

[Omitted information: Stop adjusting the control when the indicator lamp lights. The light comes on but the instructor doesn't mention it.]

4. Readjust the Plate control until the Test Meter shows a maximum reading again.

FADEOUT

III. Doing the RF Channel Tuning for the nearest Unit channel.

1. The piece of equipment being used is the AN/TRC-24 transmitter.
2. Set the Crystal Select switch to the Unit channel position.
3. Turn the Radio Frequency Channel Tune control.

[Omitted information: Which direction to turn the control.]

- a. The channel is tuned correctly when you get a zero reading on the Frequency Drift meter and a maximum reading on the Measure meter.
4. Turn the Lock control.
  - a. Turn it clockwise to lock the RF Channel Control in place.

FADEOUT

IV. The B Band tuning procedure on an AN/TRC-24 transmitter.

1. Put the Test Switch in the Forward Power position.
2. Adjust the Plate Control.
  - a. Turn it until you get a maximum reading on the Test meter.
3. Adjust the Amplifier Output Coupling control.
  - a. Turn it until you get a maximum reading on the Test meter.
4. Repeat steps 2 and 3 until you no longer get a maximum reading on the Test meter.

[Omitted information: None]

FADEOUT

V. Making the high voltage adjustment on the AN/TRC-24 Power Supply.

1. Go to the Power Supply. Set the 750 Volt Adjust switch to position 2.
2. Set the DC Test switch to the 750 Lower Scale position.
3. Turn the 750 Volt DC switch to ON. [The voltmeter needle moves, but the instructor doesn't mention it.]

[Omitted information: What the reading on the voltmeter should be.]

4. Reset the DC Test switch to the 275 Lower Scale position.

FADEOUT

UNIT III - LESSON 3

Outline of Script for Videotape

"Checkpoint 1 - Unit III, Lesson 3"

Topic: Procedures (5) on the AN/TRC-24 radio set.

I. Modulator Adjustment for the AN/TRC-24 Transmitter.

1. Set the Measure Switch to the Mod Adjust position.
2. Use a screwdriver to adjust the Mod Adjust control.
  - a. Turn it until the Measure meter reads zero.
  - b. Location of Measure meter.
3. Hold the Meter Sensitivity switch in the Increase position.
4. [While doing Step 3] Use a screwdriver to adjust the Mod Trim control.

[Omitted information: Which direction to turn the control.]

  - a. Turn it until you get a maximum reading on the Measure meter.
5. [Instructor releases the Meter Sensitivity switch, but does not describe this step.]
6. Readjust the Mod Adjust control for a reading on the Measure meter.

[Omitted information: What the reading on the Measure meter should be.]

FADEOUT

## II. Presetting the AN/TRC Power Supply.

1. Set the 750 Volt Adjust switch at position 1.
2. Set the 115 Volt AC switch to the OFF position.
3. Go to the right. Set the DC Test switch to the 150 Volt Upper Scale position.
4. Go to the left and down. Check the 150 Volt DC switch: It should be in the OFF position.
5. To the right is the 150 Volt control.  
[Omitted information: What to do with this control.]
6. Go to the right. Set the 750 Volt DC switch in the OFF position.

FADEOUT

## III. Tuning the RF Channel Tune control for the nearest Decade Channel on the AN/TRC-24 Transmitter.

1. Rotate the RF Channel tune control back and forth about the Decade Channel.
  - a. In this case, the Decade Channel is 141.
  - b. The Unit Channel is 137.
  - c. Continue to rotate the control until you get a zero reading on the Frequency Drift meter and a maximum reading on the Measure meter.
2. Adjust the Indicator Control so the assigned Decade Channel is under the Indicator.
3. Check the Frequency Drift meter to make sure it has not drifted from zero.
  - a. If it has drifted away from zero, repeat above 2 steps.

[Omitted information: No procedural information omitted. Explanation of difference between Decade Channel and Unit Channel is omitted.]

FADEOUT

IV Making the Preliminary High Voltage Adjustment on the AN/TRC-24 Power Supply.

1. Go to the Power Supply. Set the 750 Volt Adjust switch to position 1.
2. Set the DC Test switch to the 750 Volt Lower Scale position.
3. Turn the 750 Volt DC switch to ON.
4. Check the [DC Volt] meter.

[Omitted information: Name of the meter. What the meter reading should be.]

5. Return the DC Test switch to the 275 Lower Scale position.

FADEOUT

V. Doing the AFC Check on the AN/TRC-24 transmitter.

1. Go to the transmitter. Turn the AFC switch to the ON position.
2. Turn the AFC control to the +4 mark.
  - a. Notice that the Frequency Drift meter moves to the right of the zero mark.
3. Release the [AFC] control.
  - a. Notice that the [Frequency Drift] meter returns to zero.
4. Turn the AFC control to the -4 mark
  - a. Notice that the Frequency Drift meter moves to the left of the zero mark
5. Release the AFC control
  - a. It will automatically return to the zero position

[Omitted Information: None]

FADEOUT

UNIT III - LESSON 3

Outline of Script for Videotape

Post-test or Checkpoint 1, Form B

- I. Doing the RF Channel tuning for the nearest unit channel of the AN/TRC-24 Transmitter.
  1. Set the crystal select switch to the Unit channel position.
  2. Turn the Radio Frequency Channel tune control.

[Omitted information: Which direction to turn the control.]

    - a. Turn until you get a zero reading on the Frequency Drift meter and a maximum reading on the Measure meter.
  3. Turn the lock control.
    - a. Turn it clockwise to lock the RF Channel control in place.

FADEOUT

- II. Doing the Mod adjustment for the AN/TRC-24 Transmitter.
  1. Set the Measure switch to the Mod adjust position.
  2. Use a screwdriver to adjust the Mod adjust control.
    - a. Turn it until the Measure meter reads zero.
  3. Hold the meter sensitivity switch in the Increase position.
  4. [While doing step 3] Use a screwdriver to adjust the Mod Trim control.

[Omitted information: Which direction to turn the control.]

    - a. Turn the control until you get a maximum reading on the Measure meter.

5. [Instructor releases meter sensitivity switch but does not describe this step.]
6. Readjust the Mod adjust control for a reading on the Measure meter.

[Omitted information: What the reading should be.]

FADEOUT

III. Tuning the RF Channel Tune control for the nearest Decade Channel on the AN/TRC-24 Transmitter.

1. Rotate the RF Channel Tune control back and forth about the Decade Channel.
  - a. In this case, the Decade Channel is 141.
  - b. The Unit channel is 137.
  - c. Continue to rotate the control until you get a zero reading on the Frequency Drift meter and a maximum reading on the Measure meter.
2. Adjust the Indicator control so the assigned Decade Channel is under the Indicator.
3. Check the Frequency Drift meter, to make sure it has not drifted from zero.
  - a. If it has drifted from zero, repeat the above 2 steps.

[Omitted information: No procedural information omitted. Explanation of difference between Decade Channel and Unit channel is omitted.]

FADEOUT

IV. Making the high voltage adjustment on the AN/TRC-24 Power Supply.

1. Go to the Power Supply. Set the 750 Volt Adjust switch to position 2.
2. Set the DC Test switch to the 750 Lower Scale position.
3. Turn the 750 Volt DC switch to ON. [The voltmeter needle moves, but the instructor doesn't mention it.]

[Omitted information: What the reading on the voltmeter should be.]

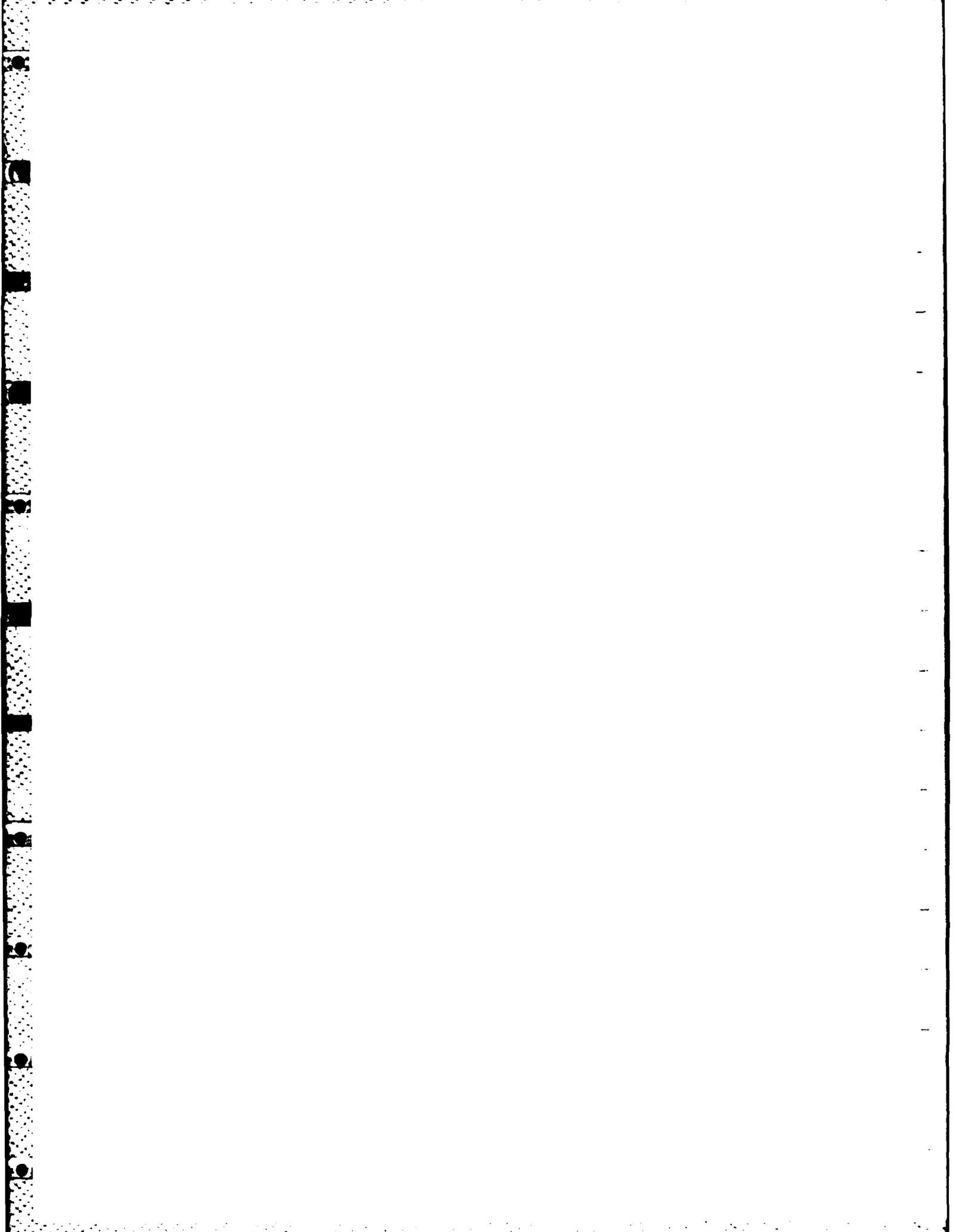
4. Reset the DC Test switch to the 275 Lower Scale position.

FADEOUT

V. Features of the Kodak Ektagraphic Slide Projector, Model AF-2.

1. Called a carousel projector.
2. The round carousel tray holds up to 40 slides.
  - a. Standard 2 x 2 inch cardboard or plastic mounts.
  - b. 35mm slides are most common.
3. Automatic timer permits automatic slide advance or manual.
4. Projector can be connected to an audiotape player, which will synchronize slides and sound.
5. Projector can show film strips with the addition of a film strip adapter.
6. Projector can be operated by remote control by plugging unit [shown] into receptacle at back of projector [shown].
7. Power selector switch:
  - a. 4 settings: OFF, FAN, LOW, HIGH.
  - b. When switch is at FAN, the fan operates but not the light.
  - c. This setting is for cooling the bulb after use.
  - d. This setting is also used with something called the dissolve control.

[Omitted information: How the dissolve control is used. What it is.]
8. The various settings of the automatic timer.



## Introduction to Unit IV

### Note-Taking for Demonstration

The purpose of Unit IV is to give students some guidelines for note-taking and to provide practice in taking notes on demonstrations similar to those they will see in the 31M course.

Unit IV has three lessons. Lesson 1, Basic Note-Taking Skills, explains some basic note-taking strategies, then provides practice in taking notes on videotaped demonstrations. These demonstrations cover such topics as capabilities of the equipment, location and function of the parts. Lesson 2, Taking Notes to Show Sequence, emphasizes the importance of listing steps in the right sequence, and of indicating where inserted material belongs. The students practice taking notes on videotaped demonstrations showing procedures with a series of steps. Lesson 3, Taking Notes to Show Relationships, teaches strategies for showing main ideas and supporting detail. Again, videotaped demonstrations are used to provide practice in note-taking.

Each lesson in Unit IV contains a Student Guide, videotaped demonstrations to be used for practice exercises, and a checkpoint which measures attainment of the terminal objective. The checkpoint consists of a videotaped demonstration and a set of questions the student must answer using his/her notes. The alternate form of the checkpoint consists of another set of questions based on the same videotaped demonstration. The Instructor Guide for each lesson includes the scoring key for the checkpoint, with instructions on what to do if the student performs poorly on the checkpoint.

In addition, the practice exercises in Lesson 2 make use of sets of captioned photos based on the demonstrations, which the student is to arrange in the right order. The Instructor Guide contains alternate written forms of these exercises to be used if the card sets are not available.

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INSTRUCTOR GUIDE

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UNIT IV. NOTE-TAKING FOR DEMONSTRATION

Lesson 1. Basic Note-Taking Skills

TERMINAL OBJECTIVE: Takes notes and subsequently uses the notes to answer questions about the equipment.

CONDITION: Given a demonstration introducing a piece of equipment, and including information such as capabilities of the equipment, location and function of the parts, etc.

STANDARD: Notes include all important information and are comprehensible to the note-taker.

ESTIMATED LESSON LENGTH: 3 hours, 30 minutes

INSTRUCTIONAL MATERIALS: Student Guide containing self-paced materials and exercises. Videotaped demonstrations.

OTHER MEDIA AND SUPPORT MATERIALS: Video cassette player. Videotapes: Practical Exercises, Checkpoint 1

REFERENCES: None

LESSON STRUCTURE: The lesson is divided into five sections.

Section A. Recognizing Important Information  
(Student Guide, p. 3)

Section B. Writing Brief but Complete Notes  
(Student Guide, p. 5)

Section C. Using Common Abbreviations and Symbols  
(Student Guide, p. 7)

Section D. Indication Omissions and Questions  
(Student Guide, p. 11)

Section E. Taking Notes on Videotaped Demonstrations (Student Guide, p. 20)

ENABLING OBJECTIVES:

Section A

- Action: Recognizes material that should and should not be included in notes.
- Condition: Given a transcript of a demonstration.
- Standard: Crosses out material that is not related to the performance of the task; underlines verbal markers that point to important information.

Section B

- Action: Writes notes in "telegraphic" style.
- Condition: Given a transcript of a demonstration.
- Standard: Rewrites the material, leaving out unimportant words and using phrases rather than sentences.

Section C

- Action: Uses common abbreviations and symbols.
- Condition: Given a transcript of a demonstration, and a list of common abbreviations and symbols.
- Standard: Rewrites the material, using abbreviations and symbols correctly.

Section D

- Action: Indicates omissions in notes and questions about notes.
- Condition: Given a transcript of a demonstration, a set of notes on the demonstration (with space left for missing information), and a page from the Soldier's Manual covering the same material.
- Standard: Fills in the missing information; marks notes with a question mark where the information conflicts with the Soldier's Manual; writes out any questions the student should ask the instructor.

## Section E

- Action:** Takes notes that show all the important information included in the demonstration.
- Condition:** Given a videotaped demonstration showing capabilities of a piece of equipment and/or location and function of parts, instructions to take notes on the demonstration, and a set of questions based on the demonstration.
- Standard:** Correctly answers questions about the demonstration, referring only to the notes.

### SPECIAL INSTRUCTIONS FOR PRACTICE EXERCISES:

In addition to the usual paper and pencil materials, this lesson uses videotaped demonstrations. You will be responsible for giving the student the tape for the practice exercises. It is marked:

#### Unit IV, Lesson 1 - Practice Exercises

The "Practice Exercise" tape contains two separate demonstrations. Make sure the students know how to operate the videotape equipment. Since students may need to watch the demonstration more than once, it is especially important that they know how to rewind the videotape without damaging it. (Note: The instructions at the end of each demonstration tell the student to ask the instructor to rewind the tape. Tell the student to ignore these instructions.) After demonstrating how to rewind, supervise the students the first time they do it on their own. Show the students how to reset the counter. Also point out to the students that they can stop the tape if they miss something or if they just want more time to write things down. The machine will automatically rewind the tape for a short distance, so when the tape is started again, the last few seconds the student saw will be repeated.

For the first videotaped demonstration (Exercise 6), students will be told to show you their notes before answering the questions. Compare their notes with the outline (page 6) and the labeled drawing (page 7) and point out any missing or incorrect information. Don't give them the information, just say "This is incorrect" or "You didn't write down the name (function, location) of this part (control, indicator)" Tell the student to watch the tape again and correct his notes before trying to answer the questions. For the second videotaped demonstration (Exercise 7), the student will evaluate his own notes, but he may ask you for help.

When the student is finished with the tape, rewind it to the beginning so that it will be ready for the next demonstration.

TESTING:

Checkpoint 1, Form A for this lesson includes a videotaped demonstration. The student will take notes on the demonstration, wait for at least 30 minutes (to increase the chances that his/her answers will be based on the notes rather than on memory), and then use the notes to answer 10 questions about the demonstration. To administer this checkpoint:

- . When the student asks for the checkpoint, give him/her the videotape marked "Unit IV, Lesson 1 - Checkpoint 1, Form A." Also give him/her the Instruction Sheet for the checkpoint. DO NOT give him the questions.
- . If the student wants to see the demonstration again, tell him/her to rewind the videotape to the beginning.
- . When the student has finished watching the demonstration, assign him/her to some other activity\* for a period of 30 minutes or more. Remind the student to keep the notes in a safe place.
- . Rewind the tape so that it will be ready for the next student.
- . At the end of the 30 minute period, give the student the checkpoint questions. THE STUDENT SHOULD NOT HAVE ACCESS TO THE VIDEOTAPE WHILE ANSWERING THE QUESTIONS.

After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.

\*If it happens to be near lunch hour or the end of the day, simply wait until after lunch or the beginning of the next day. If you cannot take advantage of these natural breaks, assign reading materials that are relevant to the 31M course.

8 or 9 correct

Compare the student's notes with the notes that follow the scoring key. Determine why student was unable to answer questions - were notes incomplete, incorrect, illegible, etc? Provide feedback to student. Probe for comprehension. Then have student go on to the next prescribed lesson.

7 or less correct

Compare student's notes with the notes that follow the scoring key. Determine why the student was unable to answer questions - were notes incomplete, incorrect, illegible? Provide feedback to student. Prescribe review of appropriate parts of lesson, then administer Form B of the checkpoint. Give student the choice of adding to his/her previous notes, or taking a new set of notes. When student finishes, score checkpoint and provide feedback. Then have student go on to the next prescribed lesson.

#### INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Report Form. Monitor students to make sure that they are working steadily and that they are not having any difficulty with the videotape equipment. Be sure they complete all the exercises. For some exercises where there is no one correct answer, students will be told to show you their answers. Be prepared to point out any shortcomings and suggest ways to improve their answers. For the videotaped exercises, be sure the student uses only his/her notes to answer the questions - i.e., student should not answer the questions while viewing the videotape. Provide explanations or clarifications of material when needed. Score the checkpoint immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

Demonstration Notes of Exercise 6

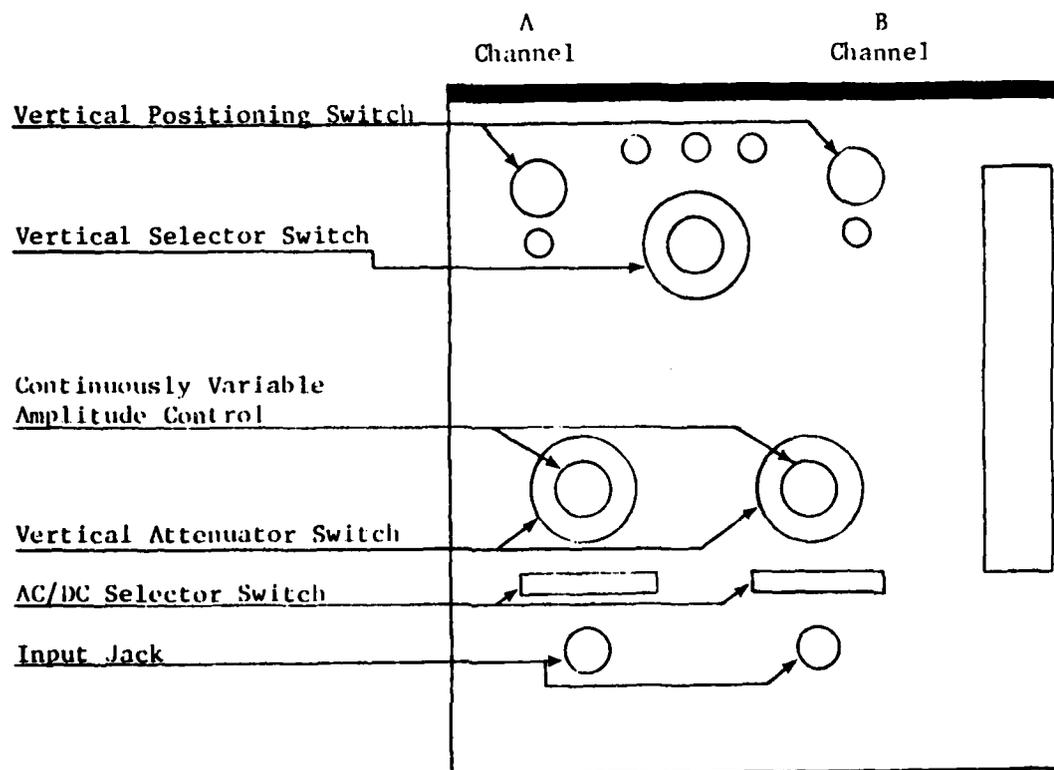
AN/USM 281A Oscilloscope

Vertical Controls

1. Two sets of controls, for A channel and B channel.
  - A. Input jacks
    1. A channel on left
    2. B channel on right
  - B. Vertical positioning controls (A and B)  
(function not explained)
  - C. Vertical attenuator switches (A and B)  
  
Controls height of vertical display in steps
  - D. Continuously variable amplitude controls (A and B)
    1. In center of vertical attenuator switches
    2. Must be turned fully clockwise to get an accurate voltage indication.
  - E. AC-DC selector switches (A and B)  
  
Selects AC or DC configuration - switches in a capacitor.
  - F. Vertical selector switch - can be set to display A channel, B channel, or A and B simultaneously.

Exercise #6

Outline from Demonstration on  
AN/USM 281A Oscilloscope  
Vertical Controls



UNIT IV - LESSON 1

Scoring Key for Checkpoint 1, Form A

1. c
2. b
3. a
4. c
5. d
6. b
7. b
8. d
9. c
10. a

UNIT IV - LESSON 1

Scoring Key for Checkpoint 1, Form B

1. d

2. b

3. c

4. c

5. a

6. b

7. d

8. a

9. a

10. c

## UNIT IV - LESSON 1

### Notes on Checkpoint Demonstration

#### Operation and Use of the AN/USM-281A Oscilloscope

##### Technical information in TM 9-6625-2362-122

- Drawing in front of manual shows front panel and controls
- Tables in front of manual - description and function of each control

##### Uses of equipment

- Troubleshooting (signal tracing method)
- Peak-to-peak voltmeter
- Frequency meter
- DC Voltmeter

##### Location and function of controls (see drawing on next page)

Lower left - vertical functions

Lower right - horizontal functions

Left of CRT (top to bottom)

INTENSITY control - turn outer rim to control intensity of CRT beam

BEAM FINDER button - in middle of INTENSITY control

- if controls are set up correctly but no display, press B.F. button - trace will show up on screen, then use VERT.

POSITIONING control to move it where it should be

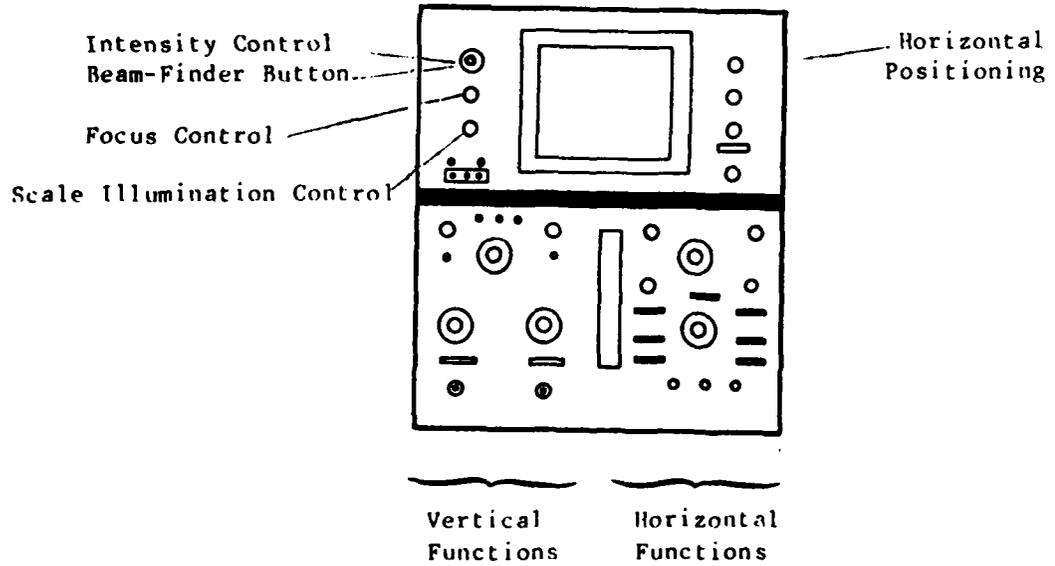
FOCUS control

SCALE ILLUMINATION control - lights up up and down lines on face of CRT - used to make peak-to-peak voltage and frequency measures

POWER OFF/ON switch - has pilot light

Right of CRT (top to bottom)

HORIZONTAL POSITIONING - moves trace to left or right (other controls not discussed)



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INSTRUCTOR GUIDE

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UNIT IV. NOTE-TAKING FOR DEMONSTRATION

Lesson 2. Taking Notes to Show Sequence

TERMINAL OBJECTIVE: Notes show actions correctly sequenced.

CONDITION: Given a demonstration showing a series of steps in a procedure.

STANDARD: Takes notes of the sequence of actions (steps) and subsequently uses the notes to answer questions concerning sequence.

ESTIMATED LESSON LENGTH: 2 hours

INSTRUCTIONAL MATERIALS: Student Guide containing self-paced materials and exercises. Videotaped demonstrations.

OTHER MEDIA AND SUPPORT MATERIALS: Card sets (to be used in practice exercises), Videotapes: Practice Exercises, Checkpoint 1

REFERENCES: None

LESSON STRUCTURE: The lesson is divided into three sections.

Section A. Using a Two-Column Format  
(Student Guide, p. 2)

Section B. Making Additions or Corrections to Notes (Student Guide, p. 6)

Section C. Taking Notes on Videotaped Demonstrations (Student Guide p. 9)

ENABLING OBJECTIVES:

Section A

Action: Uses a two-column format to list steps and key points.

Condition: Given a transcript from a demonstration of a procedure with several steps.

Standard: Lists steps in correct sequence, in left-hand column; lists key points in right-hand column.

### Section B

- Action: Makes additions and corrections to notes.
- Condition: Given a transcript from a demonstration of a procedure with several steps, and a set of notes with one step missing.
- Standard: Uses arrows, renumbering, etc. to show where the missing step should be inserted.

### Section C

- Action: Takes notes that show all steps in the correct sequence.
- Condition: Given a videotaped demonstration of a procedure with several steps, instructions to take notes on the demonstration, and a set of questions based on the demonstration.
- Standard: Correctly answers questions about the sequence of steps, referring only to the notes.

### SPECIAL INSTRUCTIONS FOR PRACTICE EXERCISES:

In addition to the usual paper and pencil materials, this lesson uses videotaped demonstrations. You will be responsible for giving the student the tape for the practice exercises. It is marked:

#### Unit IV, Lesson 2 - Practice Exercises

The "Practice Exercise" tape contains two separate demonstrations. Make sure the students know how to operate the videotape equipment. Since students may need to watch the demonstration more than once, it is especially important that they know how to rewind the videotape without damaging it. (Note: The instructions at the end of each demonstration tell the student to ask the instructor to rewind the tape. Tell the student to ignore these instructions.) After demonstrating how to rewind, supervise the students the first time they do it on their own. Show the students how to read the counter. Also point out to the students that they can stop the tape if they miss something or if they just want more time to write things down. The machine will automatically rewind the tape for a short distance, so when the tape is started again, the last few seconds the student saw will be repeated.

For the first videotaped demonstration (Exercise 3), students will be told to show you their notes before answering the questions. Compare their notes with the outline (page 5) and point out any missing or incorrect information. Don't give them the information, just say "This is in the wrong order," or "You left out the step that comes after ...". Tell the student to watch the tape again and correct his notes before trying to answer the questions. For the second videotaped demonstration (Exercise 4), the student will evaluate his own notes, but he may ask you for help.

When the student is finished with the tape, rewind it to the beginning so that it will be ready for the next demonstration.

This lesson also makes use of two sets of picture cards showing the steps in the two demonstrations for the practice exercises. They are marked:

Card Set #1 (for Practice Exercise 3)

Card Set #2 (for Practice Exercise 4)

When you give them to the student, these cards should be arranged in random order (NOT in the sequence shown in the demonstration). The student is to arrange the cards in order, with the first step on top and the last step on the bottom. You should be familiar with these cards in case the student needs assistance. Students will score themselves and then return the cards to you. Make sure the cards are rearranged in random order before putting them away.

NOTE: If the card sets are not available, give the student the alternate forms of the exercises. They are included as separate pages in this set of materials.

TESTING:

Checkpoint 1, Form A for this lesson includes a videotaped demonstration. The student will take notes on the demonstration, wait for at least 30 minutes (to increase the chances that his/her answers will be based on the notes rather than on memory), and then use the notes to answer 10 questions about the demonstration. To administer this checkpoint:

- When the student asks for the checkpoint, give him/her the videotape marked "Unit IV, Lesson 2 - Checkpoint 1, Form A/R." Also give him/her the Instruction Sheet for the checkpoint. DO NOT give him the questions.

- . If the student wants to see the demonstration again, tell him/her to rewind the videotape to the beginning.
- . When the student has finished watching the demonstration, assign him/her to some other activity\* for a period of 30 minutes or more. Remind the student to keep the notes in a safe place.
- . Rewind the tape so that it will be ready for the next student.
- . At the end of the 30 minute period, give the student the checkpoint questions. THE STUDENT SHOULD NOT HAVE ACCESS TO THE VIDEOTAPE WHILE ANSWERING THE QUESTIONS.

After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Compare the student's notes with the notes that follow the scoring key. Determine why student was unable to answer questions - were notes incomplete, incorrect, illegible, etc? Provide feedback to student. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Compare student's notes with the notes that follow the scoring key. Determine why the student was unable to answer questions - were notes incomplete, incorrect, illegible? Provide feedback to student. Prescribe review of appropriate parts of lesson, then administer Form B of the checkpoint. Give student the choice of adding to his/her previous notes, or taking a new set of notes. When student finishes, score checkpoint and provide feedback. Then have student go on to the next prescribed lesson.

\*If it happens to be near lunch hour or the end of the day, simply wait until after lunch or the beginning of the next day. If you cannot take advantage of these natural breaks, assign reading materials that are relevant to the 31M course.

INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Report Form. Monitor student to make sure that they are working steadily and that they are not having any difficulty with the videotape equipment. Be sure they complete all the exercises. For some exercises where there is no one correct answer, students will be told to show you their answers. Be prepared to point out any shortcomings and suggest ways to improve their answers. For the videotaped exercises, be sure the student uses only his/her notes to answer the questions - i.e., student should not answer the questions while viewing the videotape. Provide explanations or clarifications of material when needed. Score the checkpoint immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

### Exercise #3

#### Outline from Demonstration on Adjust Gain Control - AN/TCC-7

- I. Working on Test Panel
- II. Steps
  - A. Set MEASURE SELECT switch to CHECK GAIN position.
  - B. Adjust FINE TUNE control until indicator on test meter goes all the way to the right (maximum deflection).
  - C. Adjust GAIN control (with screwdriver) until indicator on test meter goes back to zero.
  - D. Remove jack.
  - E. Reset MEASURE SELECT switch to OFF.

UNIT IV - LESSON 2

Scoring Key for Checkpoint 1, Form A

1. a

2. c

3. d

4. b

5. d

6. a

7. c

8. b

9. d

10. b

UNIT IV - LESSON 2

Scoring Key for Checkpoint 1, Form B

1. b
2. b
3. d
4. a
5. b
6. d
7. c
8. b
9. c
10. a

UNIT IV - LESSON 2

Notes on Checkpoint Demonstration

Procedure: Count a frequency on the AN/TSM-16 Frequency Meter.

STEPS	KEY POINTS
1. Set FUNCTION switch to FREO COUNT position.	
2. Couple frequency to be measured to COUNTER INPUT receptacle.	
3. Rotate SENSITIVITY control slowly clockwise until indication on INPUT LEVEL meter is well within green area.	
4. Rotate TIME-SECONDS switch to desired time sampling period.	(markings at bottom)
5. Adjust DISPLAY TIME control for a suitable display time between counts.	
6. Translate reading on frequency counter into cycles per second.	Multiply count by factor indicated on "MULTIPLY BY" scale of TIME-SECONDS switch (markings at top). Example: 5000 X .1 = 500 cps

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UNIT IV. NOTE-TAKING FOR DEMONSTRATION

Lesson 3. Taking Notes to Show Relationships

TERMINAL OBJECTIVE: Notes show the relationship of supporting detail when there are up to three main ideas and up to two levels of subordination for each.

CONDITION: Given a demonstration of a procedure with two or three major parts, with up to two levels of subordination (steps and substeps) under at least one of the major parts.

STANDARD: Takes notes and subsequently uses notes to answer questions about the relationships between major parts, steps, and substeps.

ESTIMATED LESSON LENGTH: 1 hour, 55 minutes

INSTRUCTIONAL MATERIALS: Student Guide containing self-paced materials and exercises. Videotaped demonstrations.

OTHER MEDIA AND SUPPORT MATERIAL: Video cassette player.  
Videotapes: Practice Exercises, Checkpoint 1

REFERENCES: None

LESSON STRUCTURE: The lesson is divided into three sections.

Section A. Taking Notes to Show Major Parts and Steps (Student Guide, p. 2)

Section B. Taking Notes to Show Major Parts, Steps, and Substeps (Student Guide, p. 6)

Section C. Taking Notes on Videotaped Demonstrations (Student Guide, p. 10)

ENABLING OBJECTIVES:

Section A

- Action: Takes notes showing major parts and steps under each part.
- Condition: Given a transcript from a demonstration of a procedure having two major parts and two or more steps in each part.
- Standard: Lists major parts with appropriate steps under each part; indicates relationship either by using formal outline style or by underlining main ideas and indenting steps.

Section B

- Action: Takes notes showing major parts, steps, and substeps.
- Condition: Given a transcript from a demonstration of a procedure having three major parts, two or more steps in each part, and two or more substeps under at least one of the steps.
- Standard: Lists major parts, with appropriate steps under each part, and substeps under steps; indicates relationship either by using formal outline style or by underlining main ideas, indenting steps, and further indenting substeps.

Section C

- Action: Takes notes that show relationship of major parts, steps, and substeps.
- Condition: Given: (1) a videotaped demonstration of a procedure with two or three major parts, and up to two levels of subordination, (2) instructions to take notes on the demonstration, and (3) a set of questions based on the demonstration.
- Standard: Correctly answers questions about the relationship between major parts, steps, and substeps, referring only to the notes.

## SPECIAL INSTRUCTIONS FOR PRACTICE EXERCISES:

In addition to the usual paper and pencil materials, this lesson uses videotaped demonstrations. You will be responsible for giving the student the tape for the practice exercises. It is marked:

### Unit IV, Lesson 3 - Practice Exercises

The "Practice Exercise" tape contains two separate demonstrations. Make sure the students know how to operate the videotape equipment. Since students may need to watch the demonstration more than once, it is especially important that they know how to rewind the videotape without damaging it. (Note: The instructions at the end of each demonstration tell the student to ask the instructor to rewind the tape. Tell the student to ignore these instructions.) After demonstrating how to rewind, supervise the students the first time they do it on their own. Show the students how to reset the counter. Also point out to the students that they can stop the tape if they miss something or if they just want more time to write things down. The machine will automatically rewind the tape for a short distance, so when the tape is started again, the last few seconds the student saw will be repeated.

For the first videotaped demonstration (Exercise 3), students will be told to show you their notes before answering the questions. Compare their notes with the outline (page 6) and point out any missing or incorrect information. Don't give them the information, just say "This is in the wrong order," or "You left out the step that comes after ...". Tell the student to watch the tape again and correct his notes before trying to answer the questions. For the second videotaped demonstration (Exercise 4), the student will evaluate his own notes, but he may ask you for help.

When the student is finished with the tape, rewind it to the beginning so that it will be ready for the next demonstration.

### TESTING:

Checkpoint 1, Form A for this lesson includes a videotaped demonstration. The student will take notes on the demonstration, wait for at least 30 minutes (to increase the chances that his/her answers will be based on the notes rather than on memory), and then use the notes to answer 10 questions about the demonstration. To administer this checkpoint:

- When the student asks for the checkpoint, give him/her the videotape marked "Unit IV, Lesson 3 - Checkpoint 1, Form A/B."  
Also give him/her the Instruction Sheet for the checkpoint.  
DO NOT give him the questions.

- . If the student wants to see the demonstration again, tell him/her to rewind the videotape to the beginning.
- . When the student has finished watching the demonstration, assign him/her to some other activity\* for a period of 30 minutes or more. Remind the student to keep the notes in a safe place.
- . Rewind the tape so that it will be ready for the next student.
- . At the end of the 30 minute period, give the student the checkpoint questions. THE STUDENT SHOULD NOT HAVE ACCESS TO THE VIDEOTAPE WHILE ANSWERING THE QUESTIONS.

After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Compare the student's notes with the notes that follow the scoring key. Determine why student was unable to answer questions - were notes incomplete, incorrect, illegible, etc? Provide feedback to student. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Compare student's notes with the notes that follow the scoring key. Determine why the student was unable to answer questions - were notes incomplete, incorrect, illegible? Provide feedback to student. Prescribe review of appropriate parts of lesson, then administer Form B of the checkpoint again. Give student the choice of adding to his/her previous notes, or taking a new set of notes. When student finishes, score checkpoint and provide feedback. Then have student go on to the next prescribed lesson.

\*If it happens to be near lunch hour or the end of the day, simply wait until after lunch or the beginning of the next day. If you cannot take advantage of these natural breaks, assign reading materials that are relevant to the 31M course.

INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Report Form. Monitor students to make sure that they are working steadily and that they are not having any difficulty with the videotape equipment. Be sure they complete all the exercises. For some exercises where there is no one correct answer, students will be told to show you their answers. Be prepared to point out any shortcomings and suggest ways to improve their answers. For the videotaped exercises, be sure the student uses only his/her notes to answer the questions - i.e., student should not answer the questions while viewing the videotape. Provide explanations or clarifications of material when needed. Score the checkpoint immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

Exercise #3

Outline for Demonstration on  
Initial Tuning Procedure - AN/TRC-24

STEPS

KEY POINTS

Starting:

1. Turn POWER switch to ON.
2. Check MEASURE meter.

Wait for receiver to warm up (tone goes off).  
Should read between 29 and 31.  
See TM if reading is off.

Calibration:

1. Turn MEASURE switch to 2ND LIM position.
2. Hold AFC/OFF/CAL switch to CAL position.
3. Adjust FINE TUNE control for:
  - a. Zero on FREQ DRIFT meter.
  - b. Maximum on MEASURE meter.
4. Set INDEX control over red line nearest assigned channel.
5. Release AFC/OFF/CAL switch.
6. Disconnect antenna jack.

Keep holding switch in CAL position.

Be sure it returns to OFF.

UNIT IV - LESSON 3

Scoring Key for Checkpoint 1, Form A

1. b
2. c
3. b
4. b
5. c
6. c
7. a
8. d
9. c
10. c

UNIT IV - LESSON 3

Scoring Key for Checkpoint 1, Form B

1. b
2. a
3. d
4. b
5. c
6. d
7. c
8. a
9. a
10. b

UNIT IV - LESSON 3

Notes on Demonstration for Checkpoint 1, Form A/B

Presets for the AN/TRC-24 Radio Set

I. Receiver Presets (assigned Channel 137)

- A. COARSE TUNE control - push in and turn until 137 appears in center of window
- B. FINE TUNE control - adjust until red line nearest 137 appears behind hairline in center of OSC window
- C. RF AMP tune control - adjust until 137 appears under hairline

II. Transmitter Presets

- A. Upper panel
  - 1. Set PULSED OSCILLATOR control to ODD CHANNELS position
  - 2. Adjust TUNE control so 137 appears under pointer
- B. Center (upper half of lower panel)
  - 1. Adjust INDEX control so pointer is in center of window
  - 2. Adjust RF CHANNEL TUNE control so 137 appears behind index pointer
  - 3. Set AFC control to zero
  - 4. Adjust DRIVER TUNE control so 137 is in center of window

III Power Supply Presets

- A. 750 V ADJ control - preset to 1
- B. DC TEST switch - set to 150 UPPER SCALE position
- C. 150 V ADJ control - turn fully counterclockwise (use screwdriver)
- D. Connect ground wires to ground binding post
- E. Plug cord into power outlet

## Introduction to Unit V

### Recognizing a Part of a Whole

The purpose of this lesson is to provide the 3IM student with several helpful pointers for locating and identifying a part of a whole. Although it is not expected that many students will be deficient in this area, there may be some who experience difficulty either in reading the labels to identify parts or in distinguishing physical characteristics to locate and identify parts. This unit has been designed specifically for the student who has weaknesses in one or both of these areas.

The 3IM course is very much equipment-oriented. Throughout the duration of the course, the student is exposed to pictures of equipment and to actual equipment. He/she is expected to become familiar with the configurations of these pieces of equipment. The objective of this unit is to help the student to do this. In order to locate and identify specific parts (e.g., controls, indicators, or pieces of equipment that are parts of larger systems), the student must be able to read the labels and to distinguish physical differences of parts on the basis of location, of external (shape) and internal (design) form, and relative size.

By designing the unit to include many illustrations of actual and simplified versions of 3IM equipment, it is hoped the student will feel a close correspondence with the 3IM course itself. While learning essential skills for locating and identifying a part of a whole, he/she should perceive the lesson material as relevant to the 3IM course.

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UNIT V. RECOGNIZING A PART OF A WHOLE

Lesson 1. Recognizing a Part of a Whole

TERMINAL OBJECTIVE: Compares physical features to recognize a part<sup>1</sup> of a whole.

CONDITION: Given a picture of a labeled part(s), and given a picture of the whole containing that part.

STANDARD: Student identifies the part in the whole.

ESTIMATED LESSON LENGTH: 1 hour

METHOD OF INSTRUCTION: Student Guide containing self-paced materials, exercises, and checkpoint.

OTHER MEDIA AND SUPPORT MATERIALS: Additional review exercises and checkpoint, scoring keys for checkpoints.

REFERENCES: Many of the drawings and photographs used in this lesson are found in the Soldier's Manual, TMs, and TEC Lessons. Some of these pictures have been simplified and rearranged to conform to the lesson plan.

LESSON STRUCTURE: This lesson is divided into five sections:

- Section A. Reading the Labels
- Section B. Observing How the Parts Are Arranged
- Section C. Checking the Forms - Shape and Design - of the Parts
- Section D. Checking the Relative Size of the Parts
- Section E. Ignoring Irrelevant Features

<sup>1</sup> A part of a whole can be defined in two ways:

- 1) One part of a piece of equipment.
- 2) A piece of equipment that is one part of a larger system.

ENABLING OBJECTIVES:

Section A

1. Action: Distinguishes locations of attached labels.  
Condition: Given a picture with labels attached to the parts, and given the location of the part.  
Standard: Identifies the labeled part.
2. Action: Reads and distinguishes labels.  
Condition: Given the name of the labeled part, and given the whole piece of equipment or system containing that part.  
Standard: Identifies the location of the label.
3. Action: Matches a labeled part with the corresponding numbered part.  
Condition: Given a picture of a piece of equipment with unattached labels, and given the same piece of equipment, except that the parts have numbers instead of labels.  
Standard: Identifies a numbered part in the whole.

Section B

1. Action: Determines the location of the part.  
Condition: Given a picture of a piece of equipment, and given another picture of the same piece of equipment.  
Standard: Identifies the specified part on the piece of equipment.
2. Action: Compares and distinguishes the general arrangement of the parts.  
Condition: Given a picture a picture of a piece of equipment, and given pictures of several more pieces of equipment.  
Standard: Matches the identical pieces of equipment.

Section C

1. Action: Distinguishes shapes (external forms).  
Condition: Given a part, and given several more parts.  
Standard: Matches the two identical parts.
2. Action: Distinguishes shapes (external forms) of parts.  
Condition: Given a picture of a labeled or unlabeled part, and given a picture of a whole containing that part.  
Standard: Identifies the given part in the whole.
3. Action: Distinguishes shapes (external forms).  
Condition: Given a part, and given several more parts with identical shapes.  
Standard: Matches the two identical parts.
4. Action: Distinguishes designs (internal forms) of parts.  
Condition: Given a picture of a labeled or unlabeled part, and given a picture of a whole containing that part and other parts having the same or similar shape.  
Standard: Identifies the given part in the whole.

Section D

1. Action: Compares and distinguishes sizes of parts.  
Condition: Given a picture of a labeled piece of equipment, and given the same piece of equipment, except that the parts have numbers instead of labels.  
Standard: Identifies a specified part.

TESTING:

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT V - LESSON 1

Scoring Key for Checkpoint 1, Form A

1. b.

2. c.

3. d.

4. c.

5. c.

6. b.

7. a.

8. b.

9. b.

10. d.

UNIT V - LESSON 1

Scoring Key for Checkpoint 1, Form B

1. b.
2. d.
3. a.
4. d.
5. c.
6. d.
7. b.
8. c.
9. c.
10. b.

## Introduction to Unit VI

### Locating Information in Tables

The purpose of Unit VI is to teach students to use the row and column headings and subheadings in order to locate information within the kinds of tables used in the 31M10 MOS - equipment performance checklists, troubleshooting charts, and tables for performing PMCS. The intent is not to teach them how to use the tables to perform their jobs. That they learn in the 31M10 course. The intent is to help them find their way about in tables, so that, for example, if the Sergeant says, "Look at the normal indication in Step 10," they will be able to find it quickly.

Unit VI contains three lessons. Lesson 1, "The Structure of Tables and Diagrams," teaches students about the row-by-column structure of tables and diagrams and how to find the entry at the intersection of a specified row and column. Lesson 2, "Interpreting Column Headings," teaches the meanings of the column headings most frequently encountered in tables used by the 31M MOS. Lesson 3, "Locating Information in 31M Tables," gives students practice in using the column headings and the table structure to find needed information.

Each lesson in Unit VI contains a Student Guide, one checkpoint (Form A) which measures attainment of the terminal objective, one Review Exercise for students who do poorly on the checkpoint, and an additional checkpoint (Form B), parallel to the first. The Instructor Guide for each lesson includes scoring keys for both forms of the checkpoint.

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UNIT VI. LOCATING INFORMATION IN TABLES  
UNIT VII. READING CABLING DIAGRAMS

Lesson 1. The Structure of Tables and Diagrams

- TERMINAL OBJECTIVE:** Uses row and column headings to locate information in simplified<sup>1</sup> cabling diagrams and tables.
- CONDITION:** Given a simplified diagram of a video patch panel or table, with three or more rows and three or more columns, and having up to two levels of column headings (headings and subheadings).
- STANDARD:** Student identifies entries in specified rows or columns, and identifies the row or column in which specified entries are to be found.
- ESTIMATED LESSON LENGTH:** 45 minutes
- INSTRUCTIONAL MATERIAL:** Student Guide containing self-paced materials and exercises. Checkpoint.
- OTHER MEDIA AND SUPPORT MATERIALS:** Additional review exercise and checkpoint, scoring keys for checkpoints.
- REFERENCES:** The cabling diagrams and tables used in this lesson are simplified versions of those found in the Soldier's Manual and in TMs.

<sup>1</sup> The cabling diagrams are simplified in the following ways:

1. Simple letter combinations are used to designate components instead of actual equipment acronyms (e.g., XYZ instead of TD-660).
2. Familiar words or letters are used to designate rows instead of actual cable connection points (e.g., CAT instead of PCM IN).

The tables are simplified in the following ways:

1. The number of rows is much smaller than the number in tables used in the 31M MOS.
2. Familiar words or phrases are used for column headings and table entries.

LESSON STRUCTURE: The lesson is divided into three sections:

Section A. Rows and Columns in Diagrams and Tables (Student Guide, p. 2)

Section B. Cabling Diagrams for Two or More Systems (Student Guide, p. 7)

Section C. The Structure of Tables in 31M Materials (Student Guide, p. 12)

ENABLING OBJECTIVES:

Section A

1. Action: Distinguishes rows and columns.

Condition: Given a grid with x rows and y columns.

Standard: States or selects the number of rows or number of columns.

2. Action: Locates entries in specified rows or columns.

Condition: Given a two-way table, with one entry in each row-column intersection.

Standard: Names the entry or entries in any specified row, column, or row-column intersection.

Section B

Action: Locates entries in cabling diagrams for two or more systems.

Condition: Given a simplified cabling diagram with two levels of column headings (systems and components within systems).

Standard: Names the entry or entries in any specified system, component, or row, or at any combination of system, component, and row.

Section C

- Action: Locates entries in tables similar to 31M troubleshooting and maintenance tables.
- Condition: Given a simplified 31M table, having rows designated by Item No. or Step, and having one to three parts (substeps) at each Item No. or Step.
- Standard: Names the entry or entries in any specified column or row (Step, Item No., or sub-step No.), or at any specified row-column intersections; or names the row and/or column containing specified information.

TESTING:

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT VI - LESSON 1  
UNIT VII - LESSON 1

Scoring Key for Checkpoint 1, Form A

1. N
2. SYSTEM 2, ABC (in either order)
3. E
4. D, H, L, P, E, I, M, Q (in any order)
5. XYZ
6. Count items
7. Examine and Turn
8. Expected Result in Item No. 3c.
9. Needle moves
10. Plug

UNIT VI - LESSON 1  
UNIT VII - LESSON 1

Scoring Key for Checkpoint 1, Form B

1. 3
2. malfunctions at Item No. 2.
3. D
4. V
5. H
6. C, E, F
7. B, C, G, I
8. D, E
9. A
10. SYSTEM 3, JKL, BLUE (in any order)

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UNIT VI. LOCATING INFORMATION IN TABLES

Lesson 2. Interpreting Table Headings

TERMINAL OBJECTIVE: Uses column headings to locate information.

CONDITION: Given column headings from a troubleshooting checklist or chart or from a maintenance table.

STANDARD: Student selects the appropriate columns for finding specific information.

ESTIMATED LESSON LENGTH: 1 hour, 15 minutes

INSTRUCTIONAL MATERIAL: Student Guide containing self-paced materials and exercises. Checkpoint.

OTHER MEDIA AND SUPPORT MATERIALS: Additional review exercise and checkpoint, scoring keys for checkpoints.

REFERENCES: Tables for troubleshooting and maintenance can be found in almost all the TMs relevant to low- and medium-capacity multichannel radio equipment.

LESSON STRUCTURE: The lesson is divided into three sections:

Section A. Identifying Tables by Title  
(Student Guide, p. 2)

Section B. Interpreting Column Headings in  
Equipment Performance Checklists and  
Troubleshooting Charts  
(Student Guide, p. 4)

Section C. Interpreting Column Headings in  
Maintenance Tables  
(Student Guide, p. 11)

ENABLING OBJECTIVES:

Section A

- Action: Locates correct table for a given troubleshooting or maintenance operation.
- Condition: Given titles of two or more tables, each relevant to a different piece of equipment, equipment application, or maintenance interval.
- Standard: Selects the appropriate table for the task being performed.

Section B

1. Action: Defines column headings in equipment performance checklists and troubleshooting charts.  
Condition: Given column headings and their definitions.  
Standard: States the definition, given the heading; or states the heading, given the definition.
2. Action: Interprets column headings in troubleshooting charts.  
Condition: Given column headings from an equipment performance checklist or troubleshooting chart.  
Standard: Selects the column in which specified information is found.

Section C

1. Action: Defines column headings in maintenance tables.  
Condition: Given column headings and their definitions (including headings which require a key for interpretation).  
Standard: States the definition, given the heading; or states the heading, given the definition.
2. Action: Interprets column headings in maintenance tables.  
Condition: Given column headings from a maintenance table, with or without a key explaining some of the column headings.  
Standard: Selects the column in which specified information is found.

TESTING:

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT VI - LESSON 2

Scoring Key for Checkpoint 1, Form A

1. 4-7c
2. Corrective measure
3. Fault symptom
4. What to do at each step (or just: what to do)
5. Malfunction
6. Probable cause
7. Suggested remedy
8. Quarterly
9. Reference
10. Item to Be Inspected

UNIT VI - LESSON 2

Scoring Key for Checkpoint 1, Form B

1. Table 4-3
2. Action
3. Unit
4. Normal result
5. Possible trouble
6. Symptom
7. Possible trouble
8. Equipment is not ready/available if:
9. A
10. Procedure

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UNIT VI. LOCATING INFORMATION IN TABLES

Lesson 3. Locating Information In 31M Tables

TERMINAL OBJECTIVE: Locates information in checklists, troubleshooting charts, and maintenance tables.

CONDITION: Given one or more pages from an equipment performance checklist, troubleshooting chart, or maintenance table.

STANDARD: Student identifies information in a specified cell by locating the correct row-column intersection.

ESTIMATED LESSON LENGTH: 1 hour, 25 minutes

INSTRUCTIONAL MATERIAL: Student Guide containing self-paced materials and exercises. Checkpoint.

OTHER MEDIA AND SUPPORT MATERIALS: Additional review exercise and checkpoint, scoring keys for checkpoints.

REFERENCES: Equipment Performance Checklist in TM 11-5820-461-12, para 5-11b. Troubleshooting charts and maintenance tables are found in most TMs used in the 31M10 course.

LESSON STRUCTURE: Since the lesson is short, it is not divided into sections. However, exercises for students are inserted at several points besides the end of the lesson.

ENABLING OBJECTIVES:

1. Action: Locates information in checklists.

Condition: Given a checklist of one or more pages, in which rows denote steps and columns denote Unit, Action, Normal indication, and Corrective measures.

Standard: Uses row and column information to locate entries in the table.

2. Action: Locates information in troubleshooting charts.
- Condition: Given a troubleshooting chart in which rows have item numbers and columns denote Malfunctions, Probable cause, and Corrective action, with one or more probable causes and corresponding corrective actions for each malfunction.
- Standard: Uses row and column information to locate entries in the table.
3. Action: Locates information in maintenance tables.
- Condition: Given a maintenance table in which rows denote item numbers and columns denote inspection intervals (interpretable with a key), items to be inspected, procedures, and either references or problems making the equipment inoperable.
- Standard: Uses row and column information to locate entries in table.

TESTING:

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT VI - LESSON 3

Scoring Key for Checkpoint 1, Form A

1. Meter indicates 115 volts. MANUAL indicator goes out.
2. Check HV fuse.
3. Set MANUAL-AUTOMATIC switch to AUTOMATIC.
4. Defective or misoriented antenna.
5. Defective order wire cable between RT-773/GKC-103(V) and R-1329(P)/GRC-103(V).
6. Request distant terminal troubleshooting.
7. Before operation, during operation, and weekly.
8. METER SELECT switch, PWR and CABLE CURRENT switches and cable current alarm circuit, Traffic (pcm) alarm circuit.
9. Operate receiver AC POWER switch to ON.
10. Order wire fails to operate.

UNIT VI - LESSON 3

Scoring Key for Checkpoint 1, Form B

1. Multimeter indicates in green area of meter scale.
2. AM-1955(\*)/GRC or AM-1956(\*)/GRC.
3. Adjust AFC TUNE control for peak indication on multimeter.
4. Replace lamp.
5. Incorrect tuning of MULT PEAK control.
6. Replace receiver head.
7. A shock hazard exists.
8. During operation and weekly.
9. Operate MAIN circuit breaker to ON; AMPERES AC meter indicates zero.

NOTE to scorer: The first half of the sentence is adequate.

10. POWER INDICATOR neon lamp and AC VOLTS METER on POWER DISTRIBUTION PANEL, POWER DISTRIBUTION PANEL.

## Introduction to Unit VII, Lesson 2

### Identifying Connections in Simple and Complex Cabling Diagrams

The purpose of this lesson is to bring the student to the point where he/she can read and understand simple and complex cabling diagrams. Initially, the plan was to develop separate lessons for simple and complex diagrams. Since the basic structure of both kinds of diagrams is the same, it was decided to incorporate the two into a single lesson. Furthermore, the procedure for identifying cable connections is the same for both simple and complex diagrams.

The specific objective of this lesson is to teach the student how to identify cable connections on these diagrams and how to identify the system(s) in which these connections are to be found. In order to make these identifications, the student must possess certain knowledges and skills. He/she must first become familiar with the structure of cabling diagrams. To attain this familiarity, the ability to read verbal and non-verbal (visual representations) material is essential, for cabling diagrams consist of both kinds. Secondly, the student must be able to apply his/her knowledge of the structure of a cabling diagram in the procedure of identifying cable connections.

Before a student can identify cable connections and the system(s) in which they are found, he/she must learn how to distinguish the different systems, components, and connectors. He/she must also learn how to trace or follow the cabling lines in order to find the connecting points to which the cables are attached. These are processes which involve "reading" non-verbal material.

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UNIT VII. READING CABLING DIAGRAMS

Lesson 2. Identifying Connections in Simple and  
Complex Cabling Diagrams

- TERMINAL OBJECTIVE: Identifies the cable connections within a given system(s), and identifies the system(s) having a specified cable connection.
- CONDITION: Given a cabling diagram for a two-, three-, and four-system terminal.
- STANDARD: Student selects correct alternative from various configurations.
- ESTIMATED LESSON LENGTH: 1 hour, 50 minutes
- INSTRUCTIONAL MATERIAL: Student Guide containing self-paced materials and exercises. Checkpoint.
- OTHER MEDIA AND SUPPORT MATERIALS: Additional review exercise and checkpoint, scoring keys for checkpoints.
- REFERENCES: Some of the cabling diagrams used in this lesson are found in the Soldier's Manual and TEC lessons. Others are simplified versions<sup>1</sup> of these diagrams.

<sup>1</sup> The cabling diagrams are simplified in the following ways:

1. Simple letters are used to designate components instead of actual equipment acronyms (e.g., A instead of TD-660).
2. Words (colors), Roman numerals, or letter-number combinations are used to designate rows instead of actual cable connector points (e.g., RED instead of PCM IN).

- LESSON STRUCTURE: The lesson is divided into four sections:
- Section A. The Structure of Cabling Diagrams  
(Student Guide, p. 2)
  - Section B. Identifying the System(s) in Which Cable Connections Are Found  
(Student Guide, p. 6)
  - Section C. Identifying Cable Connections Using a Five-Step Procedure  
(Student Guide, p. 9)
  - Section D. Applying the Five-Step Procedure to a Simple and Complex Cabling Diagram  
(Student Guide, p. 19)

ENABLING OBJECTIVES:

Since the plan of this lesson called for a certain amount of repetition from one section to another, it was decided not to break down the enabling objectives according to section. Instead, the enabling objectives are listed for the entire lesson as follows:

1. Action: Distinguishes the parts of a cabling diagram.  
Condition: Given a written description of a part of a cabling diagram.  
Standard: Writes the name of the part.
2. Action: Distinguishes the parts of a cabling diagram.  
Condition: Given a cabling diagram with letters to represent the parts and given directions to name a specified part, or given the name of the part and given directions to specify the letter.  
Standard: Names or identifies a specified part of a cabling diagram.
3. Action: Distinguishes two-, three-, and four-system diagrams.  
Condition: Given a cabling diagram with two, three, or four systems.  
Standard: Determines the number of systems there are.

4. Action: Distinguishes two- and three-component systems.  
Condition: Given a cabling diagram having two or three components within each system.  
Standard: Determines the number of components.
5. Action: Distinguishes systems that are cabled and systems that are not cabled.  
Condition: Given a cabling diagram having cable connections within one or more systems.  
Standard: Identifies the system(s) that is cabled.
6. Action: Locates one end of a cable connection.  
Condition: Given a cabling diagram with one or more cable connections.  
Standard: Identifies the system, component, and connector of one end of a cable connection.
7. Action: Locates the second end of a cable connection.  
Condition: Given a cabling diagram with one end (connecting point) of a cable connection identified.  
Standard: Traces the cable from the identified end of a connection to the other end of the connection.
8. Action: Locates systems that are interconnected.  
Condition: Given a cabling diagram with two or more interconnected systems.  
Standard: Identifies the interconnected systems.

TESTING:

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT VII - LESSON 2

Scoring Key for Checkpoint 1, Form A

1. c.

2. b.

3. a.

4. c.

5. c.

6. b.

7. c.

8. d.

9. c.

10. b.

UNIT VII - LESSON 2

Scoring Key for Checkpoint 1, Form B

1. c.

2. b.

3. c.

4. b.

5. a.

6. c.

7. c.

8. a.

9. b.

10. d.

## Introduction to Unit VIII

### Diagnosing Equipment Malfunctions

The purpose of Unit VIII is to prepare students for instruction in troubleshooting which begins in Week 5 of the 31M10 course. In order to learn to troubleshoot, students must be able to do three things:

1. Operate the equipment.
2. Compare what is happening on the equipment with expected (normal) indications.
3. Read printed descriptions of symptoms accurately.

The first requirement is taught in the 31M course. This is not in the province of BSEP instruction. However, the second and third requirements are prerequisites which are not taught in the AIT course and are in the province of BSEP instruction. The comparison/decision-making/reasoning skills (number 2 above) are taught in Lessons 1 and 2, and the reading skills (number 3) are taught in Lessons 3 and 4 of Unit VIII.

Unit VIII is designed for integration within the 31M course during the fourth week of training. By the time students encounter this unit, they have already learned to operate low-capacity radio and cable systems. Thus, they are familiar with the components, controls, and indicators which comprise the systems. They have also become familiar with relevant military terminology and acronyms; e.g., they know that designations for equipment components take a certain form.

A minimum level of these skills and knowledges is necessary to understand the content of instruction in Unit VIII, especially Lessons 3 and 4. In these lessons, students must read sentences from technical manuals (TMs) which describe symptoms. Students "disentangle" each sentence, i.e., analyze the sentence into three major parts:

Equipment component

Action (A switch or control set or adjusted in a certain way)

Symptom (Abnormal indication on one or more indicators)

Here is an example of such a sentence:

T-983(P)/GRC-103(V) LOW POWER indicator does not extinguish within 60 seconds after AC POWER switch is operated to ON/RESET and meter indication is below normal with meter selector switch at 600 VDC.

In order to analyze the sentence, students must know that:

"T-983(P)/GRC-103(V)" is the name of an equipment component.

"LOW POWER" indicator is an indicator that may be on or off.

"AC POWER switch" is a switch, one of whose positions is  
"ON/RESET."

"meter" refers to a meter on the T-983.

"meter selector switch" is a switch, one of whose positions is  
"600 VDC."

The students' training during the first three weeks of the AIT course ensures that they know the facts listed above, as well as other similar ones.

It would be unreasonable to expect BSEP instructors to know as much about the equipment as the students. Nor is it necessary. However, you do need to know enough to distinguish names of equipment components from names of controls and indicators when you see them in print, so that you will be able to help students if they have trouble in Unit VIII. The brief section below is intended to provide you, the BSEP instructor, with the minimum amount of information that is necessary to enable you to perform your role.

#### Introduction to Radio and Cable Systems

Radio systems, both low- and medium-capacity, consist of a radio (transmitter and receiver), multiplexing equipment (PCM equipment) which makes transmission on multiple channels possible, and auxiliary equipment including an antenna and generator. Cable systems do not include a radio and antenna; but the other components are the same. Each component in a system has an acronym designation, similar to a model number. For example, just as "Datsun 280 ZX" uniquely defines a specific model of car, the acronym TD-660(\*)/G uniquely defines a specific multiplexer. It is important for you, as a BSEP instructor, to recognize that a given acronym represents an equipment component and not, for example, a control or indicator. It is not necessary for you to know which component is represented by each acronym.

Each equipment component has various switches and controls which the operator manipulates, and certain indicators (meters, lights, buzzers) which the operator monitors. It is not necessary for BSEP instructors to know all the controls and indicators. However, you should be able to identify names of controls and indicators when they appear in print. This is made easier by the fact that names of controls are usually (but not always) printed in upper-case letters in TMs and FMs.

## Components of Radio and Cable Systems

The shelters in which radio systems are housed are called assemblages. The assemblage itself has certain controls, e.g., light switches. Within the assemblage is some combination of components, some of which are listed below. Only those components which appear in the reading materials of Unit VIII are listed here.

<u>Full Acronym as it appears in print</u>	<u>Component Name</u>	<u>Usually referred to as:</u>
AN/GRC-103(N)	Low-capacity radio	"Angry 103"
AN/GRC-50(V)	Medium-capacity radio	"Angry 50"
T-983(P)/GRC-103(V)	Transmitter of the low-capacity radio	T-983
R-1329(P)/GRC-103(V)	Receiver of the low-capacity radio	R-1329
T-893(P)/GRC	Transmitter of the medium-capacity radio	T-893
R-1331(P)/GRC or R-1148(P)/GRC	Receiver of the medium-capacity radio	R-1331 and R-1148 (The 31M course uses the R-1331(P)/GRC only, but TMs often refer to both.)
TD-202/U TD-204/U TD-660(A)/G or TD-660(*)/G TD-352/U or TD-353/U TD-754/U	Various multiplexers	Usually referred to omitting the G/U at the end, e.g., TD-202.
RT-773/GRC-103(V)	Order wire	RT-773
CV-1548/G	Telephone signal converter	CV-1548

There are several things you probably notice about these acronyms which make it easy to remember what they stand for:

1. All equipment acronyms consist of one or more letters, followed by a hyphen, then a number, followed by a letter or letters, with or without a slash. At any rate, all acronyms end with a letter.
2. Radio sets start with AN/GRC-.
3. T- stands for transmitter, R- for receiver.
4. Anything starting with TD- is a multiplexer.

What do you, as a BSEP instructor, need to know about these components and their acronyms? You do not need to know the acronyms by memory. You do need to be able to recognize these as names of equipment components, rather than controls or indicators, when you see them in print. For example, here is part of a sentence from a TM:

T-983(P)/GRC-103(V) AC POWER and LOW POWER indicators do not light...

You should recognize that the component being discussed is the T-983(P)/GRC-103(V). The "AC POWER" is not part of the component designation.

### Controls and Indicators

There are too many controls and indicators to list them all here. Besides, you do not need to know them. You do have to be able to tell whether a given name in a printed reference is the name of a control or of an indicator. This is usually not hard to do, if you remember a few facts:

1. Switches and controls are things the operator manipulates. Each switch and control has a name, e.g.,

AFC LEVEL control

METER SELECT switch

Also remember that any switch has at least two positions, sometimes more. For example, an ON-OFF switch has two positions: ON and OFF. Some switches on 31M equipment have many positions. Instructions for setting switches in TMs always tell the operator what position to set the switch to.

2. Indicators are things like lights or meters which indicate what is happening in the equipment. Each indicator has a name. Instructions in TMs often tell the operator what a given indicator should (or should not) show under certain conditions, e.g.,:

TEST ALIGN meter indicates in green area.

Multimeter shows peak indication.

You will gradually acquire additional familiarity with the controls and indicators on 31M equipment as you look at TMs and help students with the material in Unit VIII. At this point, the best thing for you to do is to put yourself in the place of a student and work through the four lessons of Unit VIII. Be sure that you understand the material in the lessons thoroughly. If you do, you will have no trouble helping students to do the same thing.

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UNIT VIII. DIAGNOSING EQUIPMENT MALFUNCTIONS

Lesson 1. Deciding Whether an Indication is Normal

TERMINAL OBJECTIVE: Compares obtained result with description of normal indication on one indicator.

CONDITION: Given a description of a normal indication on one indicator, and given the obtained result either matching or not matching the description.

STANDARD: Student classifies obtained result as normal or abnormal.

ESTIMATED LESSON LENGTH: 30 minutes

INSTRUCTIONAL MATERIAL: Student Guide containing self-paced materials and exercises. Checkpoint.

OTHER MEDIA AND SUPPORT MATERIALS: Additional review exercise and checkpoint, scoring keys for checkpoints.

REFERENCES: Troubleshooting checklist based on normal indications, TM 11-5820-461-12 w/c, para 5-11, pages 5-11 to 5-17.

LESSON STRUCTURE: The lesson is divided into two sections:

Section A. Indicators, Indications, and Normal Indications (Student Guide, p. 3)

Section B. Deciding Whether Something is Wrong with Your Equipment (Student Guide, p. 7)

ENABLING OBJECTIVES:

Section A

1. Action: Classifies examples and non-examples of the terms:  
indicator, indication.  
Condition: Given definitions, and practice examples and non-examples.  
Standard: Classifies examples and non-examples correctly.
2. Action: Predicts what should happen if the equipment is operating properly.  
Condition: Given a normal indication for one indicator.  
Standard: Makes a prediction that matches the normal indication.

Section B

1. Action: Decides whether equipment indications match or do not match normal indications.  
Condition: Given a normal indication and an equipment indication, one indicator.  
Standard: Correctly states that the normal indication and the equipment indication are the same or different.
2. Action: States the rule for determining whether something is wrong with the equipment.  
Condition: Given incomplete statements of the rule.  
Standard: Completes the statements correctly.

TESTING:

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT VIII - LESSON 1

Scoring Key for Checkpoint 1, Form A

1. Yes
2. Yes
3. No
4. No
5. Yes
6. Yes
7. No
8. Yes
9. No
10. Yes

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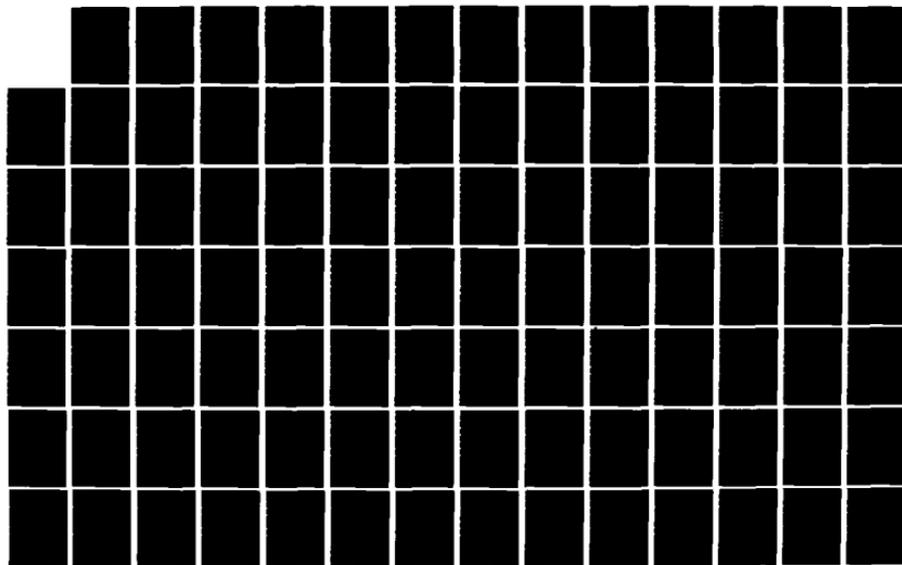
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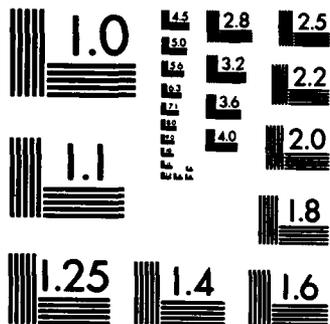
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MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

UNIT VIII - LESSON 1

Scoring Key for Checkpoint 1, Form B

1. Yes
2. No
3. Yes
4. Yes
5. No
6. Yes
7. Yes
8. No
9. No
10. No

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UNIT VIII. DIAGNOSING EQUIPMENT MALFUNCTIONS

Lesson 2. Deciding Whether Something is Wrong  
Based on Two or More Indicators

TERMINAL OBJECTIVE: Compares obtained result with description of normal indication on two or more indicators.

CONDITION: Given a description of a normal indication including two or more indicators, and given the obtained result on all indicators, with all, some, or none of the indicators matching the description.

STANDARD: Student classifies obtained result as normal or abnormal.

ESTIMATED LESSON LENGTH: 35 minutes

INSTRUCTIONAL MATERIAL: Student Guide containing self-paced materials and exercises. Checkpoint.

OTHER MEDIA AND SUPPORT MATERIALS: Additional review exercise and checkpoint, scoring keys for checkpoints.

REFERENCES: Troubleshooting checklist based on normal indications, TM 11-5820-461-12 w/c, para 5-11, pages 5-11 to 5-17.

LESSON STRUCTURE: The lesson is divided into two sections:

Section A. Review of Procedure for One Indicator  
(Student Guide, p. 3)

Section B. Procedure for Two or More Indicators  
(Student Guide, p. 6)

Students who have just completed Unit VIII, Lesson 1, should be told to omit Section A, unless the instructor decides that they need additional practice.

**ENABLING OBJECTIVES:**

**Section A**

**Action:** Compares obtained result with description of normal indication on one indicator. If obtained result matches description, classifies as normal.

**Condition:** Given a description of a normal indication on one indicator, and given the obtained result either matching or not matching the description.

**Standard:** Decides whether there is anything wrong.

**Note:** This is the terminal objective of Unit VIII, Lesson 1.

**Section B**

**Action:** Compares equipment indications with those listed in a checklist normal indication.

**Condition:** Given a description of a normal indication on two or more indicators, and given the obtained results on the corresponding equipment indicators, with from zero to all indications matching.

**Standard:** Decides whether or not all equipment indications match the checklist normal indication.

**TESTING:**

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.

7 or less correct Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Students who have just completed Lesson 1 of this unit should omit Section A, unless the instructor feels that they need additional practice. All other students should do both sections. Record date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score checkpoints immediately after students finish, and provide immediate feedback. Record checkpoint score(s) and time of lesson completion on Student Record Form.

**UNIT VIII - LESSON 2**

**Scoring Key for Checkpoint 1, Form A**

1. No
2. Yes
3. Yes
4. Yes
5. Yes
6. No
7. Yes
8. Yes
9. No
10. Yes

UNIT VIII - LESSON 2

Scoring Key for Checkpoint 1, Form B

1. Yes
2. Yes
3. Yes
4. No
5. Yes
6. Yes
7. Yes
8. No
9. No
10. Yes

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UNIT VIII. DIAGNOSING EQUIPMENT MALFUNCTIONS

Lesson 3. Finding Descriptions of Symptoms: One Indicator

**TERMINAL OBJECTIVE:** Compares obtained result with description of symptoms including one indicator, in a troubleshooting table in a TM.

**CONDITION:** Given a description of an equipment symptom including one indicator, and given a list of symptoms from a troubleshooting table.

**STANDARD:** Student locates the symptom description matching the equipment symptom.

**ESTIMATED LESSON LENGTH:** 42.5 minutes

**INSTRUCTIONAL MATERIAL:** Student Guide containing self-paced materials and exercises. Checkpoint.

**OTHER MEDIA AND SUPPORT MATERIALS:** Additional review exercise and checkpoint, scoring keys for checkpoints.

**REFERENCES:** Many TMs used in the 31M10 course include troubleshooting tables based on symptoms. Most of the material in this lesson is based on TM 11-5895-453-14-2, Table 5-11.

**LESSON STRUCTURE:** The lesson is divided into three sections:

Section A. Recognizing Symptoms  
(Student Guide, p. 4)

Section B. Reading Malfunction Descriptions  
(Student Guide, p. 5)

Section C. Matching Equipment Symptom Descriptions in Troubleshooting Tables  
(Student Guide, p. 9)

ENABLING OBJECTIVES:

Section A

- Action: Defines the terms symptom and malfunction.
- Condition: Given descriptions of results on equipment and information concerning the normal indication.
- Standard: Classifies examples and non-examples of symptoms correctly.

Section B

- Action: Analyzes descriptions of symptoms (one indicator) from a troubleshooting table.
- Condition: Given a symptom description from a troubleshooting table.
- Standard: Identifies the equipment component, operator action, and resulting symptom.

Section C

- Action: Decides whether equipment symptoms match TM symptom descriptions (one indicator).
- Condition: Given a description of what happened on equipment and a symptom description from a TM.
- Standard: Decides whether the two descriptions match or not.

TESTING:

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.

7 or less correct Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score checkpoints immediately after students finish, and provide immediate feedback. Record checkpoint score(s) and time of lesson completion on Student Record Form.

UNIT VIII - LESSON 3

Scoring Key for Checkpoint 1, Form A

	<u>Item No.</u>
1.	15
2.	4
3.	14a
4.	7
5.	10
6.	2d
7.	13
8.	8
9.	1a
10.	6

UNIT VIII - LESSON 3

Scoring Key for Checkpoint 1, Form B

	<u>Item No.</u>
1.	11d
2.	1b
3.	14d
4.	5
5.	13
6.	9
7.	3
8.	11b
9.	4
10.	12

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UNIT VIII. DIAGNOSING EQUIPMENT MALFUNCTIONS

Lesson 4. Finding Descriptions of Symptoms  
When There are Two or More Indicators

- TERMINAL OBJECTIVE: Compares obtained result with description of symptom including two or more indicators, in a troubleshooting table in a TM.
- CONDITION: Given a description of an equipment symptom including two or more indicators, and given a list of symptoms from a troubleshooting table.
- STANDARD: Student locates the symptom description matching the equipment symptom.
- ESTIMATED LESSON LENGTH: 55 minutes
- INSTRUCTIONAL MATERIAL: Student Guide containing self-paced materials and exercises. Checkpoint.
- OTHER MEDIA AND SUPPORT MATERIALS: Additional review exercise and checkpoint, scoring keys for checkpoints.
- REFERENCES: Many TMs used in the 31M10 course include troubleshooting tables based on symptoms. Most of the material in this lesson is based on TM 11-5895-453-14-2 and TM 11-5895-366-15.
- LESSON STRUCTURE: The lesson is divided into three sections:
- Section A. Review of Procedure for One Indicator (Student Guide, p. 3)
  - Section B. Reading Symptom Descriptions for Two or More Indicators (Student Guide, p. 7)
  - Section C. Matching Equipment Symptoms to Symptom Descriptions (Student Guide, p. 15)
- Students who have just completed Lesson 3 of this unit should be directed to omit Section A, unless the instructor feels that they need additional review and/or practice.

ENABLING OBJECTIVES:

Section A

**Action:** Compares obtained result with descriptions of symptoms including one indicator, in a troubleshooting table in a TM.

**Condition:** Given a description of an equipment symptom including one indicator, and given a list of symptoms from a troubleshooting table.

**Standard:** Locates the symptom description matching the equipment symptom.

**Note:** This is the terminal objective of the preceding lesson: Unit VIII, Lesson 3.

Section B

**Action:** Analyzes descriptions of symptoms (two or more indicators) from troubleshooting tables.

**Condition:** Given a symptom description, including two or more indicators, sometimes on two or more equipment components, from a troubleshooting table.

**Standard:** Identifies the equipment components, operator actions, and all resulting symptom indications.

Section C

**Action:** Decides which of two symptom descriptions in a TM matches an equipment symptom.

**Condition:** Given two symptom descriptions, including the same equipment components and operator actions but different combinations of resulting symptom indications.

**Standard:** Selects the description which matches the equipment symptom.

TESTING:

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

INSTRUCTIONAL GUIDELINES:

Students who have just completed Lesson 3 of this unit may be told to omit Section A. All other students should do all three sections. Record date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score checkpoints immediately after students finish, and provide immediate feedback. Record checkpoint score(s) and time of lesson completion on Student Record Form.

UNIT VIII - LESSON 4

Scoring Key for Checkpoint 1, Form A

Item No.

1. 3
2. 11
3. 15
4. 4
5. 5
6. 7
7. 10
8. 1
9. 6
10. 8

UNIT VIII - LESSON 4

Scoring Key for Checkpoint 1, Form B

Item No.

1. 3

2. 14

3. 11

4. 5

5. 15

6. 8

7. 9

8. 1

9. 6

10. 2

## Introduction to Unit IX

### Scale Reading

The purpose of Unit IX is to teach students how to read scales such as those found on the meters and dials of 31M equipment. In Unit IX, they learn about decimals, ones, fives, tens, and hundreds scales. They work with scale values increasing from left to right (the most common type) and also with scale values increasing from right to left (less common type), since equipment in the 31M10 MOS uses both types.

Unit IX contains four lessons. Lesson 1, Labeling Place Value, teaches the hundreds, tens, ones, and tenths place values. Lesson 2, Numbering Scale Points, teaches the student to identify values on ones, fives, tens, and hundreds scales. Lesson 3, Scales Divided into Tenths, teaches the students how to identify scale values on decimal scales. Lesson 4, Comparing Scale Settings, teaches the students how to identify scales with readings within specified ranges.

Each lesson in Unit IX contains a Student Guide, one checkpoint (Form A) which measures attainment of the terminal objectives, one Review Exercise for students who do poorly on the checkpoint, and an additional checkpoint (Form B), parallel to the first. The Instructor Guide for each lesson includes scoring keys for both forms of the checkpoint.

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UNIT IX. SCALE READING

Lesson 1. Labeling Place Value

TERMINAL OBJECTIVE: Breaks down a given four-digit number with one decimal.

CONDITION: Given a four-digit number with one decimal place.

STANDARD: Student:

- Identifies first place to the right of decimal point as tenths column.
- Identifies third place to the left of the decimal point as hundreds column.
- Identifies second place to the left of the decimal point as tens column.
- Identifies first place to the left of the decimal point as ones column.

ESTIMATED LESSON LENGTH: 1 hour

INSTRUCTIONAL MATERIALS: Student Guide containing self-paced materials and exercises. Checkpoint.

OTHER MEDIA AND SUPPORT MATERIALS: Additional review exercise and checkpoint, scoring keys for checkpoints.

REFERENCES: None

LESSON STRUCTURE: The lesson is divided into three sections:

Section A. Basic Facts About Place Values  
(Student Guide, p. 2)

Section B. Writing Numbers (Student Guide, p. 2)

Section C. Identifying Place Value  
(Student Guide, p. 9)

**ENABLING OBJECTIVES:**

**Section A**

**Action:** Reads basic material about digits and place values.

**Section B**

**Action:** Writes numbers when given place values of digits.

**Condition:** Given 4 digits and their place values.

**Standard:** Writes number in the form xxx.x.

**Section C**

**Action:** Identifies place value of a digit.

**Condition:** Given a number of the form xxx.x.

**Standard:** Identifies place value of any digit.

**TESTING:**

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise and Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT IX - LESSON 1

Scoring Key for Checkpoint 1, Form A

1. 332.1
2. 631.7
3. 752.5
4. 903.6
5. 738.9
6. 826.5
7. 222.2
8. 170.6
9. ones
10. tens

UNIT IX - LESSON 1

Scoring Key for Checkpoint 1, Form B

1. 689.2

2. 912.7

3. 763.5

4. 310.2

5. 521.3

6. 598.6

7. 247.4

8. 318.7

9. hundreds

10. tenths

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UNIT IX. SCALE READING

Lesson 2. Numbering Scale Points

**TERMINAL OBJECTIVE:** Assigns values to an unnumbered scale consisting of whole numbers.

**CONDITION:** Given a picture of a scale measuring either hundreds, tens, fives, or ones, with only the end points marked, and with equally spaced divisions between the end points,

Given a picture of a scale measuring hundreds with divisions marked 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.

**STANDARD:** Student identifies the numerical value of a given point or student selects the actual numerical value of a given scale division.

**ESTIMATED LESSON LENGTH:** 25 minutes

**INSTRUCTIONAL MATERIALS:** Student Guide containing self-paced materials and exercises. Checkpoint.

**OTHER MEDIA AND SUPPORT MATERIALS:** Additional review exercise and checkpoint, scoring keys for checkpoints.

**REFERENCES:** None

**LESSON STRUCTURE:** The lesson is divided into four sections:

Section A. Identify the Value of Unnumbered Points on a Fives Scale (Student Guide, p. 2)

Section B. Identify the Value of Unnumbered Points on a Ones Scale (Student Guide, p. 5)

Section C. Identify the Value of Unnumbered Points on a Tens Scale (Student Guide, p. 9)

Section D. Identify the Value of Points on a Hundreds Scale (Student Guide, p. 13)

**ENABLING OBJECTIVES:**

**Section A**

- Action:** Identifies numerical value of midpoint of a line segment.
- Condition:** Given the values of the endpoints of the line segment and the midpoint labeled.
- Standard:** Correctly identifies the value of the midpoint.

**Section B**

- Action:** Identifies numerical value of unit lines on a line segment.
- Condition:** Given the values of the endpoints of the line segment and the unit lines.
- Standard:** Correctly identifies the value of the specified unit line.

**Section C**

- Action:** Identifies numerical value of a point on a tens scale.
- Condition:** Given the values of the endpoints of the line segment labeled.
- Standard:** Correctly identifies the value of a specified point.

**Section D**

- Action:** Identifies the numerical value of a point on a hundreds scale.
- Condition:** Given a scale with hundreds labeled 0, 1, 2, 3.....
- Standard:** Correctly identifies the value of a specific point.

**TESTING:**

There is one checkpoint at the end of the lesson. It contains 10 questions. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise and Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the check points immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT IX - LESSON 2

Scoring Key for Checkpoint 1, Form A

1. 15
2. 45
3. 85
4. 12
5. 56
6. 65
7. 30
8. 36
9. 600
10. 800

UNIT IX - LESSON 2

Scoring Key for Checkpoint 1, Form B

1. 55

2. 15

3. 65

4. 37

5. 93

6. 50

7. 18

8. 81

9. 600

10. 700

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INSTRUCTOR GUIDE

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UNIT IX. SCALE READING

Lesson 3. Scales Divided into Tenths

TERMINAL OBJECTIVE: Assigns values to an unnumbered scale consisting of decimal fractions from zero to one.

CONDITION: Given a picture of a scale with 0 and +1 points marked, with nine divisions, unnumbered, equally spaced between 0 and +1.

STANDARD: Student identifies the numerical value corresponding to a particular scale division.

ESTIMATED LESSON LENGTH: 30 minutes

INSTRUCTIONAL MATERIALS: Student Guide containing self-paced materials and exercises. Checkpoint.

OTHER MEDIA AND SUPPORT MATERIALS: Additional review exercise and checkpoint, scoring keys for checkpoints.

REFERENCES: None

LESSON STRUCTURE: The lesson is divided into three sections:

Section A. Examples and Explanations of Scales  
(Student Guide, p. 2)

Section B. Assign Values to Scale Divisions  
(Student Guide, p. 14)

Section C. Identify the Value of a Line on a Scale (Student Guide, p. 17)

ENABLING OBJECTIVES:

Section A

- Action: (1) Reads about decimal scales and divisions on decimal scales.  
(2) Chooses the value of a point on a decimal scale.
- Condition: Given a (1) decimal fraction or (2) a decimal fraction name.
- Standard: Correctly writes the (1) decimal fraction name or (2) the decimal fraction.

Section B

- Action: Writes the missing decimal fractions on a scale.
- Condition: Given a decimal scale with some divisions labeled and some not.
- Standard: Correctly labels the unlabeled divisions.

Section C

- Action: Identifies the value of a point on a decimal scale.
- Condition: Given a decimal scale with marked divisions.
- Standard: Correctly supplies the numerical value of a point indicated.

TESTING:

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.

8 or 9 correct Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.

7 or less correct Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT IX - LESSON 3

Scoring Key for Checkpoint 1, Form A

1. b.
2. a.
3. d.
4. c.
5. a.
6. a.
7. 0.9
8. 0.5
9. three-tenths
10. eight-tenths

UNIT IX - LESSON 3

Scoring Key for Checkpoint 1, Form B

1. b. 0.2
2. b. nine-tenths
3. d. 0.6
4. a. 0.8
5. c. five-tenths
6. d. 0.3
7. 0.6
8. 0.7
9. four-tenths
10. two-tenths

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UNIT IX. SCALE READING

Lesson 4. Comparing Scale Settings

**TERMINAL OBJECTIVE:** Compares two drawings of scales and discriminates if the second setting is within two or three divisions to the left or right of the first.

**CONDITION:** Given an unnumbered scale with a designated setting.

**STANDARD:** Student selects which of several alternatives shows a scale having a setting within two or three scale divisions of the first.

**ESTIMATED LESSON LENGTH:** 30 minutes

**INSTRUCTIONAL MATERIALS:** Student Guide containing self-paced materials and exercises. Checkpoint.

**OTHER MEDIA AND SUPPORT MATERIALS:** Additional review exercise and checkpoint, scoring keys for checkpoints.

**REFERENCES:** None

**LESSON STRUCTURE:** The lesson is divided into three sections:

- Section A. Reading Different Types of Scales  
(Student Guide, p. 2)
- Section B. Reading within Ranges  
(Student Guide, p. 17)
- Section C. Selecting Reading within Ranges  
(Student Guide, p. 28)

Section A

1. **Action:** Identifies the reading on a scale.

**Condition:** Given a straight line scale, meter, or dial with scale reading indicated.

**Standard:** Correctly supplies the value of the reading.

Section B

- Action: States whether a scale value is within a range from the scale reading.
- Condition: Given a straight line scale, meter, or dial with a scale reading indicated, and a scale value.
- Standard: States whether the reading is within two or three marks from the value.

Section C

- Action: Identifies which scales have readings within one or two marks from each other.
- Condition: Given a straight line scale, meter, or dial with a scale reading indicated, and other similar scales with readings.
- Standard: Identifies which scale reading is within two or three marks from the first.

TESTING:

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise and Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT IX - LESSON 4

Scoring Key for Checkpoint 1, Form A

1. b. No
2. a. Yes
3. a. Yes
4. b. No
5. a. Yes
6. a. Yes
7. b. No
8. b. No
9. b. No
10. a. Yes

UNIT IX - LESSON 4

Scoring Key for Checkpoint 1, Form B

1. b. No
2. a. Yes
3. b. No
4. a. Yes
5. a. Yes
6. b. No
7. a. Yes
8. b. No
9. a. Yes
10. a. Yes

**INSTRUCTOR GUIDE**

**31M10 Functional Basic  
Skills Education Package**

**Contract No. DABT60-81-C-0006  
Sequence No. A020**

**Prepared for:  
Department of the Army  
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Fort Eustis, Virginia 23604**

**Prepared by:  
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## INSTRUCTOR GUIDE

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### INTRODUCTION

#### Purpose of the Course

The 31M10 Functional Basic Skills Education Program (FBSEP) has been designed to prepare soldiers for AIT training and for successful performance in their units as Multichannel Communications Equipment Operators. In training and on the job, soldiers in the 31M MOS must install, operate, maintain, and troubleshoot complex communications equipment. In order to do this, they need certain technical skills, reading skills, and other learning skills. For example, they need skills for interpreting cabling diagrams in order to install radio and cable equipment. They need reading comprehension skills in order to use the performance steps, checklists, tables, and charts in their technical manuals (TMs). They need scale-reading skills in order to interpret meter readings on the equipment. They need listening and note-taking skills in order to learn from the lectures and demonstrations in the AIT course. Since these kinds of skills are not taught in the 31M10 course, they are prerequisites. That is, it is assumed that soldiers possess these technical, reading, listening, and other skills upon entry into the course. Many soldiers do, in fact, possess these skills to an adequate degree. Many others, however, do not. The purpose of FBSEP is to provide the latter group of 31M10 trainees with the prerequisites they need for success in the 31M10 course.

#### Background of the Course

The Army, as well as other branches of the Armed Services, has offered basic skill instruction for many years. However, until recently, the instruction has been geared to the development of general reading, writing, and arithmetic skills, much like those taught in school. However, in recent years, there has been a movement, in both military and civilian adult basic skill training, toward teaching of functional basic skills, i.e., skills that can be directly applied to adult occupations. For example, instead of reading stories, adult learners in functional basic skill programs may read job manuals or job application forms.

The FBSEP program for 31M10 has been designed to provide training in the basic skills that are directly and functionally related to training and performance in the 31M10 MOS. The content of instruction is generally taken or adapted from 31M materials, and the instruction itself clearly demonstrates the relevance of the content to the AIT course and the MOS.

Furthermore, because different students lack different prerequisites, FBSEP training has been designed so that each student receives instruction only in those skills he/she lacks. Two students may both be assigned to FBSEP, yet have none of their training in common. This goal has been accomplished by making the FBSEP training materials largely self-instructional. Thus, a FBSEP instructor may teach in a classroom in which no two students are working on the same lesson. Individualization of instruction also accommodates to other differences among students. For example, some students need more time to master a given skill than others. Self-instructional learning materials permit each student to proceed at his/her own pace. Some students need more practice and more help in going through the material than others. The FBSEP course has been designed to give each student as much practice or help as he/she needs.

#### Development of FBSEP for 31M10

Development of FBSEP went through a series of stages. The first stage was analysis of the 31M10 MOS and AIT course to identify prerequisite functional skills and learning strategies. This involved observing AIT course delivery, examining instructional materials, and analyzing AIT lesson plans. A large number of potentially important prerequisites were identified in this manner - far more than could (or should) be taught in FBSEP training.

The next stage of development was verification. The verification process had several purposes. They were to: (1) determine the reliability of the identification of prerequisites; (2) develop preliminary methods for measuring the prerequisites; (3) establish the level of performance of 31M10 AIT students on the prerequisites; and (4) relate performance on the prerequisites to performance in the AIT course. Most of the prerequisites which had been identified were found to be positively related to AIT performance; i.e., students who possessed the skills to a high degree did better in the course than students who lacked the skills or possessed them to a lower degree.

The next stage in FBSEP development was design of the FBSEP course. The purpose was to decide what skills to teach and in what order. Design followed directly from the results of verification. Skills which were easy for poor as well as good AIT students and skills which did not

relate to AIT performance were eliminated. The remaining skills were organized into groups of skills (units) and specific skills within units (lessons). The units and lessons were sequenced both with respect to the point in the AIT course where they are first needed and also in terms of their relationship to one another. Table 1 shows the units and lessons within units.

Occurring simultaneously with design of FBSEP was development of tests to identify students who lack prerequisite skills and to prescribe appropriate FBSEP instruction. A two-stage test was developed - a Screening Test and a Diagnostic Test. The Screening Test yields scores in each unit. Students who score below cutoff in one or more units are judged to need FBSEP. These students (and only these students) then take the Diagnostic Test(s) for the unit(s) in which they scored below cutoff, in order to identify the specific lessons in which instruction is needed.

The next stage in the development of FBSEP was the actual development of all lesson materials, i.e., training materials, Student Guides, media for instruction, tests, and Instructor Guides.

The final stage in development, validation, is yet to come. This final stage will answer the question: Does FBSEP succeed in teaching the skills it has been designed to teach? Validation will be accomplished by testing incoming 31M students, assigning those who lack prerequisite skills to the appropriate lessons, then administering lesson posttests to determine whether the students have acquired and retained the skills they have been taught.

### Learning/Teaching Strategies

FBSEP instruction has a number of characteristics which differentiate it from traditional classroom instruction. These include:

1. Explicit statement of learning objectives.
2. Self-instructional materials.
3. Frequent, built-in opportunities for student response.
4. Immediate feedback for all responses.
5. Criterion-referenced testing.

Let us discuss these in turn.

Table I

Units and Lessons

<u>Unit</u>	<u>Lesson</u>	<u>Title</u>
I Reading Comprehension	1	Vocabulary
	2	Strategies for Understanding Sentences
	3	Reading Negative Sentences
	4	Reading Sentences With Dependent Clauses
	5	Ordering One, Two, or Three Tasks
	6	Determining the Order of Steps: Multiple Actions
	7	Understanding Lists and Paragraphs
II Using a Table of Contents	1	Chapters and Sections
	2	Using a Task List to Find a Task Description
	3	Tables with Paragraph Numbers and Page Numbers
III Listening Skills	1	Remembering Information Heard in Lectures
	2	Remembering Information Seen in Demonstrations
	3	Recognizing When Important Information is Missing
IV Note-Taking for Demonstration	1	Basic Note-Taking Skills
	2	Taking Notes to Show Sequence
	3	Taking Notes to Show Relationships
V Recognizing a Part of a Whole	1	Recognizing a Part of a Whole
VI Locating Information in Tables	1	The Structure of Tables and Diagrams
	2	Interpreting Table Headings
	3	Locating Information in 3M Tables
VII Reading Cabling Diagrams	1	The Structure of Tables and Diagrams (Same as Unit VI, Lesson 1)
	2	Identifying Connections in Simple and Complex Cabling Diagrams

(continued on next page)

Table I (continued)

VIII Diagnosing Equipment Malfunctions	1	Deciding Whether an Indication Is Normal
	2	Deciding Whether There Is Something Wrong Based on 2 or More Indicators
	3	Finding Descriptions of Symptoms: One Indicator
	4	Finding Descriptions of Symptoms: Two or More Indicators
IX Scale Reading	1	Labeling Place Value
	2	Numbering Scale Points
	3	Scales Divided into Tenths
	4	Comparing Scale Settings

## Explicit Statement of Learning Objectives

Learning objectives - what the student is expected to be able to do after instruction - are stated explicitly and made available to both student and instructor in each lesson. In each lesson, the final goal of the lesson is explicitly stated as a terminal objective. And the various subgoals which the student must attain on the way toward the terminal objective are stated as enabling objectives. These terms are defined more precisely below.

Terminal objective - the behavior which the student is expected to exhibit at the end of the lesson.

Enabling objectives - behaviors students acquire as prerequisites to attainment of the terminal objective.

Objectives, both terminal and enabling, have three components: action, condition, and standard. They are defined as follows:

Action - the specific behavior.

Condition - the conditions under which the action is to be performed.

Standard - the means by which the performance is to be evaluated; the criterion the student must meet in order for his/her behavior to be judged acceptable.

The Instructor Guide for each lesson in FBSEP lists the terminal objective of the lesson, and all enabling objectives in the order in which they are attained. Each objective lists the action, condition, and standard of the objective. In the Student Guides, objectives are called Learning Goals, and they are written in a form that the students can understand.

## Self-Instructional Materials

Most student learning materials for each lesson are contained in the Student Guide for the lesson. Student Guides are designed to be used by students with minimal intervention by the instructor. Thus, each Student Guide contains: (1) all the material to be learned and (2) instructions for proceeding through the material. Both are written to be self-explanatory. The language has been kept simple so that even relatively poor readers should have little difficulty comprehending it. The instructions are explicit and easy to follow. In most lessons, most students will be able to use the Student Guides and attain the lesson objectives with little or no guidance.

### Frequent, Built-In Opportunities for Student Response

A new behavior being acquired needs to be strengthened and maintained through practice. Each Student Guide includes numerous exercises in which the student practices a new behavior(s) by answering questions. All students receive these built-in opportunities to practice. In addition, if a student's performance on a test (checkpoint) indicates that additional practice is needed (except those in Units III and IV), the instructor can provide it by prescribing a Review Exercise, also self-instructional. At least one Review Exercise is available for each lesson, to be assigned to students who need it.

### Immediate Feedback for All Responses

In most cases, students check their own answers to the exercises in the Student Guides and Review Exercises immediately after answering them. By verifying correct answers, students receive immediate reinforcement for their responses, hence for the learning which enabled the students to make the correct responses. In the case of incorrect responses, students can compare the correct answers with their own and receive immediate corrective feedback, which should increase the probability of correct responses in the future. Research in behavioral psychology has demonstrated the importance of immediate feedback for learning. The FBSEP materials are designed so that immediate feedback occurs regularly and often.

### Criterion-Referenced Testing

Though most of the exercises within lessons are self-correcting, each lesson contains at least one test which is corrected by the instructor. The tests are called checkpoints. Table 2 lists the checkpoints and where they are located within each lesson. They are designed to measure attainment of objectives, as stated in the Student and Instructor Guides. Tests which measure attainment of explicitly stated objectives are called criterion-referenced tests. All the FBSEP checkpoints are criterion-referenced. The students, as well as the instructor, know ahead of time what kinds of things they will be expected to do on a checkpoint, though, of course, they do not know exactly what questions will be asked.

### The Role of the Instructor in FBSEP

Obviously, the FBSEP instructor does not play the following roles common to traditional instruction: lecturer, leader of group recitations or discussions, source of most of the information needed in each

Table 2. Checkpoint List

<u>Unit</u>	<u>Lesson</u>	<u>Checkpoint(s)</u>	<u>Location</u>
I	1	Checkpoint 1, Form A Checkpoint 2, Form A Checkpoint 3, Form A	after Section A after Section B after Section C
I	2	Checkpoint 1, Form A Checkpoint 2, Form A	after Section B after Section D
I	3	Checkpoint 1, Form A	end of lesson
I	4	Checkpoint 1, Form A	after Section B
I	5	Checkpoint 1, Form A	after Section C
I	6	Checkpoint 1, Form A	after Section C
I	7	Checkpoint 1, Form A	after Section C
II	1	Checkpoint 1, Form A	after Section C
II	2	Checkpoint 1, Form A Checkpoint 2, Form A	after Section C after Section D
II	3	Checkpoint 1, Form A	after Section D
III	1	Checkpoint 1, Form A/B	after Section D
III	2	Checkpoint 1, Form A/B	after Section C
III	3	Checkpoint 1, Form A/B	after Section C
IV	1	Checkpoint 1, Form A/B	after Section E
IV	2	Checkpoint 1, Form A/B	after Section C
IV	3	Checkpoint 1, Form A/B	after Section C
V	1	Checkpoint 1, Form A	after Section E
VI	1	Checkpoint 1, Form A	after Section C
VI	2	Checkpoint 1, Form A	after Section C
VI	3	Checkpoint 1, Form A	end of lesson

Table 2. (continued)

<u>Unit</u>	<u>Lesson</u>	<u>Checkpoint(s)</u>	<u>Location</u>
VII	1	(Same as Unit VI, Lesson 1)	
VII	2	Checkpoint 1, Form A	after Section D
VIII	1	Checkpoint 1, Form A	after Section B
VIII	2	Checkpoint 1, Form A	after Section B
VIII	3	Checkpoint 1, Form A	after Section C
VIII	4	Checkpoint 1, Form A	after Section C
IX	1	Checkpoint 1, Form A	after Section C
IX	2	Checkpoint 1, Form A	after Section D
IX	3	Checkpoint 1, Form A	after Section C
IX	4	Checkpoint 1, Form A	after Section C

NOTE: For all lessons in Units III and IV, there are no alternate forms of the checkpoints. Therefore, after completing Review Exercises, students retake the same checkpoint.

lesson. The instructor does play the following roles: facilitator of the learning process, tutor, and manager. Each of these has several components or sub-roles. The roles are discussed below:

1. Facilitator of the learning process. This includes being:
  - a. a resource person. All students occasionally (and some students often) require help in order to understand the material being taught or the instructions to be followed in a Student Guide. In such cases, the instructor must be ready to provide whatever information or help is needed by the individual student.
  - b. a motivator. Students occasionally indicate by their behavior that they are uninterested or bored. In such cases, the instructor may need to provide an incentive to continue working, by pointing out the relevance of the material being learned or, perhaps, by just being encouraging and positive about the student's need and ability to master the material.
  - c. a reinforcer. Success is a powerful incentive for continuation of a learning effort. The lesson materials, through the self-correcting exercises, provide students with some tangible evidence of their own success (reinforcement). But for many students this is not enough. In such cases, and also in scoring checkpoints, which are instructor-corrected, the instructor provides the positive reinforcement which rewards past performance and encourages future efforts.
  
2. Tutor. When students experience difficulty in learning and need help beyond that provided by the self-instructional materials, the instructor provides one-to-one tutoring. This role involves being:
  - a. a diagnostician. By examining the student's responses on exercises and/or tests and by asking questions, the instructor determines the source of the difficulty. That is, he/she finds out precisely what the student does not understand and why. If the student misunderstands something, the instructor pinpoints the exact source of the misunderstanding.
  - b. a remediator. On the basis of the diagnosis, the instructor provides information and support to teach the skills that are lacking or clarifies the point which is not understood.

Since different students have trouble for different reasons and require different remediation, tutoring calls for a great deal of skill. This role is one where the instructor in FBSEP truly becomes a teacher in the best sense of the word.

3. Manager. With different students working on different lessons in the same classroom, management to ensure the smooth flow of instruction becomes a particularly important role. Management includes being:

a. a manager of material flow. The instructor must see to it that each student receives his/her prescribed lesson materials in the prescribed sequence. This includes Student Guides, Review Exercises when needed, and checkpoints.

b. a decision-maker. Instructors make decisions concerning individual students as well as other kinds of decisions. For individual students, instructors must make decisions such as:

- (1) Does this student need help now or not? Students are expected, generally, to seek help when they need it. However, some students either do not recognize that they need help or are reluctant to ask. The instructor must monitor students regularly and watch for signs of problems, e.g., a student with a puzzled expression, a student who seems to be making little or no progress. In such cases, the instructor may need to take the initiative and offer help.
- (2) After a checkpoint: Does this student need additional practice (a Review Exercise) or not?
- (3) At the end of a lesson: What should this student be assigned to do next?

Decisions (2) and (3) are based on students' prescriptions and on information in the Instructor Guides. The instructor must be able to use these guidelines accurately.

Decisions must also be made when several students need instructor attention simultaneously. In such cases, the instructor must decide which need is most urgent and/or can be met most quickly.

- c. a record keeper. Accurate records are vital to the success of FBSEP. For each student, records are needed of which lessons the student did, when he/she started and finished, and how well the student did (scores on checkpoints). Therefore, an important part of management is the regular maintenance and up-dating of records.

### The Role of the Student in FBSEP

The role of the student in FBSEP is also different from the usual student role in traditional instruction. Far from being passive recipients of information, students in FBSEP are active processors of information. Students are also more responsible than in traditional instruction for managing and monitoring their own learning. Though the instructor decides what materials students are to work with (Student Guides, Review Exercises), students "teach" themselves via the materials, monitor their own performance on exercises, and decide when and if they need help from the instructor. These are roles most students are not accustomed to playing. Therefore, instructors are often called on to help students to acquire these roles. This means that an additional important role of the instructor in FBSEP is to help students to become independent, responsible learners.

### Student Characteristics

The students in FBSEP are young men and women, most of them recent high school graduates or drop-outs. Most of them probably joined the Army in the hope of acquiring job skills which can be carried over into civilian life. They probably assume - with relief - that their experience with formal classroom instruction, especially in basic skills like reading and math, is over. For many, their high school (and possibly elementary school) experiences with basic skills were unpleasant and perhaps even strongly aversive. Those who experienced difficulty or were labeled "slow learners" may associate school with punishment and ridicule. Such students will hardly be overjoyed to find themselves in yet another basic skills educational program. Therefore, preparation of students for FBSEP and proper motivation are essential.

The FBSEP materials are designed to motivate students and provide incentives for learning. They do this in several ways. First, their format is sufficiently different from the usual classroom so that few negative responses to classroom instruction will carry over. Since students proceed at their own pace, they do not have to worry about being bored in a lesson that moves too slowly or being confused and falling behind in a lesson that moves too fast. In addition, by

checking their own answers to most exercises, students avoid the criticism they have come to fear for incorrect responses. Furthermore, the sequencing of instruction and frequent practice in each lesson make success highly likely, thus avoiding the failure which such students fear and providing incentive for continued effort.

Second, the FBSEP materials are obviously relevant to the tasks the students will be performing in the AIT course and in their MOS. Each Student Guide begins with an explanation of the relationship between the lesson and their future Army training and career. And the content of the lessons themselves is either taken from 31M10 materials or adapted from them. For example, the reading materials in Unit I, "Reading Comprehension" are about or from 31M10 equipment, field manuals, and technical manuals (TMs). So the nature of the material should make the lessons inherently motivating.

Nevertheless, the previous learning history of the students presents certain problems which necessitate careful monitoring by instructors. For example, though instructions for proceeding through each lesson are explicitly stated in the Student Guides, students may have trouble following the printed instructions - more likely because they do not bother to read them carefully than because they cannot understand them. In addition, students may tend to rush through exercises and/or not to make good use of the corrective feedback provided. The Introduction to FBSEP which each student receives upon entry in FBSEP explains the lesson structure and attempts to prevent some of these problems. Nevertheless, instructors will have to monitor students closely to make sure that students are working steadily but not rushing, are following instructions, are completing exercises when they come to them, and are checking their answers carefully.

Instructors must be especially careful to be warm, supportive, and encouraging in their interactions with students. In all probability, the students' interactions with teachers in the past have been largely unpleasant and negative. The students have come to think of teachers as cold, punishing, and critical. This is not conducive to learning. FBSEP instructors, in order to fulfill their role as facilitators of learning, must "accentuate the positive;" i.e., they must emphasize what students can do rather than what they cannot do. They must be sure to reward correct responses, while gently correcting wrong ones. They must express confidence in the students' ability to succeed and convey that confidence to the students. By so doing, they will make the FBSEP experience a pleasant one for themselves and their students; and they will increase the students' probability of success as learners not only in FBSEP but also in the AIT course and their future Army careers.

## Course Administration

Each student assigned to FBSEP receives a prescription based on his/her performance on the Screening and Diagnostic Tests. A FBSEP Prescription Sheet is shown on the next page. The student's prescription describes the specific lessons the student is to complete, and the sequence in which they are to be assigned. The first lesson listed is the first one assigned. When the student finishes it, the next one is assigned, etc.

When a new student enters the FBSEP program, he/she is first given a three-ring binder including an "Introduction to FBSEP." The student is to place his/her prescription inside the front cover. In addition, all lesson materials given to the student are inserted in the binder in the order in which the instructor provides them. In this way, each student gradually builds his/her own "textbook/workbook" as he/she progresses through the course.

After the student has read the Introduction to FBSEP, the instructor should make sure that he/she understands the structure of the program. At that point, the student is ready to begin the course. The steps are as follows, for front-loaded FBSEP instruction:

1. The instructor provides the student with the Student Guide for the first prescribed lesson, as well as any other media required to complete the lesson, e.g., audiotape, dictionary. The student then proceeds through the Student Guide.
2. In most lessons, the student is told to request a specific checkpoint, Form A, at the end of the lesson (a few lessons have more than one checkpoint). The student completes the checkpoint and brings it to the instructor for scoring.
3. The instructor scores the checkpoint and takes one of two actions, based on the student's score:
  - a. If the student's score is at or above a specified cutoff point,\* the student is provided with corrective feedback, then goes on to the next lesson (or to the next part of the same lesson if there are additional sections), and Steps 1-3 are repeated.
  - b. If the student's score is below the cutoff point, the instructor provides tutoring to remediate the student's difficulty, then assigns the appropriate Review Exercise for additional practice.

\*Cutoff points are given in the Instructor Guides for individual lessons.



After completing the Review Exercise, the student takes a second checkpoint, Form B. This too is scored immediately. The student is provided with corrective feedback, then proceeds to the next prescribed lesson (or next part of the same lesson), regardless of his/her checkpoint score, and Steps 1-3 are repeated.

4. As each lesson is completed, it is checked off on both the student's and the instructor's copies of the FBSEP Prescription Sheet.
5. After the student has completed all prescribed front-loaded lessons, he/she proceeds to the 31M10 AIT course.

For FBSEP lessons that are integrated with the AIT course (all of Unit VIII and Lesson 4 of Unit IX), the preceding steps are followed at the appropriate point in the AIT course.

Each student's progress through the FBSEP course is tracked by means of a FBSEP Student Record Form, shown on the next page. The instructor has one such form for each student in his/her classroom. As a new lesson is assigned, the instructor enters it in the "Unit-Lesson" column, along with the date and the time. Checkpoint scores are recorded in the appropriate columns. Only those checkpoints completed by the student are recorded; the remaining columns are left blank. For example, if a student scores above the cutoff point on checkpoint Form A of a lesson having only one checkpoint, only one score will be recorded for that lesson, under Checkpoint 1A. When the student completes the lesson, the date and time are written in the appropriate columns. Then the same procedure is followed for recording the next assigned lesson.

#### Required Facilities

Instructors need to have the following facilities for all lessons:

1. Completed prescription sheets for all students assigned to the classroom.
2. Instructor Guides for all lessons taking place in the classroom.
3. An adequate supply of Student Guides, Review Exercises, and checkpoints for all lessons taking place in the classroom.
4. A Student Record Form for each student assigned to the classroom.



In addition, some lessons have special needs. If these lessons are to take place in the classroom, the following additional facilities are required:

<u>Unit</u>	<u>Lesson</u>	<u>Section(s) of Lessons</u>	<u>Media Required</u>
I	1	A	Cassette tape player
	1	A	Audiotape of Word Lists I through V
I	2	B	Dictionary
II	2	All	Soldier's Manual for 31M10 (FM 11-31M1/2)
III	1	All	Audiotape player
	1	A,B,C	Audiotape: Practice Exercises
	1	After D	Audiotape: Checkpoint 1, Form A/B
III	2	All	Videotape player
	2	A,B	Videotape: Practice Exercises
	2	After C	Videotape: Checkpoint 1, Form A/B
III	3	All	Audiotape player
	3	All	Videotape player
	3	B	Audiotape: Practice Exercises I
		C	Videotape: Practice Exercises II
		After C	Videotape: Checkpoint 1, Form A/B
IV	1	All	Videotape player
	1	E	Videotape: Practice Exercises
	1	After E	Videotape: Checkpoint 1, Form A/B
	1	All	Blank paper for taking notes
IV	2		Videotape player
	2	C	Videotape: Practice Exercises
	2	After C	Videotape: Checkpoint 1, Form A/B
	2	C	Card Sets 1 and 2
	2	All	Blank paper for taking notes
IV	3	All	Videotape player
	3	C	Videotape: Practice Exercises
	3	After C	Videotape: Checkpoint 1, Form A/B
	3	All	Blank paper for taking notes.

## Structure of the Instructor Guide for Each Unit/Lesson

The rest of this Instructor Guide includes information needed for teaching individual units and lessons within units. There are nine sections, one for each unit. Within each unit, the Instructor Guides for individual lessons are arranged in the order in which lessons are prescribed.

The section for each unit begins with an Introduction to the Unit. This provides the instructor with an overview of the unit, including its purpose, the type of skills taught, and the relationship of the skills to the 31M10 AIT course. If there are special instructional requirements that distinguish the unit from others, they are described here.

Instructor Guides for individual lessons all follow the same format and include:

- TERMINAL OBJECTIVE:** The behavior to be acquired.
- CONDITION:** The conditions under which the terminal behavior is to be demonstrated.
- STANDARD:** How well the terminal behavior is to be performed.
- ESTIMATED LESSON LENGTH:** Estimated average time required, in hours, to complete the lesson.
- METHOD OF INSTRUCTION:** A summary of the instructional materials required by all students.
- OTHER MEDIA AND SUPPORT MATERIALS:** Additional materials needed, including material required by the instructor.
- REFERENCES:** Sources of additional information relevant to the content of the lesson. However, these references are not needed in order to teach the lesson.
- LESSON STRUCTURE:** Titles of the sections of the lesson, if the lesson is divided into sections.
- ENABLING OBJECTIVES:** Listed by section, in the order in which they are attained. Each includes Action, Condition, and Standard.
- TESTING:** A description of the checkpoint(s) in the unit, including cutoff points and actions to be taken by the instructor based on the student's score.

**INSTRUCTIONAL GUIDELINES:** Guidelines for teaching the lesson,  
monitoring student behavior, and tracking  
and recording student progress.

Scoring keys for all checkpoints (Forms A and B) follow the information  
listed above. Additional materials may be appended for lessons with  
special needs.

## Introduction to Unit I

### Reading Comprehension

The purpose of Unit I is to teach skills and strategies for reading comprehension, in the context of reading materials used in the 31M MOS. The instruction rests on several assumptions:

1. We assume that many adults who are poor readers lack a sufficient vocabulary to cope with their reading materials. Lack of understanding of the words in the material to be read obviously hinders comprehension.
2. We assume that many adults who are poor readers have developed bad reading habits, such as:
  - reading haphazardly and unsystematically.
  - trying to read technical material too fast.
  - skipping over "hard" sentences rather than working on them to figure them out.
  - keying on individual words, especially nouns and verbs, and not paying attention to relationships among the words, e.g., prepositions, conjunctions.

We assume that what these students need are strategies for reading systematically, for figuring out difficult sentences, and for considering all parts of a sentence in relation to one another.

Because of the complexity of the skills and strategies to be taught, Lessons 1 and 2, which lay the foundation, are relatively long. Because of their length, these lessons have checkpoints inserted within the lesson as well as at the end. Lesson 1 has six checkpoints, while Lesson 2 has two. In addition, in both lessons, students are expected to go to the instructor for specific kinds of information at various points within the lesson. For these reasons, students must be monitored especially closely in these lessons.

Lesson 1, "Vocabulary," provides instruction and practice on 96 words which occur frequently in 31M materials. They are not technical terms. The necessary technical terms are taught in the 31M course. They are non-technical terms which students must know in order to read the Soldier's Manual and TMs with understanding.

Lesson 2 teaches five "guidelines" (strategies) for comprehending sentences. Students practice using the guidelines on materials related to the 31M course. Many of the sentences they read have to do with the operation of radio equipment. It is important to keep in mind that the intent of the lesson is not to teach the content of these particular sentences, but to teach skills for comprehending such sentences when students encounter them in the 31M course.

Lessons 3 and 4 deal with particular kinds of sentences which poor readers have trouble with - negative sentences and sentences with clauses. Students continue to use the strategies learned in Lesson 2, as well as strategies specific to the types of sentences in these two lessons.

Most of the materials students have to read in the 31M course are procedural directions - step-by-step instructions for carrying out tasks. Some of the skills for reading procedural directions are those taught in Lessons 2 through 4. Skills for determining the sequence or order in which actions are to be carried out are taught in Lessons 5 and 6.

The last lesson, Lesson 7, teaches students to find their way about in larger units of printed material - lists and paragraphs.

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INSTRUCTOR GUIDE

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UNIT I. READING COMPREHENSION

Lesson 1. Vocabulary

TERMINAL OBJECTIVE: Identifies meanings of words in context.

CONDITION: Given a word embedded within a sentence taken or adapted from 31M reading materials.

STANDARD: Student selects correct definition.

ESTIMATED LESSON LENGTH: 3 hours

INSTRUCTIONAL MATERIAL: Student Guide containing self-paced materials, exercises. Checkpoints. Audiotape of word pronunciation.

OTHER MEDIA AND SUPPORT MATERIALS: Additional review exercise and checkpoints, scoring keys for checkpoints. Students need paper in order to complete review exercises. Script of audiotape.

REFERENCES: None

LESSON STRUCTURE: The lesson is divided into six sections. The first five sections (A through E) deal with similar objectives for the five distinct WORD LISTS.

Section A. Word List I Activities  
(Student Guide, p. 4)

Section B. Word List II Activities  
(Student Guide, p. 15)

Section C. Word List III Activities  
(Student Guide, p. 25)

Section D. Word List IV Activities  
(Student Guide, p. 36)

Section E. Word List V Activities  
(Student Guide, p. 48)

**Section F. Similar and Opposite Meanings**  
**(Student Guide, p. 63)**

**ENABLING OBJECTIVES:**

**Section A**

1. Action: Defines WORD LIST I correctly.  
Condition: Given words from WORD LIST I and definitions  
Standard: Correctly matches the word and its definition.
2. Action: Completes puzzle by filling in correct words from WORD LIST I.  
Condition: Given a list of definitions for words from WORD LIST I.  
Standard: Selects the correct word for each definition.
3. Action: Uses WORD LIST I words correctly.  
Condition: Given sentences containing WORD LIST I words.  
Standard: Chooses which sentence uses a word correctly, and which uses a word incorrectly.

**Section B**

1. Action: Defines WORD LIST II correctly.  
Condition: Given words from WORD LIST II and definitions  
Standard: Correctly matches the word and its definition.
2. Action: Completes puzzle by filling in correct words from WORD LIST II.  
Condition: Given a list of definitions for words from WORD LIST II.  
Standard: Selects the correct word for each definition.

3. Action: Uses WORD LIST II words correctly.  
Condition: Given sentences containing WORD LIST II words.  
Standard: Chooses which sentence uses a word correctly, and which uses a word incorrectly.

### Section C

1. Action: Defines WORD LIST III correctly.  
Condition: Given words from WORD LIST III and definitions  
Standard: Correctly matches the word and its definition.
2. Action: Solves word anagrams using words from WORD LIST III.  
Condition: Given the words from WORD LIST III with letters scrambled.  
Standard: Unscrambles each word and writes its definition.
3. Action: Uses WORD LIST III words correctly.  
Condition: Given sentences containing WORD LIST III words.  
Standard: Chooses which sentence uses a word correctly, and which uses a word incorrectly.

### Section D

1. Action: Defines WORD LIST IV correctly.  
Condition: Given words from WORD LIST IV and definitions  
Standard: Correctly matches the word and its definition.
2. Action: Solves word anagrams using words from WORD LIST IV.  
Condition: Given the words from WORD LIST IV with letters scrambled.  
Standard: Unscrambles each word and writes its definition.

3. Action: Uses WORD LIST IV words correctly.  
Condition: Given sentences containing WORD LIST IV words.  
Standard: Chooses which sentence uses a word correctly, and which uses a word incorrectly.

#### Section E

1. Action: Defines WORD LIST V correctly.  
Condition: Given words from WORD LIST V and definitions  
Standard: Correctly matches the word and its definition.
2. Action: Solves word search using words from WORD LIST V.  
Condition: Given a grid of letters and definitions of WORD LIST V words vertically or horizontally positioned.  
Standard: Circles words from WORD LIST V.
3. Action: Uses WORD LIST V words correctly.  
Condition: Given sentences containing WORD LIST V words.  
Standard: Chooses which sentence uses a word correctly, and which uses a word incorrectly.

#### Section F

1. Action: Recognizes words with similar or opposite meanings.  
Condition: Given sentences containing selected words.  
Standard: Fills in or selects words with similar or opposite meanings.
2. Action: Manipulates root words into various forms.  
Condition: Given a root word and its definition, e.g., adjust.  
Standard: Defines or selects other forms of the word, e.g., readjust, adjustment.

## TESTING:

Sections A through E contain five word tests (tests for Word Lists I, II, III, IV, and V). For each test, students listen to words on an audiotape and then choose the best definition from the list supplied. The purpose is to identify the specific words a student does not know and, therefore, needs to study and learn.

It should be noted that the 96 words in the Word Lists were systematically chosen from frequency lists of words used in the Soldier's Manual. Therefore, some of the words have very similar or the same meanings (e.g., indicate and designate). Section F of the Student Guide expands on the similar meanings of words.

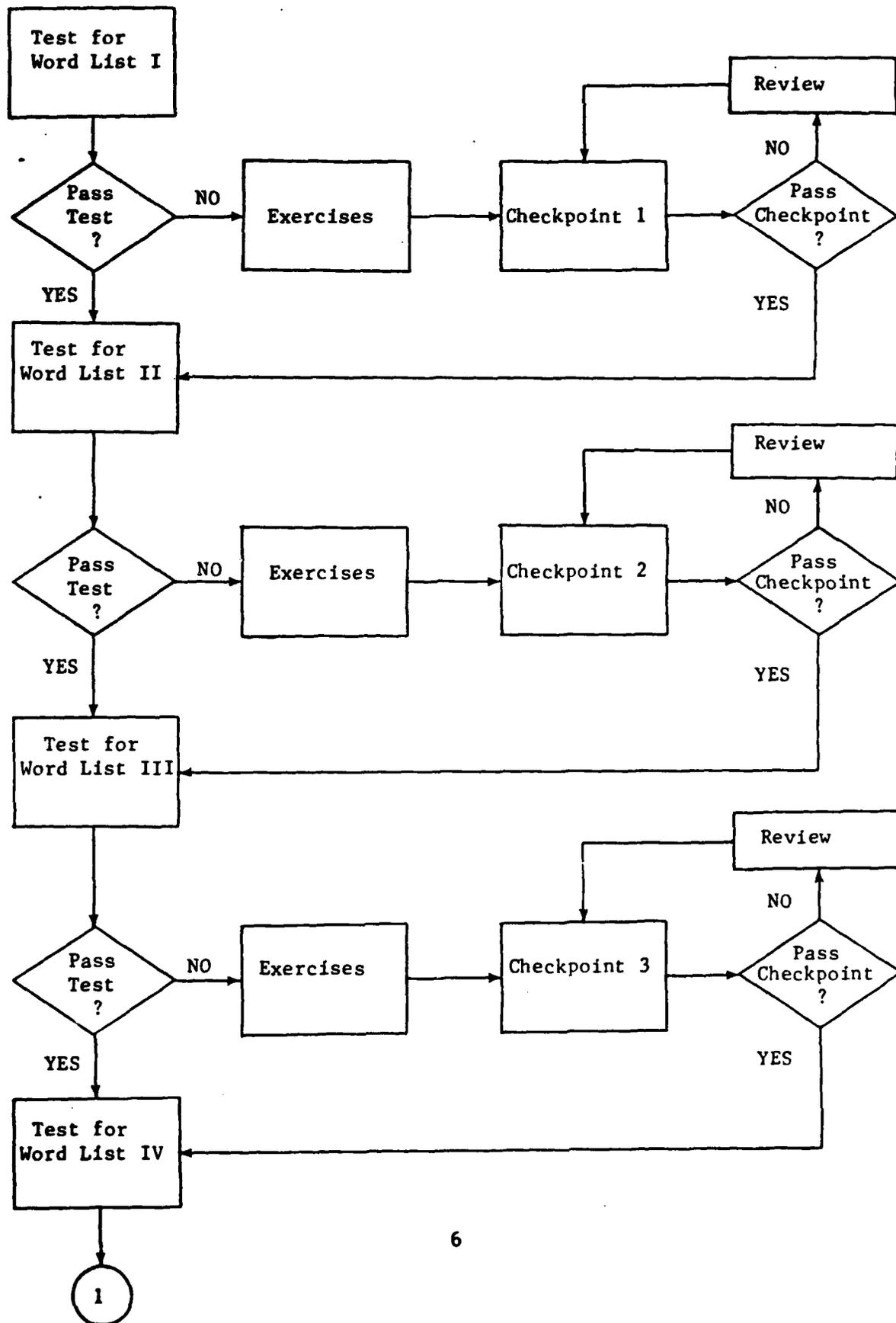
The student is directed to have each word test scored immediately upon completion. If a student is below cutoff on the word test, he completes exercises and a checkpoint using the words from that word test.

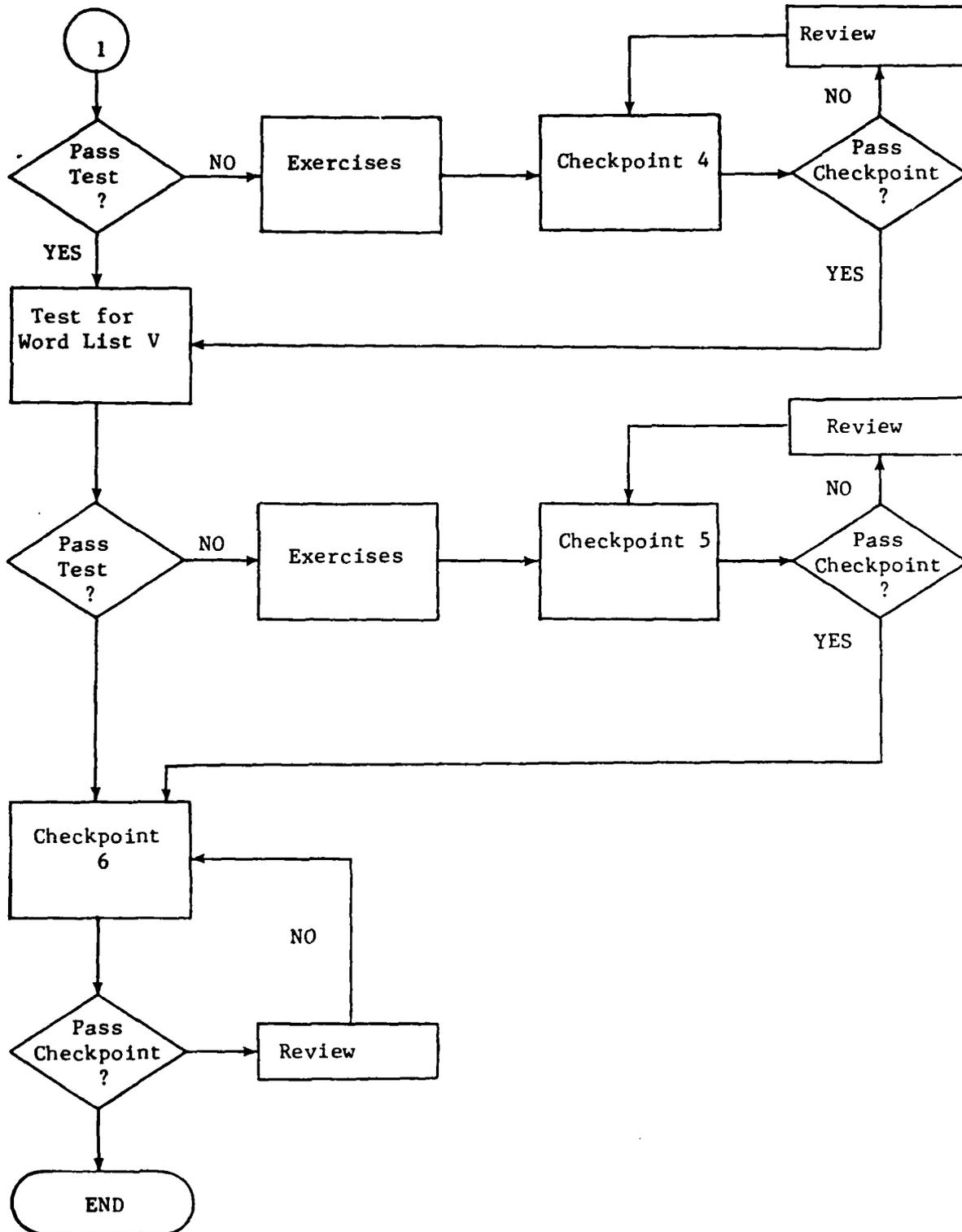
If a student is above cutoff on the word test, he proceeds to the next successive word test after reviewing any words he/she missed. Thus, the general flow of students can be shown in a flowchart shown on the next two pages.

One student may progress through the lesson passing tests for WORD LISTS I, II, III, and V. This student would be required to complete exercises and checkpoint for only WORD LIST IV and the final checkpoint of the lesson. Another student may not pass any of the word tests and be required to complete the exercises and checkpoints for all of the WORD LISTS and the final checkpoint.

The word tests and checkpoints have varying numbers of items, so the cutoff points vary also. On page 7 are listed the cutoff points for the various word tests and checkpoints. A student must score at or above the cutoff to be considered passing any word test or checkpoint.

Flowchart Showing Progression  
of Students through UNIT I, Lesson 1





TEST	NUMBER OF ITEMS	CUTOFF POINT
Test for WORD LIST I	15	13
Checkpoint 1, Forms A and B	15	13
Test for WORD LIST II	15	13
Checkpoint 2, Forms A and B	15	13
Test for WORD LIST III	20	17
Checkpoint 3, Forms A and B	20	17
Test for WORD LIST IV	20	17
Checkpoint 4, Forms A and B	20	17
Test for WORD LIST V	26	22
Checkpoint 5, Forms A and B	26	22
Checkpoint 6, Forms A and B	30	26

The Word List tests and Checkpoints 1 through 5 are all contained in Sections A through E of the lesson. Checkpoint 6 is found at the end of the lesson (after Section F). As you mark the Word List tests and checkpoints, underline the items missed and write the letter indicating the correct answer beside each item missed.

After you have scored each of the Word List tests, take the following actions, based on the student's score.

<u>Test</u>	<u>Score</u>	<u>Action</u>
WORD TEST I	15	Send student on to test for WORD LIST II.
	13 or 14	Have student read and study definitions he/she missed and then send the student on to test for WORD LIST II.
	12 or less	Have student complete exercises that follow the Word Test and then complete Checkpoint 1, Form A.
WORD TEST II	15	Send student on to test for WORD LIST III.
	13 or 14	Have student read and study definitions he/she missed and then send the student on to test for WORD LIST III.
	12 or less	Have student complete exercises that follow the Word Test and then complete Checkpoint 2, Form A.
WORD TEST III	20	Send student on to test for WORD LIST IV.
	17,18, or 19	Have student read and study definitions he/she missed and then send the student on to test for WORD LIST IV.
	16 or less	Have student complete exercises that follow the Word Test and then complete Checkpoint 3, Form A.

<u>Test</u>	<u>Score</u>	<u>Action</u>
WORD TEST IV	20	Send student on to test for WORD LIST V.
	17,18, or 19	Have student read and study definitions he/she missed and then send the student on to test for WORD LIST V.
	16 or less	Have student complete exercises that follow the Word Test and then complete Checkpoint 4, Form A.
WORD TEST V	26	Send student on to complete Checkpoint 6, Form A.
	22,23,24 or 25	Have the student read and study definitions he/she missed and then send the student on to Checkpoint 6, Form A.
	24 or less	Have the student complete the exercises that follow the Word Test and then Complete Checkpoint 5, Form A.

After you have scored each checkpoint\* take the following actions, based on the student's score.

<u>Checkpoint</u>	<u>Score</u>	<u>Action</u>
Checkpoint 1 Form A	15	Send student on to WORD TEST II.
	13 or 14	Have student read and study definitions he/she missed and then send student on to WORD TEST II.
	12 or less	Have student complete Review Exercise 1** and then complete Checkpoint 1, Form B.
Checkpoint 1, Form B	15	Send student on to WORD TEST II.
	14 or less	Have student read and study definitions he/she missed and then student on to WORD TEST II.

\* Note that a student completes Checkpoints 1, 2, 3, 4, or 5 only if he/she fails the associated Word List test. All students complete Checkpoint 6, Form A.

\*\* Review Exercise 1 is completed for non-mastery of all Form A checkpoints except Checkpoint 6, Form A.

<u>Checkpoint</u>	<u>Score</u>	<u>Action</u>
Checkpoint 2 Form A	15	Send student on to WORD TEST III.
	13 or 14	Have student read and study definitions he/she missed and then send student on to WORD TEST III.
	12 or less	Have student complete Review Exercise 1 and then complete Checkpoint 2, Form B.
Checkpoint 2, Form B	15	Send student on to WORD TEST III.
	14 or less	Have student read and study definitions he/she missed and then student on to WORD TEST III.
Checkpoint 3, Form A	20	Send student on to WORD TEST IV.
	17,18, or 19	Have student read and study definitions he/she missed and then send student on to WORD TEST IV.
	16 or less	have student complete Review Exercise 1 and then complete Checkpoint 3, Form B.
Checkpoint 3, Form B	15	Send student on to WORD TEST IV.
	14 or less	Have student read and study definitions he/she missed and then student on to WORD TEST IV.
Checkpoint 4, Form A	20	Send student on to WORD TEST V.
	17,18, or 19	Have student read and study definitions he/she missed and then send student on to WORD TEST V.
	16 or less	Have student complete Review Exercise 1 and then complete Checkpoint 4, Form B.
Checkpoint 4, Form B	15	Send student on to WORD TEST V.
	14 or less	Have student read and study definitions he/she missed and then student on to WORD TEST V.

<u>Checkpoint</u>	<u>Score</u>	<u>Action</u>
Checkpoint 5, Form A	26	Send student on to Checkpoint 6, Form A.
	22,23,24, or 25	Have student read and study definitions he/she missed and then send student on to Checkpoint 6, Form A.
	21 or less	Have student complete Review Exercise 1 and then complete Checkpoint 5, Form B.
Checkpoint 5, Form B	26	Send student on to Checkpoint 6, Form A.
	25 or less	Have student read and study definitions he/she missed and then send student on to Checkpoint 6, Form A.
Checkpoint 6, Form A	30	Send student on to next lesson.
	26,27,28 or 29	Have student read and study definitions he/she missed and then send student on to next lesson.
	25 or less	Have student complete Review Exercise 2 and then complete Checkpoint 6, Form B.
Checkpoint 6, Form B	30	Send student on to next lesson.
	29 or less	Have student read and study definitions he/she missed and then send student on to next lesson.

The same review exercise (Review Exercise 1) is used to review after Checkpoint 1, Form A; Checkpoint 2, Form A; Checkpoint 3, Form B; Checkpoint 4, Form A; and Checkpoint 5, Form A. In all cases, the review exercise instructs the student to write down all words and their definitions that he/she missed on the checkpoint, then to study those words as well as other in that checkpoint. Therefore, the student will need to refer to his/her checkpoints. He/she should be shown the checkpoint so that the correct definitions of missed words can be copied. But, the checkpoints must be collected before the student is given Form B of the checkpoint.

If the student appears doubtful about which words are to be studied, point out the words that have been marked wrong on the checkpoint and the correct answer indicated.

The review exercise (Review Exercise 2) for Checkpoint 6, Form A requires the student to write down words and definitions missed on all previous WORD TESTS and checkpoints and to study all 96 words in the lesson before asking for Checkpoint 6, Form B. Once again, the student will need to refer to previous checkpoints but they must be collected by the instructor before the student completes Form B of Checkpoint 6.

#### INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

This lesson requires careful monitoring to make certain that students are following instructions precisely, especially at the start of the lesson. Make sure that students listen to the appropriate portions of the audiotape prior to each word test, and that students bring each word test to you for scoring, before going on to the next portion of the tape and next word test. Also check to see that they spend some time studying missed words on each word test.

During the rest of the lesson, check students periodically to make sure that they are completing all exercises as directed; and that they ask for checkpoints when requested to do so. Check students who are doing Review Exercises to make sure that they review the words prior to requesting the Form B checkpoints.

The script of audiotape, Unit 1, Lesson 1 can be found after the checkpoint keys.

UNIT I - LESSON 1

Scoring Key for WORD LIST I and Checkpoint 1, Form A

Directions: On the student's test, underline the words missed by each student and clearly write the letter indicating the correct answer on the test.

<u>Word</u>	<u>Correct Definition</u>
1. appropriate	h. suitable or right for a certain person or purpose
2. component	d. part of a larger piece of equipment or system
3. detect	o. to notice if something is there
4. distribution	m. something spread out over a large area
5. electronics	i. related to radios, transistors, and communication equipment
6. gradually	a. a little bit at a time; moving slowly
7. insert	g. to put in
8. maximum	e. highest possible level
9. minimum	f. lowest possible level
10. orient	n. to turn to the required position
11. procedure	c. a particular way of doing something
12. proper	b. correct
13. range	j. how far something can be transmitted
14. terrain	k. type of countryside or land
15. vegetation	l. plants, trees, and other plant life

UNIT I - LESSON 1

Scoring Key for WORD LIST II and Checkpoint 2, Form A

Directions: On the student's test, underline the words missed by each student and clearly write the letter indicating the correct answer on the test.

<u>Word</u>	<u>Correct Definition</u>
1. adequate	d. enough for some purpose
2. clockwise	n. in the direction that hands of a clock move.
3. counterclockwise	m. in the opposite direction from the hands of a clock
4. depress	g. to push down
5. designate	a. to specify, name, or point out
6. energize	k. supply power for operation; start up
7. engage	l. to put in gear; to use; to interlock with
8. extend	h. to stretch out to fullest length
9. fault	b. a defect or flaw; something wrong
10. function	c. the expected action of something; to carry on normal work
11. horizontal	f. level, like the horizon ———
12. indicate	a. to specify, name, or point out
13. modification	j. a change in something
14. receptacle	i. an electrical socket or outlet
15. vertical	e. straight up and down

UNIT 1 - LESSON 1

Scoring Key for WORD LIST III and Checkpoint 3, Form A

Directions: On the student's test, underline the words missed by each student and clearly write the letter indicating the correct answer on the test.

<u>Word</u>	<u>Correct Definition</u>
1. approximately	s. almost exactly
2. automatically	k. acting without help from anything else
3. cable	h. a collection of wires carrying electrical current; to hook up those wires
4. capacity	e. ability of equipment
5. character	o. a letter or simple number
6. defective	d. lacking something; broken
7. exceed	b. to be greater than
8. excess	i. too much of something
9. index	c. an alphabetical list that helps in finding a certain part of a book
10. insure	q. to make certain
11. manually	t. by hand
12. monitor	m. to check on the operation of equipment without disturbing it
13. standard	p. a gauge or rule used in measuring something; a statement of how something is to be done
14. symptom	l. a sign that something is wrong
15. technical	r. special knowledge about a mechanical subject

(continued on the next page)

- |                   |  |
|-------------------|--|
| 16. terminal      | n. an end-point along a communication system |
| 17. transmit      | f. to send a message                         |
| 18. uncorrectable | g. cannot be made right                      |
| 19. vehicle       | j. a car, truck, or van                      |
| 20. visual        | a. by sight; can be seen                     |

UNIT I - LESSON 1

Scoring Key for WORD LIST IV and Checkpoint 4, Form A

Directions: On the student's test, underline the words missed by each student and clearly write the letter indicating the correct answer on the test.

<u>Word</u>	<u>Correct Definition</u>
1. action	d. a physical movement; a thing done
2. adjust	j. to re-position parts of equipment (usually slowly)
3. applicable	t. suitable to use
4. cause	o. to make something happen
5. caution	a. carefulness; a warning to be careful
6. configuration	g. grouping; outward shape, form, or figure
7. contaminate	b. to make something unfit for use or impure
8. deficiency	l. missing some necessary quality or activity
9. detach	s. to separate
10. effective	n. powerful; produces desired result
11. element	e. a necessary part of a piece of equipment
12. elevate	c. to lift up
13. exterior	q. the outside
14. extinguish	p. to go out, put out, or turn off
15. meter	r. an instrument used for measuring the amount of something

(continued on the next page)

- |                 |  |
|-----------------|--|
| 16. mission     | i. the purpose for which something is done                     |
| 17. process     | h. a series of actions needed to complete some product or goal |
| 18. preliminary | k. what is to be done first                                    |
| 19. preventive  | f. stopping something from happening                           |
| 20. status      | m. the condition of something                                  |

UNIT I - LESSON 1

Scoring Key for WORD LIST V and Checkpoint 5, Form A

Directions: On the student's test, underline the words missed by each student and clearly write the letter indicating the correct answer on the test.

<u>Word</u>	<u>Correct Definition</u>
1. assign	h. appoint; give a task to do
2. authorize	b. give the power to do something
3. auxiliary	q. providing help; back-up
4. establish	w. to prove beyond doubt
5. interval	x. time between
6. location	y. a placement or position
7. maintenance	k. procedure for keeping equipment in working order
8. malfunction	e. failure to operate normally; something wrong
9. momentarily	a. for a short time
10. obstruction	n. blockage
11. operational	l. in working order; ready to perform
12. preset	r. to set beforehand
13. proficient	m. good at doing some task
14. readjust	f. to adjust again
15. reduce	g. to narrow down; to lessen
16. reference	u. where to find information
17. rotate	j. to turn around

(continued on the next page)

- |                   |   |
|-------------------|---|
| 18. seated        | c. in the correct space or place                  |
| 19. secure        | i. to fasten tightly                              |
| 20. select        | s. to choose                                      |
| 21. sequence      | t. ordering of steps to do something              |
| 22. serial number | v. identifying number                             |
| 23. site          | y. a placement or position                        |
| 24. slot          | o. a space into which something fits              |
| 25. suitable      | p. appropriate or correct to use for some purpose |
| 26. tension       | d. tautness; stretched until tight                |

UNIT I - LESSON 1

Scoring Key for Checkpoint 6, Form A

- |       |       |
|-------|-------|
| 1. b  | 16. b |
| 2. d  | 17. b |
| 3. d  | 18. d |
| 4. a  | 19. a |
| 5. b  | 20. d |
| 6. b  | 21. c |
| 7. d  | 22. a |
| 8. c  | 23. a |
| 9. d  | 24. d |
| 10. a | 25. b |
| 11. c | 26. c |
| 12. a | 27. b |
| 13. b | 28. c |
| 14. d | 29. a |
| 15. a | 30. d |

UNIT I - LESSON 1

Scoring Key for Checkpoint 1, Form B

1. h
2. l
3. a
4. c
5. g
6. o
7. i
8. k
9. j
10. b
11. m
12. n
13. f
14. e
15. d

UNIT I - LESSON 1

Scoring Key for Checkpoint 2, Form B

1. k
2. a
3. b
4. h
5. n
6. d
7. c
8. g
9. m
10. l
11. i
12. n
13. e
14. f
15. j

UNIT I - LESSON 1

Scoring Key for Checkpoint 3, Form B

1. b
2. j
3. m
4. p
5. f
6. q
7. s
8. l
9. r
10. d
11. a
12. h
13. e
14. i
15. c
16. g
17. o
18. n
19. k
20. t

UNIT I - LESSON 1

Scoring Key for Checkpoint 4, Form B

1. q
2. k
3. a
4. f
5. t
6. n
7. s
8. i
9. b
10. g
11. p
12. r
13. d
14. e
15. c
16. l
17. m
18. j
19. o
20. h

UNIT I - LESSON 1

Scoring Key for Checkpoint 5, Form B

- |       |       |
|-------|-------|
| 1. r  | 14. x |
| 2. t  | 15. s |
| 3. i  | 16. e |
| 4. c  | 17. p |
| 5. b  | 18. w |
| 6. a  | 19. q |
| 7. o  | 20. g |
| 8. u  | 21. f |
| 9. y  | 22. d |
| 10. l | 23. a |
| 11. n | 24. k |
| 12. h | 25. j |
| 13. m | 26. v |

UNIT I - LESSON 1

Scoring Key for Checkpoint 6, Form B

- |       |       |
|-------|-------|
| 1. d  | 16. c |
| 2. a  | 17. d |
| 3. b  | 18. a |
| 4. c  | 19. d |
| 5. d  | 20. c |
| 6. a  | 21. d |
| 7. c  | 22. c |
| 8. c  | 23. a |
| 9. d  | 24. d |
| 10. a | 25. a |
| 11. a | 26. b |
| 12. d | 27. b |
| 13. b | 28. a |
| 14. a | 29. a |
| 15. b | 30. c |

THE CONTENT OF THE AUDIOTAPE  
LABELED UNIT I, LESSON 1 IS FOUND  
ON THE FOLLOWING PAGES.

WORD LIST I

1. appropriate

Find the appropriate TM before going on.

2. component

Each component of the radio set must fit in a certain place in the van.

3. detect

If you detect a tone, increase the volume.

4. distribution

In certain situations, you will need to have a wide distribution of the signal.

5. electronics

The shelf should contain only electronics equipment.

6. gradually

Turn the switch gradually to the left.

7. insert

Insert the cable into the connector.

8. maximum

The Q-123(W) meter registers at the maximum point.

9. minimum

This is the minimum number of items required to place the AB-123 in working order.

10. orient

At this time, you must orient the antenna to the direction of the signal.

WORD LIST I (cont'd)

11. procedure

This section describes the procedure to use when operating the DOG-324.

12. proper

If you do not get the proper result, you must find the problem.

13. range

The range of the signal must be determined before sending the message.

14. terrain

The vans are designed to travel on most types of terrain.

15. vegetation

Vegetation will not stop the radio signal.

WORD LIST II

1. adequate  
Be sure you have an adequate amount of fuel for the trip.
2. clockwise  
The switch will turn in a clockwise direction.
3. counterclockwise  
Turn the knob in a counterclockwise direction.
4. depress  
Depress the POWER button.
5. designate  
You will designate a captain for the team.
6. energize  
Now you must energize the transmitting radio terminal.
7. engage  
Continue to shift up until you engage high gear.
8. extend  
Extend the mast sections as far as possible.
9. fault  
You must isolate the fault in order to fix it.
10. function  
The function of the antenna is to help in the reception of the signal.

WORD LIST II (cont'd)

11. horizontal

Be sure the rack support bar is in the horizontal position.

12. indicate

The multimeter may indicate a minimum level.

13. modification

The manual describes the modifications which have been made to the equipment.

14. receptacle

Be sure the wire is firmly in the receptacle.

15. vertical

The needle on the meter should be nearly vertical.

WORD LIST III

1. approximately

The reading should be approximately 95.

2. automatically

It will automatically snap into place.

3. cable

The cable must be attached at this point.

4. capacity

The capacity of the equipment to send the signal can now be determined.

5. character

The name CD-583 is made up of five characters.

6. defective

The problem may be caused by defective operation of switches and controls.

7. exceed

The reading should not exceed 100.

8. excess

Check to see that there is not an excess amount of noise on the line.

9. index

Use the index of the TM to find the appropriate page.

10. insure

Insure the proper alignment is performed in the test.

WORD LIST III (cont'd)

11. manually

You should manually extend the antenna.

12. monitor

You should monitor the system to be sure the transmission continues.

13. standard

The standard is met when the system is in operation.

14. symptom

The buzzer sounding may be a symptom of something wrong.

15. technical

Use this manual to answer your technical questions about the equipment.

16. terminal

The terminal will send the signal to the receiver.

17. transmit

Stations transmit groups of frequencies.

18. uncorrectable

Some problems may be uncorrectable.

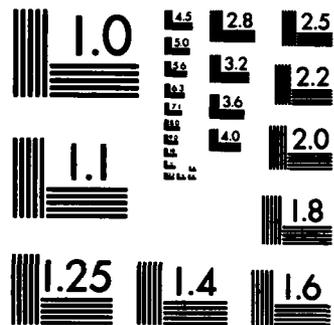
19. vehicle

Place the equipment in the transport vehicle.

20. visual

The purpose of visual inspection is to locate faults without testing circuits.





MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

## WORD LIST IV

1. action

The TM tells you what action to take if there is no signal.

2. adjust

You may need to adjust the dial to get the proper reading.

3. applicable

These steps are applicable in all types of weather.

4. cause

Troubleshooting will help you find the cause of the problem.

5. caution

Use caution when you are working with electricity.

6. configuration

The equipment should always be in this configuration.

7. contaminate

If it runs roughly, water may contaminate the gasoline.

8. deficiency

If there is a deficiency in the equipment, it will not work.

9. detach

Detach the ropes from the pole.

10. effective

In order to be an effective team, you must work together in a cooperative manner.

11. element

Each element of the generator performs an important task.

WORD LIST IV (cont'd)

12. elevate

Now you must elevate the antenna.

13. exterior

Connect the cable to the exterior of the case.

14. extinguish

The light should extinguish when the button is pushed.

15. meter

If the needle on the meter moves, the circuits are shorted.

16. mission

Your mission is to install and operate the radio.

17. process

This section describes the process of assembling the generator.

18. preliminary

Here is a list of preliminary electrical checks you must complete.

19. preventive

In order to avoid problems in the future, you should complete the preventive maintenance tasks.

20. status

During this task, you must determine the status of the equipment.

## WORD LIST V

1. assign  
The sergeant will assign you to a work group.
2. authorize  
He will authorize the need for spare parts.
3. auxiliary  
When you are out of gas, you must find the auxiliary fuel tank.
4. establish  
You must establish which part is causing the problem.
5. interval  
After an interval of 5 seconds, the light should come on.
6. location  
Choose a location that is flat and sheltered.
7. maintenance  
This section tells you how to perform general maintenance on the generator.
8. malfunction  
A malfunction can delay your transmission for long periods.
9. momentarily  
The buzzer should sound momentarily.
10. obstruction  
If fuel is not getting through, check for an obstruction in the hose.

WORD LIST V (cont'd)

11. operational

Check to see that all parts are operational.

12. preset

Now you must preset the voltage on the 123-ABC.

13. proficient

By practicing, you will become proficient in the use of the transmitter.

14. readjust

During the process, it may be necessary to readjust the voltage.

15. reduce

In some situations, you may need to reduce the amount of power.

16. reference

Sometimes, another manual will be given as a reference.

17. rotate

Rotate the antenna until the signal is strong and clear.

18. seated

Be sure the bolt is well seated in place.

19. secure

Secure the base plate to the ground.

20. select

Select a location about 6 feet by 7 feet.

21. sequence

Follow this sequence of steps to determine the problem.

WORD LIST V (cont'd)

22. serial number

All of the components will have a serial number to help in identification.

23. site

Your team must locate a level site.

24. slot

The catch should fit neatly in the slot.

25. suitable

If the meter readings are suitable, no further maintenance is required.

26. tension

The guy wires will be under a great deal of tension when the process is complete.

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**INSTRUCTOR GUIDE**

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**UNIT I. READING COMPREHENSION**

**Lesson 2. Strategies for Understanding Sentences**

- TERMINAL OBJECTIVE:** Interprets sentences describing radio and radio equipment, task conditions, task standards, and performance steps.
- CONDITION:** Given sentences describing equipment or describing tasks, similar to sentences found in 31M10 reading materials.
- STANDARD:** Student answers questions concerning the content of the sentence and recognizes sentences which are or are not paraphrases of the original sentence.
- ESTIMATED LESSON LENGTH:** 4 hours, 45 minutes
- INSTRUCTIONAL MATERIAL:** Student Guide containing self-paced materials and exercises. Checkpoints. It is anticipated that this lesson may require considerable monitoring of student progress and considerable one-to-one tutoring.
- OTHER MEDIA AND SUPPORT MATERIALS:** Additional review exercises and checkpoints, scoring keys for checkpoints.
- REFERENCES:** Reading materials like those in this lesson are to be found in the Soldier's Manual, most of the TMs used by the 31M10 MOS, and the "Introduction to Multichannel Communications Equipment Operator Course" (202-31M20/A-F,-M).

- LESSON STRUCTURE:** The lesson is divided into four sections:
- Section A. Types of 31M Reading Materials  
(Student Guide, p. 2)
  - Section B. Reading Descriptions of Equipment  
(Student Guide, p. 6)
  - Section C. Reading Task Conditions and Standards  
(Student Guide, p. 36)
  - Section D. Reading Performance Steps  
(Student Guide, p. 44)

There are two checkpoints in the lesson, one at the end of Section B and the other at the end of Section D.

**ENABLING OBJECTIVES:**

Section A

- Action:** Matches types of reading materials to types of information in the materials.
- Condition:** Given questions concerning equipment and performance of tasks.
- Standard:** Identifies the type of reading material in which answers to the questions are found.

**NOTE:** Section A introduces the student to different types of reading materials used in the 31M MOS. It is intended primarily as a motivator and advance organizer and does not teach comprehension skills.

## Section B

1. Action: Uses the following five guidelines for comprehending the meaning of sentences.

1. Pay close attention to new terms and their definitions.
2. Do not skip over terms you do not understand. Find out what they mean before you go on.

If you do not understand a sentence the first time you read it, do the following:

3. Read the sentence again, slowly and carefully.
4. Read the sentence out loud.
5. Form an image (a picture in your mind) of what the sentence says.

Condition: Given the guidelines and examples showing how each is used.

Standard: Applies each guideline to new sentences.

2. Action: Answers questions concerning the content of sentences about radio concepts and radio equipment (literal comprehension).

Condition: Given sentences about radio concepts (e.g., modulation) and radio equipment (e.g., oscillator).

Standard: Correctly answers fill-in-the-blank and multiple-choice questions concerning the concepts and equipment.

NOTE: The student answers questions about sentence content with the sentence present. The intent is not to have students memorize the information in the sentences, but to provide practice in sentence comprehension.

3. **Action:** Recognizes paraphrases and non-paraphrases of sentences about radio concepts and radio equipment.
- Condition:** Given a sentence about radio concepts or equipment, and given comparison sentences, some of which do and some of which do not say the same thing as the original sentence.
- Standard:** Identifies each comparison sentence as having the same or a different meaning, or selects, from several comparison sentences, the one which has the same meaning as the original.

### Section C

1. **Action:** Answers questions concerning the conditions under which a task is performed.
- Condition:** Given sentences describing the conditions for performing a task.
- Standard:** Searches the sentence(s) to find answers to questions.
2. **Action:** Answers questions concerning the standards which must be met in performing a task.
- Condition:** Given sentences describing the standards for performing a task.
- Standard:** Searches the sentence(s) to find answers to questions.

NOTE 1: The conditions and standards used in the lesson are taken from the 31M10 Soldier's Manual, usually literally but sometimes with slight changes in wording.

NOTE 2: As in Section B, the intent is not for students to memorize the conditions and standards, but to provide practice in interpreting them.

NOTE 3: Students are expected to continue to use the five guidelines for comprehension introduced in Section B. See Enabling Objective 1 for Section B.

## Section D

1. **Action:** Answers questions concerning the content of printed performance steps for single actions, which contain the following terms as well as others:

Operate  
Adjust  
Check  
Insure  
Monitor  
Momentarily  
Sequentially

**Condition:** Given performance steps in which the terms above as well as others are used.

**Standard:** Answers questions concerning what has to be done and how.

2. **Action:** Recognizes paraphrases and non-paraphrases of printed performance steps.

**Condition:** Given a sentence describing a performance step, and given comparison sentences, some of which do and some of which do not say the same thing as the original sentence.

**Standard:** Identifies each comparison sentence as having the same or a different meaning, or selects from several comparison sentences the one which has the same meaning as the original performance step.

**NOTE:** As in previous sections, students are not expected to memorize the information in the performance steps, but rather to interpret the information correctly, using the five guidelines (Section B, Enabling Objective 1) as needed.

### **TESTING:**

This lesson contains two checkpoints. Checkpoint 1 at the end of Section B contains 10 questions measuring Enabling Objectives 2 and 3 of that section. Checkpoint 2 at the end of the lesson contains 10 questions measuring the enabling objectives of Sections C and D.

After you have scored Checkpoint 1, Form A, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	Student should continue with the lesson, beginning with Section C.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have the student go on to Section C of the lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe Review Exercise 1 followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to Section C of the lesson.

After you have scored Checkpoint 2, Form A, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have the student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe Review Exercise 2 followed by Checkpoint 2, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

## INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

This lesson may require more careful monitoring than most. Many BSEP students have well-established bad reading habits, such as:

Rushing through sentences instead of reading methodically.

Skipping over terms they do not understand.

Not following printed instructions to the letter.

A major purpose of this lesson is to change these habits. To do so, it is essential that students take the five guidelines seriously, learn how to use them, and apply them as needed. At various points, especially in Section B, students are told to do things like read a sentence out loud or go to the instructor for some specific purpose. Make sure that they do so. A student who simply sits at his/her desk flipping pages and writing answers is probably not following the instructions.

A possible problem with this lesson (as with others) is that students may try to get through it too fast. Reading comprehension requires slow, methodical, and active processing of each sentence by the student. If a student appears to be rushing, take steps to slow him/her down, by asking questions about the lesson, by checking to make sure that all instructions are being carefully followed, or by other measures that seem appropriate.

UNIT 1 - LESSON 2

Scoring Key for Checkpoint 1, Form A

1. a
2. c
3. b
4. a
5. They modify the amplitude of the carrier wave.
6. d
7. c
8. c
9. d
10. The speaker changes electric energy to sound.

UNIT I - LESSON 2

Scoring Key for Checkpoint 1, Form B

1. 40 miles.
2. a
3. c
4. A generator.
5. d
6. multiplex equipment.
7. b
8. a
9. amplitude modulation.
10. c

UNIT 1 - LESSON 2

Scoring Key for Checkpoint 2, Form A

1. 10 KW Generator Set, 5-pound sledge hammer, ground rod, ground strap, 8-inch flat tip screwdriver, 8-inch adjustable wrench, standard pliers.
2. TM 5-6115-275-14
3. She must determine the fuel supply and connect without causing damage to any connectors or the generator set.
4. U855
5. d.
6. S
7. D
8. S
9. S
10. D

UNIT I - LESSON 2

Scoring Key for Checkpoint 2, Form B

1. ALFA terminal.
2. Basic issue tools, safety equipment.
3. Associated TMs, multichannel systems diagram.

NOTE TO THE INSTRUCTOR: Student may list "Multichannels systems diagram" in the answer to question 2 instead of question 3. That is O.K., as long as "Multichannel systems diagram" is included in either question 2 or question 3.

4. a.
5. 30 minutes.
6. D
7. S
8. c.
9. Receiver meter.
10. When the receiver meter reads in green area of scale.

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UNIT I. READING COMPREHENSION

Lesson 3. Reading Negative Sentences

**TERMINAL OBJECTIVE:** Interprets negative sentences.

**CONDITION:** Given a sentence in negative form, i.e., an instruction including terms such as "Do not," "none," "no," which tells what should not happen.

**STANDARD:** Student selects or states what should happen.

**ESTIMATED LESSON LENGTH:** 45 minutes

**INSTRUCTIONAL MATERIAL:** Student Guide containing self-paced materials and exercises. Checkpoint.

**OTHER MEDIA AND SUPPORT MATERIALS:** Additional review exercise and checkpoint, scoring keys for checkpoints.

**REFERENCES:** The sentences used in this lesson are performance steps extracted or adapted from ones found in the 31M Soldier's Manual and various TMs.

The lesson, being short, is not divided into sections. However, practice exercises are inserted at several points within the lesson.

**PREREQUISITE:** Unit I, Lesson 2.

**ENABLING OBJECTIVES:**

1. **Action:** Uses the five guidelines taught in Lesson 2 to comprehend negative sentences.

**Condition:** Given the guidelines and a reminder to use them in this lesson.

**Standard:** None.

2. **Action:** Decides whether specified actions or outcomes are or are not appropriate.
- Condition:** Given instructions for actions stated in negative form.
- Standard:** Correctly classifies each action or outcome as "all right" or "not all right."
3. **Action:** Decides which of several actions or outcomes is appropriate.
- Condition:** Given instructions for actions stated in negative form and various positive interpretations.
- Standard:** Selects the correct interpretation (action or outcome).

**TESTING:**

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

**UNIT I - LESSON 3**

**Scoring Key for Checkpoint 1, Form A**

1. Check the current level.
2. c.
3. Sgt. Smith will not receive a signal.
4. Yes.
5. b.
6. a.
7. d.
8. No.
9. a.
10. 50 or less.

**UNIT I - LESSON 3**

**Scoring Key for Checkpoint 1, Form B**

1. Not receive PCM signals.
2. 40 or less.
3. d.
4. Yes.
5. c.
6. a.
7. b.
8. c.
9. a.
10. Open air vent.

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**UNIT I. READING COMPREHENSION**

**Lesson 4. Reading Sentences with Dependent Clauses**

**TERMINAL OBJECTIVE:** Interprets sentences with clauses.

**CONDITION:** Given a sentence with one or more dependent clauses.

**STANDARD:** Student answers questions based on the sentence or recognizes paraphrases and non-paraphrases.

**ESTIMATED LESSON LENGTH:** 1 hour

**INSTRUCTIONAL MATERIAL:** Student Guide containing self-paced materials and exercises. Checkpoint.

**OTHER MEDIA AND SUPPORT MATERIALS:** Additional review exercise and checkpoint, scoring keys for checkpoints.

**REFERENCES:** Sentences such as those found in this lesson are to be found in various TMs and FMs relevant to the 31M MOS.

**LESSON STRUCTURE:** The lesson is divided into two sections:

Section A. Reading Sentences with Dependent Clauses That Start with When, As, While, Until, and If  
(Student Guide, p. 2)

Section B. Reading Sentences with Dependent Clauses That Start with Who or Whom, Which, That, and Where  
(Student Guide, p. 10)

**PREREQUISITE:** Unit I, Lesson 2.

**ENABLING OBJECTIVES:**

**Note:** These are the enabling objectives in both Section A and Section B.

1. **Action:** Uses the five guidelines taught in Lesson 2 to comprehend sentences with clauses.  
**Condition:** Given the guidelines and a reminder to use them in this lesson.  
**Standard:** None.
2. **Action:** Separates sentences into main clause and dependent clause(s).  
**Condition:** Given sentences with one or two dependent clauses.  
**Standard:** Places a vertical line correctly between the main clause and dependent clause or between two dependent clauses.
3. **Action:** Identifies the main clause and the dependent clause(s).  
**Condition:** Having separated a sentence into clauses.  
**Standard:** Identifies each clause as MAIN CLAUSE or DEPENDENT CLAUSE.
4. **Action:** Comprehends each clause in a sentence.  
**Condition:** Having separated the sentence into clauses.  
**Standard:** None
5. **Action:** Puts the clauses together to comprehend the entire sentence.  
**Condition:** Having comprehended each clause in the sentence.  
**Standard:** None

**TESTING:**

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

Score

Action

10 correct

End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.

8 or 9 correct

Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.

7 or less correct

Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

**UNIT I - LESSON 4**

**Scoring Key for Checkpoint 1, Form A**

1. b.
2. c.
3. temperature
4. Summer position.
5. a.
6. c.
7. a.
8. poor connections, broken cables, and similar defects.
9. a.
10. which machine is being operated.

UNIT I - LESSON 4

Scoring Key for Checkpoint 1, Form B

1. b.
2. c.
3. a.
4. Several
5. c.
6. Will not stay closed.
7. Record it on Form ABC.
8. a.
9. b.
10. a.

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UNIT I. READING COMPREHENSION

Lesson 5. Ordering One, Two, or Three Tasks

- TERMINAL OBJECTIVE:** Determines sequence of two or three actions.
- CONDITION:** Given directions to perform two or three actions whose order is explicit or implicit.\*
- STANDARD:** Student selects the action to be performed first, second, or third, or selects a paraphrase giving the correct sequence of actions.
- ESTIMATED LESSON LENGTH:** 1 hour
- INSTRUCTIONAL MATERIAL:** Student Guide containing self-paced materials and exercises. Checkpoint.
- OTHER MEDIA AND SUPPORT MATERIALS:** Additional review exercise and checkpoint, scoring keys for checkpoints.
- REFERENCES:**
- LESSON STRUCTURE:** The lesson is divided into four sections:
- Section A. The Order of Two Tasks  
(Student Guide, p. 2)
  - Section B. The Order of Three Tasks  
(Student Guide, p. 8)
  - Section C. Mixed Up Order of Tasks  
(Student Guide, p. 12)
  - Section D. Listing and Paraphrasing Steps  
(Student Guide, p. 21)

\* Explicit order means that events are listed in the statement in the order they occur. Implicit order means that events do not occur in the order they occur in a statement; the order is changed by words such as "before" and "after."

**ENABLING OBJECTIVES:**

**Section A**

- Action:** Identifies or lists what happens first and second.
- Condition:** Given directions telling the order of two tasks (explicit).
- Standard:** Identifies or lists which task comes first and which comes second.

**Section B**

- Action:** Identifies or lists what happens first, second, and third.
- Condition:** Given directions telling the order of three tasks (explicit).
- Standard:** Identifies or lists which task comes first, second, and third.

**Section C**

- Action:** Identifies or lists what happens first, second, and third.
- Condition:** Given directions telling the order of three tasks (implicit).
- Standard:** Identifies or lists which task comes first, second, and third.

**Section D**

- Action:** Lists or paraphrases what happens first, second, and third.
- Condition:** Given directions telling the order (explicit or implicit) of two or three tasks.
- Standard:** Identifies the correct order of events, or identifies a correct paraphrase of the directions.

**TESTING:**

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise and Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT I - LESSON 5

Scoring Key for Checkpoint I, Form A

1. a.
2. c.
3. a.
4. b.
5. c.
6. a.
7. d.
8. b.
9. a.
10. b.

**UNIT I - LESSON 5**

**Scoring Key for Checkpoint 1, Form B**

1. a.
2. c.
3. d.
4. c.
5. a.
6. b.
7. c.
8. c.
9. b.
10. c.

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UNIT 1. READING COMPREHENSION

Lesson 6. Determining the Order of Steps: Multiple Actions

**TERMINAL OBJECTIVE:** Determines sequence: Multiple explicit\* relationships.

**CONDITION:** Given directions to perform a sequence of actions (three to five), in which all actions are explicitly described in the correct order.

**STANDARD:** Student answers questions concerning the order of actions.

**ESTIMATED LESSON LENGTH:** 1 hour

**INSTRUCTIONAL MATERIALS:** Student Guide containing self-paced materials and exercises. Checkpoint.

**OTHER MEDIA AND SUPPORT MATERIALS:** Additional review exercise and checkpoint, scoring keys for checkpoints.

**REFERENCES:** None

**LESSON STRUCTURE:** The lesson is divided into three sections:

- Section A. Position of Tasks (Student Guide, p. 2)
- Section B. Before and After (Student Guide, p. 7)
- Section C. Directions in Simpler Form  
(Student Guide, p. 12)

\* Explicit order means that events are listed in the statement in the order they occur.

**ENABLING OBJECTIVES:**

**Section A**

1. **Action:** Chooses which task happens first, second, third, fourth and fifth.
- Condition:** Given directions to perform a sequence of tasks (three to five), in which all tasks are explicitly described in the correct order.
- Standard:** Selects the ordinal position of each task.

**Section B**

- Action:** Chooses which task happens before or after another.
- Condition:** Given directions to perform a sequence of tasks (three to five), in which all tasks are explicitly described in the correct order.
- Standard:** Selects which task comes before or after a specified task.

**Section C**

- Action:** Chooses which list best summarizes the directions given.
- Condition:** Given directions to perform a sequence of tasks (three to five), in which all tasks are explicitly described in the correct order.
- Standard:** Selects the list which best condenses and summarizes the directions.

**TESTING:**

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise and Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT I - LESSON 6

Scoring Key for Checkpoint 1, Form A

1. c.
2. a.
3. d.
4. b.
5. d.
6. c.
7. d.
8. a.
9. a.
10. d.

**UNIT I - LESSON 6**

**Scoring Key for Checkpoint 1, Form B**

1. d.
2. a.
3. b.
4. d.
5. b.
6. b.
7. d.
8. b.
9. d.
10. c.

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UNIT 1. READING COMPREHENSION

Lesson 7. Understanding Lists and Paragraphs

- TERMINAL OBJECTIVE:** Identifies information about long lists and paragraphs.
- CONDITIONS:** Given a list or paragraph describing a task or equipment.
- STANDARD:** Student identifies similar information, information included or not included.
- ESTIMATED LESSON LENGTH:** 1 hour, 10 minutes
- INSTRUCTIONAL MATERIALS:** Student Guide containing self-paced materials and exercises. Checkpoint.
- OTHER MEDIA AND SUPPORT MATERIALS:** Additional review exercise and checkpoint, scoring keys for checkpoints.
- REFERENCES:** None
- LESSON STRUCTURE:** The lesson is divided into two sections:
- Section A. Information in Lists  
(Student Guide, p. 2)
  - Section B. Information in Paragraphs  
(Student Guide, p. 9)
- ENABLING OBJECTIVES:**

Section A

- Action:** Answers questions about long lists of information.
- Condition:** Given lists of information.
- Standard:** Identifies a specific item in a list, a paraphrase of a specific item in a list, information included and not included in a list.

Section B

Action: Answers questions about long lists of information.

Condition: Given a paragraph.

Standard: Identifies information that is and is not contained in the paragraph, and chooses a paragraph that says the same thing.

TESTING:

The checkpoint at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise and Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT I - LESSON 7

Scoring Key for Checkpoint 1, Form A

1. d.
2. b.
3. a.
4. b.
5. a.
6. c.
7. d.
8. c.
9. a.
10. c.

UNIT I - LESSON 7

Scoring Key for Checkpoint 1, Form B

1. a.
2. d.
3. b.
4. d.
5. b.
6. b.
7. b.
8. d.
9. b.
10. b.

## Introduction to Unit II

### Using a Table of Contents

The purpose of Unit II is to teach students to use the various types of Tables of Contents (including Task Lists) they will need to deal with when finding information in the Soldier's Manual and Technical Manuals (TMs). While a simple Table of Contents may present little difficulty for most students, the Tables of Contents in the 31M10 publications have several unusual features which can be confusing, unless they are explained.

Unit II has three lessons. Lesson 1, Chapters and Sections, explains the basic parts of a simple Table of Contents, then presents examples in which the chapter headings are subdivided into sections, as is the case in most 31M10 publications. The 2-part page numbers used in military publications are also taught. Lesson 2, Using a Task List to Find a Task Description, introduces the student to the unusual organization of the Soldier's Manual. The Task Lists are presented as Tables of Contents with special characteristics. (Entries are identified by 10-digit numbers; they are not in strict numerical order; they are grouped by topic.) Strategies are taught for quickly scanning the lengthy Task Lists to find either a particular title or Task Number. Lesson 3, Tables with Paragraph Numbers and Page Numbers, teaches the student to use the most complex forms of Tables of Contents in which the chapters are subdivided into sections and the sections into paragraphs, each with its own 2-part page number and 2-part paragraph number.

Each lesson in Unit II contains a Student Guide, at least one checkpoint<sup>1</sup> (Form A) which measures attainment of the terminal objective, one Review Exercise<sup>2</sup> for students who do poorly on the checkpoint, and an additional checkpoint (Form B) parallel to the first. The Instructor Guide for each lesson includes scoring keys for both forms of the checkpoint.

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<sup>1</sup> Lesson 2 has two checkpoints.

<sup>2</sup> Lesson 3 has a special Review Exercise to teach students to read simple Roman numerals (used in numbering parts of Tables of Contents, etc).

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UNIT II. USING A TABLE OF CONTENTS

Lesson 1. Chapters and Sections

- TERMINAL OBJECTIVE:** Identifies two-part page numbers of entries in a table of contents.
- CONDITION:** Given a table of contents (similar to that in the Soldier's Manual) for locating task lists and task summaries for different categories of tasks.
- STANDARD:** Student identifies the page number on which information relevant to a specified section and chapter is located, or identifies the topic to be found on a specified page of a specified chapter.
- ESTIMATED LESSON LENGTH:** 2 hours
- INSTRUCTIONAL MATERIAL:** Student Guide containing self-paced materials and exercises. Checkpoint.
- OTHER MEDIA AND SUPPORT MATERIALS:** Additional review exercise and checkpoint, scoring keys for checkpoints.
- REFERENCES:** The Table of Contents (not the Task Lists) in the Soldier's Manual.
- LESSON STRUCTURE:** The lesson is divided into three sections:
- Section A. Recognizing Chapters and Sections  
(Student Guide, p. 2)
  - Section B. Using a Two-Part Page Number  
(Student Guide, p. 9)
  - Section C. Using a Table of Contents Like the One in the Soldier's Manual  
(Student Guide, p. 11)

**ENABLING OBJECTIVES:**

**Section A**

1. **Action:** Uses a simple table of contents.  
**Condition:** Given a table of contents with only chapter titles (no sections) and page numbers.  
**Standard:** Identifies chapter titles starting on a specified page number or page numbers of a specified chapter.
2. **Action:** Distinguishes chapter and section titles in a table of contents.  
**Condition:** Given a table of contents in which chapters are divided into sections and the sections carry page numbers.  
**Standard:** Identifies chapter titles, section titles, page numbers of specified titles (either chapter or section).

**Section B**

- Action:** Identifies which part of a two-part page number refers to the chapter and which to the page.
- Condition:** Given a two-part page number, or a page number and chapter number (in either order).
- Standard:** States what the two-part page number means, or writes the two-part page number.

**Section C**

- Action:** Coordinates specified chapter and section titles to find page numbers in a table of contents.
- Condition:** Given part of a table of contents (like that in a Soldier's Manual) with two-part page numbers and chapters with identical section titles, and from which the chapter numbers were removed.
- Standard:** Identifies page numbers of specified chapter-sections, and identifies chapter number from the page number.

**TESTING:**

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT II - LESSON 1

Scoring Key for Checkpoint 1, Form A

1. 5  
Explanation: If the student wrote a higher number, he/she was counting sections, not just chapters.
2. 4
3. What chapter is meant. (Answer need not be those exact words.)
4. 1-10  
Explanation: If the student wrote 3-157 or 5-211, point out that Zulu was asked for, not Zulu Level.
5. Tango Level (Answer should include the word Level.)
6. Golf Level
7. 2-106
8. 5-100
9. 3-79  
Explanation: If the student wrote 4-205, point out that he/she confused the chapter title with the section title.
10. 4-85  
Explanation: If the student wrote 5-100, point out that he/she did not carefully look at the chapter title that was given.

UNIT II - LESSON 1

Scoring Key for Checkpoint 1, Form B

1. 4-97
2. 5-83
3. 2-98
4. 3-207
5. Golf Level
6. Papa Level
7. 3
8. What chapter is meant. (Answer need not be those exact words.)
9. 5
10. 1-3

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## INSTRUCTOR GUIDE

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### UNIT II. USING A TABLE OF CONTENTS

#### Lesson 2. Using a Task List to Find a Task Description

**TERMINAL OBJECTIVE:** Scans task list to identify page on which information is listed, using a focusing strategy.

**CONDITION:** Given a task list for finding descriptions of specific tasks, each task name preceded by its task number, and given either a task name or task number.

**STANDARD:** Student identifies the page number on which a specified task description is to be found.

**ESTIMATED LESSON LENGTH:** 2 hours

**INSTRUCTIONAL MATERIAL:** Student Guide containing self-paced materials and exercises. Checkpoint. NOTE: STUDENT NEEDS SOLDIER'S MANUAL FOR THIS LESSON.

**OTHER MEDIA AND SUPPORT MATERIALS:** Additional review exercise and checkpoint, scoring keys for checkpoints.

**REFERENCES:** Soldier's Manual Task Lists.

**LESSON STRUCTURE:** The lesson is divided into four sections:

Section A. Finding a Task List in the Soldier's Manual (Student Guide, p. 2)

Section B. Scanning a Task List to Find a Task Number (Student Guide, p. 5)

Section C. Scanning a Task List to find a Task Title (Student Guide, p. 13)

Section D. Using a Task List to Find a Page Number (Student Guide, p. 15)

ENABLING OBJECTIVES:

Section A

- Action: Uses Table of Contents to locate Task Lists in a Soldier's Manual.
- Condition: Given a Soldier's Manual and directions.
- Standard: Finds first page of both Task Lists in the Soldier's Manual.

Section B

- Action: Scans a Task List to find a particular task number.
- Condition: Given a task number and Task List (with numbers not in numerical order).
- Standard: Uses focusing strategy to find a task number.

Section C

- Action: Scans a Task List to find a particular task title.
- Condition: Given a task title and Task List.
- Standard: Uses focusing strategy to find a task title.

Section D

- Action: Uses a Task List to find a page number.
- Condition: Given a Soldier's Manual and a task number or title.
- Standard: Uses focusing strategies to find task number or title, then finds page number.

TESTING:

There are two checkpoints, one after Section C and one after Section D. Each contains 10 questions measuring the terminal objective. After you have scored each checkpoint, take the following actions, based on the student's score.

A. Checkpoint 1

Score

10 correct Student should go on to Section D of the lesson.

8 or less correct Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to Section D.

B. Checkpoint 2

Score

Action

10 correct End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.

8 or 9 correct Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.

7 or less correct Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe Review Exercise 1, Checkpoint 1, Form B, Review Exercise 2, and Checkpoint 2, Form B. Score each checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT II - LESSON 2

Scoring Key for Checkpoint 1, Form A

1. a. Chapter 2 Task List only.  
Explanation: All the Task Numbers in the Chapter 3 Task List (except one) start with 113-, so 031-503-1010 can't be in that Task List.
2. b. The first section of the number.
3. Disinfect Water for Drinking (Canteen)  
Explanation: In case the student couldn't find it, this Task List entry is on page 2-4.
4. Lead Physical Conditioning Activities  
Explanation: This Task List entry is on page 2-7.
5. Operate Repeater Set, Radio, AN TRC-113(V)  
Explanation: This Task List entry is on page 3-2.
6. Chapter 3  
Explanation: This Task List entry is on page 3-2.
7. Direct Operator's Daily Preventive Maintenance of Telephone Terminal Sets  
Explanation: The Task List entry is on page 2-8.
8. Chapter 2  
Explanation: This Task List entry is on page 2-8.
9. 113-593-4009  
Explanation: This Task List entry is on page 3-5.
10. 113-593-1012  
Explanation: This Task List entry is on page 3-7.

UNIT II - LESSON 2

Scoring Key for Checkpoint 2, Form A

1. 2-382  
Explanation: This Task List entry is found on page 2-8.
2. 2-172  
Explanation: This Task List entry is found on page 2-4.
3. 3-80  
Explanation: This Task List entry is found on page 3-2.
4. 2-315  
Explanation: This Task List entry is found on page 2-7.
5. 3-10  
Explanation: This Task List entry is found on page 3-1.
6. 3-243  
Explanation: This Task List entry is found on page 3-5.
7. 3-289  
Explanation: This Task List entry is found on page 3-7.
8. 3-34  
Explanation: This Task List entry is found on page 3-1.
9. 3-327  
Explanation: This Task List entry is found on page 3-8.
10. 3-299  
Explanation: This Task List entry is found on page 3-7.

UNIT II - LESSON 2

Scoring Key for Checkpoint 1, Form B

1. 113-593-1021
2. Operate Terminal Set, Telephone, AN/TCC-61  
Explanation: This entry can be found on page 3-3.
3. Encode and Decode Messages Using KTC-600, Tactical Operations Code.  
Explanation: This entry can be found on page 2-7.
4. Operate Terminal Telegraph-Telephone, AN-MCC-6.  
Explanation: This entry can be found on page 37.
5. Splint a Suspected Fracture.  
Explanation: This entry can be found on page 2-3.
6. 113-593-1007  
Explanation: This entry can be found on page 3-3.
7. 113-593-2006  
Explanation: This entry can be found on page 3-4.
8. 113-593-3016  
Explanation: This entry can be found on page 3-6.
9. 113-593-2005  
Explanation: This entry can be found on page 3-1.
10. Troubleshoot Repeater Set, Radio, AN/TRC-113(V).  
Explanation: This entry can be found on page 3-2.

UNIT II - LESSON 2

Scoring Key for Checkpoint 2, Form B

1. 3-296
2. 3-332
3. 3-44
4. 3-280
5. 3-241
6. 3-44
7. 3-80
8. 3-181
9. 3-237
10. 3-101

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INSTRUCTOR GUIDE

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UNIT II. USING A TABLE OF CONTENTS

Lesson 3. Tables with Paragraph Numbers and Page Numbers

**TERMINAL OBJECTIVE:** Locates paragraphs when they are numbered by chapter.

**CONDITION:** Given a table of contents from a manual in which paragraphs are numbered sequentially within each chapter (e.g., 3-9 means Chapter 3, paragraph 9).

**STANDARD:** Student identifies the paragraph for a given topic, or the topic for a given paragraph, or the page on which a given paragraph is to be found.

**ESTIMATED LESSON LENGTH:** 2 hours

**INSTRUCTIONAL MATERIAL:** Student Guide containing self-paced materials and exercises. Checkpoint.

**OTHER MEDIA AND SUPPORT MATERIALS:** Additional review exercise and checkpoint, scoring keys for checkpoints. Special review exercise (Review Exercise 2) on reading Roman numerals, scoring key for Review Exercise 2.

**REFERENCES:** Selections from Tables of Contents used in this lesson were taken from the following TMs: 11-5803-382-12, 11-5805-357-15, 11-5805-367-12, and 11-5820-461-12.

**LESSON STRUCTURE:** The lesson is divided into four sections:

- Section A. Recognizing Chapter, Section, and Paragraph Titles (Student Guide, p. 2)
- Section B. Using a Two-Part Page Number (Student Guide, p. 9)
- Section C. Using a Two-Part Paragraph Number (Student Guide, p. 11)
- Section D. Using a Table of Contents with Paragraph and Page Numbers (Student Guide, p. 13)

ENABLING OBJECTIVES:

Section A

1. Action: Distinguishes chapter, section, and paragraph titles in a Table of Contents.  
Condition: Given a Table of Contents in which chapters are divided into sections and the sections are divided into paragraphs.  
Standard: Identifies chapters, sections, and paragraphs by title.
2. Action: Reads Roman numerals used in a Table of Contents.  
Condition: Given a Table of Contents in which sections are numbered with Roman numerals (not higher than X).  
Standard: Gives equivalent Arabic numbers for specified Roman numerals (between I and X).

Section B

- Action: Identifies which part of a two-part page number refers to the chapter and which to the page.
- Condition: Given a two-part page number, or a page number and a chapter number (in either order).
- Standard: States what the two-part page number means, or writes the two-part page number.

Section C

- Action: Identifies which part of a two-part paragraph number refers to the chapter and which to the paragraph.
- Condition: Given a two-part paragraph number, or a chapter number and a paragraph number (in either order).
- Standard: States what the two-part paragraph number means, or writes the two-part paragraph number.

#### Section D

- Action:** Identifies page numbers and paragraph numbers in a Table of Contents.
- Condition:** Given a Table of Contents like those in the TMs and a page number or paragraph number or title.
- Standard:** Identifies the corresponding title or page number or paragraph number.

#### TESTING:

The checkpoint at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise and Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

#### INSTRUCTIONAL GUIDELINES:

If student has trouble with Question 4 in Section A, assign the exercise on Roman numerals. Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT II - LESSON 3

Scoring Key for Checkpoint 1, Form A

1. 5-1
2. 3-8
3. 4-26
4. Checking unpacked equipment
5. 5-2
6. 1-4
7. 3-27
8. System troubleshooting
9. 6-1
10. 2-5

UNIT II - LESSON 3

Scoring Key for Checkpoint 1, Form B

1. 2-6
2. 1-4
3. Fdm system lineup
4. 1-2
5. 3-10
6. 3-34
7. Transmitting equipment
8. 4-3
9. 4-6
10. 4-5

UNIT II - LESSON 3

Scoring Key for Review Exercise 2

1. VI = 6
2. VIII = 8
3. IV = 4
4. III = 3
5. II = 2
6. V = 5
7. I = 1
8. XI = 11
9. X = 10
10. VII = 7
11. IX = 9

## Introduction to Unit III

### Listening Skills

The purpose of Unit III is to teach students techniques for remembering information heard in lectures or seen in demonstrations when it is not possible for them to take notes (as is sometimes the case). The Unit presents many opportunities for practicing listening and watching skills via audiotapes and videotapes.

Unit III has three lessons. Lesson 1, Remembering Information Heard in Lectures, gives students practice in listening carefully, in identifying important information, and in using a variety of encoding (remembering) strategies. An audiotape of brief lectures is used along with the usual paper and pencil materials. Lesson 2, Remembering Information Seen in Demonstrations, is similar in structure to Lesson 1. The focus here, however, is upon learning from watching as well as listening. The encoding strategy of visualizing is introduced. A videotape of several short demonstrations is used with this lesson. Lesson 3 is called Recognizing when Important Information is Missing. Often through a deficiency in listening or remembering, sometimes through a deficiency in the lecture, an important piece of information is not remembered. Students are sometimes not even aware of such gaps in their knowledge; obviously, a handicap in filling these gaps. Lesson 3 gives instruction and practice in recognizing when necessary information is missing. An audiotape and videotape are used.

Each lesson in Unit III contains a Student Guide, and a checkpoint which measures attainment of the terminal objective. Students who do poorly on the checkpoint take a review. The same checkpoint is then re-administered. The Instructor Guide for each lesson includes a scoring key for the checkpoint, a list of the audiotapes and/or videotapes used in the lesson, scripts of the tapes, and directions on how to facilitate the student's use of the tape playback equipment.

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INSTRUCTOR GUIDE

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UNIT III. LISTENING SKILLS

Lesson 1. Remembering Information Heard in Lectures

- TERMINAL OBJECTIVE:** Uses retrieval strategies to recall lecture information in response to questions.
- CONDITION:** Given the requirement to recall material from a lecture, when note-taking is not possible.
- STANDARD:** Student uses appropriate strategies to retrieve the needed information.
- ESTIMATED LESSON LENGTH:** 4 hours, 30 minutes
- INSTRUCTIONAL MATERIALS:** Student Guide containing self-paced materials and exercises. AUDIOTAPE ("Practice Exercises - Unit III, Lesson 1"). Checkpoint. AUDIOTAPE ("Checkpoint 1 - Unit III, Lesson 1").
- OTHER MEDIA AND SUPPORT MATERIALS:** Scoring key for checkpoint, scripts for audiotapes. NOTE: See page 4 for Special Instructions for using the audiotapes.
- REFERENCES:** None
- LESSON STRUCTURE:** The lesson is divided into four sections:
- Section A. Listening Carefully  
(Student Guide, p. 2)
  - Section B. Recognizing Important Points in a Lecture (Student Guide, p. 6)
  - Section C. Storing Information in Your Memory  
(Student Guide, p. 15)
  - Section D. Recalling Information from Your Memory  
(Student Guide, p. 34)

ENABLING OBJECTIVES:

Section A

- Action: Listens to and follows a series of step-by-step directions.
- Condition: Given a taped set of directions to draw various figures on a work sheet.
- Standard: Produces the required figures from oral directions.

Section B

1. Action: Identifies instructor's verbal signals of importance.  
Condition: Given a taped lecture and descriptions of verbal signals of importance.  
Standard: Identifies which signals were used.
2. Action: Identifies important information based on verbal signals of importance.  
Condition: Given a taped lecture and descriptions of verbal signals of importance.  
Standard: Identifies the most important information in the lecture.
3. Action: Uses organizers (categories) to identify important information in lectures.  
Condition: Given a taped lecture and a series of organizers (categories of important information).  
Standard: Recalls from the lecture items of information pertinent to each organizer.

### Section C

1. Action: Relates new information to information already known.  
Condition: Given two sets of information (one representing information to be learned, one representing information already learned).  
Standard: Identifies relationships between the two sets of information.
2. Action: Paraphrases statements.  
Condition: Given brief statements of procedures and general information about radio communication.  
Standard: Rewords the statements but retains all important information.
3. Action: Groups (categorizes) information.  
Condition: Given statements of detailed information about radio equipment and categories.  
Standard: Identifies items of information belonging to each category.
4. Action: Converts information into questions and answers.  
Condition: Given a passage of detailed information about radio.  
Standard: Writes several questions and answers using information in the passage.

### Section D

- Action: Recalls lecture information in response to questions.  
Condition: Given a short lecture.  
Standard: Uses the strategies taught in this lesson to recall the required information.

NOTE: Answers for some of the exercises can vary. It is difficult to have students check their answers to those Exercises. Therefore, for several of the exercises, students are directed to have the instructor check the answers. You will need only the Student Guide and the sample answers provided there to check most of those exercises.

For Exercise 7, however, you may need to refer to the script of the lecture for that exercise. (It is attached as part of the Instructor Guide.) The student is directed to convert statements from the lecture into questions and answers. Any factual statement in the lecture may be used.

#### SPECIAL INSTRUCTIONS FOR USING THE AUDIOTAPES:

In addition to the usual paper and pencil materials, this lesson uses two audiotapes of lectures. The Student Guide directs the student to ask you for the tape at the appropriate time. The tapes and when they are needed are as follows:

Practice Exercises - Unit III, Lesson 1 - Needed at the start of Section A, and in Sections B and C, but not in D.

Checkpoint 1, Form A/B - Unit III, Lesson 1 - Needed when the student starts the checkpoint.

When you give the student the first tape, make sure that he/she knows how to operate the cassette machine. Set the tape counter to zero. Point out the location of the counter to the student.

The Practice Exercises tape contains seven short lectures. Some of them the student will have to listen to more than once. The lesson directs the student to rewind the tape at the appropriate spots. STUDENTS MAY REWIND AUDIOTAPES THEMSELVES. Show the student how to rewind, stop, and restart the tape.

When the student has completed the lesson, make sure the tape is rewound to the beginning.

NOTE: Scripts of both audiotapes can be found following the checkpoint scoring key.

**TESTING:**

Checkpoint 1, Form A/B at the end of the lesson contains 10 questions measuring the terminal objective. Give the student the audiotape and the questions at the same time. Point out to the student that he/she may not look at the questions before hearing the tape. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Show the student which questions were answered incorrectly. Do <u>not</u> tell the student the correct answer, however. Have the student review the appropriate sections of this lesson. Have him/her take Checkpoint 1, Form A/B again, answering only the questions missed the first time. Score checkpoint again and explain any questions answered incorrectly. Then have the student go on to the next prescribed lesson. NOTE: There is no separate Review Exercise for this lesson.

**INSTRUCTIONAL GUIDELINES:**

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT III - LESSON 1

Scoring Key for Checkpoint 1, Form A/B

1. c
2. b
3. a
4. c
5. d
6. b
7. b
8. d
9. c
10. a

Unit III - Lesson 1

Script for Practical Exercises

LECTURE #1

Listening to and Following Step-by-Step Directions

This is the lecture for Exercise 1 for Unit III, Lesson 1. Make sure you have a pencil ready.

I will give you some directions to make certain marks on your paper. After each direction, I will pause to let you perform the action. Then I'll give the next direction, and so on. I will give each direction only once. I won't repeat any direction.

Now turn to the next page in your Student Guide.

(Pause 2 sec.)

You should see a page with the letters A through P arranged in rows and columns.

Here are the directions. Step 1, Draw a square around the Letter E.

(Pause 2 sec.)

Next, draw a square around letter C.

(Pause 2 sec.)

Next, connect G and H with a line that runs from the middle of one letter to the middle of the other letter.

(Pause 2 sec.)

Next, draw a circle around the letter L.

(Pause 2 sec.)

Next, draw a circle around the letter J.

(Pause 2 sec.)

Next, connect the circles around L and J with a line. The line should not touch the letter K.

(Pause 2 sec.)

Next, draw a circle around the letter B.

(Pause 2 sec.)

Next, draw a triangle around the letter O. Draw it with one point facing the top of the paper.

(Pause 2 sec.)

Now draw a triangle around the letter F. Draw it with one point facing the bottom of the paper.

(Pause 2 sec.)

That is all the drawing you will do. Now, turn to the next page in your Student Guide and compare what you drew on your Work Page with the Answer Sheet. Stop this tape while you do that. Turn off the tape now.

LECTURE #2

Listening to and Following Step-by-Step Directions

This is Exercise 2 for Unit III, Lesson 1. Make sure you have a pencil and a blank piece of standard 8 1/2 X 11 paper ready.

(Pause 2 sec.)

I will give you some directions to draw certain shapes on your paper. After each direction, I will pause to let you perform the action. Then I'll give the next direction, and so on. I will give each direction only once. I won't repeat any direction.

Now, first, position your blank sheet of paper so that it is vertical. That is, the way you normally position paper to write on it.

(Pause 2 sec.)

Next, draw a vertical line down the middle of the paper. Exactly in the middle, from the top to the bottom.

(Pause 3 sec.)

Next draw a horizontal line across the middle of the paper. Exactly in the middle, from left to right.

(Pause 3 sec.)

Now your paper should be divided into 4 equal sections.

Next, go to the upper left of the paper and draw a triangle. Draw it so one point is pointing to the top of the paper and make it big enough so that it just about fills the whole upper left section.

(Pause 4 sec.)

Next, draw another triangle inside the first triangle. Draw it so one point is pointing down. Make this triangle big enough so it touches the sides of the first triangle.

(Pause 5 sec.)

Next, go to the upper right section of the paper and draw a circle. Draw it big enough to just about fill the whole upper right section.

(Pause 4 sec.)

Next, inside that circle draw a square. Make the square big enough so that its corners touch the sides of the circle.

(Pause 5 sec.)

Next, go to the lower left section of the paper and draw a square that is about 1 inch on each side. Estimate how big an inch is.

(Pause 4 sec.)

Next, inside that square draw a circle. Make the circle big enough so that it touches the square.

(Pause 4 sec.)

Next, go to the lower right section of the paper. Draw a triangle. Draw it so that one point is pointing to the bottom of the paper and make it big enough so that it just about fills the whole lower right section.

(Pause 4 sec.)

Next, draw another triangle inside the first triangle. Draw it so one point is pointing up. Make it big enough so that it touches the sides of the first triangle.

(Pause 5 sec.)

That is all the drawing you will do. Now turn to the next page in your Student Guide and compare what you drew with the drawing on the answer sheet. Stop this tape while you do that. Turn off the tape now.

## LECTURE #3

### Instructors' Signals of What is Important

This is Lecture #3 for Unit III, Lesson 1.

In this exercise, I will read a short description and will use some of the signals that instructors use to let you know what information is important.

(Pause 2 sec.)

This lecture is on Radio Communications. First, I'll tell you some general information about radio communications.

You should know that radio is the principal means of communication between and within tactical units.// Radio is also used for communication between: two or more aircraft in flight, and between aircraft and ground units.

(Pause)

// Another thing is that radio communication is highly adaptable to rapidly changing conditions. Communication with highly mobile units, such as ships, aircraft, and tanks, would be extremely difficult if radio communications were not available.

(Pause)

// We'll go into radio equipment in detail later. At this point we'll just say that a radio set consists essentially of a transmitter that generates radio frequency energy. You have the radio frequency energy sent out over a transmitting antenna and picked up by a receiving antenna and a receiver that converts the radio frequency waves into audio frequency or sound.

Now, I'm going to talk about the advantages of using radio. You will need to know this, so listen carefully.

Advantage #1. Radio facilities usually can be installed quickly.

// 2. Once installed, radio equipment is ready for use and does not require reinstallation.

// 3. Radio is mobile. It can be used by units operating in the air, or the sea, and in trucks and vans.

// 4. Radio lends itself to many modes of operation, such as voice, radiotelephone, and radiotelegraph.

5. Natural obstacles, such as minefields, or lands under enemy control do not limit radio to the same extent that they limit other means of communication. For example, in radio communications, usually no wire is used between the point where information originates and the point to which information is sent. Instead, the connecting link is electromagnetic waves in space. You'll want to remember that. Electromagnetic waves in space is the connecting link between two stations--  
Electromagnetic--I'll spell it-- E L E C T R O M A G N E T I C.

6. A radio operator may be located at some distance from the set he operates through the use of remote control equipment.

Now, let me repeat those advantages quickly to make sure you have got them.

1. Radio can be installed quickly.
2. Once it is installed, it does not need reinstallation.
3. Radio is mobile--you can move it around.
4. Radio lends itself to many modes of operation.
5. Obstacles don't stop the electromagnetic waves to the same extent as with other forms of communications.
6. The radio operator can be located away from the set.//

Those are the advantages of radio. There are some disadvantages to radio too, but we'll discuss those at another time.

That is the end of the lecture for Exercise 3. Now go to your Student Guide and answer the questions for this exercise.

STOP THE TAPE NOW.

LECTURE #4 (Used in Exercise 5, Parts 1-2)

Description of the AN/TRC-24\*

This is Lecture #4 for Unit III, Lesson 1. Listen to this short lecture. Then answer the questions in your Student Guide.

This is a short description of some of the characteristics of the radio set AN/TRC-24.

All configurations of the AN/TRC-24 radio set provide for multichannel, line of sight, two-way communication in the ultra high frequency range.

The AN/TRC-24 radio sets provide 399 operating channels in the low band range and 500 channels in the high band range. Some configurations of the radio set include both bands, others include either the high band or the low band.

The AN/TRC-24 radio set is intended mainly for use as a radio link in a communication network which includes carrier telephone and teletype-writer equipment.

The major components of the AN/TRC-24 radio set are installed in cases that are used for stack mounting. All operating controls, meters, and input and output connectors are located on the front panels of the various components.

The transmitting equipment of the radio set is made up of: Transmitter, Radio T-893/GRC, Power Supply, PP-2054/GRC, and the Amplifier-Oscillator AM-1957/GRC.

[Repeat]

\* Adapted from TM 11-5820-461-12

The combination of Receiver, Radio R-1148(P)/GRC and Amplifier-Converter AM-1955/GRC makes up the receiving equipment of the radio set. I'll repeat those components of the receiving equipment. They are:

The Receiver, Radio-R-1148(P)/GRC and Amplifier-Converter AM-1955/GRC.

The Antenna AT-903/G: I'll repeat that - Antenna AT-903/G - is a directional, horn-type antenna, used for both transmitting and receiving radio frequency energy.

The power supply for the transmitter is stacked on top of the radio T-893/GRC.

The power supply for the receiving equipment is provided by a self-contained power supply located in the lower rear deck of the receiver.

Now turn off the tape and answer the questions in your Student Guide.

LECTURE #5 (Used in Exercise 7)

Listening and Paraphrasing

This is Lecture #5 for Unit III, Lesson 1. Make sure you have a pencil ready.

Listen to statement #1.

Set the circuit breaker on the TCC-7 to the ON position.  
The associated glow lamp should light.

Now stop the tape and write your paraphrase in your Student Guide.

(Pause)

Now listen to Statement #2.

One disadvantage of radio is that it is not very secure.  
The enemy can listen to your messages.

Now stop the tape and write your paraphrase in your Student Guide.

(Pause)

Now listen to statement #3.

You will need a screwdriver to make this next adjustment. Adjust the high frequency control for a zero reading on the Test Meter.

Now stop the tape and write your paraphrase in your Student Guide.

(Pause)

Now listen to statement #4.

Communication with highly mobile units, such as ships, aircraft, and tanks, would be extremely difficult if radio communications were not available.

Now stop the tape and write your paraphrase in your Student Guide.

(Pause)

Now listen to statement #5.

There are two important switches on the Test Panel: The Measure Selective switch and the Measure Non-Selective switch. I'll repeat those names: The Measure Selective switch and the Measure Non-Selective switch. Whenever one of these switches is being used, the other switch should be in the OFF position.

Now stop the tape and write your paraphrase in your Student Guide. This is the last statement for this exercise, Exercise 5. After you finish writing your paraphrase, check your answers.

STOP THE TAPE NOW.

## LECTURE #6

### Grouping

This is Lecture #6 for Unit III, Lesson 1. Listen to this short lecture. Then answer the question in your Student Guide.

The Telephone Terminal Sets\* are contained in vans which can be transported by air or ground vehicle.

Fluorescent lights are mounted on the ceiling of the van to provide primary lighting.

The POWER ENTRANCE BOX, located on the outside rear wall of the van provides receptacles for making connections to a source of power.

The POWER DISTRIBUTION PANEL, located on the inside rear wall of the van, distributes power to the lights and equipment in the van.

The POWER ENTRANCE BOX also contains binding posts for connecting intercom lines to the van.

The SIGNAL ENTRANCE BOX is also located on the outside rear wall of the van. It provides receptacles for connecting telephone lines.

The main purpose of the Telephone Terminal Sets is to: Transmit or send messages over cable.

Now turn off the tape and answer the question in your Student Guide.

After you have answered the question, you will be directed to  
rewind the tape to the start of this exercise and listen to it again.

STOP THE TAPE NOW.

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\* Information is taken from TM 11-5805-358-14-2, Terminal Sets,  
Telephone, AN/TCC-60, and AN/TCC-69.

LECTURE #7 (Used in Exercise 11)

Making Up Questions

This is Lecture #7 for Unit III, Lesson 1. Listen to this short lecture. Then answer the question in your Student Guide. This lecture should sound familiar. You heard it earlier when you did Exercise 5.

This is a short description of some of the characteristics of the radio set AN/TRC-24.

All configurations of the AN/TRC-24 radio set provide for multichannel, line of sight, two-way communication in the ultra high frequency range.

The AN/TRC-24 radio sets provide 399 operating channels in the low band range and 500 channels in the high band range. Some configurations of the radio set include both bands, others include either the high band or the low band.

The AN/TRC-24 radio set is intended *mainly for use as a radio link* in a communication network which includes carrier telephone and teletype-writer equipment.

The major components of the AN/TRC-24 radio set are installed in cases that are used for stack mounting. All operating controls, meters, and input and output connectors are located on the front panels of the various components.

The transmitting equipment of the radio set is made up of: Transmitter, Radio T-893/GRC, Power Supply, PP-2054/GRC, and the Amplifier-Oscillator AM-1957/GRC.

[Repeat]

The combination of Receiver, Radio R-1148(P)/GRC with Amplifier-Converter AM-1955/GRC makes up the receiving equipment of the radio set. I'll repeat those components of the receiving equipment. They are:

The Receiver, the Radio-R-1148(P)/GRC, and the Amplifier-Converter AM-1955/GRC.  
set.

The Antenna AT-903/G. I'll repeat that - Antenna AT-903/G - is a directional, horn-type antenna, used for both transmitting and receiving radio frequency energy.

The power supply for the transmitter is stacked on top of the radio T-893/GRC.

The power supply for the receiving equipment is provided by a self-contained power supply located in the lower rear deck of the receiver.

Now turn off the tape and answer the questions in your Student Guide.

## UNIT III - LESSON 1

### Script for Checkpoint 1, Form A/B

#### LECTURE #1

A river crossing is a very difficult operation. This lecture will cover points which require special attention for success of a tactical river crossing at night. We will discuss 3 major points; 1) the advantages of a night river crossing, 2) points to consider about lighting when crossing a river under blackout conditions, and 3) the disadvantages of a night river crossing.

First we will discuss the advantages of a night river crossing.

There are several reasons why you might want to cross a river at night. One is to surprise the enemy. Another is to keep an attack going--to follow the enemy. A third is when the enemy has air superiority over the crossing area, or there is open land by the river so that you could be easily attacked while crossing during daylight.

(pause 1 sec)

Next we will discuss point 2, lighting considerations under blackout conditions.

The best natural light condition is a quarter-moon behind your units. A moon behind you lights the terrain in front of you. It also reduces the enemy's ability to see your attack.

To aid soldiers in night river crossings, several night vision devices are available. Two examples are: infrared binoculars, and starlight scopes.

Artificial light can be used. However, the use of artificial lighting must be carefully timed in order to prevent discovery. Artificial lighting aids include flashlights and vehicle lights.

(pause 1 sec)

Finally, our third point, the disadvantages of night river crossings. We have said that surprise may be gained by night crossings. There are, however, some disadvantages to making a night river crossing. There is more confusion in crossing a river at night. Also, night river crossings are less efficient. Night crossings require more control and coordination for effective movement. Extra measures must be taken to prevent vehicle accidents. Preparing the site and assembling rafts and bridges require more time at night.

(pause 1 sec)

When making a decision on whether to cross at night, commanders in charge of river crossing operations must weigh the advantage of surprise against the disadvantages of reduced speed and the need for extra controls.

In this lecture we discussed: first, the advantages of a night river crossing; second, some lighting considerations under blackout conditions; and third, the disadvantages of a night river crossing.

That is the end of the lecture.

Stop the tape and answer the questions on the Checkpoint.

UNIT III - LESSON 1

Script for Checkpoint 1, Form A/B

Lecture 2\*

This lecture is on the procedure for adjusting the Transmitter Amplifier Gain on the PQT-37 telephone terminal.

You will be working with 3 different panels: the Test Panel, the Subgroup Panel, and Modem 2.

First, on the TEST PANEL, set the MEASURE SELECTIVE switch to the 37 KC position.

Then, on MODEM 2, set the Channel 2 SEND-MEASURE switch to the SEND position.

The next step is to check the FINE TUNE adjustment on the TEST PANEL.

The test meter should show the maximum right-hand deflection all the way to the right.

The next step is to slide the SUBGROUP PANEL forward in the mounting rack. This is necessary to reach the ...

... TRANSMITTER AMPLIFIER GAIN control. Using a screwdriver, turn the control until ...

... you get a reading of zero on the test meter.

Then secure the SUBGROUP PANEL back in its mounting rack.

Now, go to the Test Panel and reset the MEASURE SELECTIVE switch to OFF.

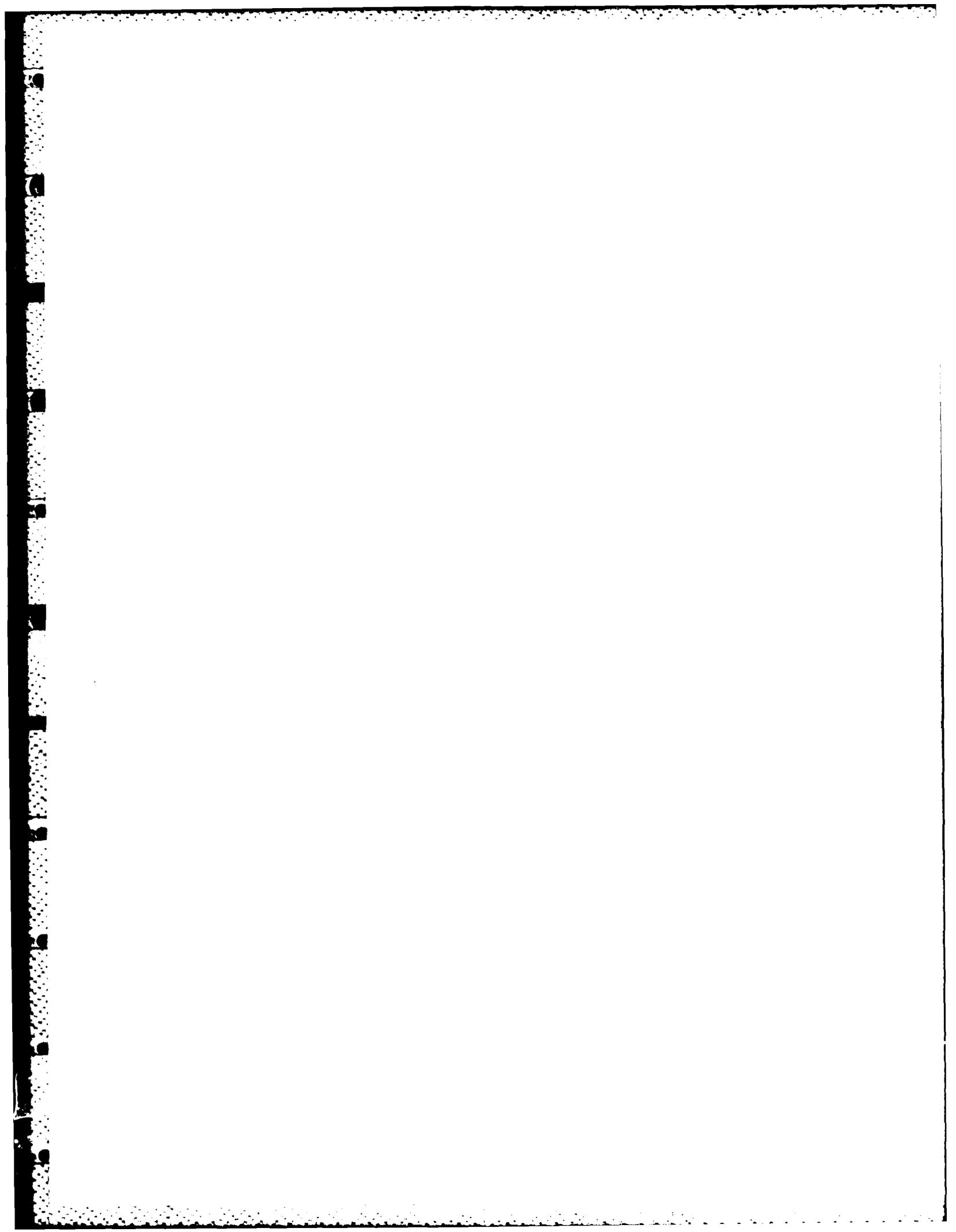
Finally, remove the TEST PANEL measure cord plug from the TRANSMITTER AMPLIFIER OUT jack which is on the GROUP PANEL.

This completes the TRANSMITTER AMPLIFIER GAIN adjustment for the PQT-37 telephone terminal.

Stop the tape and answer the questions on the Checkpoint.

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\* Adapted from the Unit IV, Lesson 2 Post-test video script.



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INSTRUCTOR GUIDE

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UNIT III. LISTENING SKILLS

Lesson 2. Remembering Information Seen in Demonstrations

- TERMINAL OBJECTIVE: Uses retrieval strategies to recall demonstration information for response to questions on performance of steps.
- CONDITION: Given a demonstration and the requirement to recall steps in the procedure and other information in the demonstration, when note-taking is not possible.
- STANDARD: Student uses appropriate strategies to retrieve the required information and answer the questions.
- ESTIMATED LESSON LENGTH: 3 hours
- INSTRUCTIONAL MATERIAL: Student Guide containing self-paced materials, exercises. VIDEOTAPE ("Practice Exercises - Unit III, Lesson 2"). Checkpoint. VIDEOTAPE ("Checkpoint 1 - Unit III, Lesson 2")
- OTHER MEDIA AND Scoring key for checkpoint. Outlines of videotape scripts. NOTE: See page 3 for Special Instructions.
- REFERENCES: The demonstrations shown in the videotapes are of selected procedures in operating the AN/TCC-7.
- LESSON STRUCTURE: The lesson is divided into three sections:
- Section A. Selecting and Organizing What to Remember (Student Guide, p. 2)
  - Section B. Storing Information in Your Memory (Student Guide, p. 9)
  - Section C. Recalling Information from Your Memory (Student Guide, p. 23)

ENABLING OBJECTIVES:

Section A

1. Action: Identifies instances of specified types of statements.  
Condition: Given a videotaped demonstration (which the student may repeat).  
Standard: Identifies instances of the following types of statements:
  - . Purpose of procedure
  - . Names of switches, meters, jacks, etc.
  - . Locations of switches, meters, jacks, etc.
  - . Actions performed
  - . Order of steps (actions) in the procedure
  - . Indications when a step is done correctly

Section B

1. Action: Visualizes location of switches, meters, etc.  
Condition: Given a videotaped demonstration (which the student may repeat).  
Standard: Indicates on blank diagrams, locations of specified switches, meters, etc. Or labels parts of a diagram corresponding to the equipment demonstrated. Or indicates where on the equipment front panel the procedure starts and where it ends.
2. Action: Organizes information presented in a demonstration into related categories.  
Condition: Given a videotaped demonstration (which the student may repeat), statements from the demonstration and category headings.  
Standard: Arranges statements under appropriate headings.
3. Action: Paraphrases information presented in a demonstration.  
Condition: Given a videotaped demonstration (which the student may repeat) and statements from the demonstration.  
Standard: Rephrases statements into his/her own words.

4. Action: Selects most appropriate memorizing strategy for a situation.
- Condition: Given examples of four or five different learning situations (e.g., procedure; factual information; lists of dials, switches, etc.).
- Standard: Selects the memorizing strategy recommended for the given situation.

### Section C

- Action: Selects the most appropriate recall strategy for a situation.
- Condition: Given examples of information students have already memorized in this lesson.
- Standard: States the appropriate recall strategy.

### SPECIAL INSTRUCTIONS FOR USING THE VIDEOTAPES:

In addition to the usual paper and pencil materials, this lesson uses two videotapes of demonstrations. The Student Guide directs the student to ask you for the tapes at the appropriate time. The two videotapes and when they are needed are as follows:

Practice Exercise - Unit III, Lesson 2 - Needed first in Section A, on page 4, and in Section B, but not in Section C.

Checkpoint 1, Form A/B - Unit III, Lesson 2 - Needed when the student starts the checkpoint.

When you give the student the videotape, make sure he/she knows how to stop and start the tape player. Since students may need to watch a demonstration more than once, it is especially important that they know how to rewind the videotape without damaging it. After demonstrating how to rewind, supervise the students the first time they do it on their own. Show the students where the counter is located. The machine will automatically rewind the tape for a short distance, so when the tape is started again, the last few seconds the student saw will be repeated.

When the student has completed the lesson, make sure the tape has been rewound to the beginning so it will be ready for the next student.

NOTE: Outlines of the scripts of both videotapes can be found following the Checkpoint Scoring Key.

**TESTING:**

Checkpoint 1, Form A/B at the end of the lesson contains 10 questions measuring the terminal objective. Give the student the videotape and the questions at the same time. Point out to the student that he/she may not look at the questions before viewing the tape. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Have the student review the appropriate section(s) of this lesson. Then re-administer Checkpoint 1, Form A/B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT III - LESSON 2

Scoring Key for Checkpoint 1, Form A/B

1. a
2. c
3. d
4. b
5. d
6. a
7. c
8. b
9. d
10. b

UNIT III - LESSON 2

Outline of Script for Videotape

"Practice Exercises - Unit III, Lesson 2"

Topic: Procedures (3) in the Transmit Line-Ups for the AN/TCC-7 Telephone Terminal.

- I. Making the 200 Volt Control Adjustment on the PP-827, Power Supply
  1. Location of PP-827, Power Supply.
  2. Set 115 Volt AC Power switch on PP-827 to ON position.
    - a. Alarm sounds.
    - b. After a few seconds, Alarm stops.
  3. On the Test Panel, set Measure switch to the 200 Volt Adjust position.
  4. On the Test Panel, make sure both the Measure Selective switch and Measure Non-Selective switch are OFF.
  5. On the Power Supply, use a screwdriver to adjust the 200 Volt Control Adjust.
    - a. Turn the control slowly clockwise.
    - b. Keep turning until Test Meter (on the Test Panel) reads zero.
  6. On the Test Panel, return the Measure switch to Transmission position.

FADEOUT

## II. Setting the 1 kilocycle (KC) control.

1. 1 KC control located inside the Test Panel.
2. Slide Test Panel forward on mounting rack for access to internal controls.
3. Set Measure Non-Selective switch to Check 1 KC position.
4. Connect Test Panel [measure cord] plug into the 1 KC jack at the bottom left of the panel.
5. Use a screwdriver to adjust the 1 KC control.
  - a. Adjust the internal [1 KC] control until Test Meter reads zero.
  - b. You may have to turn the 1 KC control either clockwise or counterclockwise.
6. Push Test Panel back into place in the mounting rack.

FADEOUT

## III. Checking the High Frequency (HF) Control

1. [On the Test Panel] set the Measure Non-Selective switch to the Check HF position.
2. Put the measure cord plug into the HF jack.
3. Use a screwdriver to adjust the HF control.
  - a. Turn the HF control until the [Test] Meter reads zero.
  - b. You may have to turn the [HF] control either left or right.
4. Set the Measure Non-Selective switch to OFF.

## UNIT III - LESSON 2

### Outline of Script for Videotape

#### "Checkpoint 1 - Unit III, Lesson 2"

Topic: Presetting the Test Panel and Carrier Supply Panel of the AN/TCC-7 Telephone Terminal.

#### I. Test Panel

1. Slide Test Panel forward in rack for access for internal adjustments.
2. Use a screwdriver to adjust the High Frequency (HF) control.
  - a. HF control is located in the lower left-hand corner of the Test Panel.
  - b. Turn the HF control to the full counterclockwise position.
  - c. Then turn the HF control three-quarters of a turn clockwise.
3. Use a screwdriver to adjust the 65 kilocycle (KC) Transmit control on the inside of the Test Panel.
  - a. Turn the 65 KC Transmit Control to the full counterclockwise position.
  - b. Then turn the control three-quarters of a turn clockwise. (Like the HF control.)
4. Adjust the 1 Kilocycle (KC) control located next to the 65 KC control.
  - a. Set the 1 KC control three-quarters of a turn from the full counterclockwise position.
5. Push Test Panel back into position in mounting rack.
6. Connect the [measure cord] plug jack into the Channel Out jack.

FADEOUT

## II. Carrier Supply Panel

1. Slide Carrier Supply Panel forward for access to internal controls.
2. Start at the left of the panel. Set the 68 Kilocycle (KC) alarm Cutoff switch to OFF.
3. Turn the 120 KC Alarm Cutoff switch to OFF.
4. Set the 12 and 28 Send switch to OFF.
5. Set the Carrier Sync switch to the Local (or down) position.
6. Use a screwdriver to adjust the 12 KC control.
  - a. Turn the 12 KC control to the full counterclockwise position.
  - b. Then turn the control three-quarters of a turn clockwise.
7. Use a screwdriver to adjust the 28 KC control.
  - a. Set the 28 KC control at three-quarters of a turn from the full counterclockwise position.
8. Use a screwdriver to adjust the 68 KC control, which is located inside the Carrier Supply Panel.
  - a. Set the 68 KC control at three-quarters of a turn from the full counterclockwise position.
9. Push the Carrier Supply Panel back in the mounting rack.

FADEOUT

UNIT III - LESSON 2

Outline of Script for Videotape

Post-test or Checkpoint 1, Form B

- I. Transmit Line-up for AN/TCC-7.
  - A. Adjusting the Gain Control.
    1. Go to Test Panel.
    2. Set Measure Selective switch to Check Gain position.
    3. Slowly adjust Fine Tune Control.
      - a. You should get a maximum right-hand deflection on the Test Meter. (That means indicator needle on meter should be as far right as possible.)
    4. Use screwdriver to adjust the Gain Control.
      - a. Turn Gain Control until the indicator on the Test Meter goes to zero.
    5. Remove the measure cord plug from the HF jack.
    6. Reset Measure Selective switch to OFF.

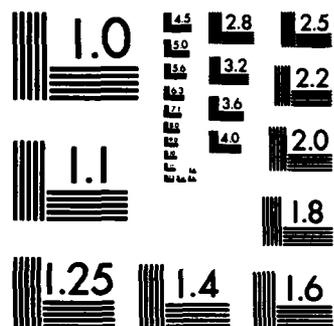
FADEOUT

- B. Adjusting the Orderwire Transmitter Amplifier Output.
  1. Set the Measure Non-Selective switch to the Orderwire Transmitter Amplifier Out position.
  2. Connect the Test Panel measure cord to the Transmitter Amplifier Out jack on the Orderwire Panel.
  3. Slide the Orderwire Panel forward to get at inside controls.

4. On the Test Panel, press and hold the attenuator [instructor pronounces it antenuator] 10 and 20 dB (decibel) push buttons.
  - a. While holding the buttons, do the next 3 steps.
5. On the orderwire Panel, set the Send Orderwire switch to ON.
6. With a screwdriver, adjust the Transmitter Gain Control.
  - a. This control is on the inside of the Orderwire Panel.
  - b. Turn the control clockwise.
  - c. Turn until the Test Meter on the Test Panel reads +5.
7. Reset the Send Orderwire switch to OFF.
8. Release the attenuator buttons.
9. Push the Orderwire Panel back into position.
10. Reset Measure Non-Selective switch to OFF.

FADEOUT





MICROCOPY RESOLUTION TEST CHART  
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INSTRUCTOR GUIDE

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UNIT III. LISTENING SKILLS

Lesson 3. Recognizing When Important Information Is Missing

**TERMINAL OBJECTIVE:** Uses controlling strategies to recognize a deficiency in a lecture or demonstration or in listening which warrants a request for clarification.

**CONDITION:** Given a lecture or demonstration.

**STANDARD:** Student identifies an item of information missing, yet needed for complete understanding.

**ESTIMATED LESSON LENGTH:** 1 hour, 45 minutes

**INSTRUCTIONAL MATERIAL:** Student Guide containing self-paced materials and exercises. AUDIOTAPE ("Practice Exercise 1 - UNIT III, Lesson 3"), VIDEOTAPE ("Practice Exercise 2 - Unit III, Lesson 3"). Checkpoint. VIDEOTAPE ("Checkpoint 1 - Unit III, Lesson 3")

**OTHER MEDIA AND SUPPORT MATERIALS:** Scoring key for checkpoint, script for audiotape, outlines of videotape scripts. NOTE: See page 2 for Special Instructions for using the tapes.

**REFERENCES:** None

**LESSON STRUCTURE:** The lesson is divided into three sections:

Section A. How to Tell When Information Is Missing  
(Student Guide, p. 2)

Section B. Practice in Listening for Missing Information (Student Guide, p. 8)

Section C. Practice in Watching for Missing Information (Student Guide, p. 14)

**ENABLING OBJECTIVES:**

**Section A**

- Action:** Identifies gaps in information which need to be filled.
- Condition:** Given statements of procedures, some of which contain gaps in information (i.e., essential information is missing).
- Standard:** Identifies the statements which contain gaps and identifies the missing information.

**Section B**

- Action:** Identifies gaps in information which need to be filled.
- Condition:** Given a series of brief audiotaped lectures, some of which contain gaps in information.
- Standard:** Identifies the lectures which contain gaps and identifies the missing information.

**Section C**

- Action:** Identifies gaps in information which need to be filled.
- Condition:** Given a series of brief videotaped demonstrations, some of which contain gaps in information.
- Standard:** Identifies the demonstrations which contain gaps and identifies the missing information.

**SPECIAL INSTRUCTIONS FOR USING THE AUDIO AND VIDEO TAPES:**

In addition to the usual paper and pencil materials, this lesson uses one audiotape of lectures and two videotapes of demonstrations. The Student Guide directs the student to ask you for the tapes at the appropriate time. Tapes and when they are used are as follows:

- Practice Exercise I - Unit III, Lesson 3 (audio) - Needed in Section B.
- Practice Exercise II - Unit III, Lesson 3 (video) - Needed in Section C.
- Checkpoint 1, Form A/B - Unit III, Lesson 3 (video) - Needed when the student starts the Checkpoint.

When you give the student the audiotape, make sure he/she knows how to operate the cassette machine. The student may need to listen to parts of the tape more than once. **STUDENTS MAY REWIND AUDIOTAPES.** Make sure the student knows how to rewind, stop, and restart the audiotape. Set the tape counter to zero before the student begins. Point out the location of the tape counter to the student.

When the student has completed use of the audiotape, make sure that it is rewound to the beginning and ready for the next student.

When you give the student the videotape, make sure he/she knows how to stop and start the tape player. Since students may need to watch a demonstration more than once, it is especially important that they know how to rewind the videotape without damaging it. After demonstrating how to rewind, supervise the students the first time they do it on their own. Show the students where the counter is located. The machine will automatically rewind the tape for a short distance, so when the tape is started again, the last few seconds the student saw will be repeated.

When the student has completed the lesson, rewind the tape to the beginning so it will be ready for the next student.

**NOTE:** The script for the audiotape and outlines of the scripts for both videotapes can be found following the Checkpoint Scoring Key.

**TESTING:**

Checkpoint 1, Form A/B at the end of the lesson contains 10 questions measuring the terminal objective. Give the student the videotape and the questions at the same time. Point out to the student that he/she may not look at the questions before viewing the tape. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.

7 or less correct    Have the student review the appropriate section(s) of this lesson. Then re-administer checkpoint 1, Form A/B. Score checkpoint again when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

**UNIT III - LESSON 3**

**Scoring Key for Checkpoint 1, Form A/B**

1. c
2. d
3. b
4. c
5. c
6. d
7. a
8. d
9. d
10. d

Unit III, Lesson 3

Practice Exercises I (Section B)

This is the tape for Practice Exercises I for Unit III, Lesson 3. This is Lecture 1.

I am going to read some instructions. Listen carefully to each step. I will say each step twice.

Your sergeant gives you these instructions for starting a generator, which you have never seen before.

Step 1. Place the circuit breaker in the off position.

[Repeat]

Step 2. Place the remote-local switch in the local position.

[Repeat]

Step 3. Turn the voltage adjusting knob all the way to the left.

[Repeat]

Step 4. Set the voltage selector switch to the correct setting.

[Repeat]

Step 5. Pull the choke control all the way out.

[Repeat]

Step 6. Press the start-stop switch to start until the engine starts, then release.

[Repeat]

Now stop the tape and go to your Student Guide. Answer the questions there.

Script for Unit III, Lesson 3 Practice Exercises I (Section B)

This is Lecture 2 for Unit III, Lesson 3.

I am going to read some instructions. Listen carefully to each step. I will say each step twice.

These are the directions for loading a roll of paper in a teletype machine.

Step 1. Place the roll of paper on the spindle.

[Repeat]

Step 2. Unroll about one foot of paper by pulling on the loose end.

[Repeat]

Step 3. Take hold of the loose end of the paper. Fold the corners toward each other to make a point.

[Repeat]

Step 4. Go to the handle at the left of the platen. Pull the handle all the way toward you.

[Repeat]

Step 5. Push the point of the paper into the slot behind the platen.

[Repeat]

Step 6. Grasp the point of the paper as it comes through the other side of the slot and pull about 6 inches of paper through the slot.

[Repeat]

Now stop the tape and go to your Student Guide. Answer the questions there.

Script for Unit III, Lesson 3 Practice Exercises I (Section B)

This is Lecture 3 for Unit III, Lesson 3.

I am going to read some instructions. Listen carefully to each step. I will say each step only once.

- Step 1. Set the circuit breaker to the ON position.  
The indicator light should come on.
- Step 2. Set the power switch to the ON position. The alarm will sound.
- Step 3. Wait several seconds and the alarm should go off. If the alarm does not stop, turn the alarm cut-off switch toward the indicator light. That will turn off the alarm. Then continue with the adjustment.
- Step 4. Set the Measure switch to the 150 Volt position.
- Step 5. Turn the 150 Volt adjust control clockwise until the test meter reads zero.
- Step 6. Return the Measure switch to the vertical position.

Now stop the tape and go to your Student Guide. Answer the questions there.

**Script for Unit III, Lesson 3 Practice Exercises I (Section B)**

**This is Lecture 4 for Unit III, Lesson 3.**

**I am going to read some instructions. Listen carefully to each step. I will say each step only once.**

**The following procedure provides adjustment of the passage of the 1 kilocycle and the 68 kilocycle signals through the transmitter.**

- Step 1. Request the distant terminal to send a 1 kilocycle test signal.**
- Step 2. Set the Transmitter multimeter selector switch to the 1 KC (or kilocycle) IN position. Then set the multimeter selector switch to the 68 KC IN position. The multimeter should read in the green area for both settings of the switch.**
- Step 3. If necessary, adjust the INPUT level control.**
- Step 4. Go back to the transmitter multimeter selector switch and put it in the 1 KC MOD position. Then put it in the 68 KC MOD position. The multimeter should read in the green area for both positions.**

**Now stop the tape and go to your Student Guide. Answer the questions there.**

UNIT III - LESSON 3

Outline of Script for Videotape

"Practice Exercise II - Unit III, Lesson 3" (Section C)

Topic: Procedures (5) on the AN/TRC-24 radio set.

I. Doing the Supply Voltage Check on the AN/TRC-24.

1. Go to the Power Supply. Turn the 115 Volt AC switch to the ON position.
2. Check the supply voltage on the AC Volt meter.

[Omitted information: What the meter reading should be.]

FADEOUT

II. Setting the Low Power Alarm on the AN/TRC-24.

1. Go to the transmitter. Set the Test switch to the Forward Power position.
2. Adjust the Plate Control until the Test Meter reads about 10.
3. Use a screwdriver to set the Threshold Adjust control.
  - a. Turn the Control Counter clockwise.

[Omitted information: Stop adjusting the control when the indicator lamp lights. The light comes on but the instructor doesn't mention it.]

4. Readjust the Plate control until the Test Meter shows a maximum reading again.

FADEOUT

III. Doing the RF Channel Tuning for the nearest Unit channel.

1. The piece of equipment being used is the AN/TRC-24 transmitter.
2. Set the Crystal Select switch to the Unit channel position.
3. Turn the Radio Frequency Channel Tune control.

[Omitted information: Which direction to turn the control.]

- a. The channel is tuned correctly when you get a zero reading on the Frequency Drift meter and a maximum reading on the Measure meter.
4. Turn the Lock control.
    - a. Turn it clockwise to lock the RF Channel Control in place.

FADEOUT

IV. The B Band tuning procedure on an AN/TRC-24 transmitter.

1. Put the Test Switch in the Forward Power position.
2. Adjust the Plate Control.
  - a. Turn it until you get a maximum reading on the Test meter.
3. Adjust the Amplifier Output Coupling control.
  - a. Turn it until you get a maximum reading on the Test meter.
4. Repeat steps 2 and 3 until you no longer get a maximum reading on the Test meter.

[Omitted information: None]

FADEOUT

V. Making the high voltage adjustment on the AN/TRC-24 Power Supply.

1. Go to the Power Supply. Set the 750 Volt Adjust switch to position 2.
2. Set the DC Test switch to the 750 Lower Scale position.
3. Turn the 750 Volt DC switch to ON. [The voltmeter needle moves, but the instructor doesn't mention it.]

[Omitted information: What the reading on the voltmeter should be.]

4. Reset the DC Test switch to the 275 Lower Scale position.

FADEOUT

UNIT III - LESSON 3

Outline of Script for Videotape

"Checkpoint 1 - Unit III, Lesson 3"

Topic: Procedures (5) on the AN/TRC-24 radio set.

- I. Modulator Adjustment for the AN/TRC-24 Transmitter.
  1. Set the Measure Switch to the Mod Adjust position.
  2. Use a screwdriver to adjust the Mod Adjust control.
    - a. Turn it until the Measure meter reads zero.
    - b. Location of Measure meter.
  3. Hold the Meter Sensitivity switch in the Increase position.
  4. [While doing Step 3] Use a screwdriver to adjust the Mod Trim control.  
[Omitted information: Which direction to turn the control.]
    - a. Turn it until you get a maximum reading on the Measure meter.
  5. [Instructor releases the Meter Sensitivity switch, but does not describe this step.]
  6. Readjust the Mod Adjust control for a reading on the Measure meter.  
[Omitted information: What the reading on the Measure meter should be.]

FADEOUT

## II. Presetting the AN/TRC Power Supply.

1. Set the 750 Volt Adju. switch at position 1.
2. Set the 115 Volt AC switch to the OFF position.
3. Go to the right. Set the DC Test switch to the 150 Volt Upper Scale position.
4. Go to the left and down. Check the 150 Volt DC switch: It should be in the OFF position.
5. To the right is the 150 Volt control.

[Omitted information: What to do with this control.]

6. Go to the right. Set the 750 Volt DC switch in the OFF position.

### FADEOUT

## III. Tuning the RF Channel Tune control for the nearest Decade Channel on the AN/TRC-24 Transmitter.

1. Rotate the RF Channel tune control back and forth about the Decade Channel.
  - a. In this case, the Decade Channel is 141.
  - b. The Unit Channel is 137.
  - c. Continue to rotate the control until you get a zero reading on the Frequency Drift meter and a maximum reading on the Measure meter.
2. Adjust the Indicator Control so the assigned Decade Channel is under the Indicator.
3. Check the Frequency Drift meter to make sure it has not drifted from zero.
  - a. If it has drifted away from zero, repeat above 2 steps.

[Omitted information: No procedural information omitted. Explanation of difference between Decade Channel and Unit Channel is omitted.]

### FADEOUT

**IV Making the Preliminary High Voltage Adjustment on the AN/TRC-24 Power Supply.**

1. Go to the Power Supply. Set the 750 Volt Adjust switch to position 1.
2. Set the DC Test switch to the 750 Volt Lower Scale position.
3. Turn the 750 Volt DC switch to ON.
4. Check the [DC Volt] meter.

[Omitted information: Name of the meter. What the meter reading should be.]

5. Return the DC Test switch to the 275 Lower Scale position.

**FADEOUT**

**V. Doing the AFC Check on the AN/TRC-24 transmitter.**

1. Go to the transmitter. Turn the AFC switch to the ON position.
2. Turn the AFC control to the +4 mark.
  - a. Notice that the Frequency Drift meter moves to the right of the zero mark.
3. Release the [AFC] control.
  - a. Notice that the [Frequency Drift] meter returns to zero.
4. Turn the AFC control to the -4 mark
  - a. Notice that the Frequency Drift meter moves to the left of the zero mark
5. Release the AFC control
  - a. It will automatically return to the zero position

[Omitted Information: None]

**FADEOUT**

UNIT III - LESSON 3

Outline of Script for Videotape

Post-test or Checkpoint 1, Form B

- I. Doing the RF Channel tuning for the nearest unit channel of the AN/TRC-24 Transmitter.
  1. Set the crystal select switch to the Unit channel position.
  2. Turn the Radio Frequency Channel tune control.

[Omitted information: Which direction to turn the control.]

    - a. Turn until you get a zero reading on the Frequency Drift meter and a maximum reading on the Measure meter.
  3. Turn the lock control.
    - a. Turn it clockwise to lock the RF Channel control in place.

FADEOUT

- II. Doing the Mod adjustment for the AN/TRC-24 Transmitter.
  1. Set the Measure switch to the Mod adjust position.
  2. Use a screwdriver to adjust the Mod adjust control.
    - a. Turn it until the Measure meter reads zero.
  3. Hold the meter sensitivity switch in the Increase position.
  4. [While doing step 3] Use a screwdriver to adjust the Mod Trim control.

[Omitted information: Which direction to turn the control.]

    - a. Turn the control until you get a maximum reading on the Measure meter.

5. [Instructor releases meter sensitivity switch but does not describe this step.]
6. Readjust the Mod adjust control for a reading on the Measure meter.

[Omitted information: What the reading should be.]

**FADEOUT**

**III. Tuning the RF Channel Tune control for the nearest Decade Channel on the AN/TRC-24 Transmitter.**

1. Rotate the RF Channel Tune control back and forth about the Decade Channel.
  - a. In this case, the Decade Channel is 141.
  - b. The Unit channel is 137.
  - c. Continue to rotate the control until you get a zero reading on the Frequency Drift meter and a maximum reading on the Measure meter.
2. Adjust the Indicator control so the assigned Decade Channel is under the Indicator.
3. Check the Frequency Drift meter, to make sure it has not drifted from zero.
  - a. If it has drifted from zero, repeat the above 2 steps.

[Omitted information: No procedural information omitted. Explanation of difference between Decade Channel and Unit channel is omitted.]

**FADEOUT**

IV. Making the high voltage adjustment on the AN/TRC-24 Power Supply.

1. Go to the Power Supply. Set the 750 Volt Adjust switch to position 2.
2. Set the DC Test switch to the 750 Lower Scale position.
3. Turn the 750 Volt DC switch to ON. [The voltmeter needle moves, but the instructor doesn't mention it.]  
  
[Omitted information: What the reading on the voltmeter should be.]
4. Reset the DC Test switch to the 275 Lower Scale position.

FADEOUT

V. Features of the Kodak Ektagraphic Slide Projector, Model AF-2.

1. Called a carousel projector.
2. The round carousel tray holds up to 40 slides.
  - a. Standard 2 x 2 inch cardboard or plastic mounts.
  - b. 35mm slides are most common.
3. Automatic timer permits automatic slide advance or manual.
4. Projector can be connected to an audiotape player, which will synchronize slides and sound.
5. Projector can show film strips with the addition of a film strip adapter.
6. Projector can be operated by remote control by plugging unit [shown] into receptacle at back of projector [shown].
7. Power selector switch:
  - a. 4 settings: OFF, FAN, LOW, HIGH.
  - b. When switch is at FAN, the fan operates but not the light.
  - c. This setting is for cooling the bulb after use.
  - d. This setting is also used with something called the dissolve control.

[Omitted information: How the dissolve control is used. What it is.]
8. The various settings of the automatic timer.

## Introduction to Unit IV

### Note-Taking for Demonstration

The purpose of Unit IV is to give students some guidelines for note-taking and to provide practice in taking notes on demonstrations similar to those they will see in the 3IM course.

Unit IV has three lessons. Lesson 1, Basic Note-Taking Skills, explains some basic note-taking strategies, then provides practice in taking notes on videotaped demonstrations. These demonstrations cover such topics as capabilities of the equipment, location and function of the parts. Lesson 2, Taking Notes to Show Sequence, emphasizes the importance of listing steps in the right sequence, and of indicating where inserted material belongs. The students practice taking notes on videotaped demonstrations showing procedures with a series of steps. Lesson 3, Taking Notes to Show Relationships, teaches strategies for showing main ideas and supporting detail. Again, videotaped demonstrations are used to provide practice in note-taking.

Each lesson in Unit IV contains a Student Guide, videotaped demonstrations to be used for practice exercises, and a checkpoint which measures attainment of the terminal objective. The checkpoint consists of a videotaped demonstration and a set of questions the student must answer using his/her notes. The alternate form of the checkpoint consists of another set of questions based on the same videotaped demonstration. The Instructor Guide for each lesson includes the scoring key for the checkpoint, with instructions on what to do if the student performs poorly on the checkpoint.

In addition, the practice exercises in Lesson 2 make use of sets of captioned photos based on the demonstrations, which the student is to arrange in the right order. The Instructor Guide contains alternate written forms of these exercises to be used if the card sets are not available.

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INSTRUCTOR GUIDE

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UNIT IV. NOTE-TAKING FOR DEMONSTRATION

Lesson 1. Basic Note-Taking Skills

**TERMINAL OBJECTIVE:** Takes notes and subsequently uses the notes to answer questions about the equipment.

**CONDITION:** Given a demonstration introducing a piece of equipment, and including information such as capabilities of the equipment, location and function of the parts, etc.

**STANDARD:** Notes include all important information and are comprehensible to the note-taker.

**ESTIMATED LESSON LENGTH:** 3 hours, 30 minutes

**INSTRUCTIONAL MATERIALS:** Student Guide containing self-paced materials and exercises. Videotaped demonstrations.

**OTHER MEDIA AND SUPPORT MATERIALS:** Video cassette player.  
Videotapes: Practical Exercises, Checkpoint 1

**REFERENCES:** None

**LESSON STRUCTURE:** The lesson is divided into five sections.

Section A. Recognizing Important Information  
(Student Guide, p. 3)

Section B. Writing Brief but Complete Notes  
(Student Guide, p. 5)

Section C. Using Common Abbreviations and Symbols  
(Student Guide, p. 7)

Section D. Indication Omissions and Questions  
(Student Guide, p. 11)

Section E. Taking Notes on Videotaped Demonstrations (Student Guide, p. 20)

**ENABLING OBJECTIVES:**

**Section A**

- Action:** Recognizes material that should and should not be included in notes.
- Condition:** Given a transcript of a demonstration.
- Standard:** Crosses out material that is not related to the performance of the task; underlines verbal markers that point to important information.

**Section B**

- Action:** Writes notes in "telegraphic" style.
- Condition:** Given a transcript of a demonstration.
- Standard:** Rewrites the material, leaving out unimportant words and using phrases rather than sentences.

**Section C**

- Action:** Uses common abbreviations and symbols.
- Condition:** Given a transcript of a demonstration, and a list of common abbreviations and symbols.
- Standard:** Rewrites the material, using abbreviations and symbols correctly.

**Section D**

- Action:** Indicates omissions in notes and questions about notes.
- Condition:** Given a transcript of a demonstration, a set of notes on the demonstration (with space left for missing information), and a page from the Soldier's Manual covering the same material.
- Standard:** Fills in the missing information; marks notes with a question mark where the information conflicts with the Soldier's Manual; writes out any questions the student should ask the instructor.

## Section E

- Action:** Takes notes that show all the important information included in the demonstration.
- Condition:** Given a videotaped demonstration showing capabilities of a piece of equipment and/or location and function of parts, instructions to take notes on the demonstration, and a set of questions based on the demonstration.
- Standard:** Correctly answers questions about the demonstration, referring only to the notes.

### SPECIAL INSTRUCTIONS FOR PRACTICE EXERCISES:

In addition to the usual paper and pencil materials, this lesson uses videotaped demonstrations. You will be responsible for giving the student the tape for the practice exercises. It is marked:

#### Unit IV, Lesson 1 - Practice Exercises

The "Practice Exercise" tape contains two separate demonstrations. Make sure the students know how to operate the videotape equipment. Since students may need to watch the demonstration more than once, it is especially important that they know how to rewind the videotape without damaging it. (Note: The instructions at the end of each demonstration tell the student to ask the instructor to rewind the tape. Tell the student to ignore these instructions.) After demonstrating how to rewind, supervise the students the first time they do it on their own. Show the students how to reset the counter. Also point out to the students that they can stop the tape if they miss something or if they just want more time to write things down. The machine will automatically rewind the tape for a short distance, so when the tape is started again, the last few seconds the student saw will be repeated.

For the first videotaped demonstration (Exercise 6), students will be told to show you their notes before answering the questions. Compare their notes with the outline (page 6) and the labeled drawing (page 7) and point out any missing or incorrect information. Don't give them the information, just say "This is incorrect" or "You didn't write down the name (function, location) of this part (control, indicator)" Tell the student to watch the tape again and correct his notes before trying to answer the questions. For the second videotaped demonstration (Exercise 7), the student will evaluate his own notes, but he may ask you for help.

When the student is finished with the tape, rewind it to the beginning so that it will be ready for the next demonstration.

## TESTING:

Checkpoint 1, Form A for this lesson includes a videotaped demonstration. The student will take notes on the demonstration, wait for at least 30 minutes (to increase the chances that his/her answers will be based on the notes rather than on memory), and then use the notes to answer 10 questions about the demonstration. To administer this checkpoint:

- . When the student asks for the checkpoint, give him/her the videotape marked "Unit IV, Lesson 1 - Checkpoint 1, Form A." Also give him/her the Instruction Sheet for the checkpoint. DO NOT give him the questions.
- . If the student wants to see the demonstration again, tell him/her to rewind the videotape to the beginning.
- . When the student has finished watching the demonstration, assign him/her to some other activity\* for a period of 30 minutes or more. Remind the student to keep the notes in a safe place.
- . Rewind the tape so that it will be ready for the next student.
- . At the end of the 30 minute period, give the student the checkpoint questions. THE STUDENT SHOULD NOT HAVE ACCESS TO THE VIDEOTAPE WHILE ANSWERING THE QUESTIONS.

After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.

\*If it happens to be near lunch hour or the end of the day, simply wait until after lunch or the beginning of the next day. If you cannot take advantage of these natural breaks, assign reading materials that are relevant to the 31M course.

8 or 9 correct

Compare the student's notes with the notes that follow the scoring key. Determine why student was unable to answer questions - were notes incomplete, incorrect, illegible, etc? Provide feedback to student. Probe for comprehension. Then have student go on to the next prescribed lesson.

7 or less correct

Compare student's notes with the notes that follow the scoring key. Determine why the student was unable to answer questions - were notes incomplete, incorrect, illegible? Provide feedback to student. Prescribe review of appropriate parts of lesson, then administer Form B of the checkpoint. Give student the choice of adding to his/her previous notes, or taking a new set of notes. When student finishes, score checkpoint and provide feedback. Then have student go on to the next prescribed lesson.

#### INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Report Form. Monitor students to make sure that they are working steadily and that they are not having any difficulty with the videotape equipment. Be sure they complete all the exercises. For some exercises where there is no one correct answer, students will be told to show you their answers. Be prepared to point out any shortcomings and suggest ways to improve their answers. For the videotaped exercises, be sure the student uses only his/her notes to answer the questions - i.e., student should not answer the questions while viewing the videotape. Provide explanations or clarifications of material when needed. Score the checkpoint immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

## Demonstration Notes of Exercise 6

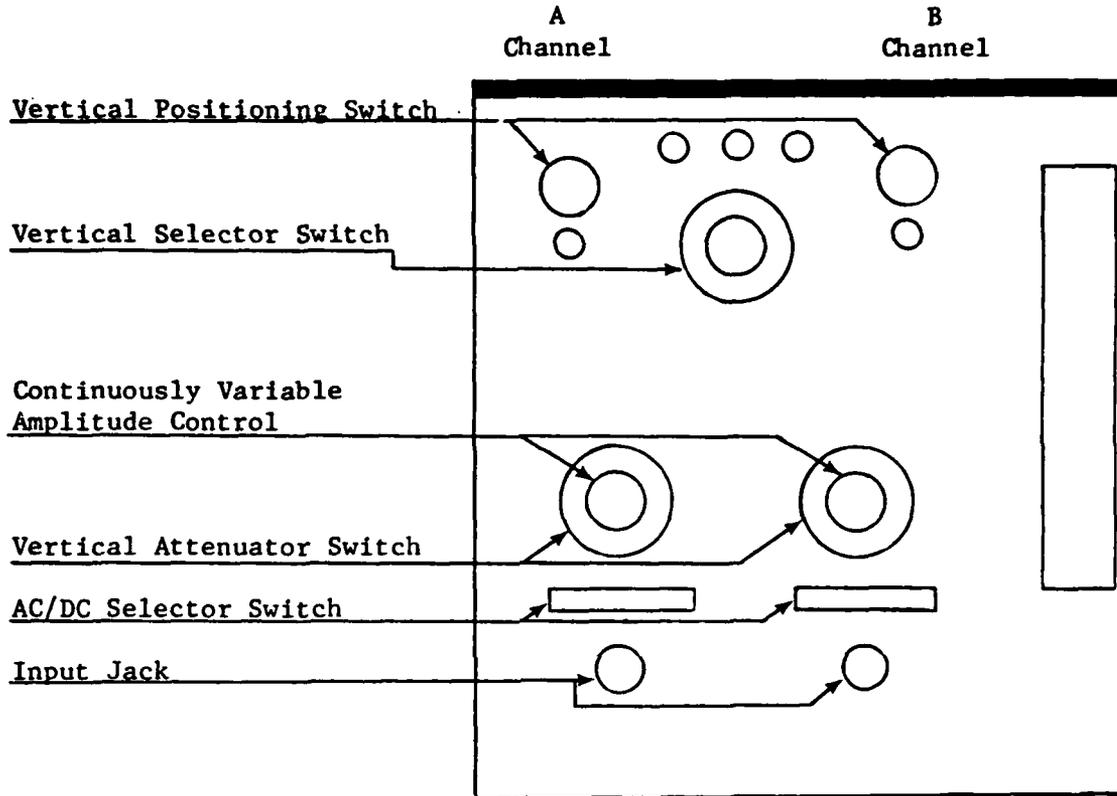
### AN/USM 281A Oscilloscope

#### Vertical Controls

1. Two sets of controls, for A channel and B channel.
  - A. Input jacks
    1. A channel on left
    2. B channel on right
  - B. Vertical positioning controls (A and B)  
(function not explained)
  - C. Vertical attenuator switches (A and B)  
  
Controls height of vertical display in steps
  - D. Continuously variable amplitude controls (A and B)
    1. In center of vertical attenuator switches
    2. Must be turned fully clockwise to get an accurate voltage indication.
  - E. AC-DC selector switches (A and B)  
  
Selects AC or DC configuration - switches in a capacitor.
  - F. Vertical selector switch - can be set to display A channel, B channel, or A and B simultaneously.

Exercise #6

Outline from Demonstration on  
AN/USM 281A Oscilloscope  
Vertical Controls



UNIT IV - LESSON 1

Scoring Key for Checkpoint 1, Form A

1. c

2. b

3. a

4. c

5. d

6. b

7. b

8. d

9. c

10. a

UNIT IV - LESSON 1

Scoring Key for Checkpoint 1, Form B

1. d

2. b

3. c

4. c

5. a

6. b

7. d

8. a

9. a

10. c

## UNIT IV - LESSON 1

### Notes on Checkpoint Demonstration

#### Operation and Use of the AN/USM-281A Oscilloscope

##### Technical information in TM 9-6625-2362-122

- Drawing in front of manual shows front panel and controls
- Tables in front of manual - description and function of each control

##### Uses of equipment

- Troubleshooting (signal tracing method)
- Peak-to-peak voltmeter
- Frequency meter
- DC Voltmeter

##### Location and function of controls (see drawing on next page)

Lower left - vertical functions

Lower right - horizontal functions

Left of CRT (top to bottom)

INTENSITY control - turn outer rim to control intensity of CRT beam

BEAM FINDER button - in middle of INTENSITY control

- if controls are set up correctly but no display, press B.F. button - trace will show up on screen, then use VERT.

POSITIONING control to move it where it should be

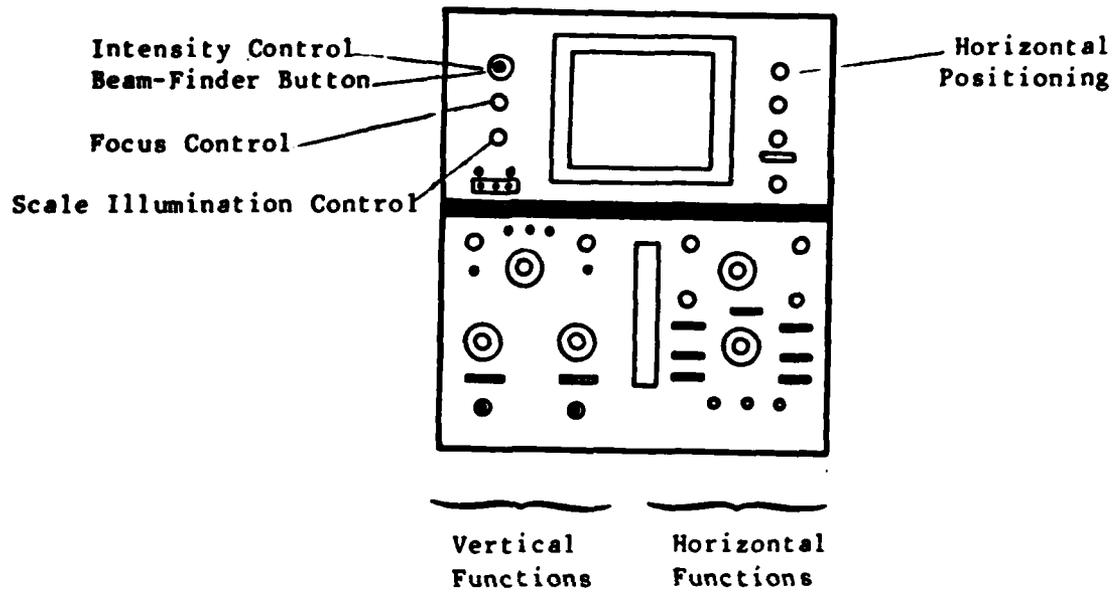
FOCUS control

SCALE ILLUMINATION control - lights up up and down lines on face of CRT - used to make peak-to-peak voltage and frequency measures

POWER OFF/ON switch - has pilot light

Right of CRT (top to bottom)

HORIZONTAL POSITIONING - moves trace to left or right (other controls not discussed)



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INSTRUCTOR GUIDE

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UNIT IV. NOTE-TAKING FOR DEMONSTRATION

Lesson 2. Taking Notes to Show Sequence

TERMINAL OBJECTIVE: Notes show actions correctly sequenced.

CONDITION: Given a demonstration showing a series of steps in a procedure.

STANDARD: Takes notes of the sequence of actions (steps) and subsequently uses the notes to answer questions concerning sequence.

ESTIMATED LESSON LENGTH: 2 hours

INSTRUCTIONAL MATERIALS: Student Guide containing self-paced materials and exercises. Videotaped demonstrations.

OTHER MEDIA AND SUPPORT MATERIALS: Card sets (to be used in practice exercises), Videotapes: Practice Exercises, Checkpoint 1

REFERENCES: None

LESSON STRUCTURE: The lesson is divided into three sections.

Section A. Using a Two-Column Format  
(Student Guide, p. 2)

Section B. Making Additions or Corrections to Notes (Student Guide, p. 6)

Section C. Taking Notes on Videotaped Demonstrations (Student Guide p. 9)

ENABLING OBJECTIVES:

Section A

Action: Uses a two-column format to list steps and key points.

Condition: Given a transcript from a demonstration of a procedure with several steps.

Standard: Lists steps in correct sequence, in left-hand column; lists key points in right-hand column.

### Section B

**Action:** Makes additions and corrections to notes.

**Condition:** Given a transcript from a demonstration of a procedure with several steps, and a set of notes with one step missing.

**Standard:** Uses arrows, renumbering, etc. to show where the missing step should be inserted.

### Section C

**Action:** Takes notes that show all steps in the correct sequence.

**Condition:** Given a videotaped demonstration of a procedure with several steps, instructions to take notes on the demonstration, and a set of questions based on the demonstration.

**Standard:** Correctly answers questions about the sequence of steps, referring only to the notes.

### SPECIAL INSTRUCTIONS FOR PRACTICE EXERCISES:

In addition to the usual paper and pencil materials, this lesson uses videotaped demonstrations. You will be responsible for giving the student the tape for the practice exercises. It is marked:

#### Unit IV, Lesson 2 - Practice Exercises

The "Practice Exercise" tape contains two separate demonstrations. Make sure the students know how to operate the videotape equipment. Since students may need to watch the demonstration more than once, it is especially important that they know how to rewind the videotape without damaging it. (Note: The instructions at the end of each demonstration tell the student to ask the instructor to rewind the tape. Tell the student to ignore these instructions.) After demonstrating how to rewind, supervise the students the first time they do it on their own. Show the students how to read the counter. Also point out to the students that they can stop the tape if they miss something or if they just want more time to write things down. The machine will automatically rewind the tape for a short distance, so when the tape is started again, the last few seconds the student saw will be repeated.

For the first videotaped demonstration (Exercise 3), students will be told to show you their notes before answering the questions. Compare their notes with the outline (page 5) and point out any missing or incorrect information. Don't give them the information, just say "This is in the wrong order," or "You left out the step that comes after ...". Tell the student to watch the tape again and correct his notes before trying to answer the questions. For the second videotaped demonstration (Exercise 4), the student will evaluate his own notes, but he may ask you for help.

When the student is finished with the tape, rewind it to the beginning so that it will be ready for the next demonstration.

This lesson also makes use of two sets of picture cards showing the steps in the two demonstrations for the practice exercises. They are marked:

Card Set #1 (for Practice Exercise 3)

Card Set #2 (for Practice Exercise 4)

When you give them to the student, these cards should be arranged in random order (NOT in the sequence shown in the demonstration). The student is to arrange the cards in order, with the first step on top and the last step on the bottom. You should be familiar with these cards in case the student needs assistance. Students will score themselves and then return the cards to you. Make sure the cards are rearranged in random order before putting them away.

NOTE: If the card sets are not available, give the student the alternate forms of the exercises. They are included as separate pages in this set of materials.

#### TESTING:

Checkpoint 1, Form A for this lesson includes a videotaped demonstration. The student will take notes on the demonstration, wait for at least 30 minutes (to increase the chances that his/her answers will be based on the notes rather than on memory), and then use the notes to answer 10 questions about the demonstration. To administer this checkpoint:

- When the student asks for the checkpoint, give him/her the videotape marked "Unit IV, Lesson 2 - Checkpoint 1, Form A/B." Also give him/her the Instruction Sheet for the checkpoint. DO NOT give him the questions.

- . If the student wants to see the demonstration again, tell him/her to rewind the videotape to the beginning.
- . When the student has finished watching the demonstration, assign him/her to some other activity\* for a period of 30 minutes or more. Remind the student to keep the notes in a safe place.
- . Rewind the tape so that it will be ready for the next student.
- . At the end of the 30 minute period, give the student the checkpoint questions. THE STUDENT SHOULD NOT HAVE ACCESS TO THE VIDEOTAPE WHILE ANSWERING THE QUESTIONS.

After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Compare the student's notes with the notes that follow the scoring key. Determine why student was unable to answer questions - were notes incomplete, incorrect, illegible, etc? Provide feedback to student. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Compare student's notes with the notes that follow the scoring key. Determine why the student was unable to answer questions - were notes incomplete, incorrect, illegible? Provide feedback to student. Prescribe review of appropriate parts of lesson, then administer Form B of the checkpoint. Give student the choice of adding to his/her previous notes, or taking a new set of notes. When student finishes, score checkpoint and provide feedback. Then have student go on to the next prescribed lesson.

\*If it happens to be near lunch hour or the end of the day, simply wait until after lunch or the beginning of the next day. If you cannot take advantage of these natural breaks, assign reading materials that are relevant to the 31M course.

#### INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Report Form. Monitor student to make sure that they are working steadily and that they are not having any difficulty with the videotape equipment. Be sure they complete all the exercises. For some exercises where there is no one correct answer, students will be told to show you their answers. Be prepared to point out any shortcomings and suggest ways to improve their answers. For the videotaped exercises, be sure the student uses only his/her notes to answer the questions - i.e., student should not answer the questions while viewing the videotape. Provide explanations or clarifications of material when needed. Score the checkpoint immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

### Exercise #3

#### Outline from Demonstration on Adjust Gain Control - AN/TCC-7

#### I. Working on Test Panel

#### II. Steps

- A. Set MEASURE SELECT switch to CHECK GAIN position.
- B. Adjust FINE TUNE control until indicator on test meter goes all the way to the right (maximum deflection).
- C. Adjust GAIN control (with screwdriver) until indicator on test meter goes back to zero.
- D. Remove jack.
- E. Reset MEASURE SELECT switch to OFF.

UNIT IV - LESSON 2

Scoring Key for Checkpoint 1, Form A

1. a
2. c
3. d
4. b
5. d
6. a
7. c
8. b
9. d
10. b

UNIT IV - LESSON 2

Scoring Key for Checkpoint 1, Form B

1. b
2. b
3. d
4. a
5. b
6. d
7. c
8. b
9. c
10. a

## UNIT IV - LESSON 2

### Notes on Checkpoint Demonstration

Procedure: Count a frequency on the AN/TSM-16 Frequency Meter.

#### STEPS

#### KEY POINTS

1. Set FUNCTION switch to FREO COUNT position.
2. Couple frequency to be measured to COUNTER INPUT receptacle.
3. Rotate SENSITIVITY control slowly clockwise until indication on INPUT LEVEL meter is well within green area.
4. Rotate TIME-SECONDS switch to desired time sampling period. (markings at bottom)
5. Adjust DISPLAY TIME control for a suitable display time between counts.
6. Translate reading on frequency counter into cycles per second. Multiply count by factor indicated on "MULTIPLY BY" scale of TIME-SECONDS switch (markings at top). Example:  
5000 X .1 = 500 cps

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INSTRUCTOR GUIDE

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UNIT IV. NOTE-TAKING FOR DEMONSTRATION

Lesson 3. Taking Notes to Show Relationships

**TERMINAL OBJECTIVE:** Notes show the relationship of supporting detail when there are up to three main ideas and up to two levels of subordination for each.

**CONDITION:** Given a demonstration of a procedure with two or three major parts, with up to two levels of subordination (steps and substeps) under at least one of the major parts.

**STANDARD:** Takes notes and subsequently uses notes to answer questions about the relationships between major parts, steps, and substeps.

**ESTIMATED LESSON LENGTH:** 1 hour, 55 minutes

**INSTRUCTIONAL MATERIALS:** Student Guide containing self-paced materials and exercises. Videotaped demonstrations.

**OTHER MEDIA AND SUPPORT MATERIAL:** Video cassette player.  
Videotapes: Practice Exercises, Checkpoint 1

**REFERENCES:** None

**LESSON STRUCTURE:** The lesson is divided into three sections.

Section A. Taking Notes to Show Major Parts and Steps (Student Guide, p. 2)

Section B. Taking Notes to Show Major Parts, Steps, and Substeps (Student Guide, p. 6)

Section C. Taking Notes on Videotaped Demonstrations (Student Guide, p. 10)

**ENABLING OBJECTIVES:**

**Section A**

- Action:** Takes notes showing major parts and steps under each part.
- Condition:** Given a transcript from a demonstration of a procedure having two major parts and two or more steps in each part.
- Standard:** Lists major parts with appropriate steps under each part; indicates relationship either by using formal outline style or by underlining main ideas and indenting steps.

**Section B**

- Action:** Takes notes showing major parts, steps, and substeps.
- Condition:** Given a transcript from a demonstration of a procedure having three major parts, two or more steps in each part, and two or more substeps under at least one of the steps.
- Standard:** Lists major parts, with appropriate steps under each part, and substeps under steps; indicates relationship either by using formal outline style or by underlining main ideas, indenting steps, and further indenting substeps.

**Section C**

- Action:** Takes notes that show relationship of major parts, steps, and substeps.
- Condition:** Given: (1) a videotaped demonstration of a procedure with two or three major parts, and up to two levels of subordination, (2) instructions to take notes on the demonstration, and (3) a set of questions based on the demonstration.
- Standard:** Correctly answers questions about the relationship between major parts, steps, and substeps, referring only to the notes.

## SPECIAL INSTRUCTIONS FOR PRACTICE EXERCISES:

In addition to the usual paper and pencil materials, this lesson uses videotaped demonstrations. You will be responsible for giving the student the tape for the practice exercises. It is marked:

### Unit IV, Lesson 3 - Practice Exercises

The "Practice Exercise" tape contains two separate demonstrations. Make sure the students know how to operate the videotape equipment. Since students may need to watch the demonstration more than once, it is especially important that they know how to rewind the videotape without damaging it. (Note: The instructions at the end of each demonstration tell the student to ask the instructor to rewind the tape. Tell the student to ignore these instructions.) After demonstrating how to rewind, supervise the students the first time they do it on their own. Show the students how to reset the counter. Also point out to the students that they can stop the tape if they miss something or if they just want more time to write things down. The machine will automatically rewind the tape for a short distance, so when the tape is started again, the last few seconds the student saw will be repeated.

For the first videotaped demonstration (Exercise 3), students will be told to show you their notes before answering the questions. Compare their notes with the outline (page 6) and point out any missing or incorrect information. Don't give them the information, just say "This is in the wrong order," or "You left out the step that comes after ...". Tell the student to watch the tape again and correct his notes before trying to answer the questions. For the second videotaped demonstration (Exercise 4), the student will evaluate his own notes, but he may ask you for help.

When the student is finished with the tape, rewind it to the beginning so that it will be ready for the next demonstration.

### TESTING:

Checkpoint 1, Form A for this lesson includes a videotaped demonstration. The student will take notes on the demonstration, wait for at least 30 minutes (to increase the chances that his/her answers will be based on the notes rather than on memory), and then use the notes to answer 10 questions about the demonstration. To administer this checkpoint:

- When the student asks for the checkpoint, give him/her the videotape marked "Unit IV, Lesson 3 - Checkpoint 1, Form A/B." Also give him/her the Instruction Sheet for the checkpoint. DO NOT give him the questions.

- . If the student wants to see the demonstration again, tell him/her to rewind the videotape to the beginning.
- . When the student has finished watching the demonstration, assign him/her to some other activity\* for a period of 30 minutes or more. Remind the student to keep the notes in a safe place.
- . Rewind the tape so that it will be ready for the next student.
- . At the end of the 30 minute period, give the student the checkpoint questions. THE STUDENT SHOULD NOT HAVE ACCESS TO THE VIDEOTAPE WHILE ANSWERING THE QUESTIONS.

After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Compare the student's notes with the notes that follow the scoring key. Determine why student was unable to answer questions - were notes incomplete, incorrect, illegible, etc? Provide feedback to student. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Compare student's notes with the notes that follow the scoring key. Determine why the student was unable to answer questions - were notes incomplete, incorrect, illegible? Provide feedback to student. Prescribe review of appropriate parts of lesson, then administer Form B of the checkpoint again. Give student the choice of adding to his/her previous notes, or taking a new set of notes. When student finishes, score checkpoint and provide feedback. Then have student go on to the next prescribed lesson.

\*If it happens to be near lunch hour or the end of the day, simply wait until after lunch or the beginning of the next day. If you cannot take advantage of these natural breaks, assign reading materials that are relevant to the 31M course.

#### INSTRUCTIONAL GUIDELINES:

Record the date and time at which each student begins the lesson on the Student Report Form. Monitor students to make sure that they are working steadily and that they are not having any difficulty with the videotape equipment. Be sure they complete all the exercises. For some exercises where there is no one correct answer, students will be told to show you their answers. Be prepared to point out any shortcomings and suggest ways to improve their answers. For the videotaped exercises, be sure the student uses only his/her notes to answer the questions - i.e., student should not answer the questions while viewing the videotape. Provide explanations or clarifications of material when needed. Score the checkpoint immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

### Exercise #3

#### Outline for Demonstration on Initial Tuning Procedure - AN/TRC-24

#### STEPS

#### KEY POINTS

##### Starting:

1. Turn POWER switch to ON.
2. Check MEASURE meter.

Wait for receiver to warm up (tone goes off).  
Should read between 29 and 31.  
See TM if reading is off.

##### Calibration:

1. Turn MEASURE switch to 2ND LIM position.
2. Hold AFC/OFF/CAL switch to CAL position.
3. Adjust FINE TUNE control for:
  - a. Zero on FREQ DRIFT meter.
  - b. Maximum on MEASURE meter.
4. Set INDEX control over red line nearest assigned channel.
5. Release AFC/OFF/CAL switch.
6. Disconnect antenna jack.

Keep holding switch in CAL position.

Be sure it returns to OFF.

UNIT IV - LESSON 3

Scoring Key for Checkpoint 1, Form A

1. b
2. c
3. b
4. b
5. c
6. c
7. a
8. d
9. c
10. c

**UNIT IV - LESSON 3**

**Scoring Key for Checkpoint 1, Form B**

1. b
2. a
3. d
4. b
5. c
6. d
7. c
8. a
9. a
10. b

## UNIT IV - LESSON 3

### Notes on Demonstration for Checkpoint 1, Form A/B

#### Presets for the AN/TRC-24 Radio Set

##### I. Receiver Presets (assigned Channel 137)

- A. COARSE TUNE control - push in and turn until 137 appears in center of window
- B. FINE TUNE control - adjust until red line nearest 137 appears behind hairline in center of OSC window
- C. RF AMP tune control - adjust until 137 appears under hairline

##### II. Transmitter Presets

- A. Upper panel
  1. Set PULSED OSCILLATOR control to ODD CHANNELS position
  2. Adjust TUNE control so 137 appears under pointer
- B. Center (upper half of lower panel)
  1. Adjust INDEX control so pointer is in center of window
  2. Adjust RF CHANNEL TUNE control so 137 appears behind index pointer
  3. Set AFC control to zero
  4. Adjust DRIVER TUNE control so 137 is in center of window

##### III Power Supply Presets

- A. 750 V ADJ control - preset to 1
- B. DC TEST switch - set to 150 UPPER SCALE position
- C. 150 V ADJ control - turn fully counterclockwise  
(use screwdriver)
- D. Connect ground wires to ground binding post
- E. Plug cord into power outlet

## Introduction to Unit V

### Recognizing a Part of a Whole

The purpose of this lesson is to provide the 3IM student with several helpful pointers for locating and identifying a part of a whole. Although it is not expected that many students will be deficient in this area, there may be some who experience difficulty either in reading the labels to identify parts or in distinguishing physical characteristics to locate and identify parts. This unit has been designed specifically for the student who has weaknesses in one or both of these areas.

The 3IM course is very much equipment-oriented. Throughout the duration of the course, the student is exposed to pictures of equipment and to actual equipment. He/she is expected to become familiar with the configurations of these pieces of equipment. The objective of this unit is to help the student to do this. In order to locate and identify specific parts (e.g., controls, indicators, or pieces of equipment that are parts of larger systems), the student must be able to read the labels and to distinguish physical differences of parts on the basis of location, of external (shape) and internal (design) form, and relative size.

By designing the unit to include many illustrations of actual and simplified versions of 3IM equipment, it is hoped the student will feel a close correspondence with the 3IM course itself. While learning essential skills for locating and identifying a part of a whole, he/she should perceive the lesson material as relevant to the 3IM course.

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UNIT V. RECOGNIZING A PART OF A WHOLE

Lesson 1. Recognizing a Part of a Whole

TERMINAL OBJECTIVE: Compares physical features to recognize a part<sup>1</sup> of a whole.

CONDITION: Given a picture of a labeled part(s), and given a picture of the whole containing that part.

STANDARD: Student identifies the part in the whole.

ESTIMATED LESSON LENGTH: 1 hour

METHOD OF INSTRUCTION: Student Guide containing self-paced materials, exercises, and checkpoint.

OTHER MEDIA AND SUPPORT MATERIALS: Additional review exercises and checkpoint, scoring keys for checkpoints.

REFERENCES: Many of the drawings and photographs used in this lesson are found in the Soldier's Manual, TMs, and TEC Lessons. Some of these pictures have been simplified and rearranged to conform to the lesson plan.

LESSON STRUCTURE: This lesson is divided into five sections:

Section A. Reading the Labels

Section B. Observing How the Parts Are Arranged

Section C. Checking the Forms - Shape and Design - of the Parts

Section D. Checking the Relative Size of the Parts

Section E. Ignoring Irrelevant Features

<sup>1</sup> A part of a whole can be defined in two ways:

- 1) One part of a piece of equipment.
- 2) A piece of equipment that is one part of a larger system.

**ENABLING OBJECTIVES:**

**Section A**

1. **Action:** Distinguishes locations of attached labels.  
**Condition:** Given a picture with labels attached to the parts, and given the location of the part.  
**Standard:** Identifies the labeled part.
2. **Action:** Reads and distinguishes labels.  
**Condition:** Given the name of the labeled part, and given the whole piece of equipment or system containing that part.  
**Standard:** Identifies the location of the label.
3. **Action:** Matches a labeled part with the corresponding numbered part.  
**Condition:** Given a picture of a piece of equipment with unattached labels, and given the same piece of equipment, except that the parts have numbers instead of labels.  
**Standard:** Identifies a numbered part in the whole.

**Section B**

1. **Action:** Determines the location of the part.  
**Condition:** Given a picture of a piece of equipment, and given another picture of the same piece of equipment.  
**Standard:** Identifies the specified part on the piece of equipment.
2. **Action:** Compares and distinguishes the general arrangement of the parts.  
**Condition:** Given a picture a picture of a piece of equipment, and given pictures of several more pieces of equipment.  
**Standard:** Matches the identical pieces of equipment.

### Section C

1. Action: Distinguishes shapes (external forms).  
Condition: Given a part, and given several more parts.  
Standard: Matches the two identical parts.
2. Action: Distinguishes shapes (external forms) of parts.  
Condition: Given a picture of a labeled or unlabeled part, and given a picture of a whole containing that part.  
Standard: Identifies the given part in the whole.
3. Action: Distinguishes shapes (external forms).  
Condition: Given a part, and given several more parts with identical shapes.  
Standard: Matches the two identical parts.
4. Action: Distinguishes designs (internal forms) of parts.  
Condition: Given a picture of a labeled or unlabeled part, and given a picture of a whole containing that part and other parts having the same or similar shape.  
Standard: Identifies the given part in the whole.

### Section D

1. Action: Compares and distinguishes sizes of parts.  
Condition: Given a picture of a labeled piece of equipment, and given the same piece of equipment, except that the parts have numbers instead of labels.  
Standard: Identifies a specified part.

**TESTING:**

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT V - LESSON 1

Scoring Key for Checkpoint 1, Form A

1. b.
2. c.
3. d.
4. c.
5. c.
6. b.
7. a.
8. b.
9. b.
10. d.

UNIT V - LESSON 1

Scoring Key for Checkpoint 1, Form B

1. b.

2. d.

3. a.

4. d.

5. c.

6. d.

7. b.

8. c.

9. c.

10. b.

## Introduction to Unit VI

### Locating Information in Tables

The purpose of Unit VI is to teach students to use the row and column headings and subheadings in order to locate information within the kinds of tables used in the 31M10 MOS - equipment performance checklists, troubleshooting charts, and tables for performing PMCS. The intent is not to teach them how to use the tables to perform their jobs. That they learn in the 31M10 course. The intent is to help them find their way about in tables, so that, for example, if the Sergeant says, "Look at the normal indication in Step 10," they will be able to find it quickly.

Unit VI contains three lessons. Lesson 1, "The Structure of Tables and Diagrams," teaches students about the row-by-column structure of tables and diagrams and how to find the entry at the intersection of a specified row and column. Lesson 2, "Interpreting Column Headings," teaches the meanings of the column headings most frequently encountered in tables used by the 31M MOS. Lesson 3, "Locating Information in 31M Tables," gives students practice in using the column headings and the table structure to find needed information.

Each lesson in Unit VI contains a Student Guide, one checkpoint (Form A) which measures attainment of the terminal objective, one Review Exercise for students who do poorly on the checkpoint, and an additional checkpoint (Form B), parallel to the first. The Instructor Guide for each lesson includes scoring keys for both forms of the checkpoint.

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UNIT VI. LOCATING INFORMATION IN TABLES  
UNIT VII. READING CABLING DIAGRAMS

Lesson 1. The Structure of Tables and Diagrams

**TERMINAL OBJECTIVE:** Uses row and column headings to locate information in simplified<sup>1</sup> cabling diagrams and tables.

**CONDITION:** Given a simplified diagram of a video patch panel or table, with three or more rows and three or more columns, and having up to two levels of column headings (headings and subheadings).

**STANDARD:** Student identifies entries in specified rows or columns, and identifies the row or column in which specified entries are to be found.

**ESTIMATED LESSON LENGTH:** 45 minutes

**INSTRUCTIONAL MATERIAL:** Student Guide containing self-paced materials and exercises. Checkpoint.

**OTHER MEDIA AND SUPPORT MATERIALS:** Additional review exercise and checkpoint, scoring keys for checkpoints.

**REFERENCES:** The cabling diagrams and tables used in this lesson are simplified versions of those found in the Soldier's Manual and in TMs.

<sup>1</sup> The cabling diagrams are simplified in the following ways:

1. Simple letter combinations are used to designate components instead of actual equipment acronyms (e.g., XYZ instead of TD-660).
2. Familiar words or letters are used to designate rows instead of actual cable connection points (e.g., CAT instead of PCM IN).

The tables are simplified in the following ways:

1. The number of rows is much smaller than the number in tables used in the 31M MOS.
2. Familiar words or phrases are used for column headings and table entries.

- LESSON STRUCTURE:** The lesson is divided into three sections:
- Section A. Rows and Columns in Diagrams and Tables (Student Guide, p. 2)
  - Section B. Cabling Diagrams for Two or More Systems (Student Guide, p. 7)
  - Section C. The Structure of Tables in 31M Materials (Student Guide, p. 12)

**ENABLING OBJECTIVES:**

Section A

1. **Action:** Distinguishes rows and columns.  
**Condition:** Given a grid with x rows and y columns.  
**Standard:** States or selects the number of rows or number of columns.
2. **Action:** Locates entries in specified rows or columns.  
**Condition:** Given a two-way table, with one entry in each row-column intersection.  
**Standard:** Names the entry or entries in any specified row, column, or row-column intersection.

Section B

- Action:** Locates entries in cabling diagrams for two or more systems.
- Condition:** Given a simplified cabling diagram with two levels of column headings (systems and components within systems).
- Standard:** Names the entry or entries in any specified system, component, or row, or at any combination of system, component, and row.

Section C

- Action:** Locates entries in tables similar to 31M troubleshooting and maintenance tables.
- Condition:** Given a simplified 31M table, having rows designated by Item No. or Step, and having one to three parts (substeps) at each Item No. or Step.
- Standard:** Names the entry or entries in any specified column or row (Step, Item No., or sub-step No.), or at any specified row-column intersections; or names the row and/or column containing specified information.

**TESTING:**

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT VI - LESSON 1  
UNIT VII - LESSON 1

Scoring Key for Checkpoint 1, Form A

1. N
2. SYSTEM 2, ABC (in either order)
3. E
4. D, H, L, P, E, I, M, Q (in any order)
5. XYZ
6. Count items
7. Examine and Turn
8. Expected Result in Item No. 3c.
9. Needle moves
10. Plug

UNIT VI - LESSON 1  
UNIT VII - LESSON 1

Scoring Key for Checkpoint 1, Form B

1. 3
2. malfunctions at Item No. 2.
3. D
4. V
5. H
6. C, E, F
7. B, C, G, I
8. D, E
9. A
10. SYSTEM 3, JKL, BLUE (in any order)

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UNIT VI. LOCATING INFORMATION IN TABLES

Lesson 2. Interpreting Table Headings

- TERMINAL OBJECTIVE:** Uses column headings to locate information.
- CONDITION:** Given column headings from a troubleshooting checklist or chart or from a maintenance table.
- STANDARD:** Student selects the appropriate columns for finding specific information.
- ESTIMATED LESSON LENGTH:** 1 hour, 15 minutes
- INSTRUCTIONAL MATERIAL:** Student Guide containing self-paced materials and exercises. Checkpoint.
- OTHER MEDIA AND SUPPORT MATERIALS:** Additional review exercise and checkpoint, scoring keys for checkpoints.
- REFERENCES:** Tables for troubleshooting and maintenance can be found in almost all the TMs relevant to low- and medium-capacity multichannel radio equipment.
- LESSON STRUCTURE:** The lesson is divided into three sections:
- Section A. Identifying Tables by Title  
(Student Guide, p. 2)
  - Section B. Interpreting Column Headings in Equipment Performance Checklists and Troubleshooting Charts  
(Student Guide, p. 4)
  - Section C. Interpreting Column Headings in Maintenance Tables  
(Student Guide, p. 11)

**ENABLING OBJECTIVES:**

**Section A**

- Action:** Locates correct table for a given troubleshooting or maintenance operation.
- Condition:** Given titles of two or more tables, each relevant to a different piece of equipment, equipment application, or maintenance interval.
- Standard:** Selects the appropriate table for the task being performed.

**Section B**

1. **Action:** Defines column headings in equipment performance checklists and troubleshooting charts.  
**Condition:** Given column headings and their definitions.  
**Standard:** States the definition, given the heading; or states the heading, given the definition.
2. **Action:** Interprets column headings in troubleshooting charts.  
**Condition:** Given column headings from an equipment performance checklist or troubleshooting chart.  
**Standard:** Selects the column in which specified information is found.

**Section C**

1. **Action:** Defines column headings in maintenance tables.  
**Condition:** Given column headings and their definitions (including headings which require a key for interpretation).  
**Standard:** States the definition, given the heading; or states the heading, given the definition.
2. **Action:** Interprets column headings in maintenance tables.  
**Condition:** Given column headings from a maintenance table, with or without a key explaining some of the column headings.  
**Standard:** Selects the column in which specified information is found.

**TESTING:**

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT VI - LESSON 2

Scoring Key for Checkpoint 1, Form A

1. 4-7c
2. Corrective measure
3. Fault symptom
4. What to do at each step (or just: what to do)
5. Malfunction
6. Probable cause
7. Suggested remedy
8. Quarterly
9. Reference
10. Item to Be Inspected

UNIT VI - LESSON 2

Scoring Key for Checkpoint 1, Form B

1. Table 4-3
2. Action
3. Unit
4. Normal result
5. Possible trouble
6. Symptom
7. Possible trouble
8. Equipment is not ready/available if:
9. A
10. Procedure

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UNIT VI. LOCATING INFORMATION IN TABLES

Lesson 3. Locating Information In 31M Tables

**TERMINAL OBJECTIVE:** Locates information in checklists, troubleshooting charts, and maintenance tables.

**CONDITION:** Given one or more pages from an equipment performance checklist, troubleshooting chart, or maintenance table.

**STANDARD:** Student identifies information in a specified cell by locating the correct row-column intersection.

**ESTIMATED LESSON LENGTH:** 1 hour, 25 minutes

**INSTRUCTIONAL MATERIAL:** Student Guide containing self-paced materials and exercises. Checkpoint.

**OTHER MEDIA AND SUPPORT MATERIALS:** Additional review exercise and checkpoint, scoring keys for checkpoints.

**REFERENCES:** Equipment Performance Checklist in TM 11-5820-461-12, para 5-11b. Troubleshooting charts and maintenance tables are found in most TMs used in the 31M10 course.

**LESSON STRUCTURE:** Since the lesson is short, it is not divided into sections. However, exercises for students are inserted at several points besides the end of the lesson.

**ENABLING OBJECTIVES:**

1. **Action:** Locates information in checklists.

**Condition:** Given a checklist of one or more pages, in which rows denote steps and columns denote Unit, Action, Normal indication, and Corrective measures.

**Standard:** Uses row and column information to locate entries in the table.

2. Action: Locates information in troubleshooting charts.
- Condition: Given a troubleshooting chart in which rows have item numbers and columns denote Malfunctions, Probable cause, and Corrective action, with one or more probable causes and corresponding corrective actions for each malfunction.
- Standard: Uses row and column information to locate entries in the table.
3. Action: Locates information in maintenance tables.
- Condition: Given a maintenance table in which rows denote item numbers and columns denote inspection intervals (interpretable with a key), items to be inspected, procedures, and either references or problems making the equipment inoperable.
- Standard: Uses row and column information to locate entries in table.

TESTING:

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT VI - LESSON 3

Scoring Key for Checkpoint 1, Form A

1. Meter indicates 115 volts. MANUAL indicator goes out.
2. Check HV fuse.
3. Set MANUAL-AUTOMATIC switch to AUTOMATIC.
4. Defective or misoriented antenna.
5. Defective order wire cable between RT-773/GRC-103(V) and R-1329(P)/GRC-103(V).
6. Request distant terminal troubleshooting.
7. Before operation, during operation, and weekly.
8. METER SELECT switch, PWR and CABLE CURRENT switches and cable current alarm circuit, Traffic (pcm) alarm circuit.
9. Operate receiver AC POWER switch to ON.
10. Order wire fails to operate.

UNIT VI - LESSON 3

Scoring Key for Checkpoint 1, Form B

1. Multimeter indicates in green area of meter scale.
2. AM-1955(\*)/GRC or AM-1956(\*)/GRC.
3. Adjust AFC TUNE control for peak indication on multimeter.
4. Replace lamp.
5. Incorrect tuning of MULT PEAK control.
6. Replace receiver head.
7. A shock hazard exists.
8. During operation and weekly.
9. Operate MAIN circuit breaker to ON; AMPERES AC meter indicates zero.

NOTE to scorer: The first half of the sentence is adequate.

10. POWER INDICATOR neon lamp and AC VOLTS METER on POWER DISTRIBUTION PANEL, POWER DISTRIBUTION PANEL.

## Introduction to Unit VII, Lesson 2

### Identifying Connections in Simple and Complex Cabling Diagrams

The purpose of this lesson is to bring the student to the point where he/she can read and understand simple and complex cabling diagrams. Initially, the plan was to develop separate lessons for simple and complex diagrams. Since the basic structure of both kinds of diagrams is the same, it was decided to incorporate the two into a single lesson. Furthermore, the procedure for identifying cable connections is the same for both simple and complex diagrams.

The specific objective of this lesson is to teach the student how to identify cable connections on these diagrams and how to identify the system(s) in which these connections are to be found. In order to make these identifications, the student must possess certain knowledges and skills. He/she must first become familiar with the structure of cabling diagrams. To attain this familiarity, the ability to read verbal and non-verbal (visual representations) material is essential, for cabling diagrams consist of both kinds. Secondly, the student must be able to apply his/her knowledge of the structure of a cabling diagram in the procedure of identifying cable connections.

Before a student can identify cable connections and the system(s) in which they are found, he/she must learn how to distinguish the different systems, components, and connectors. He/she must also learn how to trace or follow the cabling lines in order to find the connecting points to which the cables are attached. These are processes which involve "reading" non-verbal material.

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UNIT VII. READING CABLING DIAGRAMS

Lesson 2. Identifying Connections in Simple and  
Complex Cabling Diagrams

- TERMINAL OBJECTIVE:** Identifies the cable connections within a given system(s), and identifies the system(s) having a specified cable connection.
- CONDITION:** Given a cabling diagram for a two-, three-, and four-system terminal.
- STANDARD:** Student selects correct alternative from various configurations.
- ESTIMATED LESSON LENGTH:** 1 hour, 50 minutes
- INSTRUCTIONAL MATERIAL:** Student Guide containing self-paced materials and exercises. Checkpoint.
- OTHER MEDIA AND SUPPORT MATERIALS:** Additional review exercise and checkpoint, scoring keys for checkpoints.
- REFERENCES:** Some of the cabling diagrams used in this lesson are found in the Soldier's Manual and TEC lessons. Others are simplified versions<sup>1</sup> of these diagrams.

<sup>1</sup> The cabling diagrams are simplified in the following ways:

1. Simple letters are used to designate components instead of actual equipment acronyms (e.g., A instead of TD-660).
2. Words (colors), Roman numerals, or letter-number combinations are used to designate rows instead of actual cable connector points (e.g., RED instead of PCM IN).

**LESSON STRUCTURE:** The lesson is divided into four sections:

Section A. The Structure of Cabling Diagrams  
(Student Guide, p. 2)

Section B. Identifying the System(s) in Which  
Cable Connections Are Found  
(Student Guide, p. 6)

Section C. Identifying Cable Connections Using a  
Five-Step Procedure  
(Student Guide, p. 9)

Section D. Applying the Five-Step Procedure to a  
Simple and Complex Cabling Diagram  
(Student Guide, p. 19)

**ENABLING OBJECTIVES:**

Since the plan of this lesson called for a certain amount of repetition from one section to another, it was decided not to break down the enabling objectives according to section. Instead, the enabling objectives are listed for the entire lesson as follows:

1. Action: Distinguishes the parts of a cabling diagram.  
Condition: Given a written description of a part of a cabling diagram.  
Standard: Writes the name of the part.
2. Action: Distinguishes the parts of a cabling diagram.  
Condition: Given a cabling diagram with letters to represent the parts and given directions to name a specified part, or given the name of the part and given directions to specify the letter.  
Standard: Names or identifies a specified part of a cabling diagram.
3. Action: Distinguishes two-, three-, and four-system diagrams.  
Condition: Given a cabling diagram with two, three, or four systems.  
Standard: Determines the number of systems there are.

4. Action: Distinguishes two- and three-component systems.  
Condition: Given a cabling diagram having two or three components within each system.  
Standard: Determines the number of components.
5. Action: Distinguishes systems that are cabled and systems that are not cabled.  
Condition: Given a cabling diagram having cable connections within one or more systems.  
Standard: Identifies the system(s) that is cabled.
6. Action: Locates one end of a cable connection.  
Condition: Given a cabling diagram with one or more cable connections.  
Standard: Identifies the system, component, and connector of one end of a cable connection.
7. Action: Locates the second end of a cable connection.  
Condition: Given a cabling diagram with one end (connecting point) of a cable connection identified.  
Standard: Traces the cable from the identified end of a connection to the other end of the connection.
8. Action: Locates systems that are interconnected.  
Condition: Given a cabling diagram with two or more interconnected systems.  
Standard: Identifies the interconnected systems.

**TESTING:**

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT VII - LESSON 2

Scoring Key for Checkpoint 1, Form A

1. c.
2. b.
3. a.
4. c.
5. c.
6. b.
7. c.
8. d.
9. c.
10. b.

UNIT VII - LESSON 2

Scoring Key for Checkpoint 1, Form B

1. c.
2. b.
3. c.
4. b.
5. a.
6. c.
7. c.
8. a.
9. b.
10. d.

## Introduction to Unit VIII

### Diagnosing Equipment Malfunctions

The purpose of Unit VIII is to prepare students for instruction in troubleshooting which begins in Week 5 of the 31M10 course. In order to learn to troubleshoot, students must be able to do three things:

1. Operate the equipment.
2. Compare what is happening on the equipment with expected (normal) indications.
3. Read printed descriptions of symptoms accurately.

The first requirement is taught in the 31M course. This is not in the province of BSEP instruction. However, the second and third requirements are prerequisites which are not taught in the AIT course and are in the province of BSEP instruction. The comparison/decision-making/reasoning skills (number 2 above) are taught in Lessons 1 and 2, and the reading skills (number 3) are taught in Lessons 3 and 4 of Unit VIII.

Unit VIII is designed for integration within the 31M course during the fourth week of training. By the time students encounter this unit, they have already learned to operate low-capacity radio and cable systems. Thus, they are familiar with the components, controls, and indicators which comprise the systems. They have also become familiar with relevant military terminology and acronyms; e.g., they know that designations for equipment components take a certain form.

A minimum level of these skills and knowledges is necessary to understand the content of instruction in Unit VIII, especially Lessons 3 and 4. In these lessons, students must read sentences from technical manuals (TMs) which describe symptoms. Students "disentangle" each sentence, i.e., analyze the sentence into three major parts:

Equipment component

Action (A switch or control set or adjusted in a certain way)

Symptom (Abnormal indication on one or more indicators)

Here is an example of such a sentence:

T-983(P)/GRC-103(V) LOW POWER indicator does not extinguish within 60 seconds after AC POWER switch is operated to ON/RESET and meter indication is below normal with meter selector switch at 600 VDC.

In order to analyze the sentence, students must know that:

"T-983(P)/GRC-103(V)" is the name of an equipment component.

"LOW POWER" indicator is an indicator that may be on or off.

"AC POWER switch" is a switch, one of whose positions is "ON/RESET."

"meter" refers to a meter on the T-983.

"meter selector switch" is a switch, one of whose positions is "600 VDC."

The students' training during the first three weeks of the AIT course ensures that they know the facts listed above, as well as other similar ones.

It would be unreasonable to expect BSEP instructors to know as much about the equipment as the students. Nor is it necessary. However, you do need to know enough to distinguish names of equipment components from names of controls and indicators when you see them in print, so that you will be able to help students if they have trouble in Unit VIII. The brief section below is intended to provide you, the BSEP instructor, with the minimum amount of information that is necessary to enable you to perform your role.

#### Introduction to Radio and Cable Systems

Radio systems, both low- and medium-capacity, consist of a radio (transmitter and receiver), multiplexing equipment (PCM equipment) which makes transmission on multiple channels possible, and auxiliary equipment including an antenna and generator. Cable systems do not include a radio and antenna; but the other components are the same. Each component in a system has an acronym designation, similar to a model number. For example, just as "Datsun 280 ZX" uniquely defines a specific model of car, the acronym TD-660(\*)/G uniquely defines a specific multiplexer. It is important for you, as a BSEP instructor, to recognize that a given acronym represents an equipment component and not, for example, a control or indicator. It is not necessary for you to know which component is represented by each acronym.

Each equipment component has various switches and controls which the operator manipulates, and certain indicators (meters, lights, buzzers) which the operator monitors. It is not necessary for BSEP instructors to know all the controls and indicators. However, you should be able to identify names of controls and indicators when they appear in print. This is made easier by the fact that names of controls are usually (but not always) printed in upper-case letters in TMs and FMs.

## Components of Radio and Cable Systems

The shelters in which radio systems are housed are called assemblages. The assemblage itself has certain controls, e.g., light switches. Within the assemblage is some combination of components, some of which are listed below. Only those components which appear in the reading materials of Unit VIII are listed here.

<u>Full Acronym as it appears in print</u>	<u>Component Name</u>	<u>Usually referred to as:</u>
AN/GRC-103(N)	Low-capacity radio	"Angry 103"
AN/GRC-50(V)	Medium-capacity radio	"Angry 50"
T-983(P)/GRC-103(V)	Transmitter of the low-capacity radio	T-983
R-1329(P)/GRC-103(V)	Receiver of the low-capacity radio	R-1329
T-893(P)/GRC	Transmitter of the medium-capacity radio	T-893
R-1331(P)/GRC or R-1148(P)/GRC	Receiver of the medium-capacity radio	R-1331 and R-1148 (The 31M course uses the R-1331(P)/GRC only, but TMs often refer to both.)
TD-202/U TD-204/U TD-660(A)/G or TD-660(*)/G TD-352/U or TD-353/U TD-754/U	Various multiplexers	Usually referred to omitting the G/U at the end, e.g., TD-202.
RT-773/GRC-103(V)	Order wire	RT-773
CV-1548/G	Telephone signal converter	CV-1548

There are several things you probably notice about these acronyms which make it easy to remember what they stand for:

1. All equipment acronyms consist of one or more letters, followed by a hyphen, then a number, followed by a letter or letters, with or without a slash. At any rate, all acronyms end with a letter.
2. Radio sets start with AN/GRC-.
3. T- stands for transmitter, R- for receiver.
4. Anything starting with TD- is a multiplexer.

What do you, as a BSEP instructor, need to know about these components and their acronyms? You do not need to know the acronyms by memory. You do need to be able to recognize these as names of equipment components, rather than controls or indicators, when you see them in print. For example, here is part of a sentence from a TM:

T-983(P)/GRC-103(V) AC POWER and LOW POWER indicators do not light...

You should recognize that the component being discussed is the T-983(P)/GRC-103(V). The "AC POWER" is not part of the component designation.

#### Controls and Indicators

There are too many controls and indicators to list them all here. Besides, you do not need to know them. You do have to be able to tell whether a given name in a printed reference is the name of a control or of an indicator. This is usually not hard to do, if you remember a few facts:

1. Switches and controls are things the operator manipulates. Each switch and control has a name, e.g.,

AFC LEVEL control

METER SELECT switch

Also remember that any switch has at least two positions, sometimes more. For example, an ON-OFF switch has two positions: ON and OFF. Some switches on 31M equipment have many positions. Instructions for setting switches in TMs always tell the operator what position to set the switch to.

2. Indicators are things like lights or meters which indicate what is happening in the equipment. Each indicator has a name. Instructions in TMs often tell the operator what a given indicator should (or should not) show under certain conditions, e.g.,:

TEST ALIGN meter indicates in green area.

Multimeter shows peak indication.

You will gradually acquire additional familiarity with the controls and indicators on 3IM equipment as you look at TMs and help students with the material in Unit VIII. At this point, the best thing for you to do is to put yourself in the place of a student and work through the four lessons of Unit VIII. Be sure that you understand the material in the lessons thoroughly. If you do, you will have no trouble helping students to do the same thing.

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INSTRUCTOR GUIDE

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UNIT VIII. DIAGNOSING EQUIPMENT MALFUNCTIONS

Lesson 1. Deciding Whether an Indication is Normal

TERMINAL OBJECTIVE: Compares obtained result with description of normal indication on one indicator.

CONDITION: Given a description of a normal indication on one indicator, and given the obtained result either matching or not matching the description.

STANDARD: Student classifies obtained result as normal or abnormal.

ESTIMATED LESSON LENGTH: 30 minutes

INSTRUCTIONAL MATERIAL: Student Guide containing self-paced materials and exercises. Checkpoint.

OTHER MEDIA AND SUPPORT MATERIALS: Additional review exercise and checkpoint, scoring keys for checkpoints.

REFERENCES: Troubleshooting checklist based on normal indications, TM 11-5820-461-12 w/c, para 5-11, pages 5-11 to 5-17.

LESSON STRUCTURE: The lesson is divided into two sections:

Section A. Indicators, Indications, and Normal Indications (Student Guide, p. 3)

Section B. Deciding Whether Something is Wrong with Your Equipment (Student Guide, p. 7)

**ENABLING OBJECTIVES:**

**Section A**

1. **Action:** Classifies examples and non-examples of the terms: indicator, indication.  
**Condition:** Given definitions, and practice examples and non-examples.  
**Standard:** Classifies examples and non-examples correctly.
  
2. **Action:** Predicts what should happen if the equipment is operating properly.  
**Condition:** Given a normal indication for one indicator.  
**Standard:** Makes a prediction that matches the normal indication.

**Section B**

1. **Action:** Decides whether equipment indications match or do not match normal indications.  
**Condition:** Given a normal indication and an equipment indication, one indicator.  
**Standard:** Correctly states that the normal indication and the equipment indication are the same or different.
  
2. **Action:** States the rule for determining whether something is wrong with the equipment.  
**Condition:** Given incomplete statements of the rule.  
**Standard:** Completes the statements correctly.

**TESTING:**

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

UNIT VIII - LESSON 1

Scoring Key for Checkpoint 1, Form A

1. Yes
2. Yes
3. No
4. No
5. Yes
6. Yes
7. No
8. Yes
9. No
10. Yes

UNIT VIII - LESSON 1

Scoring Key for Checkpoint 1, Form B

1. Yes
2. No
3. Yes
4. Yes
5. No
6. Yes
7. Yes
8. No
9. No
10. No

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UNIT VIII. DIAGNOSING EQUIPMENT MALFUNCTIONS

Lesson 2. Deciding Whether Something is Wrong  
Based on Two or More Indicators

TERMINAL OBJECTIVE: Compares obtained result with description of normal indication on two or more indicators.

CONDITION: Given a description of a normal indication including two or more indicators, and given the obtained result on all indicators, with all, some, or none of the indicators matching the description.

STANDARD: Student classifies obtained result as normal or abnormal.

ESTIMATED LESSON LENGTH: 35 minutes

INSTRUCTIONAL MATERIAL: Student Guide containing self-paced materials and exercises. Checkpoint.

OTHER MEDIA AND SUPPORT MATERIALS: Additional review exercise and checkpoint, scoring keys for checkpoints.

REFERENCES: Troubleshooting checklist based on normal indications, TM 11-5820-461-12 w/c, para 5-11, pages 5-11 to 5-17.

LESSON STRUCTURE: The lesson is divided into two sections:

Section A. Review of Procedure for One Indicator  
(Student Guide, p. 3)

Section B. Procedure for Two or More Indicators  
(Student Guide, p. 6)

Students who have just completed Unit VIII, Lesson 1, should be told to omit Section A, unless the instructor decides that they need additional practice.

**ENABLING OBJECTIVES:**

**Section A**

**Action:** Compares obtained result with description of normal indication on one indicator. If obtained result matches description, classifies as normal.

**Condition:** Given a description of a normal indication on one indicator, and given the obtained result either matching or not matching the description.

**Standard:** Decides whether there is anything wrong.

**Note:** This is the terminal objective of Unit VIII, Lesson 1.

**Section B**

**Action:** Compares equipment indications with those listed in a checklist normal indication.

**Condition:** Given a description of a normal indication on two or more indicators, and given the obtained results on the corresponding equipment indicators, with from zero to all indications matching.

**Standard:** Decides whether or not all equipment indications match the checklist normal indication.

**TESTING:**

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.

7 or less correct Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Students who have just completed Lesson 1 of this unit should omit Section A, unless the instructor feels that they need additional practice. All other students should do both sections. Record date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score checkpoints immediately after students finish, and provide immediate feedback. Record checkpoint score(s) and time of lesson completion on Student Record Form.

UNIT VIII - LESSON 2

Scoring Key for Checkpoint 1, Form A

1. No
2. Yes
3. Yes
4. Yes
5. Yes
6. No
7. Yes
8. Yes
9. No
10. Yes

UNIT VIII - LESSON 2

Scoring Key for Checkpoint 1, Form B

1. Yes
2. Yes
3. Yes
4. No
5. Yes
6. Yes
7. Yes
8. No
9. No
10. Yes

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UNIT VIII. DIAGNOSING EQUIPMENT MALFUNCTIONS

Lesson 3. Finding Descriptions of Symptoms: One Indicator

- TERMINAL OBJECTIVE: Compares obtained result with description of symptoms including one indicator, in a troubleshooting table in a TM.
- CONDITION: Given a description of an equipment symptom including one indicator, and given a list of symptoms from a troubleshooting table.
- STANDARD: Student locates the symptom description matching the equipment symptom.
- ESTIMATED LESSON LENGTH: 42.5 minutes
- INSTRUCTIONAL MATERIAL: Student Guide containing self-paced materials and exercises. Checkpoint.
- OTHER MEDIA AND SUPPORT MATERIALS: Additional review exercise and checkpoint, scoring keys for checkpoints.
- REFERENCES: Man. TMs used in the 31M10 course include troubleshooting tables based on symptoms. Most of the material in this lesson is based on TM 11-5895-453-14-2, Table 5-11.
- LESSON STRUCTURE: The lesson is divided into three sections:
- Section A. Recognizing Symptoms  
(Student Guide, p. 4)
  - Section B. Reading Malfunction Descriptions  
(Student Guide, p. 5)
  - Section C. Matching Equipment Symptom Descriptions in Troubleshooting Tables  
(Student Guide, p. 9)

**ENABLING OBJECTIVES:**

**Section A**

- Action:** Defines the terms symptom and malfunction.
- Condition:** Given descriptions of results on equipment and information concerning the normal indication.
- Standard:** Classifies examples and non-examples of symptoms correctly.

**Section B**

- Action:** Analyzes descriptions of symptoms (one indicator) from a troubleshooting table.
- Condition:** Given a symptom description from a troubleshooting table.
- Standard:** Identifies the equipment component, operator action, and resulting symptom.

**Section C**

- Action:** Decides whether equipment symptoms match TM symptom descriptions (one indicator).
- Condition:** Given a description of what happened on equipment and a symptom description from a TM.
- Standard:** Decides whether the two descriptions match or not.

**TESTING:**

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.

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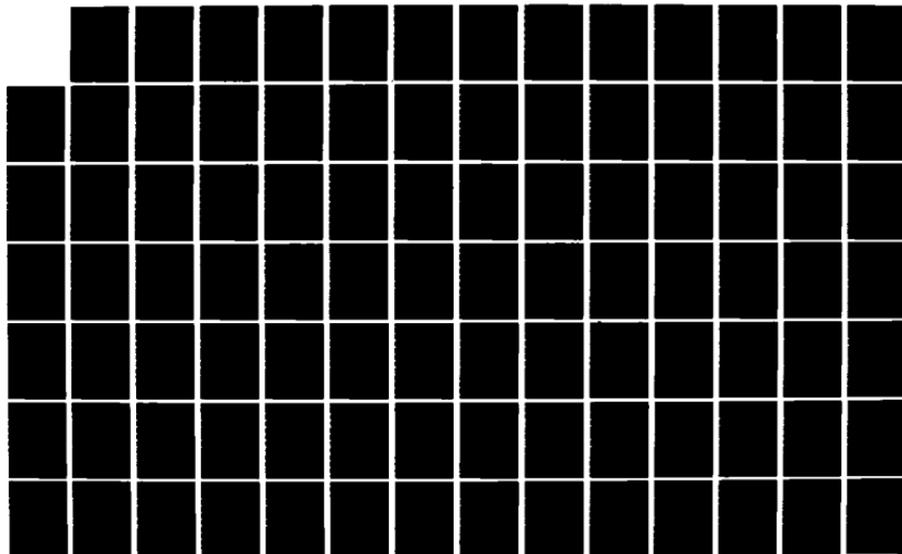
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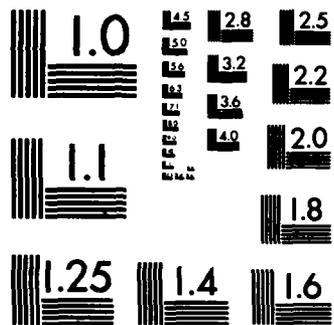
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NATIONAL BUREAU OF STANDARDS-1963-A

7 or less correct Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score checkpoints immediately after students finish, and provide immediate feedback. Record checkpoint score(s) and time of lesson completion on Student Record Form.

UNIT VIII - LESSON 3

Scoring Key for Checkpoint 1, Form A

Item No.

1. 15
2. 4
3. 14a
4. 7
5. 10
6. 2d
7. 13
8. 8
9. 1a
10. 6

UNIT VIII - LESSON 3

Scoring Key for Checkpoint 1, Form B

	<u>Item No.</u>
1.	11d
2.	1b
3.	14d
4.	5
5.	13
6.	9
7.	3
8.	11b
9.	4
10.	12

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UNIT VIII. DIAGNOSING EQUIPMENT MALFUNCTIONS

Lesson 4. Finding Descriptions of Symptoms  
When There are Two or More Indicators

- TERMINAL OBJECTIVE:** Compares obtained result with description of symptom including two or more indicators, in a troubleshooting table in a TM.
- CONDITION:** Given a description of an equipment symptom including two or more indicators, and given a list of symptoms from a troubleshooting table.
- STANDARD:** Student locates the symptom description matching the equipment symptom.
- ESTIMATED LESSON LENGTH:** 55 minutes
- INSTRUCTIONAL MATERIAL:** Student Guide containing self-paced materials and exercises. Checkpoint.
- OTHER MEDIA AND SUPPORT MATERIALS:** Additional review exercise and checkpoint, scoring keys for checkpoints.
- REFERENCES:** Many TMs used in the 31M10 course include troubleshooting tables based on symptoms. Most of the material in this lesson is based on TM 11-5895-453-14-2 and TM 11-5895-366-15.
- LESSON STRUCTURE:** The lesson is divided into three sections:
- Section A. Review of Procedure for One Indicator (Student Guide, p. 3)
  - Section B. Reading Symptom Descriptions for Two or More Indicators (Student Guide, p. 7)
  - Section C. Matching Equipment Symptoms to Symptom Descriptions (Student Guide, p. 15)
- Students who have just completed Lesson 3 of this unit should be directed to omit Section A, unless the instructor feels that they need additional review and/or practice.

**ENABLING OBJECTIVES:**

**Section A**

**Action:** Compares obtained result with descriptions of symptoms including one indicator, in a troubleshooting table in a TM.

**Condition:** Given a description of an equipment symptom including one indicator, and given a list of symptoms from a troubleshooting table.

**Standard:** Locates the symptom description matching the equipment symptom.

**Note:** This is the terminal objective of the preceding lesson: Unit VIII, Lesson 3.

**Section B**

**Action:** Analyzes descriptions of symptoms (two or more indicators) from troubleshooting tables.

**Condition:** Given a symptom description, including two or more indicators, sometimes on two or more equipment components, from a troubleshooting table.

**Standard:** Identifies the equipment components, operator actions, and all resulting symptom indications.

**Section C**

**Action:** Decides which of two symptom descriptions in a TM matches an equipment symptom.

**Condition:** Given two symptom descriptions, including the same equipment components and operator actions but different combinations of resulting symptom indications.

**Standard:** Selects the description which matches the equipment symptom.

**TESTING:**

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Students who have just completed Lesson 3 of this unit may be told to omit Section A. All other students should do all three sections. Record date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score checkpoints immediately after students finish, and provide immediate feedback. Record checkpoint score(s) and time of lesson completion on Student Record Form.

**UNIT VIII - LESSON 4**

**Scoring Key for Checkpoint 1, Form A**

	<u>Item No.</u>
1.	3
2.	11
3.	15
4.	4
5.	5
6.	7
7.	10
8.	1
9.	6
10.	8

UNIT VIII - LESSON 4

Scoring Key for Checkpoint 1, Form B

Item No.

- |     |    |
|-----|----|
| 1.  | 3  |
| 2.  | 14 |
| 3.  | 11 |
| 4.  | 5  |
| 5.  | 15 |
| 6.  | 8  |
| 7.  | 9  |
| 8.  | 1  |
| 9.  | 6  |
| 10. | 2  |

## Introduction to Unit IX

### Scale Reading

The purpose of Unit IX is to teach students how to read scales such as those found on the meters and dials of 31M equipment. In Unit IX, they learn about decimals, ones, fives, tens, and hundreds scales. They work with scale values increasing from left to right (the most common type) and also with scale values increasing from right to left (less common type), since equipment in the 31M10 MOS uses both types.

Unit IX contains four lessons. Lesson 1, Labeling Place Value, teaches the hundreds, tens, ones, and tenths place values. Lesson 2, Numbering Scale Points, teaches the student to identify values on ones, fives, tens, and hundreds scales. Lesson 3, Scales Divided into Tenths, teaches the students how to identify scale values on decimal scales. Lesson 4, Comparing Scale Settings, teaches the students how to identify scales with readings within specified ranges.

Each lesson in Unit IX contains a Student Guide, one checkpoint (Form A) which measures attainment of the terminal objectives, one Review Exercise for students who do poorly on the checkpoint, and an additional checkpoint (Form B), parallel to the first. The Instructor Guide for each lesson includes scoring keys for both forms of the checkpoint.

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INSTRUCTOR GUIDE

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UNIT IX. SCALE READING

Lesson 1. Labeling Place Value

**TERMINAL OBJECTIVE:** Breaks down a given four-digit number with one decimal.

**CONDITION:** Given a four-digit number with one decimal place.

**STANDARD:** Student:

- Identifies first place to the right of decimal point as tenths column.
- Identifies third place to the left of the decimal point as hundreds column.
- Identifies second place to the left of the decimal point as tens column.
- Identifies first place to the left of the decimal point as ones column.

**ESTIMATED LESSON LENGTH:** 1 hour

**INSTRUCTIONAL MATERIALS:** Student Guide containing self-paced materials and exercises. Checkpoint.

**OTHER MEDIA AND SUPPORT MATERIALS:** Additional review exercise and checkpoint, scoring keys for checkpoints.

**REFERENCES:** None

**LESSON STRUCTURE:** The lesson is divided into three sections:

Section A. Basic Facts About Place Values  
(Student Guide, p. 2)

Section B. Writing Numbers (Student Guide, p. 2)

Section C. Identifying Place Value  
(Student Guide, p. 9)

**ENABLING OBJECTIVES:**

**Section A**

**Action:** Reads basic material about digits and place values.

**Section B**

**Action:** Writes numbers when given place values of digits.

**Condition:** Given 4 digits and their place values.

**Standard:** Writes number in the form xxx.x.

**Section C**

**Action:** Identifies place value of a digit.

**Condition:** Given a number of the form xxx.x.

**Standard:** Identifies place value of any digit.

**TESTING:**

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise and Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

**UNIT IX - LESSON 1**

**Scoring Key for Checkpoint 1, Form A**

1. 332.1
2. 631.7
3. 752.5
4. 903.6
5. 738.9
6. 826.5
7. 222.2
8. 170.6
9. ones
10. tens

UNIT IX - LESSON 1

Scoring Key for Checkpoint 1, Form B

1. 689.2
2. 912.7
3. 763.5
4. 310.2
5. 521.3
6. 598.6
7. 247.4
8. 318.7
9. hundreds
10. tenths

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**INSTRUCTOR GUIDE**

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**UNIT IX. SCALE READING**

**Lesson 2. Numbering Scale Points**

**TERMINAL OBJECTIVE:** Assigns values to an unnumbered scale consisting of whole numbers.

**CONDITION:** Given a picture of a scale measuring either hundreds, tens, fives, or ones, with only the end points marked, and with equally spaced divisions between the end points,

Given a picture of a scale measuring hundreds with divisions marked 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.

**STANDARD:** Student identifies the numerical value of a given point or student selects the actual numerical value of a given scale division.

**ESTIMATED LESSON LENGTH:** 25 minutes

**INSTRUCTIONAL MATERIALS:** Student Guide containing self-paced materials and exercises. Checkpoint.

**OTHER MEDIA AND SUPPORT MATERIALS:** Additional review exercise and checkpoint, scoring keys for checkpoints.

**REFERENCES:** None

**LESSON STRUCTURE:** The lesson is divided into four sections:

Section A. Identify the Value of Unnumbered Points on a Fives Scale (Student Guide, p. 2)

Section B. Identify the Value of Unnumbered Points on a Ones Scale (Student Guide, p. 5)

Section C. Identify the Value of Unnumbered Points on a Tens Scale (Student Guide, p. 9)

Section D. Identify the Value of Points on a Hundreds Scale (Student Guide, p. 13)

**ENABLING OBJECTIVES:**

**Section A**

- Action:** Identifies numerical value of midpoint of a line segment.
- Condition:** Given the values of the endpoints of the line segment and the midpoint labeled.
- Standard:** Correctly identifies the value of the midpoint.

**Section B**

- Action:** Identifies numerical value of unit lines on a line segment.
- Condition:** Given the values of the endpoints of the line segment and the unit lines.
- Standard:** Correctly identifies the value of the specified unit line.

**Section C**

- Action:** Identifies numerical value of a point on a tens scale.
- Condition:** Given the values of the endpoints of the line segment labeled.
- Standard:** Correctly identifies the value of a specified point.

**Section D**

- Action:** Identifies the numerical value of a point on a hundreds scale.
- Condition:** Given a scale with hundreds labeled 0, 1, 2, 3.....
- Standard:** Correctly identifies the value of a specific point.

**TESTING:**

There is one checkpoint at the end of the lesson. It contains 10 questions. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise and Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the check points immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

**UNIT IX - LESSON 2**

**Scoring Key for Checkpoint 1, Form A**

1. 15

2. 45

3. 85

4. 12

5. 56

6. 65

7. 30

8. 36

9. 600

10. 800

**UNIT IX - LESSON 2**

**Scoring Key for Checkpoint 1, Form B**

1. 55

2. 15

3. 65

4. 37

5. 93

6. 50

7. 18

8. 81

9. 600

10. 700

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**UNIT IX. SCALE READING**

**Lesson 3. Scales Divided into Tenths**

**TERMINAL OBJECTIVE:** Assigns values to an unnumbered scale consisting of decimal fractions from zero to one.

**CONDITION:** Given a picture of a scale with 0 and +1 points marked, with nine divisions, unnumbered, equally spaced between 0 and +1.

**STANDARD:** Student identifies the numerical value corresponding to a particular scale division.

**ESTIMATED LESSON LENGTH:** 30 minutes

**INSTRUCTIONAL MATERIALS:** Student Guide containing self-paced materials and exercises. Checkpoint.

**OTHER MEDIA AND SUPPORT MATERIALS:** Additional review exercise and checkpoint, scoring keys for checkpoints.

**REFERENCES:** None

**LESSON STRUCTURE:** The lesson is divided into three sections:

Section A. Examples and Explanations of Scales  
(Student Guide, p. 2)

Section B. Assign Values to Scale Divisions  
(Student Guide, p. 14)

Section C. Identify the Value of a Line on a Scale (Student Guide, p. 17)

**ENABLING OBJECTIVES:**

**Section A**

- Action:** (1) Reads about decimal scales and divisions on decimal scales.  
(2) Chooses the value of a point on a decimal scale.
- Condition:** Given a (1) decimal fraction or (2) a decimal fraction name.
- Standard:** Correctly writes the (1) decimal fraction name or (2) the decimal fraction.

**Section B**

- Action:** Writes the missing decimal fractions on a scale.
- Condition:** Given a decimal scale with some divisions labeled and some not.
- Standard:** Correctly labels the unlabeled divisions.

**Section C**

- Action:** Identifies the value of a point on a decimal scale.
- Condition:** Given a decimal scale with marked divisions.
- Standard:** Correctly supplies the numerical value of a point indicated.

**TESTING:**

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.

8 or 9 correct Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.

7 or less correct Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise followed by Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

**UNIT IX - LESSON 3**

**Scoring Key for Checkpoint 1, Form A**

1. b.
2. a.
3. d.
4. c.
5. a.
6. a.
7. 0.9
8. 0.5
9. three-tenths
10. eight-tenths

UNIT IX - LESSON 3

Scoring Key for Checkpoint 1, Form B

1. b. 0.2
2. b. nine-tenths
3. d. 0.6
4. a. 0.8
5. c. five-tenths
6. d. 0.3
7. 0.6
8. 0.7
9. four-tenths
10. two-tenths

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UNIT IX. SCALE READING

Lesson 4. Comparing Scale Settings

**TERMINAL OBJECTIVE:** Compares two drawings of scales and discriminates if the second setting is within two or three divisions to the left or right of the first.

**CONDITION:** Given an unnumbered scale with a designated setting.

**STANDARD:** Student selects which of several alternatives shows a scale having a setting within two or three scale divisions of the first.

**ESTIMATED LESSON LENGTH:** 30 minutes

**INSTRUCTIONAL MATERIALS:** Student Guide containing self-paced materials and exercises. Checkpoint.

**OTHER MEDIA AND SUPPORT MATERIALS:** Additional review exercise and checkpoint, scoring keys for checkpoints.

**REFERENCES:** None

**LESSON STRUCTURE:** The lesson is divided into three sections:

- Section A. Reading Different Types of Scales  
(Student Guide, p. 2)
- Section B. Reading within Ranges  
(Student Guide, p. 17)
- Section C. Selecting Reading within Ranges  
(Student Guide, p. 28)

Section A

1. **Action:** Identifies the reading on a scale.

**Condition:** Given a straight line scale, meter, or dial with scale reading indicated.

**Standard:** Correctly supplies the value of the reading.

### Section B

- Action:** States whether a scale value is within a range from the scale reading.
- Condition:** Given a straight line scale, meter, or dial with a scale reading indicated, and a scale value.
- Standard:** States whether the reading is within two or three marks from the value.

### Section C

- Action:** Identifies which scales have readings within one or two marks from each other.
- Condition:** Given a straight line scale, meter, or dial with a scale reading indicated, and other similar scales with readings.
- Standard:** Identifies which scale reading is within two or three marks from the first.

### TESTING:

Checkpoint 1, Form A at the end of the lesson contains 10 questions measuring the terminal objective. After you have scored the checkpoint, take the following actions, based on the student's score.

<u>Score</u>	<u>Action</u>
10 correct	End of lesson. Student should begin the next prescribed lesson. Provide him/her with the necessary materials.
8 or 9 correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Then have student go on to the next prescribed lesson.
7 or less correct	Explain the questions which the student answered incorrectly. Probe for comprehension. Provide tutoring as needed. Prescribe the Review Exercise and Checkpoint 1, Form B. Score checkpoint when student finishes and explain questions answered incorrectly. Then have student go on to the next prescribed lesson.

**INSTRUCTIONAL GUIDELINES:**

Record the date and time at which each student begins the lesson on the Student Record Form. Monitor students to make sure that they are working steadily. Provide explanations or clarifications of material when needed. Score the checkpoints immediately after students finish, and provide immediate feedback. Record the checkpoint score(s) and time of lesson completion on the Student Record Form.

**UNIT IX - LESSON 4**

**Scoring Key for Checkpoint 1, Form A**

1. b. No
2. a. Yes
3. a. Yes
4. b. No
5. a. Yes
6. a. Yes
7. b. No
8. b. No
9. b. No
10. a. Yes

UNIT IX - LESSON 4

Scoring Key for Checkpoint 1, Form B

1. b. No
2. a. Yes
3. b. No
4. a. Yes
5. a. Yes
6. b. No
7. a. Yes
8. b. No
9. a. Yes
10. a. Yes

**INSTRUCTOR TRAINING COURSE**

**STUDENT GUIDE FOR INSTRUCTOR TRAINING COURSE**

# **31M10 Functional Basic Skills Education Package**

**Contract No. DABT60-81-C-0006  
Sequence No. A022**

**Prepared for:  
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**Prepared by:  
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STUDENT GUIDE FOR INSTRUCTOR TRAINING COURSE

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**STUDENT GUIDE FOR INSTRUCTOR TRAINING COURSE**

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## STUDENT GUIDE FOR INSTRUCTOR TRAINING COURSE

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### INTRODUCTION

This Student Guide is intended to provide you with the training you need in order to function effectively as an instructor in FBSEP for the 31M10 AIT course. It will give you background information concerning the development of FBSEP, descriptions and explanations of course content, delivery, and media requirements, and opportunities to practice the special roles required of instructors in FBSEP, many of which are quite different from those of teachers in traditional instruction.

The Instructor Training Course is primarily self-instructional. Each lesson gives you material to read and exercises to do. Some exercises will measure your comprehension of what you have read. Others will give you a chance to practice new skills. In some cases, answers to exercises are provided in the Student Guide, so that you can check your own work. In other cases, group discussions will be held to discuss the exercises. And, in still other cases, the exercise itself requires some kind of group interaction.

The terminal objective of instructor training is, of course, that you will perform effectively as an instructor in FBSEP. Each lesson also has its own objective. As you begin each lesson, read the lesson objective carefully, so that you will know what you are expected to do when you have completed the lesson. Then follow the step-by-step instructions to proceed through the lesson. Though time limits are given, they are quite liberal. If you work steadily at a pace that is comfortable for you, you should be able to complete all the work without rushing.

Besides this Student Guide, there are several other things you will need during instructor training. First, you must have a copy of the Instructor Guide for FBSEP. When you actually teach the FBSEP course, the Instructor Guide will be your handbook. It includes objectives for all FBSEP lessons, descriptions of special needs and testing requirements, and scoring keys for FBSEP lesson tests (checkpoints). During instructor training, the Instructor Guide will be your "textbook." Lessons in this Student Guide will often require you to read specified pages in the Instructor Guide.

You will also need to have access to all the materials and media used in the FBSEP course. This includes student lesson materials, checkpoints, audiotapes and videotapes, and playback equipment for playing the tapes. If you are not sure about the location or accessibility of these materials, ask the person who is conducting instructor training.

In some lessons, you will be instructed to examine training materials used in the 31M10 AIT course. These include the Soldier's Manual (FM 11-31M1/2) and assorted technical manuals (TMs). Your instructor will make them available when they are needed or will tell you where to find them.

The beginning of each lesson provides you with the following information:

- Objective:** The behavior you should be able to perform when you have completed the lesson.
- Conditions:** The conditions under which the behavior is to be demonstrated.
- Standard:** The criterion which your performance should meet; how you are expected to demonstrate the behavior.
- Media:** The materials, other than this Student Guide and a pen or pencil, which you will need to complete the lesson.
- Maximum Time Required:** An estimate of the maximum time required to complete the lesson.
- Enabling Activities:** Step-by-step instructions for proceeding through the lesson, as well as materials to read and exercises to do.

All lessons are listed in Table I. This list will provide you with an overview of the course. After you have read it, proceed directly to Lesson 1.

Table I  
Instructor Training Course Lessons

<u>Lesson</u>	<u>Title</u>
1	FBSEP Learning/Teaching Strategies and Course Structure
2	Practice Exercise with a Sample FBSEP Lesson
3	Use of Audiotape and Videotape Equipment
4	Relation of FBSEP to the 31M10 AII Course
5	Knowledge of Equipment Required for Teaching FBSEP Unit VIII
6	FBSEP Units I and II
7	FBSEP Units III and IV
8	FBSEP Units V, VI, VII, VIII, and IX
9	Discussion Session on Administrative Problems
10	Effective Communication in FBSEP
11	Role Play

## Lesson 1

### FBSEP Learning/Teaching Strategies and Course Structure

**Objective:** You will be able to describe the components of FBSEP instruction, instructor roles and teaching strategies, and the structure of the FBSEP course (units and lessons within units), as well as of each lesson.

**Conditions:** Given material to read in the Instructor Guide as well as in this Student Guide.

**Standard:** You will individually complete a worksheet ("Worksheet 1 for Instructor Training"), then will discuss the worksheet as a group.

**Media:** Instructor Guide, Introduction

**Maximum Time Required:** 4 hours

**Enabling Activities:**

1. READ THE FOLLOWING DESCRIPTION OF THE DEVELOPMENT OF FBSEP FOR 31M10

**NOTE:** You are not expected to memorize the information in this selection, nor will you be asked any questions about it. It is intended to provide you with a framework for understanding the structure and content of the FBSEP course and, consequently, for teaching the course more effectively.

#### Development of FBSEP for 31M10

The Army has long been concerned with the low level of basic skills of some recruits. Soldiers who are unable to read their technical and field manuals, and who lack basic quantitative and writing skills cannot fulfill the requirements of their jobs in the field. As a result, the Army has become one of the major teachers of remedial basic skills. Basic Skills Education Programs (BSEP) are now offered, at several levels of proficiency (BSEP I, II, etc.), at Army posts throughout the country and abroad.

However, with the exception of a few experimental programs, BSEP training usually differs little from reading, writing, and arithmetic instruction in elementary school. The skills taught are general skills;

the methods include materials developed for teaching the skills to children; and the goals are generally expressed in terms of reaching a certain grade level, rather than acquiring particular skills.

There are several problems with this approach to basic skills training. First, the specific basic skills needed for carrying out military jobs often differ from those taught in BSEP. For example, while traditional reading instruction stresses reading-to-learn (reading to store information), Army reading usually involves reading-to-do (reading to perform an immediate task). Second, the materials and methods do not appeal to adults, especially adults who have been "turned off" by traditional instruction for some time. Third, the time allotted (usually a maximum of six weeks), is too short to raise general literacy skills to a level sufficient to deal with military materials.

Though general literacy skills are unlikely to improve significantly over a short period of instruction, significant changes can be produced by instruction more closely tailored to the soldier's job, that is, by functional basic skills training (FBSEP). For example, Thomas Sticht and his associates developed a functional reading skills program for several MOSs which, in six weeks, resulted in an average gain of 2.1 grade levels in job-related reading skills.<sup>1</sup>

The FBSEP program which you will be teaching has been prepared for one particular MOS in the Signal Corps, the 31M10 "Multichannel Communications Equipment Operator" MOS. Like many others, the 31M AIT course has been plagued by a high failure rate, at least partially due to low basic skill levels of many trainees. It was anticipated that a basic skills program tailored to the 31M AIT course would produce students better able to cope with the specific reading, writing, arithmetic, etc. requirements of the course.

The program teaches not only traditional basic skills but also learning strategies. Strategies are means for processing information - visual, auditory and written. Four classes of strategies may be defined:

1. Strategies for focusing attention. These are strategies that aid students in directing their attention to what is important, while ignoring what is irrelevant. Focusing attention is the first stage of learning; we cannot learn what we have not attended to.

<sup>1</sup> Sticht, T. G. A program of Army functional job reading training: Development, implementation, and delivery system, (HumRRO FR-WD-CA-75-7). Alexandria, VA: Human Resources Research Organization, June 1975.

2. Strategies for encoding information - means of storing information in memory.
3. Strategies for retrieving information - means for recalling information from memory when it is needed.
4. Control strategies. These are higher-level strategies for regulating the use of other strategies.

Strategies of all four kinds are important for learning in the 31M10 course, and strategy training is incorporated into the FBSEP course. In the discussions which follow, the term competency is used to refer to both skills and strategies.

The development of FBSEP involved seven distinct phases:

- Phase 1. Analysis of the 31M10 AIT course to identify prerequisite competencies.
- Phase 2. Verification to insure that the competencies identified in Phase 1 are comprehensive and correct.
- Phase 3. Design of the FBSEP course based on the organization of verified competencies into units and lessons within units.
- Phase 4. Construction of a test to measure competencies, in order to identify soldiers who require FBSEP instruction.
- Phase 5. Development of instructional materials - for students and instructors.
- Phase 6. Development of a course for training FBSEP instructors.
- Phase 7. Validation. This stage involved a large-scale tryout of all the components of FBSEP developed in Phases 3, 4, and 5 and collection of data for assessing the success of the components.

The seven phases are discussed in the sections which follow.

## Phase 1. Identification of Prerequisites

Identification of prerequisites involved, first, analysis of the existing AIT course, and, second, analysis of prerequisites. The purpose of the course analysis was to identify the lowest-level skills actually taught in the course. The dividing line between these skills and still lower-level ones (prerequisites for the course) was called Baseline 1. Thus, the purpose of the course analysis was to identify Baseline 1. This was done by examining lesson plans and materials used in the AIT course, and by observing instruction being delivered. Lesson analyses were submitted to course instructors for review and revised as necessary.

Three methods were used to extend the analysis below Baseline 1: (1) Prerequisites for the lowest level skills taught in the AIT course were determined by asking, for each skill (X), "What must one be able to do in order to do X?" (2) The materials used in the course (TMs, FMs, handouts, data forms, etc.) were analyzed to identify needed reading skills. (3) The instructional delivery system (lectures, demonstrations, guided practice) was analyzed to identify listening skills and learning strategies required to profit from these modes of instruction.

The competencies which were identified fell into several subject-matter categories. Some of these are traditional subjects of basic-skill instruction: functional reading, functional arithmetic, and writing (filling out forms). Some are not traditionally taught in BSEP programs, or, at least, not stressed: equipment-related reasoning, e.g., the kind needed in troubleshooting; technical information about radios and electronics; listening and note-taking during lectures and demonstrations. The latter seemed particularly important in courses like the 31M in which much of the instruction is oral and all of it is instructor-paced. Yet, such competencies have received little attention in Army BSEP, or, for that matter, in basic skill training at any place or any level.

## Phase 2. Verification of Prerequisites

Verification involved answering a number of questions (1) How reliable was the analysis process? That is, do two or more analysts, starting from the same point and working independently, identify the same competencies, in the same hierarchical relationships? (2) Can objective, reliable, and valid measures of the competencies be developed? (3) Are the hierarchical relationships correct? That is,

are the lower-level skills in each hierarchy truly prerequisite to the higher-level ones? (4) Are the competencies related to performance in the 31M course? As the questions imply, verification was a multi-stage process. Verification was carried out in three stages.

### Stage I Verification

Stage I Verification was designed to verify the reliability of the identification/analysis process. Three analysts, working independently, analyzed a single course prerequisite into its components. Both percentage agreement on competencies identified and correlations among hierarchical order were high, indicating that competencies like those identified can be reliably identified.

### Stage II Verification

The purpose of Stage II Verification was to try out some preliminary measures of competencies, to obtain student perceptions of course needs, to determine the level of 31M students on some of the competencies, and to identify competencies which, though prerequisite to success in AIT, are already possessed even by poor students. A sample of 27 good and 35 poor<sup>2</sup> students were interviewed, and were asked to complete a series of exercises designed to measure selected competencies. Some of the results are described below.

Some prerequisite competencies presented no problem to either good or poor students, e.g., perceptual discriminations and motor chains, distinguishing odd and even numbers, verbatim copying. All students interviewed possessed these skills to a high degree.

Technical knowledge concerning radio and electronics, e.g., electrical units of measurement, radio concepts, varied from very low to very high in both good and poor students, suggesting that such knowledge is not important for success. This was confirmed by low ratings of importance from both instructors and students.

Other kinds of skills and strategies clearly differentiated good and poor students. Given a brief lecture and told to take notes, good students tended to take notes which included more information and were better organized than those of poor students. Moreover, both good and poor students rated the ability to listen and take good notes as extremely important for success in the course.

<sup>2</sup> Course instructors selected good and poor students, based on formal and informal performance measures.

In reading, both good and poor students possessed adequate decoding skills. Comprehension, however, varied widely. Differences between good and poor students were especially evident in interpreting printed procedural directions. Other reading skills which varied among students included word knowledge and locating information in tables of contents and in troubleshooting and maintenance tables.

Student interviews suggested a tendency for good students, more often than poor, to mention the use of visual imagery as a strategy for encoding information in lectures, demonstrations, and films. Given the nature of the skills learned, the modes of instruction, and the types of students in the 31M course, imagery seemed to be a particularly relevant - and potentially teachable - strategy.

### Stage III Verification

The major purpose of Stage III Verification was to obtain information on relationships between the competencies and objective measures of AIT performance in a large number of 31M students. For this purpose, items were written to measure each competency, and the resulting test was administered to 163 students beginning the course and 93 others completing it. Besides objective measures of skills, the test included questions concerning the use of strategies for focusing attention, encoding, and retrieval, as well as control strategies.

AIT course performance scores were obtained for students completing the course, and prerequisite skills and strategies were correlated with the performance measures. Some of the results are described below:

Reading skills for comprehension and for locating information showed strong relations to AIT performance, as did listening/watching skills for learning from lectures and demonstrations. Once again, the importance of note-taking skills was confirmed by their strong relationship to course performance. Other competencies related to course performance included classifying and rule-using for diagnosing equipment malfunctions, and quantitative skills for reading scales. All of these competencies were recommended for inclusion in FBSEP instruction.

However, other competencies were not related to 31M10 AIT performance and were not recommended for instruction, e.g., forming and recalling simple associations, adding 2-digit whole numbers, filling out data forms.

Analysis of responses to questions about strategy use revealed certain consistent differences between more and less successful AIT students, particularly while listening to lectures and watching demonstrations. Table II summarizes the major differences.

Table II

Lecture and Demonstration Strategies Differentiating  
Highly Successful and Marginally Successful AIT Students

	Reported More Often by Successful Students	Reported More Often by Marginal Students
Strategies for Focusing Attention	Listening for Main Ideas (Lecture)  Attending to the Narration (Demonstration)	Attending to Verbal Markers (Lecture)  Attending to Location of Equipment Components (Demonstration)
Strategies for Encoding and Retrieval	Imagery  Paraphrase  Grouping	Rote Repetition
Control Strategies	Listening and Watching for Missing Information	

This analysis provided important information for the design of instruction for learning from lectures and demonstrations.

### Phase 3. Design of the FBSEP Course

Design of the FBSEP course involved making decisions about (1) the structure of the course, (2) course delivery, and (3) integration of FBSEP with the AIT course. The decision was made to divide the course into major components called units, each to contain one or more lessons. Each unit corresponds to one major verified competency. The nine units are listed in Table III. Terminal objectives were written for each unit and for each lesson within a unit.

Different students assigned to FBSEP lack different prerequisite competencies. Therefore, instruction must be individualized to enable different students to work on different lessons in the same classroom at the same time. The decision was made to develop self-instructional materials, which students can complete at their own pace with little or no instructor intervention. The instructor role was planned to be primarily that of facilitator/tutor/manager, rather than lecturer/recitation-leader.

Decisions concerning media for delivery of instruction were guided by the self-instructional nature of the course. Thus, printed workbooks provide the major medium of instruction for most lessons. However, for Unit III, Listening Skills, and Unit IV, Note-Taking for Demonstration, printed materials alone are clearly inappropriate. In these units, printed instruction was supplemented by audiotapes (for presentation of lectures) and videotapes (for presentation of demonstrations).

Since most of the units in FBSEP deal with skills which are needed throughout the 3M10 AIT course, most FBSEP instruction was planned to be front-loaded. Unit VIII is an exception. The skills taught in this unit (reasoning and reading skills for diagnosing equipment malfunctions) are prerequisite to troubleshooting, which is not taught until Week 5 of the AIT course. Therefore, instruction in Unit VIII is provided to students who need it, while they are enrolled in Week 4 of the AIT course.

Table III

Units of the FBSEP Course

<u>Unit</u>	<u>Title of Unit</u>
I	Reading Comprehension
II	Using a Table of Contents
III	Listening Skills
IV	Note-Taking for Demonstration
V	Recognizing a Part of a Whole
VI	Locating Information in Tables
VII	Reading Cabling Diagrams
VIII	Diagnosing Equipment Malfunctions
IX	Scale Reading

#### Phase 4. Test Construction

A reliable and valid method is needed for identifying students who need FBSEP and for assigning them to appropriate instruction. A two-stage test was developed for this purpose. The purpose of the first stage, the Screening Test, is to identify students who are deficient in functional basic skills and to identify the units within which the deficiencies lie. The second stage, a set of Diagnostic Tests, determines the specific lessons within units to which students are to be assigned.

The two tests are used as follows: All beginning 31M10 students take the Screening Test prior to AIT entry. The test yields a score in each of the nine units. Each unit has a specific cutoff point. Students who score above cutoff in all units proceed directly to the AIT course. Students who score below cutoff in one or more units must take Diagnostic Tests in those units. The Diagnostic Test for each unit yields a score for each lesson in the unit, with a specific cutoff point. Students are assigned to those FBSEP lessons in which their Diagnostic Test scores are below cutoff.

#### Phase 5. Development of FBSEP

Development of FBSEP instruction occurred in three stages:

1. Development of materials and teaching strategies for each lesson.
2. Small-group tryouts.
3. Revision

Lesson development began with the derivation of enabling objectives for each terminal objective. These provided the structure and sequence of the lesson. The various components of the lesson were then constructed. These included:

1. A self-instructional workbook (Student Guide) which includes content to be mastered, directions for proceeding through the lesson, and numerous exercises for practice.
2. Additional media, if any. Most lessons require no special media. However audiotapes and videotapes were developed for Units III and IV.

3. Tests (Checkpoints) to measure attainment of lesson objectives.
4. Remedial instruction (Review Exercises) for students who need additional practice beyond that provided in the Student Guide.
5. An Instructor Guide which provides lesson objectives, checkpoint scoring keys, and other information needed for teaching the lesson. The Instructor Guide also provides an explanation of teaching strategies and instructor roles.

Small-group tryouts were conducted, using recent high school graduates and dropouts with a socioeconomic and educational background similar to that of 31M10 students. Conditions were made as similar as possible to those of the FBSEP classroom. Revisions were made on the basis of the tryout results.

#### Phase 6. Development of Instructor Training

FBSEP for 31M10 differs considerably in both content and methodology from traditional basic skills instruction. For example, the content includes some skills rarely taught at any level of instruction, such as listening skills; and it teaches strategies uniquely derived for the FBSEP course, such as special guidelines for reading comprehension. The methodology - individualized self-instruction - requires teacher roles and behaviors which most instructors, even highly experienced ones, are not accustomed to playing. Therefore, an Instructor Training Course was written in order to prepare instructors to teach the FBSEP course effectively.

Like FBSEP itself, the Instructor Training Course was built to be self-instructional for the most part. Learning materials - objectives, explanatory information, and exercises - were incorporated in a Student Guide to be used by the student teacher. An Instructor Guide provides the trainer of the course with scoring keys for exercises and guidelines for conducting the course. Completion of the Instructor Training Course marked the end of FBSEP development.

## Phase 7. Validation

The final test of any new instructional program is: Does it work? That is, does it bring about the intended results in the field setting for which it was devised? Thus, validation consists of a large-scale tryout under realistic conditions, collection of performance data, and analysis of the results to determine program success.

The FBSEP program has three components described in the last three sections - the testing component, the instructional component, and the instructor training component. All three had to be validated. Thus, validation required a complex, multifaceted approach. Validation of the three components is described below.

### Test Validation

The major question for test validation was: Are the Screening and Diagnostic Tests correctly identifying students with basic skill deficiencies and correctly assigning them to lessons? Several procedures were used to answer this question. First, the tests were administered twice to a single group of about 150 beginning 31M10 students to determine test reliability and consistency of lesson assignment. This was done before FBSEP development (Phase 5) was complete. This group of students was called the Control Group, since its members did not receive any FBSEP instruction, even if needed.

Members of the Control Group proceeded to the AIT course. After course completion, their AIT performance scores were obtained and correlated with performance on the Screening and Diagnostic Tests.

Analysis of the results showed that the tests were both reliable in consistently assigning students to lessons and valid in identifying students with deficiencies. All correlations between test scores and AIT scores were positive. Thus, students with deficiencies (low test scores) were more likely to achieve low scores in AIT than students without deficiencies. This suggested that remediation of the deficiencies, through FBSEP, might improve AIT performance as well.

### FBSEP Course Validation

The major question for course validation was: Do the FBSEP lessons remediate the deficiencies they were designed to remediate? And, if so, are the skills retained so that they can later be applied to AIT training? To answer these questions, a group of about 200 incoming 31M10 students were tested and assigned to FBSEP, if needed. These students were called the Experimental Group, because they were the first group to receive the new instruction.

Validation data included both test scores (checkpoint scores) during FBSEP lessons and scores on retention tests (post-tests) given one week after lesson completion. In addition, both students and instructors filled out a brief evaluation form after each lesson.

Most FBSEP lessons were found to be valid; students performed well on both checkpoints and post-tests, and evaluations of the lessons were positive. Lessons which failed to meet validation criteria were analyzed to determine their weaknesses, then revised in accordance with the results.

#### Instructor Training Validation

The major question for validation of instructor training was: Does training prepare instructors to teach the FBSEP course effectively? The six instructors who taught the Experimental Group constituted the validation sample for answering the question. The instructors completed the Instructor Training Course one week before the start of the FBSEP course. Evaluation of instructor-training effectiveness was conducted by examining worksheets completed during training and by means of a written test in which instructors answered questions about the FBSEP course. In addition, after the FBSEP course was underway, instructors were observed in the classroom in order to determine whether they were using the FBSEP materials and interacting with students in the ways intended by the course developers. Since instructors' worksheet, test, and classroom performance were judged to be appropriate and correct, the conclusion was that the Instructor Training Course had been effective.

#### Summary and Conclusions

FBSEP for 31M10 was designed to identify soldiers with functional basic skill deficiencies prior to AIT training and to provide them with instruction to remediate the deficiencies. Development of FBSEP involved seven phases:

1. Analysis of the 31M10 course to identify prerequisite skills and strategies.
2. Verification of the identified skills and strategies.
3. Design of FBSEP - plans for course structure, objectives, and integration with the 31M10 course.

4. Construction of Screening and Diagnostic Tests to identify students with basic skill deficiencies and assign them to appropriate lessons.
5. Development of FBSEP lessons and small-group tryouts.
6. Development of an Instructor Training Course.
7. Validation of the tests, FBSEP instruction, and instructor training.

Based on the AIT course analysis, the FBSEP course was designed to include nine units of instruction, each with one or more lessons. Tests were constructed to assign students to appropriate combinations of lessons. The lessons were designed to be self-instructional and self-paced. Because of the unique characteristics of both the content and method of instruction, an Instructor Training Course was developed to prepare FBSEP instructors. Large-scale tryouts demonstrated that all components of the FBSEP program are valid in producing the desired results.

2. READ THE INSTRUCTOR GUIDE "INTRODUCTION," PP. 1-18. Pay particular attention to the following:
  - The titles of units and lessons within units in Table I (pp. 4-5)
  - The learning/teaching strategies described on pp. 3-7
  - The definitions of terminal objective and enabling objective (p. 6)
  - The description of instructor roles (pp. 8-10)
  - The description of course administration and required facilities (pp. 12-16)
  
3. READ THE "SYNOPSIS OF THE FBSEP COURSE" WHICH BEGINS ON THE NEXT PAGE OF THIS WORKBOOK. This is an outline showing the structure of the course (successive units and, within each unit, successive lessons). The terminal objective of each lesson is included.

## SYNOPSIS OF THE FBSEP COURSE

### FBSEP Lesson List

#### UNIT I. READING COMPREHENSION

##### Lesson 1. Vocabulary

TERMINAL OBJECTIVE: Identifies meanings of words in context.

CONDITION: Given a word embedded within a sentence taken or adapted from 31M reading materials.

STANDARD: Student selects correct definition.

##### Lesson 2. Strategies for Reading Sentences

TERMINAL OBJECTIVE: Interprets sentences describing radio and radio equipment, task conditions, task standards, and performance steps.

CONDITION: Given sentences describing equipment or describing tasks, similar to sentences found in 31M10 reading materials.

STANDARD: Student answers questions concerning the content of the sentence and recognizes sentences which are or are not paraphrases of the original sentence.

##### Lesson 3. Reading Negative Sentences

TERMINAL OBJECTIVE: Interprets negative sentences.

CONDITION: Given a sentence in negative form, i.e., an instruction including terms such as "Do not," "none," "no," which tells what should not happen.

STANDARD: Student selects or states what should happen.

Lesson 4. Reading Sentences with Dependent Clauses

TERMINAL OBJECTIVE: Interprets sentences with clauses.

CONDITION: Given a sentence with one or more dependent clauses.

STANDARD: Student answers questions based on the sentence or recognizes paraphrases and non-paraphrases.

Lesson 5. Ordering One, Two, or Three Tasks

TERMINAL OBJECTIVE: Determines sequence of two or three actions.

CONDITION: Given directions to perform two or three actions whose order is explicit or implicit.

STANDARD: Student selects the action to be performed, first, second, or third, or selects a paraphrase giving the correct sequence of actions.

Lesson 6. Determining the Order of Steps: Multiple Actions

TERMINAL OBJECTIVE: Determines sequence: Multiple explicit relationships.

CONDITION: Given directions to perform a sequence of actions (three to five), in which all actions are explicitly described in the correct order.

STANDARD: Student answers questions concerning the order of actions.

Lesson 7. Understands Lists and Paragraphs

TERMINAL OBJECTIVE: Identifies information about long lists and paragraphs.

CONDITION: Given a list or paragraph describing a task or equipment.

STANDARD: Student identifies similar information, information included or not included.

## UNIT II. USING A TABLE OF CONTENTS

### Lesson 1. Chapters and Sections

- TERMINAL OBJECTIVE: Identifies two-part page numbers of entries in a table of contents.
- CONDITION: Given a table of contents (similar to that in the Soldier's Manual) for locating task lists and task summaries for different categories of tasks.
- STANDARD: Student identifies the page number on which information relevant to a specified section and chapter is located, or identifies the topic to be found on a specified page of a specified chapter.

### Lesson 2. Using a Task List to Find a Task Description

- TERMINAL OBJECTIVE: Scans task list to identify page on which information is listed, using a focusing strategy.
- CONDITION: Given a task list for finding descriptions of specific tasks, each task name preceded by its task number, and given either a task name or task number.
- STANDARD: Student identifies the page number on which a specified task description is to be found.

### Lesson 3. Tables with Paragraph Numbers and Page Numbers

- TERMINAL OBJECTIVE: Locates paragraphs when they are numbered by chapter.
- CONDITION: Given a table of contents from a manual in which paragraphs are numbered sequentially within each chapter (e.g., 3-9 means Chapter 3, paragraph 9).
- STANDARD: Student identifies the paragraph for a given topic, or the topic of a given paragraph, or the page on which a given paragraph is to be found.

## UNIT III. LISTENING SKILLS

### Lesson 1. Remembering Information Heard in Lectures

- TERMINAL OBJECTIVE: Uses retrieval strategies to recall lecture information in response to questions.
- CONDITION: Given the requirement to recall material from a lecture, when note-taking is not possible.
- STANDARD: Student uses appropriate strategies to retrieve the needed information.

### Lesson 2. Remembering Information Seen in Demonstrations

- TERMINAL OBJECTIVE: Uses retrieval strategies to recall demonstration information for response to questions on performance of steps.
- CONDITION: Given a demonstration and the requirement to recall steps in the procedure and other information in the demonstration, when note-taking is not possible.
- STANDARD: Student uses appropriate strategies to retrieve the required information and answers the questions.

### Lesson 3. Recognizing When Important Information Is Missing

- TERMINAL OBJECTIVE: Uses controlling strategies to recognize a deficiency in a lecture or demonstration or in listening which warrants a request for clarification.
- CONDITION: Given a lecture or demonstration.
- STANDARD: Student identifies an item of information missing, yet needed to complete understanding.

## UNIT IV. NOTE-TAKING FOR DEMONSTRATION

### Lesson 1. Basic Note-Taking Skills

TERMINAL OBJECTIVE: Takes notes on a demonstration introducing a piece of equipment and subsequently uses the notes to answer questions about the equipment.

CONDITION: Given: A demonstration introducing a piece of equipment, and including information such as capabilities of the equipment, location and function of the parts, etc; instructions to take notes on the demonstration; and a set of questions based on the information shown in the demonstration.

STANDARD: Student answers the questions correctly by referring to his/her notes.

### Lesson 2. Taking Notes to Show Sequence

TERMINAL OBJECTIVE: Takes notes on a demonstration showing a sequence of actions (steps) and subsequently uses the notes to answer questions concerning sequence.

CONDITION: Given: A demonstration showing a series of steps in a procedure, instructions to take notes on the demonstration, and a set of questions based on the information shown in the demonstration.

STANDARD: Student answers the questions correctly by referring to his/her notes.

Lesson 3. Taking Notes to Show Relationships

**TERMINAL OBJECTIVE:** Takes notes on a demonstration showing relationships and subsequently uses notes to answer questions about the relationships between major parts, steps, and substeps.

**CONDITION:** Given: A demonstration of a procedure with two or three major parts, with up to two levels of subordination (steps and substeps) under at least one of the major parts; instructions to take notes on the demonstration; and a set of questions based on the information shown in the demonstration.

**STANDARD:** Student answers the questions correctly by referring to his/her notes.

UNIT V. RECOGNIZING A PART OF A WHOLE

Lesson 1. Recognizing a Part of a Whole

**TERMINAL OBJECTIVE:** Compares physical features to recognize a part of a whole.

**CONDITION:** Given a picture of a labeled part(s), and given a picture of the whole containing that part.

**STANDARD:** Student identifies the part in the whole.

## UNIT VI. LOCATING INFORMATION IN TABLES

### Lesson 1. The Structure of Tables and Diagrams

- TERMINAL OBJECTIVE: Uses row and column headings to locate information in simplified cabling diagrams and tables.
- CONDITION: Given a simplified diagram of a video patch panel or table, with three or more rows and three or more columns, and having up to two levels of column headings (headings and subheadings).
- STANDARD: Student identifies entries in specified rows or columns, and identifies the row or column in which specified entries are to be found.

### Lesson 2. Interpreting Table Headings

- TERMINAL OBJECTIVE: Uses column headings to locate information.
- CONDITION: Given column headings from a troubleshooting checklist or chart or from a maintenance table.
- STANDARD: Student selects the appropriate columns for finding specific information.

### Lesson 3. Locating Information in 31M Tables

- TERMINAL OBJECTIVE: Locates information in checklists, troubleshooting charts, and maintenance tables.
- CONDITION: Given one or more pages from an equipment performance checklist, troubleshooting chart, or maintenance table.
- STANDARD: Student identifies information in a specified cell by locating the correct row-column intersection.

## UNIT VII. READING CABLING DIAGRAMS

### Lesson 1. The Structure of Tables and Diagrams (See Unit VI, Lesson 1)

### Lesson 2. Identifying Connections in Simple and Complex Cabling Diagrams

TERMINAL OBJECTIVE: Identifies the cable connections within a given system(s), and identifies the system(s) having a specified cable connection.

CONDITION: Given a cabling diagram for a two-, three-, and four-system terminal.

STANDARD: Student selects correct alternative from various configurations.

## UNIT VIII. DIAGNOSING EQUIPMENT MALFUNCTIONS

### Lesson 1. Deciding Whether an Indication Is Normal

TERMINAL OBJECTIVE: Compares obtained result with description of normal indication on one indicator.

CONDITION: Given a description of a normal indication on one indicator, and given the obtained result either matching or not matching the description.

STANDARD: Student classifies obtained result as normal or abnormal.

Lesson 2. Deciding Whether Something Is Wrong  
Based on Two or More Indicators

- TERMINAL OBJECTIVE: Compares obtained result with description of normal indication on two or more indicators.
- CONDITION: Given a description of a normal indication including two or more indicators, and given the obtained result on all indicators, with all, some, or none of the indicators matching the description.
- STANDARD: Student classifies obtained result as normal or abnormal.

Lesson 3. Finding Descriptions of Symptoms: One Indicator

- TERMINAL OBJECTIVE: Compares obtained result with description of symptoms including one indicator, in a troubleshooting table in a TM.
- CONDITION: Given a description of an equipment symptom including one indicator, and given a list of symptoms from a troubleshooting table.
- STANDARD: Student locates the symptom description matching the equipment symptom.

Lesson 4. Finding Descriptions of Symptoms When There Are  
Two or More Indicators

- TERMINAL OBJECTIVE: Compares obtained result with description of symptom including two or more indicators, in a troubleshooting table in a TM.
- CONDITION: Given a description of an equipment symptom including two or more indicators, and given a list of symptoms from a troubleshooting table.
- STANDARD: Student locates the symptom description matching the equipment symptom.

## UNIT IX. SCALE READING

### Lesson 1. Labeling Place Value

- TERMINAL OBJECTIVE:** Breaks down a given four-digit number with one decimal.
- CONDITION:** Given a four-digit number with one decimal place.
- STANDARD:** Student:
- Identifies first place to the right of the decimal point as tenths column.
  - Identifies third place to the left of the decimal point as hundreds column.
  - Identifies second place to the left of the decimal point as tens column.
  - Identifies first place to the left of the decimal point as ones column.

### Lesson 2. Numbering Scale Points

- TERMINAL OBJECTIVE:** Assigns values to an unnumbered scale consisting of whole numbers.
- CONDITION:** Given a picture of a scale measuring either hundreds, tens, fives, or ones, with only the end points marked, and with equally spaced divisions between the end points.
- Given a picture of a scale measuring hundreds with divisions marked 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.
- STANDARD:** Student identifies the numerical value of a given point or student selects the actual numerical value of a given scale division.

Lesson 3. Scales Divided into Tenths

- TERMINAL OBJECTIVE: Assigns values to an unnumbered scale consisting of decimal fractions from zero to one.
- CONDITION: Given a picture of a scale with 0 and +1 points marked, with nine divisions, unnumbered, equally spaced between 0 and +1.
- STANDARD: Student identifies the numerical value corresponding to a particular scale division.

Lesson 4. Comparing Scale Settings

- TERMINAL OBJECTIVE: Compares two drawings of scales and discriminates if the second setting is within two or three divisions to the left or right of the first.
- CONDITION: Given an unnumbered scale with a designated setting.
- STANDARD: Student selects which of several alternatives shows a scale having a setting within two or three scale divisions of the first.

4. READ THE "EXPLANATION OF LESSON STRUCTURE" BELOW.

Explanation of Lesson Structure

FBSEP lessons are self-instructional and self-paced. Each lesson is self-contained, so that the student can proceed through it at a rate appropriate for him/her. The student can (and should) seek instructor aid when needed. But no student ever has to worry about falling behind, or wait for other students to catch up. Except for tests, which are called checkpoints, and a few exceptions in Units I, III, and IV, all exercises within lessons are corrected by the student. Checkpoints, however, are scored by the instructor and thereby provide for frequent monitoring of student progress.

Most lessons consist of the following parts:

1. A Student Guide. This includes explanatory (textual) material which the student must read, exercises for the student to perform, and feedback to inform the student of his/her progress. The major part of the instructional material for each lesson is contained in the Student Guide.
2. One or two checkpoints (tests). Most lessons have just one checkpoint. Some longer lessons include two or more. The Student Guide tells the student when he/she is ready to take each checkpoint. These checkpoints are designated Form A.
3. One or two Review Exercises. These are supplementary materials intended for use by students who perform poorly on lesson checkpoints. As the name implies, a Review Exercise provides review and additional practice of material within the lesson.
4. Alternate forms of checkpoints. As stated above, students who perform poorly on a lesson checkpoint, Form A, are required to complete a Review Exercise. This is followed by an additional checkpoint, parallel to Form A and designated Form B.
5. An Instructor Guide. The Instructor Guide for each lesson includes terminal and enabling objectives for the lesson and information about lesson length, method of instruction, other media and support materials, references, testing, and instructional guidelines. The Instructor Guide also includes scoring keys for all checkpoints (Form A and Form B) within the lesson, and tells the instructor what action to take, based on student scores.

The procedure for administering a lesson is as follows:

1. The student is given a copy of the Student Guide.
2. The instructor records the lesson, date, and time on the Student Record Form.
3. The student proceeds through the Student Guide at his/her own pace, doing and correcting the exercises as required, and soliciting instructor aid when needed.
4. When instructed by the Student Guide to do so, the student tells the instructor that he/she is ready for a specified checkpoint (Form A).
5. The student completes the checkpoint and brings it to the instructor for scoring.
6. The instructor scores the checkpoint, records the score on the Record Form, and takes an appropriate action based on the student's score. The possibilities are:
  - a. The student performs well (80% or more correct). The instructor reviews incorrect answers (if any) with the student. The student is then assigned the rest of the lesson, if any remains, or is given the next assigned BSEP lesson, if any. (If the student has finished the lesson, the date and time are recorded on the Record Form.) In either case, Steps 1 to 6 are repeated for the next segment of instruction.
  - b. The student performs poorly (less than 80% correct). In this case, the student is tutored as needed and is then required to do a Review Exercise, followed by Steps 7 to 9 below.
7. When directed by the Review Exercise to do so, the student tells the instructor that he/she is ready for the alternate checkpoint (Form B).
8. The student completes the checkpoint and brings it to the instructor for scoring.

9. The instructor scores the checkpoint, records the score on the Record Form, and reviews any incorrect answers with the student. If the student scores below 80% correct, the instructor goes through the Review Exercise with the student, examining the student's answers on the self-correcting exercises and providing clarifications and explanations when needed. The student is then assigned the rest of the lesson, if any remains, or is given the next assigned BSEP lesson, if any. (If the student has completed the lesson, the instructor records the date and time of lesson completion.) Steps 1 to 6 are then repeated for the next segment of instruction.

The role of the instructor, in this kind of instruction, is primarily one of facilitator and motivator. It is also anticipated that instructors will do a good bit of one-to-one tutoring, especially when students seek help or show need for remediation based on checkpoint performance.

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5. COMPLETE "WORKSHEET 1 FOR INSTRUCTOR TRAINING," WHICH BEGINS ON THE NEXT PAGE. Use the Instructor Guide, "Introduction," as well as the material you have read in this Student Guide. Your instructor will schedule a session for discussing the worksheet.

WORKSHEET 1 FOR INSTRUCTOR TRAINING

1. What is the difference between general basic skills and functional basic skills?
  
2. Suppose that you are teaching a lesson on subtracting with two-digit numbers, involving borrowing (re-grouping). Which of the following is an appropriate statement of the terminal objective of the lesson?
  - a. The instructor will teach subtraction of two-digit numbers with borrowing.
  - b. The purpose of the lesson is to teach subtraction of two-digit numbers with borrowing.
  - c. The student will become familiar with the process of subtraction.
  - d. The student will correctly subtract two-digit numbers requiring borrowing, without error.
  
3. Which of the following is an appropriately stated enabling objective of the same lesson?
  - a. The student will understand the concept of "subtraction."
  - b. The student will correctly subtract one-digit numbers from one- or two-digit numbers, without error.
  - c. First, the teacher must teach subtraction of two-digit numbers which do not require borrowing.
  - d. The student will correctly subtract three-digit numbers requiring borrowing, without error.

4. In the column on the left, you will find some characteristics of traditional instruction. On the right, write the corresponding characteristic of individualized instruction.

Traditional Instruction

Individualized Instruction

Instructor-paced.

All students work on the same materials at the same time.

Instructor presents material in lectures.

Tests are given, collected by the instructor, scored later that day or week, then returned the next day or several days later.

5. Below are some descriptions of instructor actions. Beside each one, write which of the following roles the instructor is playing: resource person, motivator, reinforcer, diagnostician, remediator, manager of material flow, decision maker, record keeper.

Instructor Role

- a. A student says, "I don't understand why I got this question wrong." The instructor responds, "Let's see if we can figure out what the problem is."
- 
- b. A student says, "My Student Guide says that I need a videotape here." The instructor provides the required tape.
-

Instructor Role

- c. Alice says, "I'm tired of this lesson!" The instructor points out that Alice has only a few more pages to go in the Student Guide and will then be ready for a checkpoint.
- 
- d. A student comes to the instructor and says, "These instructions aren't clear. What am I supposed to do next?" The instructor clarifies the instructions in the Student Guide.
- 
- e. The instructor has determined the source of a student's difficulty and now helps the student to understand what he has been doing wrong.
- 
- f. As Sue begins a new lesson, the instructor enters the unit and lesson and the date and time on Sue's Record Form.
- 
- g. Art says, "This is easy!" The instructor replies, "Yes, you are doing very well on this lesson."
- 
- h. Mary answered 7 out of 10 questions correctly on a checkpoint. The instructor checks the Instructor Guide to find out what Mary should do next.
- 
- i. Joe has been having trouble with a lesson about diagnosing equipment malfunctions. The instructor tells Joe, "Your problem seems to be that you aren't clear about the meaning of the term 'normal indication'."
- 
- j. A student has done well on a checkpoint. The instructor says, "Super! You have really learned this material!"
-

Instructor Role

- k. A student says, "Why do I need to learn this stuff anyway?" The instructor shows the student the relevance of the lesson to the 31M10 AIT course.
- 
- l. Tom needs a certain piece of equipment. Dick is ready for a checkpoint. Harry needs clarification of something in his lesson. The instructor asks Tom and Harry to wait while finding the checkpoint for Dick.
- 
6. The Instructor Guide emphasizes the differences between traditional and individualized instruction. Describe some of the ways they are alike. For example, name and describe some roles that teachers play in both traditional and individualized instruction.

7. List some ways in which FBSEP students probably differ from high school students. For each one, discuss the implications the difference has for FBSEP instruction. That is, in what ways does the FBSEP instructor have to behave differently from a teacher in a typical high school classroom?



## Lesson 2

### Practice Exercise with a Sample FBSEP Lesson

**Objective:** You will complete one typical FBSEP lesson, playing the role of a student.

**Conditions:** Given all necessary lesson materials.

**Standard:** You will complete all exercises in the lesson, take Checkpoint 1, Form A, score it using the scoring key in the Instructor Guide, record the score on a FBSEP Record Form, complete the Review Exercise, and take, score, and record Checkpoint 1, Form B.

**Media:** You will need one consumable set of material for Unit VI (VII), Lesson 1, to include:  
Student Guide for the lesson  
Checkpoint 1, Form A  
Review Exercise  
Checkpoint 1, Form B

You also need copies of:  
Functional BSEP Student Record Form (consumable)  
Student Guide: Introduction to FBSEP for 31M10  
Instructor Guide for Unit VI (VII), Lesson 1

**Maximum Time Required:** 2 hours

#### **Introduction:**

In this lesson, you will have an opportunity to experience the FBSEP course as students do. This will also give you a chance to become thoroughly familiar with the structure and components of a typical FBSEP lesson.

#### **Enabling Activities:**

1. Read the "Student Guide: Introduction to FBSEP for 31M10," which describes the structure of the FBSEP course to students and provides guidelines for completing lessons successfully.
2. Record the date and time of starting the lesson on a FBSEP Student Record Form.
3. Go through the Student Guide for the lesson, just as you would if you were a student. Follow all the instructions. Complete and check all the exercises.

4. Take Checkpoint 1, Form A, and score it, using the Checkpoint Scoring Key in the Instructor Guide for Unit VI (VII), Lesson 1. (Here, you are stepping outside the student role, since students do not score their own checkpoints.)

5. Record your score in the record form, using the following format:

$$\frac{\text{no. correct}}{\text{total no. items}}$$

For example, if you got 8 correct on a 10-item checkpoint, the score should be recorded as 8/10.

6. Complete the Review Exercise. (Ordinarily, students do not do the Review Exercise and Checkpoint 1, Form B unless they failed Checkpoint 1, Form A. This is unlikely in your case. However, you should do the Review Exercise anyway.)

7. Take Checkpoint 1, Form B, and score it. Record your score on the record form.

8. Record the date and time of lesson completion on the record form.

9. Your instructor will schedule a group discussion of this lesson in terms of:

- a. The components of a FBSEP lesson, as illustrated by this lesson.
- b. Instructor and student roles, as illustrated by this lesson.

### Lesson 3

#### Use of Audiotape and Videotape Equipment

**Objective:** You will be able to operate audiotape and videotape playback equipment.

**Conditions:** Given a demonstration on the use of audiotape and videotape players.

**Standard:** You will demonstrate proficiency in the operation of audiotape and videotape players.

**Media:** Operational cassette tape recorder and one audiotape. Operational videotape player and monitor and one videotape.

**Maximum Time Required:** 1 hour

**Introduction:**

Units I, III, and IV of FBSEP require students to listen to audiotapes and/or watch videotapes. Students are expected to operate the equipment themselves, after being shown how to do so by the instructor. Therefore, you must be able both to operate the equipment and to show others how to do it.

**Enabling Activities:**

1. Your instructor will demonstrate the proper operation of cassette tape recorders and of videotape players, including:
  - a. Turning the equipment on and off. (Note that, on the videotape equipment, the videotape player and the monitor must both be turned on.)
  - b. Inserting the tape.
  - c. Starting and stopping.
  - d. Using the counter.
  - e. Rewinding
2. Do each of the preceding steps yourself, with both a cassette tape recorder and a videotape player. Do each step several times to make sure you are proficient. Your instructor will check you out.

## Lesson 4

### Relation of FBSEP to the 31M10 AIT Course

- Objective:** You will explain the relationship between skills taught in the 31M10 course and basic skills taught in FBSEP.
- Conditions:** Given a description of the 31M10 course in this workbook, a tour of the course (if available), and an opportunity to examine materials and media through which students learn in the AIT course.
- Standard:** You will individually complete a worksheet ("Worksheet 2 for Instructor Training"), then will discuss the worksheet as a group.
- Media:** Walking tour of 31M10 AIT course, if available  
31M10 Soldier's Manual (FM 11-31M1/2)  
TMs for operation of 31M equipment  
One or more videotaped demonstrations of equipment operation from FBSEP Unit III or IV

**Maximum Time Required:** 5 hours (assuming a 3-hour tour)

**NOTE:** The tour of the course is listed as the second activity of the Enabling Activities. However, the tour may occur first, or may have to be omitted altogether. The lesson can be successfully completed without a tour.

#### Enabling Activities:

1. READ THE DESCRIPTION OF THE 31M10 AIT COURSE AND ITS INTEGRATION WITH FBSEP WHICH FOLLOWS.

#### A Brief Description of the 31M10 Course

The 31M10 AIT course prepares soldiers to function as Multichannel Communications Equipment Operators. Soldiers in the 31M MOS install, operate, and maintain multichannel radio and cable equipment in mobile field settings. They also do limited equipment troubleshooting, though any repairs that require special tools or getting "inside" the equipment are referred to a higher level of maintenance. Besides the radio and cable receivers, transmitters, and multiplex equipment, the soldiers also install, operate, and maintain antennas and generators.

The 31M10 AIT course is 11 weeks long. The first week begins on a Wednesday and is only three days long. The remaining weeks include 5 days of instruction. Each week of the course is an independent module. If a student fails to complete some part of instruction successfully, he/she must repeat the entire week.

The course is instructor-paced and group-administered with a maximum of 25 students per class. The principal methods of instruction are lectures about equipment attributes and functions, demonstrations of equipment operation, and hands-on practice, in the classroom or in the field. Most lectures and demonstrations occur during early parts of the week. Students are usually expected to take notes. During the rest of the week, the students practice the relevant skills over and over, until they become proficient. They are expected to use their notes as well as relevant sections of the Soldier's Manual and/or TMs to guide their actions. Instructors generally circulate among the students during the practice sessions to help students who have difficulty.

Student performance during AIT is evaluated by two methods. First, most weeks of the course include a performance test or a GO/NO GO checklist. Failure on a weekly test usually results in repetition of the week's instruction. The second means of evaluation is an end-of-course test administered during the last week of the course. The test covers eight of the tasks taught in the course. Failure on any part results in immediate remediation and retesting, usually in the same week.

Almost all students who start the course finish it, though a substantial number require more than 11 weeks. A small percentage of students drop out either due to repeated failure in performance tests or to administrative reasons, e.g., excessive absence, emotional problems, reclassification.

The first five weeks of the course deal with basic principles of Army communications and operation of low-capacity equipment. In Weeks 6-10, students learn to operate more complex, medium-capacity equipment. Week 11 provides Systems Integrated Training as well as the End-of-Course Test. A week-by-week schedule of instruction is shown below:

- Week 1 - Classroom instruction on concepts and principles of radio, use of TMs, and other information necessary for the course.
- Week 2 - Installation and operation of low-capacity radio and cable systems in the classroom.

- Week 3 - Installation, operation, and maintenance of low-capacity (non-secure) radio and cable systems in a fixed field site.
- Week 4 - Operation of secure systems. Installation, operation, and maintenance of low-capacity generator and antenna.
- Week 5 - Troubleshooting low-capacity systems.
- Week 6 - Installation and operation of medium-capacity radio and cable systems in the classroom.
- Week 7 - Use of simulator for training on medium-capacity systems.
- Week 8 - Installation, operation, and maintenance of medium-capacity generator and antenna in a fixed field site.
- Week 9 - Installation, operation, and troubleshooting of medium-capacity systems (12 channels) in a fixed field site.
- Week 10 - Installation, operation, and troubleshooting of medium-capacity systems (24 channels) in a fixed field site.
- Week 11 - Systems Integrated Training in a field site (integration of skills learned in Weeks 1-10). End-of-course test.

#### Integration of FBSEP with the AIT Course

From the first week of the course, students must listen to lectures, watch demonstrations, and use the Soldier's Manual and various TMs. By the second week, all skills for equipment operation are needed except those prerequisite to troubleshooting. Therefore, most of the FBSEP units are front-loaded. Students assigned to lessons within these units complete their FBSEP instruction prior to starting the AIT course. However, the skills taught in FBSEP Unit VIII, "Diagnosing Equipment Malfunctions," are not required until Week 5 of AIT. Therefore, students assigned to lessons in Unit VIII receive FBSEP instruction while they are enrolled in Week 4 of the AIT course.

2. TOUR OF THE 31M10 COURSE. Your instructor will provide you with information about transportation and other arrangements. During the tour, you may want to write notes and comments below.

3. CARRY OUT THE FOLLOWING ENABLING ACTIVITIES IN ANY ORDER:

a. Leaf through the Soldier's Manual (FM 11-31M1/2).

- Note the table of contents, the task lists, and task descriptions.
- Notice that each task description includes Conditions, Standards, and Performance Measures (procedural steps). Read a few sentences and note the types of words used and the sentence structures.
- Look at the cabling diagrams as well as the pictures and diagrams of equipment, and consider the skills required for interpreting and using them.

b. Look at the table of contents in a TM.

- In the "List of Tables" at the end of the table of contents, find a table for preventive maintenance checks and services. Turn to the table and note its structure and its column headings.
- Next find a table for troubleshooting, and do the same thing. Read some of the entries in the column entitled "Malfunction" or "Symptom" and note the sentence structure.

c. Watch one videotaped demonstration of equipment operation. The equipment shown in the videotapes is not the equipment students work with in the 31M course, but it is similar in structure and operation. The narrator's delivery is like that which students will encounter in the course. As you watch and listen to the tape, put yourself in the place of a student, and think about the problems you would have remembering the content or taking notes on it.

4. COMPLETE "WORKSHEET 2 FOR INSTRUCTOR TRAINING."

Your instructor will schedule a session for discussing the worksheet.



## Lesson 5

### Knowledge of Equipment Required for Teaching FBSEP Unit VIII

**Objective:** You will recognize names of equipment components, controls, and indicators used in the 31M10 MOS.

**Conditions:** Given information in the Instructor Guide about radio and cable systems.

**Standard:** You will complete a worksheet ("Worksheet 3 for Instructor Training"), using the Instructor Guide.

**Media:** Instructor Guide, Introduction to Unit VIII

**Maximum Time Required:** 2 hours

#### **Introduction:**

Unit VIII of FBSEP is integrated with the AIT course and is taught sometime during Week 4 of the AIT course. The unit assumes some familiarity with the equipment used in the 31M MOS. Students acquire the necessary familiarity in their first 3 weeks of AIT instruction. This lesson is designed to give FBSEP instructors sufficient familiarity to help students who have trouble with any of the lessons in Unit VIII.

#### **Enabling Activities:**

1. In the Instructor Guide for Unit VIII, read the entire Introduction, pages i to v. Read this material carefully, and make sure that you understand it.
2. Complete "Worksheet 3 for Instructor Training," which begins on the next page. After you have finished, check your own answers in the Answer Key which follows the worksheet.

WORKSHEET 3 FOR INSTRUCTOR TRAINING

1. Match each equipment acronym on the left with its full name on the right, and put the number corresponding to the name in the space beside the acronym. (NOTE: Several acronyms may have the same name.)

- |          |                      |   |
|----------|----------------------|---|
| _____ a. | TD-660(*)/G          | (1) Receiver of the medium-capacity radio.    |
| _____ b. | TD-754/U             | (2) Low-capacity radio.                       |
| _____ c. | AN/GRC-103(V)        | (3) Multiplexer                               |
| _____ d. | R-1329(P)/GRC-103(V) | (4) Order wire                                |
| _____ e. | R-1331(P)/GRC        | (5) Transmitter of the medium-capacity radio. |
| _____ f. | TD-352/U             | (6) Transmitter of the low-capacity radio.    |
| _____ g. | TD-202/U             | (7) Receiver of the low-capacity radio.       |
| _____ h. | RT-773/GRC-103(V)    | (8) Medium-capacity radio.                    |
| _____ i. | TD-204/U             | (9) Telephone signal converter.               |
| _____ j. | AN/GRC-50(V)         |   |
| _____ k. | CV-1548/G            |   |
| _____ l. | T-893(P)/GRC         |   |
| _____ m. | T-983(P)/GRC-103(V)  |   |

2. Each item below is either a control or an indicator. If it is a control, circle C. If it is an indicator, circle I. (Remember: A control is something that the operator manipulates; an indicator gives information about the condition of the equipment.)

a. MANUAL RAISE-LOWER switch	C	I
b. AC POWER circuit breaker	C	I
c. Buzzer	C	I
d. Multimeter	C	I
e. LOW POWER indicator	C	I
f. Coupling control	C	I
g. AFC meter	C	I
h. Multimeter selector switch	C	I
i. DA-189/GRC meter	C	I
j. Voltmeter	C	I
k. INCOMING CALL lamp	C	I
l. AC VOLTS meter	C	I
m. HEATER switch	C	I
n. HEATER indicator	C	I
o. TEST ALIGN meter	C	I
p. METER SELECT switch	C	I
q. Selector switch II	C	I

3. On the following 4 pages are excerpts from Student Guides in Lessons 3 and 4. Fill in the blanks. This will give you practice with disentangling symptom descriptions.

ANSWER THE FOLLOWING QUESTIONS:

Each of the questions below gives a description of a symptom from a troubleshooting table. In the answer spaces, write a. the equipment being operated, b. the operator action, and c. the symptom that results.

1. CN-514/GRC POWER indicator does not light when POWER circuit breaker is operated to ON.
  - a. Equipment being operated: \_\_\_\_\_
  - b. Operator action: \_\_\_\_\_
  - c. Symptom that results: \_\_\_\_\_
  
2. Ceiling lights are not extinguished when assemblage door is opened and BYPASS BLACKOUT switch is at OFF.
  - a. Equipment being operated: \_\_\_\_\_
  - b. Operator action: \_\_\_\_\_
  - c. Symptom that results: \_\_\_\_\_
  
3. Incorrect indication on TD-204/U TEST ALIGN meter with METER SELECT switch at SERV FAC and SERV SEL switch at -10.
  - a. Equipment being operated: \_\_\_\_\_
  - b. Operator action: \_\_\_\_\_
  - c. Symptom that results: \_\_\_\_\_
  
4. T-983(P)/GRC-103(V) SYNC indicator does not extinguish within 10 seconds after AC POWER switch is operated to ON/RESET.
  - a. Equipment being operated: \_\_\_\_\_
  - b. Operator action: \_\_\_\_\_
  - c. Symptom that results: \_\_\_\_\_

5. TEST ALIGN meter fails to indicate yellow when selector switch 1 of TD-660A/G is at NOISE GEN.

a. Equipment being operated: \_\_\_\_\_

b. Operator action: \_\_\_\_\_

c. Symptom that results: \_\_\_\_\_

6. Incorrect or no indication on CV-1548/G TEST ALIGN meter with meter selector switch at 1600 ~.

a. Equipment being operated: \_\_\_\_\_

b. Operator action: \_\_\_\_\_

c. Symptom that results: \_\_\_\_\_

7. T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at OSC.

a. Equipment being operated: \_\_\_\_\_

b. Operator action: \_\_\_\_\_

c. Symptom that results: \_\_\_\_\_

3. T-983(P)/GRC-103(V) AC POWER and LOW POWER indicators do not light, buzzer is silent, and blower does not operate when AC POWER switch is operated to ON/RESET.

a. Equipment being operated: \_\_\_\_\_

b. Operator action: \_\_\_\_\_

c. Resulting symptom: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. T-983(P)/GRC-103(V) LOW POWER indicator does not extinguish within 60 seconds after AC POWER switch is operated to ON/RESET and meter indication is below normal with meter selector switch at 600 VDC.

(Hint: This symptom description includes just one equipment component but two operator actions.)

a. Equipment being operated: \_\_\_\_\_

b. Operator action: \_\_\_\_\_

c. Resulting symptom: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5. Incorrect indication on TD-754/G TEST ALIGN meter with METEK SELECT switch at CABLE CUR. CABLE CUR indicator lights and buzzer sounds.

a. Equipment being operated: \_\_\_\_\_

b. Operator action: \_\_\_\_\_

c. Resulting symptom: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6. ALARMS FRAME indicator of TD-352/U lights, buzzer sounds, and TEST ALIGN meter indicates in green area with meter select switch at PCM IN and TIMING IN.

a. Equipment being operated: \_\_\_\_\_

b. Operator action: \_\_\_\_\_

c. Resulting symptom: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

7. ALARMS FRAME indicator of TD-352/U, ALARMS TRAFFIC indicator of TD-202/U, and R-1331(P)/GRC SQUELCH NO SIGNAL indicator light, buzzer sounds, and no order wire.

a. Equipment being operated: \_\_\_\_\_

b. Operator action: \_\_\_\_\_

c. Resulting symptom: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

WORKSHEET 3 FOR INSTRUCTOR TRAINING

Answer Key

1. Match each equipment acronym on the left with its full name of the right, and put the number corresponding to the name in the space beside the acronym. (NOTE: Several acronyms may have the same name.)

- |                                    |   |
|------------------------------------|---|
| <u>(3)</u> a. TD-660(*)/G          | (1) Receiver of the medium-capacity radio.    |
| <u>(3)</u> b. TD-754/U             | (2) Low-capacity radio.                       |
| <u>(2)</u> c. AN/GRC-103(V)        | (3) Multiplexer                               |
| <u>(7)</u> d. R-1329(P)/GRC-103(V) | (4) Order wire                                |
| <u>(1)</u> e. R-1331(P)/GRC        | (5) Transmitter of the medium-capacity radio. |
| <u>(3)</u> f. TD-352/U             | (6) Transmitter of the low-capacity radio.    |
| <u>(3)</u> g. TD-202/U             | (7) Receiver of the low-capacity radio.       |
| <u>(4)</u> h. RT-773/GRC-103(V)    | (8) Medium-capacity radio.                    |
| <u>(3)</u> i. TD-204/U             | (9) Telephone signal converter.               |
| <u>(8)</u> j. AN/GRC-50(V)         |   |
| <u>(9)</u> k. CV-1548/G            |   |
| <u>(5)</u> l. T-893(P)/GRC         |   |
| <u>(6)</u> m. T-983(P)/GRC-103(V)  |   |

2. Each item below is either a control or an indicator. If it is a control, circle C. If it is an indicator, circle I. (Remember: A control is something that the operator manipulates; an indicator gives information about the condition of the equipment.)

- |                               |     |     |
|-------------------------------|-----|-----|
| a. MANUAL RAISE-LOWER switch  | (C) | I   |
| b. AC POWER circuit breaker   | (C) | I   |
| c. Buzzer                     | C   | (I) |
| d. Multimeter                 | C   | (I) |
| e. LOW POWER indicator        | C   | (I) |
| f. Coupling control           | (C) | I   |
| g. AFC meter                  | C   | (I) |
| h. Multimeter selector switch | (C) | I   |
| i. DA-189/GRC meter           | C   | (I) |
| j. Voltmeter                  | C   | (I) |
| k. INCOMING CALL lamp         | C   | (I) |
| l. AC VOLTS meter             | C   | (I) |
| m. HEATER switch              | (C) | I   |
| n. HEATER indicator           | C   | (I) |
| o. TEST ALIGN meter           | C   | (I) |
| p. METER SELECT switch        | (C) | I   |
| q. Selector switch II         | (C) | I   |

3. On the following 4 pages are excerpts from Student Guides in Lessons 3 and 4. Fill in the blanks. This will give you practice with disentangling symptom descriptions.

1. a. Equipment being operated: CN-514/GRC  
b. Operator action: Set POWER circuit breaker to ON.  
c. Symptom that results: POWER indicator does not light.
2. a. Equipment being operated: Assemblage  
b. Operator action: Open door. Set BYPASS BLACKOUT switch at OFF.  
c. Symptom that results: Ceiling lights are not extinguished (do not go out).

Notice that there are two operator actions in this symptom description.

3. a. Equipment being operated: TD-204/U  
b. Operator action: Set METER SELECT switch at SERV FAC. Set SERV SEL switch at -10.  
c. Symptom that results: Incorrect indication on TD-204/U TEST ALIGN meter

Again there are two operator actions in the symptom description.

4. a. Equipment being operated: T-983(P)/GRC(V)  
b. Operator action: Set AC POWER switch to ON/RESET.  
c. Symptom that results: SYNC indicator does not extinguish (go out) within 10 seconds.
5. a. Equipment being operated: TD-660A/G  
b. Operator action: Set selector switch 1 at NOISE GEN.  
c. Symptom that results: TEST ALIGN meter does not indicate yellow.

6. a. Equipment being operated: CV-1548/G
- b. Operator action: Set meter selector switch at 1600 ~.
- c. Symptom that results: Incorrect indication or no indication on  
CV-1548/G TEST ALIGN meter.
  
7. a. Equipment being operated: T-983(P)/GRC-103(V)
- b. Operator action: Set meter selector switch at OSC.
- c. Symptom that results: T-983(P)/GRC-103(V) meter indicates below  
normal.

3. a. Equipment being operated: T-983(P)/GRC-103(V)  
b. Operator action: Set AC POWER switch to ON/RESET.  
c. Resulting symptom: (1) AC POWER indicator does not light.  
(2) LOW POWER indicator does not light.  
(3) Buzzer is silent.  
(4) Blower does not operate.
4. a. Equipment being operated: T-983(P)/GRC-103(V)  
b. Operator action: Set AC POWER switch to ON/RESET. Set meter selector switch to 600 VDC.  
c. Resulting symptom: (1) LOW POWER indicator does not go out within 60 seconds.  
(2) Meter indication is below normal.
5. a. Equipment being operated: TD-754/G  
b. Operator action: Set METER SELECT switch at CABLE CUR.  
c. Resulting symptom: (1) TEST ALIGN meter shows incorrect indication.  
(2) CABLE CUR indicator is lighted.  
(3) Buzzer sounds.
6. a. Equipment being operated: TD-352/U  
b. Operator action: Set METER SELECT switch at PCM IN. Set METER SELECT switch at TIMING IN.  
c. Resulting symptom: (1) ALARMS FRAME indicator lights.  
(2) Buzzer sounds.  
(3) TEST ALIGN meter indicates in green area.

7. a. Equipment being operated: TD-352/U, TD-202/U, and R-1331(P)/GRC

b. Operator action: None given.

c. Resulting symptom: (1) ALARMS FRAME indicator of TD-352/U  
lights.

(2) ALARMS TRAFFIC indicator of TD-202/U  
lights.

(3) SQUELCH NO SIGNAL indicator of  
R-1331(P)/GRC lights.

Buzzer sounds.

No order wire.

## INTRODUCTION TO LESSONS 6 THROUGH 8

In Lessons 6 through 8, you will examine the FBSEP course, lesson by lesson, in detail. For each unit/lesson, you will first read descriptions of the skills being taught and their relation to the 31M10 AIT course. Then, you will read the lesson objectives, examine the materials used by the students, and relate student exercises to the terminal and enabling objectives of each lesson.

### Lesson 6

#### FBSEP Units I and II

**Objective:** You will be able to state the purpose of Units I and II, their relation to the AIT course, and the structure/content of each lesson. You will be able to state specific teaching strategies required by each lesson.

**Conditions:** Given an opportunity to examine all lesson materials, and the relevant sections of the Instructor Guide.

**Standard:** You will complete a worksheet ("Worksheet 4 for Instructor Training"), using the Instructor Guide.

**Media:** Instructor Guide, Units I and II.  
All lesson materials for Units I and II.

**Maximum Time Required:** 4 hours

#### Enabling Activities:

1. In the Instructor Guide, read the Introduction to Unit I, "Reading Comprehension." Note the following:
  - The relation of the unit to the 31M10 course and MOS.
  - Assumptions concerning reasons for poor reading comprehension in adults.
  - The purpose of the unit and of its individual lessons.
2. Activities for Unit I, Lesson 1, "Vocabulary":
  - a. Get a complete set of the materials required for Unit I, Lesson 1. This includes:

- Student Guide

- Audiotape: Unit I, Lesson 1, Word Lists

- Checkpoints:

- 1, Form A
- 1, Form B
- 2, Form A
- 2, Form B
- 3, Form A
- 3, Form B
- 4, Form A
- 4, Form B
- 5, Form A
- 5, Form B
- 6, Form A
- 6, Form B

- Review Exercise 1

- Review Exercise 2

b. Note that this lesson has several special instructional needs:

- (1) It includes more checkpoints than any other lesson, one at the end of each section (A through F).
- (2) Each of the first five sections (A-E) begins with a pretest. Students who pass the pretest for a section omit that section as well as the checkpoint at the end of the section. (However, Section F does not contain a pretest. All students must do Section F and the checkpoint at the end.)
- (3) Before doing each pretest, students listen to an audiotape which provides the correct pronunciation of each word in the test, as well as a sentence in which the word is used.
- (4) Two Review Exercises are provided. Review Exercise 1 is assigned if students fail any Checkpoints 1, 2, 3, 4, 5, Form A. Review Exercise 2 is assigned if students fail Checkpoint 6, Form A.

c. In the Instructor Guide, read the terminal objective, the lesson structure, and the enabling objectives.

d. Skim the Student guide. Match each exercise with the corresponding enabling objective in the Instructor Guide.

- e. Listen to part of the audiotape containing the five word lists.
- f. In the Instructor Guide, read the rules for scoring the word tests. Note the cutoff point for each test, and the action taken by the instructor as a function of student scores.
- g. In the Instructor Guide, read the rules for administering and scoring checkpoints.
- h. Examine the checkpoints.
- i. Examine the Review Exercises 1 and 2.
- j. If you have any questions about the lesson, write them down here for later discussion.

3. Activities for Unit I, Lesson 2, "Strategies for Understanding Sentences."

- a. Get a complete set of the materials required for Unit I, Lesson 2:
  - Student Guide
  - Checkpoints:
    - 1, Form A
    - 1, Form B
    - 2, Form A
    - 2, Form B
  - Review Exercise 1
  - Review Exercise 2

- b. This lesson has the following special needs:
- (1) It includes two checkpoints, Checkpoint 1 at the end of Section B and Checkpoint 2 at the end of the lesson. Students who fail Checkpoint 1, Form A do Review Exercise 1 and Checkpoint 1, Form B, before continuing the lesson. Students who fail Checkpoint 2, Form A do Review Exercise 2 and Checkpoint 2, Form B.
  - (2) At several places in Section B, students are instructed to go to the instructor for some purpose - to ask a question or to have something checked. Careful monitoring to insure compliance may be needed.
- c. In the Instructor Guide, read the terminal objective, the lesson structure, and the enabling objectives.
- d. Skim the Student Guide. In Section B, watch for the places where the student is directed to seek information from the instructor. In all the sections, match each exercise with the corresponding enabling objective in the Instructor Guide.
- e. In the Instructor Guide, read the rules for administering and scoring checkpoints.
- f. Look through the checkpoints.
- g. Skim Review Exercises 1 and 2.
- h. If you have any questions about Unit I, Lesson 2, write them down here for later discussion.

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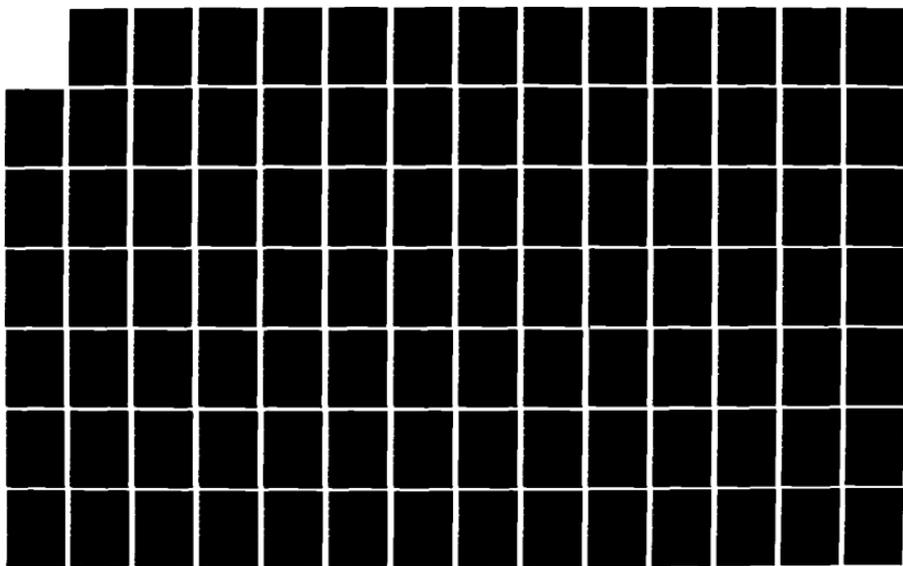
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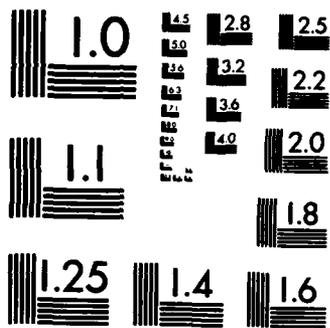
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4. Activities for Unit I, Lesson 3, "Reading Negative Sentences."

- a. Get a complete set of the materials required for Unit I, Lesson 3:

- Student Guide

- Checkpoints:

1, Form A

1, Form B

- Review Exercise

- b. Note that Lesson 2 is prerequisite to Lesson 3. All students assigned to Lesson 3 must complete Lesson 2 first.

If a student's prescription includes Unit I, Lesson 3, but not Unit I, Lesson 2, there is an error. If this happens, add Lesson 2 to the prescription and assign it first.

- c. In the Instructor Guide, read the terminal objective, the lesson structure, and the enabling objectives.
- d. Skim the Student Guide. Match each exercise with the corresponding enabling objective in the Instructor Guide.
- e. In the Instructor Guide, read the rules for administering and scoring checkpoints.
- f. Look through the checkpoints.
- g. Skim the Review Exercise.
- H. If you have any questions about Unit I, Lesson 3, write them down here for later discussion.

5. Activities for Unit I, Lesson 4, "Reading Sentences with Dependent Clauses."

a. Get a complete set of the materials required for Unit I, Lesson 4:

- Student Guide

- Checkpoints:

1, Form A

1, Form B

- Review Exercise

b. Note that Lesson 2 is prerequisite to Lesson 4. All students assigned to Lesson 4 must complete Lesson 2 first.

If a student's prescription includes Unit I, Lesson 4, but not Unit I, Lesson 2, there is an error. If this happens, add Lesson 2 to the prescription and assign it first.

c. In the Instructor Guide, read the terminal objective, the lesson structure, and the enabling objectives.

d. Skim the Student Guide. Match each exercise with the corresponding enabling objective in the Instructor Guide.

e. In the Instructor Guide, read the rules for administering and scoring checkpoints.

f. Look through the checkpoints.

g. Skim the Review Exercise.

h. If you have any questions about Unit I, Lesson 4, write them down here for later discussion.

6. Activities for Unit 1, Lesson 5, "Ordering One, Two, or Three Tasks."

a. Get a complete set of the materials required for Unit 1, Lesson 5:

- Student Guide

- Checkpoints:

1, Form A

1, Form B

- Review Exercise

b. In the Instructor Guide, read the terminal objective, the lesson structure, and the enabling objectives.

c. Skim the Student Guide. Match each exercise with the corresponding enabling objective in the Instructor Guide.

d. In the Instructor Guide, read the rules for administering and scoring checkpoints.

e. Look through the checkpoints.

f. Skim the Review Exercise.

g. If you have any questions about Unit 1, Lesson 5, write them down here for later discussion.

7. **Activities for Unit I, Lesson 6, "Determining the Order of Steps: Multiple Actions."**

- a. **Get a complete set of the materials required for Unit I, Lesson 6:**
  - **Student Guide**
  - **Checkpoints:**
    - 1, Form A
    - 1, Form b
  - **Review Exercise**
- b. **In the Instructor Guide, read the terminal objective, the lesson structure, and the enabling objectives.**
- c. **Skim the Student Guide. Match each exercise with the corresponding enabling objective in the Instructor Guide.**
- d. **In the Instructor Guide, read the rules for administering and scoring checkpoints.**
- e. **Look through the checkpoints.**
- f. **Skim the Review Exercise.**
- g. **If you have any questions about Unit I, Lesson 6, write them down here for later discussion.**

8. Activities for Unit I, Lesson 7, "Understanding Lists and Paragraphs."
  - a. Get a complete set of the materials required for Unit I, Lesson 7:
    - Student Guide
    - Checkpoints:
      - 1, Form A
      - 1, Form B
    - Review Exercise
  - b. In the Instructor Guide, read the terminal objective, the lesson structure, and the enabling objectives.
  - c. Skim the Student Guide. Match each exercise with the corresponding enabling objective in the Instructor Guide.
  - d. In the Instructor Guide, read the rules for administering and scoring checkpoints.
  - e. Look through the checkpoints.
  - f. Skim the Review Exercise.
  - g. If you have any questions about Unit I, Lesson 7, write them down here for later discussion.

9. In the Instructor Guide, read the Introduction to Unit II, "Using a Table of Contents."
10. Activities for Unit II, Lesson 1, "Chapters and Sections."
  - a. Get a complete set of the materials required for Unit II, Lesson 1:
    - Student Guide
    - Checkpoints:
      - 1, Form A
      - 1, Form B
    - Review Exercise
  - b. In the Instructor Guide, read the terminal objective, the lesson structure, and the enabling objectives.
  - c. Skim the Student Guide. Match each exercise with the corresponding enabling objective in the Instructor Guide.
  - d. In the Instructor Guide, read the rules for administering and scoring checkpoints.
  - e. Look through the checkpoints.
  - f. Skim the Review Exercise.
  - g. If you have any questions about Unit II, Lesson 1, write them down here for later discussion.

11. Activities for Unit II, Lesson 2, "Using a Task List to Find a Task Description."

a. Get a complete set of the materials required for Unit II, Lesson 2. This includes:

- Student Guide
- Soldier's Manual (FM 11-31M1/2)
- Checkpoints:
  - 1, Form A
  - 1, Form B
  - 2, Form A
  - 2, Form B
- Review Exercise 1
- Review Exercise 2

b. This lesson has the following special instructional needs:

- (1) It includes two checkpoints and two review exercises. Checkpoint 1 comes at the end of Section C and Checkpoint 2 at the end of the lesson. Students who fail Checkpoint 1, Form A should do Review Exercise 1 and Checkpoint 1, Form B, before continuing the lesson. Students who fail Checkpoint 2, Form A should do Review Exercise 2 followed by checkpoint 2, Form B.
- (2) It requires the student to use a copy of the Soldier's Manual in addition to the Student Guide.

- c. In the Instructor Guide, read the terminal objective, the lesson structure, and the enabling objectives.
- d. Skim the Student Guide. Match each exercise with the corresponding enabling objective in the Instructor Guide.
- e. In the Instructor Guide, read the rules for administering and scoring checkpoints.
- f. Look through the checkpoints.
- g. Skim Review Exercises 1 and 2.

- h. If you have any questions about Unit II, Lesson 2, write them down here for later discussion.

12. Activities for Unit II, Lesson 3, "Tables with Paragraph Numbers and Page Numbers."

- a. Get a complete set of the materials required for Unit II, Lesson 3. This includes:

- Student Guide
- Checkpoints:
  - 1, Form A
  - 1, Form B
- Review Exercise 1
- Review Exercise 2

- b. This lesson has the following special instructional needs:

- (1) Review Exercise 2 is an "extra" review exercise on Roman numerals. It is assigned at the instructor's discretion, to students who appear to have trouble reading and differentiating Roman numerals. Its assignment is not contingent on a checkpoint failure.
- (2) The last exercise in Review Exercise 2 is checked by the instructor, but there is no checkpoint assigned after this review exercise.

- c. In the Instructor Guide, read the terminal objective, the lesson structure, and the enabling objectives.
- d. Skim the Student Guide. Match each exercise with the corresponding enabling objective in the Instructor Guide.

- e. In the Instructor Guide, read the rules for administering and scoring checkpoints.
- f. Look through the checkpoints.
- g. Skim Review Exercises 1 and 2.
- h. If you have any questions about Unit II, Lesson 3, write them down here for later discussion.

13. COMPLETE WORKSHEET 4 FOR INSTRUCTOR TRAINING.  
Your instructor will schedule a session for discussion of the worksheet, as well as any questions you have about Units I and II.

WORKSHEET 4 FOR INSTRUCTOR TRAINING

Use the Instructor Guide to answer the following questions.

Unit 1

1. Which lessons in this unit have special instructional needs?
  
  
  
  
  
  
  
  
  
  
2. One kind of equipment students learn to work with in the 31M10 AIT course is a multiplexer. Would words like "multiplexer" be taught in Lesson 1 of Unit 1? \_\_\_\_\_  
  
Why or why not?
  
  
  
  
  
  
  
  
  
  
3. Some of the sentences which students have to read in Lesson 2 deal with the function of the oscillator in the radio transmitter. Is the student expected to memorize the information in these sentences? \_\_\_\_\_
  
  
  
  
  
  
  
  
  
  
4. a. Which lesson in Unit 1 deals with reading words? \_\_\_\_\_  
b. Which lessons deal with interpreting sentences? \_\_\_\_\_  
c. Which lessons deal with following step-by-step instructions in the correct order? \_\_\_\_\_  
d. Which lesson deals with reading larger units of discourse, like paragraphs? \_\_\_\_\_

5. In Lesson 1, which is the first point at which the student is instructed to have something checked by the instructor?
- \_\_\_\_\_
6. In Lesson 1, how many tests for word lists are there? \_\_\_\_\_
7. In the Test for Word List II in Section B, Charles got 13 items correct. What should Charles do next? \_\_\_\_\_
8. In the Test for Word List III in Section C, Anne got 13 items correct. What should Anne do next? \_\_\_\_\_
9. a. How many checkpoints are in Lesson 2? \_\_\_\_\_
- b. Checkpoint 1 occurs at the end of Section \_\_\_\_\_
10. In Lesson 2, students are taught five guidelines for understanding sentences. These are 5 strategies that students apply to sentences in order to figure out what the sentences say. Students are never really tested on whether they use the guidelines or not. What are some methods you can use to determine whether a student is really using the guidelines as instructed?
11. In Unit I, Lesson 2 is prerequisite to \_\_\_\_\_
12. In Lesson 4, Joe takes Checkpoint 1, Form A and scores 9 correct. What should the instructor do?

13. In Lesson 6, Arthur scores 7 correct on Checkpoint 1, Form A. What should the instructor do?

## Unit II

1. Which lesson in this unit has two checkpoints? \_\_\_\_\_
2. Which lesson requires students to use the Soldier's Manual?  
\_\_\_\_\_

## Lesson 7

### FBSEP Units III and IV

**Objective:** You will be able to state the purpose of Units III and IV, their relation to the AIT course, and the structure/content of each lesson. You will be able to state specific teaching strategies required by each lesson.

**Conditions:** Given an opportunity to examine all lesson materials, and the relevant sections of the Instructor Guide.

**Standard:** You will complete a worksheet ("Worksheet 5 for Instructor Training"), using the Instructor Guide.

**Media:** Instructor Guide, Units III and IV.  
All lesson materials for Units III and IV, including audiotapes, videotapes, and playback equipment. The specific tapes and equipment needed for each lesson are listed with the enabling activities for the lesson.

**Maximum Time Required:** 4 hours

#### **Introduction:**

Due to media requirements, administration of lessons in FBSEP Units III and IV differs from that of most lessons in other units. These differences include:

1. Since much of the instruction is delivered by means of audiotape or videotape, you must provide students with the necessary tapes and make sure that they know how to operate the playback equipment. Students must be able to:

- Turn the equipment on
- Insert the tape
- Play the tape
- Use the counter to keep track of elapsed time
- Stop the tape
- Rewind the tape to any desired counter position
- Reset the counter to zero
- Turn the equipment off

2. Note that students are permitted to rewind the tape, in order to listen to or watch segments over again, in all the lessons of these two units.
3. Note that scripts or outlines of all tapes used in each lesson are provided in the Instructor Guide.

In the rest of this lesson, you will examine lessons in Units III and IV in detail.

Enabling Activities:

1. In the Instructor Guide, read the Introduction to Unit III, "Listening Skills." Note that this unit teaches strategies for focusing attention, encoding, and retrieval of information from lectures (Lesson 1) and demonstrations (Lesson 2), as well as control strategies for identifying points in a lecture or demonstration where information is missing (Lesson 3).
2. Note that each lesson in Unit III has only one form of the checkpoint with no alternate form. If a student fails the checkpoint, do the following:
  - a. Give the student his/her score (number correct), and show the student which questions he/she answered incorrectly. But do not tell the student the correct answers.
  - b. Tutor the student in terms of types of errors he/she is making.
  - c. Direct the student to review relevant parts of the lesson in the Student Guide (Lesson 1); or provide the student with the Review Exercise (Lessons 2 and 3).
  - d. Have the student take the checkpoint again, answering only the questions missed the first time.
3. Lesson 1 has no Review Exercise. Students who fail Checkpoint 1, Form A/B on the first administration are directed to review relevant sections of the Student Guide before taking the checkpoint a second time. However, Lessons 2 and 3 do include Review Exercises.

4. Activities for Unit III, Lesson 1, "Remembering Information Heard in Lectures."

- a. Get a complete set of the materials required for Lesson 1. This includes:

- Student Guide
- Checkpoint 1, Form A/B (question booklet)
- cassette tape recorder
- the following audiotapes:

Unit III, Lesson 1, Practice Exercises

Unit III, Lesson 1, Checkpoint 1, Form A/B

- b. In the Instructor Guide, read the terminal objective, the lesson structure, and the enabling objectives.
- c. Look through the Student Guide. Notice that each section instructs students to listen to part of the tape of practice exercises. You will probably not have time to listen to all the practice exercises, but listen to a few parts. Remember that there is a script or outline of the tape in the Instructor Guide.
- d. Match each exercise in the Student Guide with the corresponding enabling objective in the Instructor Guide.
- e. In the Instructor Guide, read the rules for administering and scoring the checkpoint.
- f. Look through the script or outline for the checkpoint audiotape, and examine the checkpoint questions.
- g. If you have any questions about Unit III, Lesson 1, write them down here for later discussion.

5. **Activities for Unit III, Lesson 2, "Remembering Information Seen in Demonstrations."**

- a. **Get a complete set of the materials required for Lesson 2. This includes:**

- Student Guide
- Checkpoint 1, Form A/B (question booklet)
- Review Exercise
- videotape playback equipment
- the following videotapes:

Unit III, Lesson 2, Practice Exercises

Unit III, Lesson 2, Checkpoint 1, Form A/B

- b. In the Instructor Guide, read the terminal objective, the lesson structure, and the enabling objectives.
- c. Look through the Student Guide. Notice that students must watch part of the videotape practice exercises in each section. You will probably not have time to watch all the practice exercises, but watch a few parts. Remember that a script or outline of the tape is in the Instructor Guide.
- d. Match each exercise in the Student Guide with the corresponding enabling objective in the Instructor Guide.
- e. In the Instructor Guide, read the rules for administering and scoring the checkpoint.
- f. Look through the script or outline for the checkpoint videotape, and examine the checkpoint questions.
- g. Skim through the Review Exercise.
- h. If you have any questions about Unit III, Lesson 2, write them down here for later discussion.

6. Activities for Unit III, Lesson 3, "Recognizing When Important Information is Missing."

a. Get a complete set of the materials required for Lesson 3. This includes:

- Student Guide
- Checkpoint 1, Form A/B (question booklet)
- Review Exercise
- cassette tape recorder
- videotape playback equipment
- audiotape: Unit III, Lesson 3, Practice Exercise 1
- the following videotapes:

Unit III, Lesson 3, Practice Exercise 2

Unit III, Lesson 3, Checkpoint 1, Form A/B

- b. In the Instructor Guide, read the terminal objective, the lesson structure, and the enabling objectives.
- c. Skim through the Student Guide. Notice that the audiotape Practice Exercise 1 is used with Section B, and the videotape Practice Exercise 2 is used with Section C. Listen to or watch part of each tape. Remember that scripts or outlines are in the Instructor Guide.
- d. Match each exercise in the Student Guide with the corresponding enabling objective in the Instructor Guide.
- e. In the Instructor Guide, read the rules for administering and scoring the checkpoint.
- f. Look through the script or outline for the checkpoint videotape, and examine the checkpoint questions.
- g. Skim through the Review Exercise.
- h. If you have any questions about Unit III, Lesson 3, write them down here for later discussion.

7. In the Instructor Guide, read the Introduction to Unit IV, "Note-Taking for Demonstration."
8. The lessons of Unit IV have certain special instructional requirements which must be carefully noted:
  - a. The purpose of Unit IV is to teach students to take good notes during a demonstration, then to use those notes to answer questions and direct their activities later, after the demonstration is over. Therefore, instructors should monitor students closely during the lessons, to ensure that students answer the exercise questions in their Student Guides based on their notes after watching the videotape, rather than while they are watching the videotape.
  - b. For the same reason, checkpoints are administered as follows:
    - (1) The student is provided with the checkpoint videotape and the accompanying "Instructions for Students," but not with the checkpoint booklet.
    - (2) The student watches the videotape and takes notes. He/she is permitted to rewind as often as desired.
    - (3) The student waits for at least half an hour. During this time, he/she may start on another lesson, take a break, go to lunch, or engage in some other activity, depending on the time of day and the instructor's discretion.
    - (4) After at least one-half hour has passed, the student is given the booklet for Checkpoint 1, Form A, and uses his/her notes to answer the questions.
  - c. The Instructor Guide provides a set of Demonstration Notes for each checkpoint. If a student fails a checkpoint, Form A, compare his/her notes with the demonstration notes, then indicate to the student the kinds of errors and/or omissions in his/her notes.
  - d. After they have been tutored, students who failed a checkpoint must:
    - (1) re-view the checkpoint videotape and correct their notes.
    - (2) wait one-half hour.
    - (3) complete the checkpoint booklet, Form B.

7. Activities for Unit IV, Lesson 1, "Basic Note-Taking Skills."

a. Get a complete set of materials required for Lesson 1. This includes:

- Student Guide
- Checkpoint 1, Form A (question booklet)
- Checkpoint 1, Form B (question booklet)
- videotape playback equipment
- the following videotapes:

Unit IV, Lesson 1, Practice Exercises

Unit IV, Lesson 1, Checkpoint 1, Form A/B

- "Instructions for Students," to accompany the checkpoint videotape.

- b. In the Instructor Guide, read the terminal objective, the lesson structure, and the enabling objectives.
- c. Skim through the Student Guide. Notice that students are instructed to watch the videotape practice exercise during Section E. Play part of the tape. A script or outline of the tape is in the Instructor Guide.
- d. Match each exercise in the Student Guide with the corresponding enabling objective in the Instructor Guide.
- e. In the Instructor Guide, read the rules for administering and scoring the checkpoint.
- f. Look through the script or outline for the checkpoint videotape, and examine the checkpoint questions.
- g. If you have any questions about Unit IV, Lesson 1, write them down here for later discussion.

10. Activities for Unit IV, Lesson 2, "Taking Notes to Show Sequence."

a. Get a complete set of materials required for Lesson 2. This includes:

- Student Guide
- Checkpoint 1, Form A (question booklet)
- Checkpoint 1, Form B (question booklet)
- videotape playback equipment
- the following videotapes:

Unit IV, Lesson 2, Practice Exercises

Unit IV, Lesson 2, Checkpoint 1, Form A/B

- Card Set 1 and Card Set 2 (used during Exercises 3 and 4).
- "Instructions to Students," to accompany the checkpoint videotape.

b. Note that Lesson 1 is prerequisite to Lesson 2. All students assigned to Lesson 2 must complete Lesson 1 first.

If a student's prescription includes Unit IV, Lesson 2, but not Unit IV, Lesson 1, there is an error. If this happens, add Lesson 1 to the prescription and assign it before Lesson 2.

c. In the Instructor Guide, read the terminal objective, the lesson structure, and the enabling objectives.

d. Skim through the Student Guide. Notice that students are instructed to watch the videotape practice exercise during Section C. Play part of the tape. A script or outline of the tape is in the Instructor Guide.

e. Match each exercise in the Student Guide with the corresponding enabling objective in the Instructor Guide.

f. Note the use of the Card Sets in Exercises 3 and 4.

g. In the Instructor Guide, read the rules for administering and scoring the checkpoints.

- h. Look through the script or outline for the checkpoint videotape, and examine the checkpoint questions.
- i. If you have any questions about Unit IV, Lesson 2, write them down here for later discussion.

11. Activities for Unit IV, Lesson 3, "Taking Notes to Show Relationships."

- a. Get a complete set of materials required for Lesson 3. This includes:

- Student Guide
- Checkpoint 1, Form A (question booklet)
- Checkpoint 1, Form B (question booklet)
- videotape playback equipment
- the following videotapes:

Unit IV, Lesson 3, Practice Exercises

Unit IV, Lesson 3, Checkpoint 1, Form A/B

- "Instructions to Students," to accompany the checkpoint videotape.

- b. Note that Lesson 1 is prerequisite to Lesson 3. All students assigned to Lesson 3 must complete Lesson 1 first.

If a student's prescription includes Unit IV, Lesson 3, but not Unit IV, Lesson 1, there is an error. If this happens, add Lesson 1 to the prescription and assign it before Lesson 3.

- c. In the Instructor Guide, read the terminal objective, the lesson structure, and the enabling objectives.
- d. Skim through the Student Guide. Notice that students are instructed to watch the videotape practice exercise during Section C. Play part of the tape. A script or outline of the tape is in the Instructor Guide.
- e. Match each exercise in the Student Guide with the corresponding enabling objective in the Instructor Guide.
- f. In the Instructor Guide, read the rules for administering and scoring the checkpoints.
- g. Look through the script or outline for the checkpoint videotape, and examine the checkpoint questions.
- h. If you have any questions about Unit IV, Lesson 3, write them down here for later discussion.

12. COMPLETE WORKSHEET 5 FOR INSTRUCTOR TRAINING.  
Your instructor will schedule a session for discussion of the worksheet, as well as any questions you have about Units III and IV.

WORKSHEET 5 FOR INSTRUCTOR TRAINING

1. Which lessons in Units III and IV require the use of audiotapes?  
\_\_\_\_\_
  
2. Which lesson in Unit III requires both an audiotape and a videotape of practice exercises? \_\_\_\_\_
  
3. Pvt. Tom Jones missed items 3, 5, 6, and 8 in the checkpoint for Unit III, Lesson 2.
  - a. What kind of feedback do you give Pvt. Jones about his examination performance?
  
  
  
  
  
  
  
  
  
  
  - b. After you have tutored Pvt. Jones about the types of errors he has made, what must he do next?
    - (1)
  
  
  
  
  
    - (2)
  
  
  - c. When Pvt. Jones takes the checkpoint a second time, which questions must he answer? \_\_\_\_\_
  
4. A student just starting Lesson 1 of Unit IV asks you, "Am I allowed to rewind the tape and watch sections over again?" What do you answer? Yes \_\_\_\_\_ No \_\_\_\_\_

5. Pvt. Mary Smith missed items 1, 2, 6, 7, and 9 in the Checkpoint, Form A for Unit IV, Lesson 2.
- a. What do you do with Pvt. Smith's notes?
  
  
  - b. What must Pvt. Smith do next?
    - (1)
    - (2)
    - (3)
    - (4)
6. Cpl. John Doe has just finished watching the videotape for the checkpoint in Unit IV, Lesson 1 and taking notes. What must he do next?
7. In Unit IV, Pvt. Alice Brown has been assigned to Lessons 2 and 3 only. What is wrong with her prescription?

## Lesson 8

### FBSEP Units V, VI, VII, VIII, IX

**Objective:** You will be able to state the purpose of Units V, VI, VII, VIII, and IX, their relation to the AIT course, and the structure/content of each lesson. You will be able to state specific teaching strategies required by each lesson.

**Conditions:** Given an opportunity to examine all lesson materials, and the relevant sections of the Instructor Guide.

**Standard:** You will complete a worksheet ("Worksheet 6 for Instructor Training"), using the Instructor Guide.

**Media:** Instructor Guide, Units V, VI, VII, VIII, and IX.  
All lesson materials for Units V, VI, VII, VIII, and IX.

**Maximum Time Required:** 4 hours

#### Introduction:

The remaining FBSEP lessons follow the same basic format and have no special instructional requirements. Only a few things need to be mentioned before you begin examining the lessons themselves:

1. All the units are front-loaded except Unit VIII, which is integrated with week 4 of the AIT course.
2. Unit VI, Lesson 1 is identical with Unit VII, Lesson 1. That is, the first lesson of Unit VI is also the first lesson of Unit VII.

#### Enabling Activities:

In each unit, do the following:

1. Read the Introduction to the unit in the Instructor Guide.
2. For each lesson in the unit, do the following:
  - a. Get a complete set of the materials required for the lesson. This includes:
    - Student Guide
    - Checkpoint 1, Form A

- Review Exercise

- Checkpoint 1, Form B

- b. In the Instructor Guide, read the terminal objective, the lesson structure, and the enabling objectives.
- c. Skim through the Student Guide. Match each exercise with the corresponding enabling objective in the Instructor Guide.
- d. In the Instructor Guide, read the rules for administering and scoring checkpoints.
- e. Look through the checkpoints.
- f. Skim through the Review Exercise.
- g. If you have any questions about the lesson, write them in the spaces provided below for later discussion.
- h. When you have finished with the last lesson, complete Worksheet 6 for Instructor Training. Your instructor will schedule a session to discuss the worksheet.

Write any questions you have about each lesson below:

Unit V, Lesson 1

Unit VI, VII, Lesson 1

Unit VI, Lesson 2

Unit VI, Lesson 3

Unit VII, Lesson 2

Unit VIII, Lesson 1

Unit VIII, Lesson 2

Unit VIII, Lesson 3

Unit VIII, Lesson 4

Unit IX, Lesson 1

Unit IX, Lesson 2

Unit IX, Lesson 3

Unit IX, Lesson 4

WORKSHEET 6 FOR INSTRUCTOR TRAINING

1. Pvt. White's prescription assigns him to Unit VIII, Lessons 3 and 4. When will he receive instruction in these lessons?
  
2. Pvt. Blue has been assigned to all the lessons of Units VI and VII. List all the lessons she must complete.
  
3. In Unit VI, Lesson 2, Pvt. Blue (of Item #2 above) scored 10/10 on Checkpoint 1, Form A. What should she do next?
  
4. In Unit VI, Lesson 3, Pvt. Blue scored 7/10 on Checkpoint 1, Form A. Should she now go on to her next assigned lesson? \_\_\_\_\_
  
5. In most FBSEP lessons, a Review Exercise is assigned if  

---
  
6. Pvt. Black scored 5/10 on Checkpoint 1, Form B of Unit VIII, Lesson 2. What happens next?

## Lesson 9

### Discussion Session on Administrative Problems

- Objective:** You will arrive at possible solutions to five cases illustrating problems in administering FBSEP lessons.
- Conditions:** Given descriptions of five administrative problems.
- Standard:** Instructors will first write their own proposed solutions, individually, then will discuss each case as a group.
- Media:** Worksheet: Discussion Session on Administrative Problems
- Maximum Time Required:** Half-hour for writing individual solutions  
Half-hour for group discussion  
Total: 1 hour

#### Enabling Activities:

1. On the worksheet, read and consider each case carefully. Then write down, briefly, your own proposed solution to each problem.
2. In the discussion which follows, take notes on solutions and suggestions offered by the group.

## WORKSHEET 7 FOR INSTRUCTOR TRAINING

### DISCUSSION SESSION ON ADMINISTRATIVE PROBLEMS

#### Introduction

This session is designed to give you an opportunity to discuss student problems you might encounter during lessons that have special media requirements and exceptions to the general instructional procedures. There are five cases for you to discuss as a group. There are no right or wrong answers for the cases. Group consensus will decide the "best" way to handle a given situation. Each case is followed by a YOUR SOLUTION section and a NOTES section in which you can write down possible solutions to the problems. You can then use your notes as a quick reference later on during the actual FBSEP course.

#### Case 1

Private Simpson is working on Unit 1, Lesson 1, Vocabulary. He took the test for Word List 1 without listening to the tape, and brings it to you for scoring. He says he knows the definitions of the words on the first test.

What would you do here? Score the test? Make him take the test again, using the tape as designated?

YOUR SOLUTION:

NOTES:

Case 2

Four students have been working on Unit I, Lesson 2, Strategies for Understanding Sentences, for at least 20 minutes. No one has asked you for a definition and no one is reading statements aloud.

What would you do here?

YOUR SOLUTION:

NOTES:

Case 3

Private Ellington is working on Unit III, Lesson 1, Remembering Information Heard in Lectures. He has failed Checkpoint 1, Form A/B for a second time. (He scored 7 correct the second time around. This is an improvement over his first checkpoint score of 4 correct.)

What would you do here?

YOUR SOLUTION:

NOTES:

Case 4

Private Frederickson is working on Unit III, Lesson 2, Remembering Information Seen in Demonstrations. She keeps falling asleep while watching the videotape.

What would you do here?

YOUR SOLUTION:

NOTES:

Case 5

Private Lawson is working on Unit IV, Lesson 3, Taking Notes to Show Relationships. He is on Exercise 4, and he wants to see part of the tape over again, but he forgot to reset the counter to zero.

What would you do here?

YOUR SOLUTION:

NOTES:

Lesson 10

Effective Communication in FBSEP

**Objective:** You will be able to describe appropriate techniques for tutoring, questioning, and communicating with students in FBSEP.

**Condition:** Given information sheets on communication techniques.

**Standard:** You will complete Worksheet 8 for Instructor Training, based on the information sheets.

**Media:** Instructor Guide, Introduction, pp. 1-18.  
Three information sheets included in this Student Guide:

- #1. Effective Communications/Interpersonal Skills
- #2. Questioning Techniques
- #3. Effective Communication

**Maximum Time Required:** 1 hour

**Enabling Activities:**

1. Re-read the section of the Instructor Guide on "Learning/Teaching Strategies" (pp. 3-10).
2. Read the three information sheets on the pages following this one.
3. Complete Worksheet 8 for Instructor Training. Your instructor will schedule a session for discussing the worksheet.

## EFFECTIVE COMMUNICATIONS/INTERPERSONAL SKILLS

### Overview

The classroom is not a "depersonalized" setting. Rather, it is a collection of individuals - students and teachers - who relate to one another both formally and informally. The manner in which the informal relationships are handled has a significant effect on the more formal requirements of the students. The more threatening or supportive the informal relations become, the more likely the student's academic and classroom behaviors will be affected.

As a 31M10 FBSEP instructor, you will not be assuming the role of the traditional teacher. Instead, you will be serving as a facilitator, a tutor, and a manager. These may or may not be new roles for you. The following statements help describe what is meant by each role.

Facilitator. A facilitator is someone who takes actions which make it easier for the student to move forward toward his/her goal - mastery of the FBSEP materials. The facilitator is responsible for seeing that the student's goal is achieved in a smooth and effective manner.

Tutor. The tutor works with the student on a one-to-one basis to determine why the student is experiencing difficulty with the materials. This involves building rapport with the student and employing questioning techniques which will result in the necessary information. Based on the information, the tutor will make decisions concerning remediation. The tutor is responsible for helping the student identify problem areas and providing ways by which the student can overcome these difficulties.

Manager. The manager not only handles the paper work, but the students as well. The manager sets the classroom "tone" and establishes the range of tolerable behavior for the students. He/she must also be aware of student indicators (verbal and non-verbal) which require instructor intervention. The manager is responsible for managing material flow, handling the students in the classroom, and keeping accurate records.

Right now, you may be asking yourself how you can do all of these things. The roles assumed by the FBSEP instructor are based on effective communications and interpersonal skills. Also, these roles are not necessarily cut and dried. You do not stop being a facilitator and start being a tutor, but rather the two blend together to the benefit of the student. The following sets of guidelines are provided to assist you in fulfilling the requirements of the various roles.

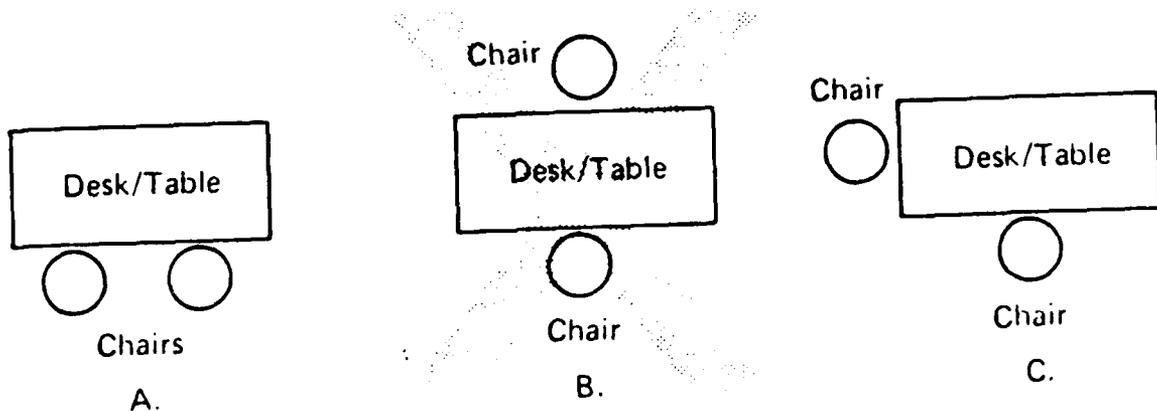
### Guidelines for Being A Facilitator

1. Be sure the student understands the directions for the lesson he/she is going to work on. Offer to go over the directions a second time.
2. Begin to establish good rapport with the student by being pleasant and non-threatening. This will aid in creating a comfortable atmosphere.
3. Assure the student that you are available as a resource person should questions or problems arise while he/she is working through the materials.
  - a. QUESTIONS: Answer questions as best you can. If you do not know the answer to a question, don't be afraid to admit it. You are not expected to be an expert on the 31M10 course or on Army rules and regulations. Offer to get the answer for the student, or refer the student to the appropriate person.
  - b. PROBLEMS: If there are problems with the materials or audiovisual equipment, try to deal with them in an open, friendly manner. Try not to reflect irritation or anger. The student might perceive your reactions as negative evaluations of something he/she did or did not do. Remember, problems with the material or equipment are not a comment on your worth as an instructor.

### Guidelines for Being a Tutor

1. Make the student feel at ease. Arrange the chairs so you can both see the papers at the same time. The standard arrangement with a desk between you isn't helpful in achieving the necessary interaction. (See the figure below.)
2. Give your full attention to the student. Try not to be interrupted while tutoring.
3. Reward and encourage good performance by using positive statements. For example, "I see you did quite well on these items," is one type of positive statement. Whatever positive statement you use, be sure it is communicated in a genuine sense. Try to use positive statements, even if the student does poorly on the exercise or checkpoint.

4. Ask the right questions. You want to find out just what happened to cause the poor performance on the checkpoint. For more on questioning techniques, see the "Questioning Techniques" information sheet.
5. Use communication skills to improve the dialogue between you and the student during the tutoring session. For more on communication skills see the "Communications" information sheet.
6. Keep on task. The student may want to bring up complaints of one kind or another. Try to keep these digressions to a minimum. Use a "focusing" technique to keep the session on the right track. An example of "focusing" is, "I think we're getting away from the purpose of this session. Let's review the problems you had with this lesson on ..."



Examples of Seating Arrangements ("A" is preferred)

#### Guidelines for Being a Manager

1. Before class begins, do the following:
  - a. Be sure you have adequate copies of all materials. Also, find out where you can get additional copies, if needed.
  - b. Have extra pencils available for students.
  - c. Check to see that all equipment is operational, if applicable.

- \*d. List out on the chalkboard all of the "rules" to be observed in the classroom and the class time schedule (use military time). The "rules" are established by the BSEP administration, such as smoking or drinking/eating in the rooms.

2. After students are seated:

- \*a. Introduce yourself (and any assistant instructor or observer). Write your name on the chalkboard. Be friendly and relaxed.
- \*b. Go over the rules and the schedule on the chalkboard.
- \*c. Tell students where restrooms, drinking fountains, and the break area are.
- \*d. Explain your role as a FBSEP instructor.
- \*e. Briefly explain the FBSEP course, including the following points:
  - (1) Designed especially for 31M10s.
  - (2) Help you be a better student in the 31M course.
  - (3) Self-paced.
- f. Ask if students have any questions.
- g. Take attendance (roll call).
- h. Determine lesson each student is to take from prescription sheets.
- i. Get students started on appropriate lessons. (See Instructor Guide of the lessons.)
- j. Be sure students can use audiovisual equipment required by some lessons.

\* Do these steps only for new student(s).

3. Monitor the students:

- a. Look for student indicators which require intervention. (See "Communications" information sheet, especially non-verbal indicators.)
- b. When assisting a student with a problem, be careful not to disturb others who are working. If the problem is involved and will require some time, perhaps have the student come up to your desk area.
- c. Be prepared to handle minor problems, such as enforcing class "rules" of talking, leaving the room without permission, etc.
- d. Be prepared to deal with a variety of student behaviors (e.g., sleeping, acting bored, overly attentive, etc.). Whenever dealing with inappropriate behaviors, be sure you:
  - (1) Do not evaluate or judge the student in any way (e.g., "Don't act like a child.").
  - (2) Take into consideration the other demands placed on the students (soldiers), such as physical training, fire guard duty, etc.
  - (3) Deal with the problem on a one-to-one basis. Public criticisms of a student are not always accepted by the other students.
  - (4) Are positive, constructive, and supportive at all times.

4. After lesson completion:

- a. Score checkpoint.
- b. Make appropriate decision based on checkpoint score.
- c. Complete all necessary forms/paperwork.

(NOTE: Details for each of the above steps are contained in the Instructor Guide.)

## QUESTIONING TECHNIQUES

General rules to follow when asking a student questions:

1. Use a friendly, polite tone of voice.
2. Keep the question short.
3. Questions should be specific, relevant, purposeful.
4. Avoid interrupting the answer unless the student is giving you information which is not helpful or irrelevant.
5. Keep to the task at hand. Try to prevent the student from switching topics or going off on tangents.
6. Acknowledge all responses. Frequent, positive reinforcement (praise) encourages participation and involvement.

### Recommended Questioning Techniques

1. Direct Questions: Useful for getting the discussion started.  
Example: "Tell me, what were the problems you encountered during this lesson?"
2. Probing Questions: Useful for obtaining more specific information that the initial response (to a question) has behind it. Use probing questions when:
  - You are given general or "vague" answers, such as "I didn't understand this last section," or "Halfway through the lesson I got confused."
  - You are given "always" or "never" answers, such as "I've never been good at math," or "I've always had problems working on my own."

Here are some do's and don'ts with regard to probing:

- a. Phrase the question in such a way that the student is helping you. For example:

"I understand ..., but I'm still unclear about ..."

"I'm still confused about ... Could you elaborate on that for me?"

"I'm puzzled about ..., so could you give me an example?"
  - b. Allow the student time to answer your question. Don't push for an immediate answer.
  - c. If you still get general, vague answers, or even no response, simply rephrase the question.
  - d. Remain objective in both speech and manner. Don't react with judgmental statements (e.g., "I can't believe you don't understand ...").
  - e. Avoid the following when probing:
    - (1) Repeating the same question over and over again.
    - (2) Interpreting the question before you allow a response (e.g., "I'm sure you didn't understand ... because you didn't read over the text carefully.").
    - (3) Use the word "why" too often.
3. Non-Directive Questions: Also useful for obtaining additional information or to clarify a response. Examples: "Would you please repeat what you said about ...?" "I'm wondering what happened there," or "Could you tell me how you arrived at that answer?"
4. Other Techniques:
- a. Silence - sometimes silence can be an effective way to obtain more information. People tend to be uncomfortable with silence and will add to or clarify what has previously been said without your asking another question.
  - b. Repeat the question - the student may be thinking about the answer, and this technique allows him/her some additional time. If there is still no response, go on to another question with the intention of going back to it later. Don't drop the issue. Go back to it at a later time.

### Types of Questions to be Avoided

1. Leading Questions: Suggest the answers you want to hear. Example:  
"This lesson is too long, isn't it?"

2. Accusatory Questions: Make student feel defensive. Likely to arouse a negative response. Example: "Why did you select that answer?" or "Don't you know that ..."

3. Any Statement or Question Which Could Make the Student Feel Defensive: For example:

"Most students don't have any problem with this lesson. What happened with you?"

"Why did you take so long to finish this lesson?"

"How could you have made that mistake when there are clear directions printed on the front page of your Student Guide?"

## EFFECTIVE COMMUNICATION

The meaning of a message is not based on words alone. It depends upon how the words are interpreted. Interpretation, in turn, depends upon such things as bodily gestures, intonation, and situational factors. Effective communication exists when the receiver interprets the sender's message in the way the sender intended it. The following items are provided to facilitate more effective communication.

### One-Way vs. Two-Way Communication

Both one-way and two-way communication are useful means for teaching and learning. A lecture is an example of one-way communication. During a lecture, the student is in a passive role. For highly motivated students who are eager to learn specific information, lectures are quite valuable. Students who want answers to questions they raised are willing to listen to one-way communication. In FBSEP, you will not be lecturing. In most cases, the students are not highly motivated or eager to learn. Therefore, two-way communication is recommended when tutoring students.

Two-way communication encourages students to interact with the instructor. It requires the student to listen and inquire - to demonstrate an understanding of the message being sent. Two-way communication takes more time, but usually has higher quality results with less student confusion.

### Communication Skills

Active Listening: A good way to encourage the student to talk is to practice active listening. Here are a few rules:

1. Encourage the student to talk by nodding and saying such things as "Yes, go on."
2. Give your full attention to the student when he/she speaks.
3. Observe what the student is doing while talking. (See following section on non-verbal communication.)

Paraphrasing: The restating of what the student said using his/her own words. Implies that you value what has been said. Some lead-ins to paraphrasing are, "I understand you said ..." or "What I heard you saying is ... Is that right?" Paraphrasing is a good way to check to see that the student understood you and to let the student know he/she has been understood.

Maintenance Functions: these provide for good and harmonious working relationships. They create an atmosphere which enables students to work effectively/efficiently.

1. Motivating: being encouraging; friendly and responsive to the students; accepting others and their abilities; showing regard for students by recognizing accomplishments or giving them an opportunity to succeed.
2. Expressing feelings: sensing student's moods, feelings, etc., whether said directly or indirectly. Use perception checking to describe what you perceive to be the student's emotional state.

Poor: "Why aren't you doing your lesson?"

Better: "I don't think you're too interested in this lesson. Am I right?"

#### Non-Verbal Communication

Non-verbal communication is sometimes known as "body language." It usually involves expressing feelings by gestures, body position, or facial expression. You should be aware of some common non-verbal indicators and their possible meanings.

<u>Indicator(s)</u>	<u>Possible Meaning</u>
Leg swinging, tapping	Nervous, uncomfortable with the situation, frustrated.
Blushing	Embarrassed, annoyed, happy.
Frequent changes in position, rocking, sighing	Bored, annoyed, frustrated.

Indicator(s)	Possible Meaning
Frowning	Annoyed, unhappy, hurt, confused, frustrated.
Failure to make eye contact	Desire to avoid situation or person, nervous.
Silence	Annoyed, hurt, confused.

As you can see, there is no direct correspondence between indicator and meaning. One indicator can mean many things, and feelings can be displayed in many ways. But by being knowledgeable about non-verbal communication, you can detect situations where instructor intervention is most likely to be required.



4. In reply to your question, "What did you find difficult about this lesson?" a student answers, "I don't know. I just had trouble with it. That's all." What might you do, say, or ask in order to get more specific information about the source of the student's difficulties?
  
5. Direct questions are especially useful for (Choose one):
  - a. getting a tutoring session started.
  - b. obtaining more specific information after a student has answered an initial question.
  
6. Give an example of a non-directive question other than the examples in Information Sheet #2.
  
7. Pvt. Ritchie has failed a checkpoint. In reply to your question, "What did you have trouble with in this lesson," he replies, "I didn't have any trouble. I know this stuff. The questions in the test aren't clear." How could you respond?

8. In the column on the left are inappropriate statements or questions a teacher might make to students. Write a better way of saying the same thing in the space on the right.

- |   |    |
|---|----|
| a. "Why aren't you working on this lesson?"   | a. |
| b. "This is really a simple procedure. I don't understand why you can't do it right." | b. |
| c. "Most of your answers on this checkpoint are wrong."                               | c. |
| d. "You shouldn't read this material so fast."  | d. |
| e. "Why didn't you follow the instructions in the Student Guide?"                     | e. |
| f. "Your approach to these questions is all wrong."                                   | f. |
| g. "You are taking too long getting through this lesson!"                             | g. |

## Lesson 11

### Role Play

Purpose. A role play session is included in this training course to allow you to practice certain communication skills -- skills in which you may or may not be proficient.

Being a good communicator does not mean you don't need role play exercises. Consider the professional sports player. Reggie Jackson is a fine baseball player. Yet he practices his batting and fielding skills daily during baseball season. He is never so good at what he does that he can go without practice. This same principle applies to your communication skills. Even if you are an instructor with many years of experience, you can benefit from a communication skills "workout."

**Objective:** Instructors will demonstrate appropriate behaviors when playing the roles of instructor in six situations that require instructor intervention and call on the use of effective interpersonal communication/tutoring skills. Each instructor will play the role of instructor in at least one situation.

**Conditions:** Given printed instructions for playing all roles, and given all the necessary information and materials for playing each specific role.

**Standard:** In each role play situation, observers will complete a checklist to evaluate the "instructor."

**Media:** Handouts describing student and instructor roles for each situation.  
Role Play Checklist  
Consumable FBSEP lesson materials required for each specific situation

**Maximum Time Required:** 4 hours

**Enabling Activities:**

1. Read the following instructions for role playing.

## Instructions for Role Playing

This session is designed to give you an opportunity to practice some of the aspects of your role as instructor in the FBSEP course, to observe others as instructors, and to experience the lessons as a student. Each of you will also observe others in the role play situation.

The roles to be used in this session will be distributed to you. Both the "student" and "instructor" will receive role play information. Before the actual role playing begins, read the procedures and instructions that follow.

### General Procedures

One person will play the student, a second will play the instructor, and the rest will observe and complete a checklist (which will be discussed later) for each role play. Time allotted per role play session will be as follows:

Prepare roles	5 minutes
Role play	10 minutes
Discussion	<u>15 minutes</u>
	30 minutes

### Instructions for the "Instructor"

1. Put yourself in the instructor role as much as possible. You are in charge of the learning environment and should attempt to do the following:
  - a. Provide a warm environment. Make the student feel comfortable and good about learning. Establish a climate conducive to learning.
  - b. Reward and encourage appropriate behavior by using positive statements.
  - c. Be enthusiastic about the materials.
  - d. Indicate the relevance of the material by pointing out that the material is closely related to skills needed for success in the 31M course.

- e. Be approving, accepting, and supportive to students at all times.
2. Read over the lesson that the student will be working on so you will be familiar with the material when the student has questions or needs tutoring.
3. Supply checkpoints and review exercises to the "student" as needed. Answer student questions and tutor student in problem spots. Record test scores on the appropriate form.
4. Keep in mind that the instructor must also:
  - a. Supply the student with appropriate lesson materials (including checkpoints and review exercises when the student requests them).
  - b. Score checkpoints and other exercises as required by the lesson.
  - c. Make decisions about the student's path through the FBSEP course. That is, make decisions about when to assign review exercises and when to send the student on to the next lesson.
  - d. Answer student questions about parts of the lesson they do not understand.
  - e. Use probing questions to find out why students missed items on checkpoints and explain the reason for the correct answer.
  - f. If a student is below cutoff on Form B of a checkpoint, go over the items missed on the checkpoint and go over the Review Exercise with him/her. Determine the place in the Review Exercise where the student missed items in the self-correcting exercises. Read over or paraphrase the material and explain the reason for each answer. Then prescribe the next lesson.

#### Instructions for the "Student"

1. Read the description of your role. Note such things as the section of the lesson you are to begin with and how well you are to do on the self-correcting exercises or checkpoints.
2. Put yourself in the student role as much as possible. Remember that students will work more slowly than you are able to. Play the role and work slowly and methodically. Do not rush through (unless directed to in the role description).

3. Read over the lesson you are working on. As you do so, keep in mind the role you are playing.

#### Instructions for "Observers"

As you observe the "student" and "instructor" during a role play situation, you are to evaluate the instructor by checking off any technique that is used by the instructor, using the checklist you will be provided with. You should observe most items on the checklist during a role play session. Look over the checklist beforehand and familiarize yourself with the behaviors you are to watch for. Keep in mind that the items are not performed in the order listed on the checklist. Also, allow the "players" to settle into their roles before you begin your evaluation. Make allowances for nervousness.

If you observe anything good or bad that is not covered by the checklist, use the section headed "Notes" to describe exactly what the interviewer did well or failed to do.

The rest of this lesson involves playing the roles of instructor, student, and observer in six situations. Your instructor will provide you with the needed materials and information.

**INSTRUCTOR TRAINING COURSE**

**TRAINER GUIDE FOR INSTRUCTOR TRAINING COURSE**

**31M10 Functional Basic  
Skills Education Package**

**Contract No. DABT60-81-C-0006**

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## TRAINER GUIDE FOR INSTRUCTOR TRAINING COURSE

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### INTRODUCTION

The Instructor Training Course for FBSEP for 31M10 is a 5-day modified self-instructional course. It is self-instructional in that the instructors-in-training go through most lessons by themselves, at their own pace. The Student Guide provides the student-instructors with materials to read and exercises to do (worksheets) which can be completed with little or no trainer intervention. However, the course is a modified self-instructional one in that most lessons end with a group discussion of the lesson, especially of answers to the worksheet. Therefore, the trainer must set time limits for completing individual work and starting group discussions. Some lessons involve group interaction throughout.

The trainer is also responsible for ensuring that all media and materials necessary for conducting each lesson are available as needed. While the student-instructors are working individually with their Student Guides, the trainer should remain available for consultation and help.

This Trainer Guide provides instructions for getting the course underway and for conducting each lesson. For each lesson, you are provided with the following:

- Objective:** The behavior which the instructors-in-training will be able to perform when they have completed the lesson.
- Conditions:** The conditions under which the behavior is to be demonstrated.
- Standard:** The criterion which the instructors' performance should meet; how they are expected to demonstrate the behavior.
- Media:** The materials needed for completing the lesson, other than the Student Guide and a pen or pencil. The trainer is responsible for ensuring that these materials are available.
- Maximum Time Required:** An estimate of the maximum time required to complete the lesson, including group discussion, if any. Use this information in order to set time limits for completing the self-paced work in each lesson and for scheduling the discussion, if any.

**Enabling Activities:** For self-instructional lessons, this is a synopsis of the activities which instructors undertake in order to attain the terminal objective. In trainer-led lessons, this is a set of instructions for conducting the lesson.

The Trainer Guide also provides "answer keys" to the worksheet questions. Note that most worksheet questions have no single correct answer. In such cases, several acceptable answers are given. However, the instructors may provide additional, equally acceptable ones.

Here is a list of all the lessons in the Instructor Training Course. This list shows the subdivisions of each lesson in terms of learning/teaching strategies, the maximum time which should be scheduled for each subdivision, and the maximum total time for the entire lesson.

Lesson	Title	Lesson Subdivisions	Maximum Time - Each Subdivision	Maximum Lesson Time
1	FBSEP Learning/ Teaching Strategies and Course Structure	Self-instruction Discussion	3 hours 1 hour	4 hours
2	Practice Exercises with a Sample FBSEP Lesson	Self-instruction Discussion	1-1/2 hours 1/2 hour	2 hours
3	Use of Audiotape and Videotape Equipment	Demonstration, Practice		1 hour
4	Relation of FBSEP to the 31M10 AIT Course	Tour Self-instruction Discussion	3 hours 1-1/2 hours 1/2 hour	5 hours
5	Knowledge of Equipment Required for Teaching FBSEP Unit VIII	Self-instruction	2 hours	2 hours
6	FBSEP Units I and II	Self-instruction Discussion	3 hours 1 hour	4 hours

Lesson	Title	Lesson Subdivisions	Maximum Time - Each Subdivision	Maximum Lesson Time
7	FBSEP Units III and IV	Self-instruction Discussion	3-1/2 hours 1/2 hour	4 hours
8	FBSEP Units V, VI, VII, VIII, and IX	Self-instruction Discussion	3-1/2 hours 1/2 hour	4 hours
9	Discussion Session on Administrative Problems	Self-instruction Discussion	1/2 hour 1/2 hour	1 hour
10	Effective Communications in FBSEP	Self-instruction Discussion	1/2 hour 1/2 hour	1 hour
11	Role Play	Group interaction	4 hours	4 hours

Before the Course Begins

Do the following well before the first day of the Instructor Training Course:

1. Read through this entire Trainer Guide, until you are confident that you can conduct all lessons.
2. Read through the Student Guide for Instructor Training Course.
3. Check with the appropriate FBSEP administrator(s) to ensure that all arrangements for conducting the course are complete, and to find out the location and dates of the course.
4. Check to make sure that all media and materials required for all lessons are available in sufficient quantities. Table I on pp. 4-6 lists the materials needed for each lesson.

Note that Lessons 6 to 8 require complete sets of FBSEP lesson materials. A complete inventory of lesson materials for all FBSEP lessons can be found in Table II on pp. 7-10.

Table I

Materials Needed by Lesson

Lesson	Student Guide for Instructor Training Course	Instructor Guide for FBSEP Course	Other Media and Materials Required for the Lesson
1	✓	✓	None
2	✓	✓	<p>Each instructor-trainee needs:</p> <p>(1) Consumable set of material for Unit VI(VII), Lesson 1. This includes:</p> <ul style="list-style-type: none"> <li>. Student Guide for the lesson</li> <li>. Checkpoint 1, Form A</li> <li>. Review Exercise</li> <li>. Checkpoint 1, Form B</li> </ul> <p>(2) Functional BSEP Student Record Form (consumable)</p> <p>(3) Student Guide: Introduction to FBSEP for 31M10</p>
3			<p>Operational cassette tape player(s).  Audiotapes (any) - one for each player.  Operational videotape player and monitor.  Videotapes (any) - one for each player.</p>
4	✓		<p>Soldier's Manual for 31M10 (FM 11-31M1/2)</p> <p>Two or more of the following TMs:</p> <ul style="list-style-type: none"> <li>TM 11-5820-461-12</li> <li>TM 11-5895-366-15</li> <li>TM 11-5895-453-14-2</li> <li>TM 11-5820-535-15</li> <li>TM 11-5805-371-14-2</li> <li>TM 11-5805-357-15</li> <li>TM 11-5805-358-14-2</li> </ul>

Table I (cont'd)

Lesson	Student Guide for Instructor Training Course	Instructor Guide for FBSEP Course	Other Media and Materials Required for the Lesson
4 cont'd			<p>One or more of the following videotapes from FBSEP Units III and IV.</p> <ul style="list-style-type: none"> <li>Unit III, Lesson 2 - Practice Exercises</li> <li>Unit III, Lesson 2 - Checkpoint</li> <li>Unit IV, Lesson 3 - Practice Exercises</li> <li>Unit IV, Lesson 3 - Checkpoint</li> </ul>
5	✓	✓	None
6	✓	✓	<p>One set of all FBSEP lesson materials for Units I and II for each instructor. This includes:</p> <ul style="list-style-type: none"> <li>Student Guides</li> <li>Review Exercises</li> <li>Checkpoints - Form A and Form B</li> <li>Audiotape of Word Lists for Unit I, Lesson 1</li> <li>Soldier's Manual for 31M10</li> <li>Dictionary</li> </ul>
7	✓	✓	<p>Audio and video playback equipment. One set of all FBSEP lesson materials for Units III and IV for each instructor. This includes:</p> <ul style="list-style-type: none"> <li>Student Guides</li> <li>Checkpoints (booklets)</li> <li>Review Exercises for Unit III, Lessons 2 and 3</li> <li>Audiotapes for Practice Exercises and checkpoints</li> <li>Videotapes for Practice Exercises and checkpoints</li> </ul>

Table I (cont'd)

Lesson	Student Guide for Instructor Training Course	Instructor Guide for FBSEP Course	Other Media and Materials Required for the Lesson
8	✓	✓	One set of all FBSEP lesson materials for Units V, VI, VII, VIII, and IX for each instructor-trainee. This includes: Student Guides Review Exercises Checkpoints - Form A and Form B
9	✓		None
10	✓	✓	None
11	✓	✓	Descriptions of Instructor and Student roles for each Role-Play Situation. 5 copies of Role Play Checklist for each instructor

Table II

Inventory of FBSEP Lesson Materials

<u>Unit</u>	<u>Lesson</u>	<u>Lesson Materials</u>
1	1	Student Guide Review Exercise 1 Review Exercise 2 Checkpoint 1, Form A Checkpoint 1, Form B Checkpoint 2, Form A Checkpoint 2, Form B Checkpoint 3, Form A Checkpoint 3, Form B Checkpoint 4, Form A Checkpoint 4, Form B Checkpoint 5, Form A Checkpoint 5, Form B Checkpoint 6, Form A Checkpoint 6, Form B Audiotape: Word Lists
	2	Student Guide Review Exercise 1 Review Exercise 2 Checkpoint 1, Form A Checkpoint 1, Form B Checkpoint 2, Form A Checkpoint 2, Form B Dictionary
	3	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
	4	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
	5	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B

Table II (cont'd)

<u>Unit</u>	<u>Lesson</u>	<u>Lesson Materials</u>
I	6	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
	7	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
II	1	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
	2	Student Guide Review Exercise 1 Review Exercise 2 Checkpoint 1, Form A Checkpoint 1, Form B Checkpoint 2, Form A Checkpoint 2, Form B Soldier's Manual (FM 11-31M1/2)
	3	Student Guide Review Exercise 1 Review Exercise 2 Checkpoint 1, Form A Checkpoint 1, Form B
III	1	Student Guide Review Exercise Checkpoint 1, Form A/B (booklet) Audiotapes: Practice Exercises Checkpoint 1, Form A/B
	2	Student Guide Checkpoint 1, Form A/B (booklet) Videotapes: Practice Exercises Checkpoint 1, Form A/B
	3	Student Guide Checkpoint 1, Form A/B (booklet) Audiotape: Practice Exercise 1 Videotapes: Practice Exercise 2 Checkpoint 1, Form A/B

Table II (cont'd)

<u>Unit</u>	<u>Lesson</u>	<u>Lesson Materials</u>
IV	1	Student Guide Checkpoint 1, Form A (booklet) Checkpoint 1, Form B (booklet) Videotapes: Practice Exercises Checkpoint 1, Form A/B
	2	Student Guide Checkpoint 1, Form A (booklet) Checkpoint 1, Form B (booklet) Videotapes: Practice Exercises Checkpoint 1, Form A/B
	3	Student Guide Checkpoint 1, Form A (booklet) Checkpoint 1, Form B (booklet) Videotapes: Practice Exercises Checkpoint 1, Form A/B
V	1	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
VI, VII	1	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
VI	2	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
	3	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
VII	2	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B

Table II (cont'd)

<u>Unit</u>	<u>Lesson</u>	<u>Lesson Materials</u>
VIII	1	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
	2	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
	3	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
	4	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
IX	1	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
	2	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
	3	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B
	4	Student Guide Review Exercise Checkpoint 1, Form A Checkpoint 1, Form B

### Getting the Course Started

When all of the student-instructors have assembled for the first day of instructor training, do the following:

1. Introduce yourself, and explain your role in the FBSEP course.
2. If the instructors do not know each other, have them introduce themselves and, perhaps, provide a bit of autobiographical information.
3. Explain the schedule for training: daily start time and stop time, lunch time, coffee breaks.
4. Distribute copies of the Student Guide for Instructor Training Course, one per instructor. Explain that this is a consumable workbook which instructors should write in and can keep.
5. Distribute copies of the Instructor Guide for the FBSEP course, one per instructor. Explain that the Instructor Guide is the primary "textbook" during instructor training, as well as the basic handbook/reference for teaching the FBSEP course.
6. Ask for and answer questions, if any.
7. Tell the instructors to read the Introduction in the Student guide, then to continue immediately with Lesson 1.
8. Set a time for completion of individual work and for discussion of the worksheet in Lesson 1. This time should be about 3 hours after instructors begin the lesson.

### Conducting the Course

1. Before each lesson begins, make sure that all necessary media/materials are available.
2. At the beginning of each lesson, remind instructors which lesson they are to do next.
3. If most of the lesson is self-instructional, give the instructors a time for meeting as a group and discussing the lesson.

4. If the lesson is not self-instructional, follow the steps in the Trainer Guide for the lesson.
5. When leading group discussions, follow these guidelines:
  - a. Pace the discussion to permit completion within the allotted time. For example, if you have scheduled 30 minutes to discuss 10 worksheet questions, do not spend 20 minutes on question no. 1.
  - b. Let the instructors do most of the talking. Offer your suggestions only after they have offered theirs. Answer questions, if asked, but do not take on the role of the "authority" who has all the answers.
  - c. Intervene if the following happens:
    - (1) An instructor (or the group) comes to a conclusion which is clearly wrong or instructionally inadvisable.
    - (2) The discussion wanders too far off the topic.
  - d. If possible, leave about five minutes at the end for a "wrap-up" of the discussion.
6. In lessons with worksheets, collect worksheets and check for 80% correct completion. Return worksheets to instructors after checking.

### Evaluating Instructor Performance

#### Lesson Evaluations

An Instructor Evaluation Form (See p. 13) is used to track instructor progress. One form is needed for each instructor. At the end of each lesson, the trainer should place a check-mark across from the lesson in the appropriate column (GO or NO GO).

An instructor is awarded a GO for the lesson if the following criteria are met:

1. All lessons: Completion of all enabling activities.
2. Lessons with worksheets: 80% correct completion of worksheet.
3. Lessons with group discussion: Participation in the discussion.
4. Lesson 3: Correct operation of playback equipment.

Instructor Evaluation Form

Instructor's Name \_\_\_\_\_

Lesson	GO	NO GO	Comments	GO after Remediation
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				

5. Lesson 11: No check marks in "No" column of role play checklists pertinent to the instructor's role.

All criteria relevant to a given lesson must be met in order to receive a GO.

If one or more criteria relevant to a given lesson are not met, the trainer should take the following steps:

1. Place a check-mark in the NO GO column.
2. In the column labeled "Comments," write the reason for the NO GO.
3. Provide appropriate remediation. This may take the form of:
  - a. counseling, tutoring, or discussion.
  - b. provision of additional time to complete the required work, if necessary.
  - c. in Lesson 11, additional role play after discussion of deficiencies.
4. When all criteria have been met, place a check-mark in the column labeled "GO after Remediation."

#### End-of-Course Evaluation

There is no formal end-of-course test for instructor training. However, we recommend that the trainer schedule an individual session with each instructor after the last lesson. Include the following topics.

1. Discuss the lesson evaluations. Reinforce successful completion and make suggestions about areas that need improvement, if any.
2. Discuss the instructor's role-playing performance (Lesson 11) in light of the checklists filled in by the observers. After discussion, each instructor should be permitted to keep the checklists pertaining to his/her role.
3. Elicit suggestions and comments about the Instructor Training course (e.g., suggestions for improvement, criticisms) from the instructor. This should be done after the instructor has been assured that he/she completed the course successfully. Encourage constructive criticism, but be accepting of all opinions offered.

## Lesson 1

### FBSEP Learning/Teaching Strategies and Course Structure

**Objective:** Instructors will be able to describe the components of FBSEP instruction, instructor roles and teaching strategies, and the structure of the FBSEP course (units and lessons within units), as well as of each lesson.

**Conditions:** Given material to read in the Instructor Guide as well as in the Student Guide for Instructor Training.

**Standard:** Instructors will individually complete a worksheet ("Worksheet 1 for Instructor Training"), then will discuss the worksheet as a group.

**Media:** Instructor Guide, Introduction

**Maximum Time Required:** 4 hours

**Enabling Activities:**

1. Self-Instruction (3 hours):

The instructors:

- a. Read a description of the development of FBSEP for 31M10 in the Student Guide.
- b. Read the Instructor Guide, Introduction, pp. 1-18.
- c. Read "Synopsis of the FBSEP course" in the Student Guide.
- d. Read the "Explanation of Lesson Structure" in the Student Guide.
- e. Complete Worksheet 1 for Instructor Training.

2. Discussion of the worksheet (1 hour. Answer key on next page).

WORKSHEET 1 FOR INSTRUCTOR TRAINING

Answer Key

1. What is the difference between general basic skills and functional basic skills?

General basic skills are not applied to any specific area or task. Functional basic skills are those required for and applied to a particular task, usually an adult occupation.

2. Suppose that you are teaching a lesson on subtracting with two-digit numbers, involving borrowing (re-grouping). Which of the following is an appropriate statement of the terminal objective of the lesson?

- a. The instructor will teach subtraction of two-digit numbers with borrowing.
- b. The purpose of the lesson is to teach subtraction of two-digit numbers with borrowing.
- c. The student will become familiar with the process of subtraction.
- d. The student will correctly subtract two-digit numbers requiring borrowing, without error.

3. Which of the following is an appropriately stated enabling objective of the same lesson?

- a. The student will understand the concept of "subtraction."
- b. The student will correctly subtract one-digit numbers from one- or two-digit numbers, without error.
- c. First, the teacher must teach subtraction of two-digit numbers which do not require borrowing.
- d. The student will correctly subtract three-digit numbers requiring borrowing, without error.

4. In the column on the left, you will find some characteristics of traditional instruction. On the right, write the corresponding characteristic of individualized instruction.

Traditional Instruction

Individualized Instruction

Instructor-paced.

Self(student)-paced

All students work on the same materials at the same time.

Each student works on his own assigned lessons. Different students work on different lessons at the same time.

Instructor presents material in lectures.

Students read materials themselves.

Tests are given, collected by the instructor, scored later that day or week, then returned the next day or several days later.

Tests are scored immediately, and immediate feedback is provided.

5. Below are some descriptions of instructor actions. Beside each one, write which of the following roles the instructor is playing: resource person, motivator, reinforcer, diagnostician, remediator, manager of material flow, decision maker, record keeper.

a. A student says, "I don't understand why I got this question wrong." The instructor responds, "Let's see if we can figure out what the problem is."

Diagnostician

b. A student says, "My Student Guide says that I need a videotape here." The instructor provides the required tape.

Resource person or  
Manager of material  
flow

Instructor Role

- c. Alice says, "I'm tired of this lesson!" The instructor points out that Alice has only a few more pages to go in the Student Guide and will then be ready for a checkpoint.
- d. A student comes to the instructor and says, "These instructions aren't clear. What am I supposed to do next?" The instructor clarifies the instructions in the Student Guide.
- e. The instructor has determined the source of a student's difficulty and now helps the student to understand what he has been doing wrong.
- f. As Sue begins a new lesson, the instructor enters the unit and lesson and the date and time on Sue's Record Form.
- g. Art says, "This is easy!" The instructor replies, "Yes, you are doing very well on this lesson."
- h. Mary answered 7 out of 10 questions correctly on a checkpoint. The instructor checks the Instructor Guide to find out what Mary should do next.
- i. Joe has been having trouble with a lesson about diagnosing equipment malfunctions. The instructor tells Joe, "Your problem seems to be that you aren't clear about the meaning of the term 'normal indication'."
- j. A student has done well on a checkpoint. The instructor says, "Super! You have really learned this material!"

Motivator

Resource person

Remediator

Record keeper

Reinforcer

Decision maker

Diagnostician

Reinforcer

Instructor Role

k. A student says, "Why do I need to learn this stuff anyway?" The instructor shows the student the relevance of the lesson to the 31M10 AIT course.

Motivator

l. Tom needs a certain piece of equipment. Dick is ready for a checkpoint. Harry needs clarification of something in his lesson. The instructor asks Tom and Harry to wait while finding the checkpoint for Dick.

Decision maker or  
manager of material  
flow

6. The Instructor Guide emphasizes the differences between traditional and individualized instruction. Describe some of the ways they are alike. For example, name and describe some roles that teachers play in both traditional and individualized instruction.

In traditional as well as individualized instruction, teachers play many of the same roles, though sometimes in different ways. For example, traditional instructors are sources of information and help (resource persons); motivate and reinforce good performance, though often in the group as a whole rather than for individual students; they diagnose and remediate, often through group instruction rather than individual tutoring; they pass out materials (manager of material flow), make decisions about what to do next (for the group rather than the individual), and keep records.

The main difference is how the roles are played and their relative importance. For example, though all the above roles are central in individualized instruction, they are usually secondary to lecturing in group instruction.

7. List some ways in which FBSEP students probably differ from high school students. For each one, discuss the implications the difference has for FBSEP instruction. That is, in what ways does the FBSEP instructor have to behave differently from a teacher in a typical high school classroom?

FBSEP students are job-oriented. Their instruction should be explicitly job-related.

FBSEP students are older and more mature. They should be treated as adults.

Many FBSEP students have found traditional instruction aversive. They need innovative approaches.

FBSEP students may have negative attitudes toward teachers. Teachers must be positive, supportive, and rewarding.

FBSEP students may lack confidence in their academic skills. They need encouragement and opportunities to experience success.

8. John has just been assigned to FBSEP. What is the first thing you should give him?

**The Student Guide Introduction to FBSEP for 31M10.**

9. Mary has finished all the exercises in her Student Guide for a particular lesson. Mary is ready to take a checkpoint.
10. Tim's score on Checkpoint 1, Form A at the end of his lesson is below the cutoff. Should he now go on to the next lesson?

No. (He needs a Review Exercise.)

11. List the lessons which require videotape playing equipment.

**Unit III, Lessons 2 and 3**

**Unit IV, Lessons 1, 2, and 3**

12. Where will you find the scoring keys for the checkpoints in a lesson?

**In the Instructor Guide for the lesson.**

## Lesson 2

### Practice Exercise with a Sample FBSEP Lesson

**Objective:** Instructors will complete one typical FBSEP lesson, playing the role of students.

**Conditions:** Given all necessary lesson materials.

**Standard:** Instructors will complete all exercises in the lesson, take Checkpoint 1, Form A, score it using the scoring key in the Instructor Guide, record the score on a FBSEP Record Form, complete the Review Exercise, and take, score, and record Checkpoint 1, Form B.

**Media:** One consumable set of material for Unit VI (VII), Lesson 1, for each instructor. This includes:  
Student Guide for the lesson  
Checkpoint 1, Form A  
Review Exercise  
Checkpoint 1, Form B

Instructors also need one copy each of:  
Functional BSEP Student Record Form (consumable)  
Student Guide: Introduction to FBSEP for 31M10  
Instructor Guide for Unit VI (VII), Lesson 1

**Maximum Time Required:** 2 hours

**Enabling Activities for Instructors:**

1. Self-Instruction (1 1/2 hours):

Instructors do the following:

- a. Read "Introduction to FBSEP for 31M10."
- b. Complete Unit VI(VII), Lesson 1, playing the role of students.  
This includes:
  - (1) Student Guide
  - (2) Review Exercise
  - (3) Checkpoints 1, Form A and Form B
- c. Score both checkpoints.

d. Record data on a FBSEP Student Record Form.

e. Participate in a discussion.

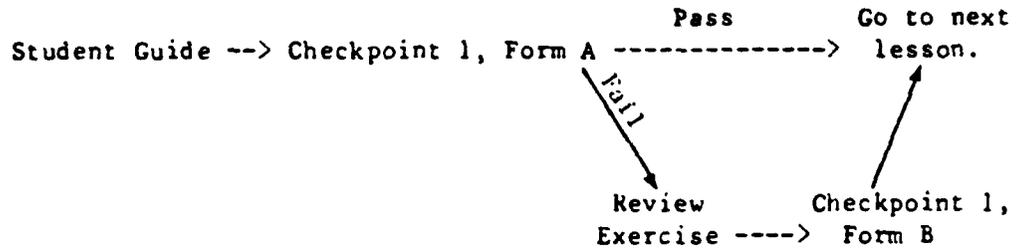
2. Discussion (15 minutes):

a. Answer any questions about the lesson.

b. Discuss the components of a typical FBSEP lesson; as illustrated by the sample lesson.

- Student Guide
- Review Exercise
- Checkpoints

c. Discuss the typical lesson sequence:



### Lesson 3

#### Use of Audiotape and Videotape Equipment

**Objective:** Instructors will be able to operate audiotape and videotape playback equipment.

**Conditions:** Given a demonstration on the use of audiotape and videotape players.

**Standard:** Each instructor will demonstrate proficiency in the operation of audiotape and videotape players.

**Media:** Operational cassette tape recorder(s) and one audiotape per player. Operational videotape player(s) and monitor(s) and one videotape per player.

**Maximum Time Required:** 1 hour

**Enabling Activities:**

1. Demonstrate the proper operation of a cassette tape recorder, including:
  - a. Plugging it in or installing batteries
  - b. Inserting the tape
  - c. Adjusting the volume
  - d. Playing, stopping, and rewinding
  - e. Setting and using the counter
  - f. Ejecting the tape
2. Demonstrate the proper operation of a videotape player and monitor, including:
  - a. Plugging it in and making sure that the monitor is cabled to the player.
  - b. Setting the monitor to an appropriate channel
  - c. Inserting the tape
  - d. Adjusting the picture

- e. Playing, stopping, and rewinding. Point out that it is important that the tape stop completely before changing its direction
  - f. Setting and using the counter
  - g. Ejecting the tape
3. Give the instructors an opportunity to practice with both the audiotape and videotape players.
  4. Check each instructor out individually, on each piece of equipment. Offer remediation if needed.

## Lesson 4

### Relation of FBSEP to the 31M10 AIT Course

**Objective:** Instructors will explain the relationship between skills taught in the 31M10 course and basic skills taught in FBSEP.

**Conditions:** Given a description of the 31M10 course in the Student Guide, a tour of the course (if available), and an opportunity to examine materials and media through which students learn in the AIT course.

**Standard:** Instructors will individually complete a worksheet ("Worksheet 2 for Instructor Training"), then will discuss the worksheet as a group.

**Media:** Walking tour of 31M10 AIT course, if available  
31M10 Soldier's Manual (FM 11-31M1/2)  
TMs for operation of 31M equipment (listed below)  
One or more videotaped demonstrations of equipment operation from FBSEP Unit III or IV (listed below)

**Maximum Time Required:** 5 hours (assuming a 3-hour tour)

**NOTE:** The tour of the course is listed as the second activity of the Enabling Activities. However, the tour may occur first, or may have to be omitted altogether. The lesson can be successfully completed without a tour.

#### Enabling Activities:

1. To be completed before the lesson begins:

a. Make sure that arrangements for the tour are complete. The tour will be led by an AIT official or instructor, and will include observation of classrooms in Burkhardt and/or Moran Halls, as well as Willard Training Area. The length of the tour should be 2-3 hours.

b. Make arrangements with the instructors for transportation to the site of the tour.

2. Before the tour (15 minutes - 1/2 hour):

Instructors read a description of the 31M10 AIT course and its integration with FBSEP in the Student Guide.

3. During the tour (2 - 3 hours):

Be available to answer questions about the relation between AIT and FBSEP. When the occasion arises, point out these relations. For example, you may point out the controls, meters, and configurations of the radio and cable equipment and name related prerequisite skills. If AIT students are using TMs or the Soldier's Manual, indicate that these require certain kinds of reading skills, to be considered later in the lesson.

4. After the tour (1 hour):

- a. After returning to the FBSEP area, deal with questions and comments about the tour.
- b. Have the following materials on hand for examination by the instructors (Instructors' Enabling Activity #3):

- (1) Soldier's Manual (FM 11-31M1/2)

- (2) Several TMs for 31M equipment. The following are recommended:

- TM 11-5820-461-12
- TM 11-5895-366-15
- TM 11-5895-453-14-2
- TM 11-5820-535-15
- TM 11-5805-371-14-2
- TM 11-5805-357-15
- TM 11-5805-358-14-2

- (3) One or more of the videotapes used in FBSEP Units III and IV. The following are recommended:

- Unit III, Lesson 2, Practice Exercises
- Unit III, Lesson 2, Checkpoint
- Unit IV, Lesson 3, Practice Exercises
- Unit IV, Lesson 3, Checkpoint

- c. Instructors complete Worksheet 2 for Instructor Training.
- d. Discussion about Worksheet 2 (1/2 hour. Answer key on the next page).

WORKSHEET 2 FOR INSTRUCTOR TRAINING

Answer Key

1. List some kinds of reading skills required for reading the Soldier's Manual and Technical Manuals (TMs).

Word recognitions of terms in the references.

Reading complex sentence constructions, e.g., in troubleshooting charts.

Locating information in tables of procedural directions.

Figuring out what to do first, second, etc.

2. What kinds of problems do you think 31M students may have learning from demonstrations like the one you watched on videotape?

Instructor talks fast and does not always articulate clearly.

Many details are given in a short time.

Student may have trouble focusing attention on what is important.

Many steps in a sequence are similar, yet order is important.

3. Can you think of any other skills that 31M students must possess in order to monitor and manipulate their equipment successfully?

Ability to locate controls and indicators quickly and accurately.

Motor (manipulative) skills.

Perceptual discriminations for noticing differences among similar components or indicators.

## Lesson 5

### Knowledge of Equipment Required for Teaching FBSEP Unit VIII

**Objective:** Instructors will recognize names of equipment components, controls, and indicators used in the 31M10 MOS.

**Conditions:** Given information in the Instructor Guide about radio and cable systems.

**Standard:** Instructors will complete a worksheet ("Worksheet 3 for Instructor Training"), using the Instructor Guide.

**Media:** Instructor Guide, Introduction to Unit VIII

**Maximum Time Required:** 2 hours

#### Introduction:

Unit VIII of FBSEP is integrated with the AIT course and is taught sometime during Week 4 of the AIT course. The unit assumes some familiarity with the equipment used in the 31M MOS. Students acquire the necessary familiarity in their first 3 weeks of AIT instruction. This lesson is designed to give FBSEP instructors sufficient familiarity to help students who have trouble with any of the lessons in Unit VIII.

**NOTE:** This lesson is entirely self-instructional. The trainer should be available to help, and to explain worksheet answers, if asked. But no group discussion is required unless the instructors request it.

#### Enabling Activities:

1. Read the Introduction to Unit VIII in the Instructor Guide.
2. Complete Worksheet 3 for Instructor Training.
3. Instructors check their own answers. (The answer key is provided on the following pages.)

WORKSHEET 3 FOR INSTRUCTOR TRAINING

Answer Key

1. Match each equipment acronym on the left with its full name on the right, and put the number corresponding to the name in the space beside the acronym. (NOTE: Several acronyms may have the same name.)

- |                                    |   |
|------------------------------------|---|
| <u>(3)</u> a. TD-660(*)/G          | (1) Receiver of the medium-capacity radio.    |
| <u>(3)</u> b. TD-754/U             | (2) Low-capacity radio.                       |
| <u>(2)</u> c. AN/GRC-103(V)        | (3) Multiplexer                               |
| <u>(7)</u> d. R-1329(P)/GRC-103(V) | (4) Order wire                                |
| <u>(1)</u> e. R-1331(P)/GRC        | (5) Transmitter of the medium-capacity radio. |
| <u>(3)</u> f. TD-352/U             | (6) Transmitter of the low-capacity radio.    |
| <u>(3)</u> g. TD-202/U             | (7) Receiver of the low-capacity radio.       |
| <u>(4)</u> h. RT-773/GRC-103(V)    | (8) Medium-capacity radio.                    |
| <u>(3)</u> i. TD-204/U             | (9) Telephone signal converter.               |
| <u>(8)</u> j. AN/GRC-50(V)         |   |
| <u>(9)</u> k. CV-1548/G            |   |
| <u>(5)</u> l. T-893(P)/GRC         |   |
| <u>(6)</u> m. T-983(P)/GRC-103(V)  |   |

2. Each item below is either a control or an indicator. If it is a control, circle C. If it is an indicator, circle I. (Remember: A control is something that the operator manipulates; an indicator gives information about the condition of the equipment.)

- |                               |     |     |
|-------------------------------|-----|-----|
| a. MANUAL RAISE-LOWER switch  | (C) | I   |
| b. AC POWER circuit breaker   | (C) | I   |
| c. Buzzer                     | C   | (I) |
| d. Multimeter                 | C   | (I) |
| e. LOW POWER indicator        | C   | (I) |
| f. Coupling control           | (C) | I   |
| g. AFC meter                  | C   | (I) |
| h. Multimeter selector switch | (C) | I   |
| i. DA-189/GRC meter           | C   | (I) |
| j. Voltmeter                  | C   | (I) |
| k. INCOMING CALL lamp         | C   | (I) |
| l. AC VOLTS meter             | C   | (I) |
| m. HEATER switch              | (C) | I   |
| n. HEATER indicator           | C   | (I) |
| o. TEST ALIGN meter           | C   | (I) |
| p. METER SELECT switch        | (C) | I   |
| q. Selector switch II         | (C) | I   |

3. On the following 4 pages are excerpts from Student Guides in Lessons 3 and 4. Fill in the blanks. This will give you practice with disentangling symptom descriptions.

1. CN-514/GRC POWER indicator does not light when POWER circuit breaker is operated to ON.

a. Equipment being operated: CN-514/GRC

b. Operator action: Set POWER circuit breaker to ON.

c. Symptom that results: POWER indicator does not light.

2. Ceiling lights are not extinguished when assemblage door is opened and BYPASS BLACKOUT switch is at OFF.

a. Equipment being operated: Assemblage

b. Operator action: Open door. Set BYPASS BLACKOUT switch at OFF.

c. Symptom that results: Ceiling lights are not extinguished (do not go out).

Notice that there are two operator actions in this symptom description.

3. Incorrect indication on TD-204/U TEST ALIGN meter with METER SELECT switch at SERV FAC and SERV SEL switch at -10.

a. Equipment being operated: TD-204/U

b. Operator action: Set METER SELECT switch at SERV FAC. Set SERV SEL switch at -10.

c. Symptom that results: Incorrect indication on TD-204/U TEST ALIGN meter

Again there are two operator actions in the symptom description.

4. T-983(P)/GRC-103(V) SYNC indicator does not extinguish within 10 seconds after AC POWER switch is operated to ON/RESET.

a. Equipment being operated: T-983(P)/GRC(V)

b. Operator action: Set AC POWER switch to ON/RESET.

c. Symptom that results: SYNC indicator does not extinguish (go out) within 10 seconds.

5. TEST ALIGN meter fails to indicate yellow when selector switch I of TD-660A/G is at NOISE GEN.
- a. Equipment being operated: TD-660A/G
  - b. Operator action: Set selector switch I at NOISE GEN.
  - c. Symptom that results: TEST ALIGN meter does not indicate yellow.
6. Incorrect or no indication on CV-1548/G TEST ALIGN meter with meter selector switch at 1600 ~.
- a. Equipment being operated: CV-1548/G
  - b. Operator action: Set meter selector switch at 1600 ~.
  - c. Symptom that results: Incorrect indication or no indication on CV-1548/G TEST ALIGN meter.
7. T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at OSC.
- a. Equipment being operated: T-983(P)/GRC-103(V)
  - b. Operator action: Set meter selector switch at OSC.
  - c. Symptom that results: T-983(P)/GRC-103(V) meter indicates below normal.

3. T-983(P)/GRC-103(V) AC POWER and LOW POWER indicators do not light, buzzer is silent, and blower does not operate when AC POWER switch is operated to ON/RESET.
- a. Equipment being operated: T-983(P)/GRC-103(V)
  - b. Operator action: Set AC POWER switch to ON/RESET.
  - c. Resulting symptom: (1) AC POWER indicator does not light.  
(2) LOW POWER indicator does not light.  
(3) Buzzer is silent.  
(4) Blower does not operate.
4. T-983(P)/GRC-103(V) LOW POWER indicator does not extinguish within 60 seconds after AC POWER switch is operated to ON/RESET and meter indication is below normal with meter selector switch at 600 VDC.
- a. Equipment being operated: T-983(P)/GRC-103(V)
  - b. Operator action: Set AC POWER switch to ON/RESET. Set meter selector switch to 600 VDC.
  - c. Resulting symptom: (1) LOW POWER indicator does not go out within 60 seconds.  
(2) Meter indication is below normal.
5. Incorrect indication on TD-754/G TEST ALIGN meter with METER SELECT switch at CABLE CUR. CABLE CUR indicator lights and buzzer sounds.
- a. Equipment being operated: TD-754/G
  - b. Operator action: Set METER SELECT switch at CABLE CUR.
  - c. Resulting symptom: (1) TEST ALIGN meter shows incorrect indication.  
(2) CABLE CUR indicator is lighted.  
(3) Buzzer sounds.

6. ALARMS FRAME indicator of TD-352/U lights, buzzer sounds, and TEST ALIGN meter indicates in green area with METER SELECT switch at PCM IN and TIMING IN.

a. Equipment being operated: TD-352/U

b. Operator action: Set METER SELECT switch at PCM IN. Set METER SELECT switch at TIMING IN.

c. Resulting symptom: (1) ALARMS FRAME indicator lights.

(2) Buzzer sounds.

(3) TEST ALIGN meter indicates in green area.

7. ALARMS FRAME indicator of TD-352/U, ALARMS TRAFFIC indicator of Td-202/U, and R-1331(P)/GRC SQUELCH NO SIGNAL indicator light, buzzer sounds, and no order wire.

a. Equipment being operated: TD-352/U, TD-202/U, and R-1331(P)/GRC

b. Operator action: None given.

c. Resulting symptom: (1) ALARMS FRAME indicator of TD-352/U lights.

(2) ALARMS TRAFFIC indicator of TD-202/U lights.

(3) SQUELCH NO SIGNAL indicator of R-1331(P)/GRC lights.

(4) Buzzer sounds.

(5) No order wire.

## Lesson 6

### FBSEP Units I and II

**Objective:** Instructors will be able to state the purpose of Units I and II, their relation to the AIT course, and the structure/content of each lesson. They will be able to state specific teaching strategies required by each lesson.

**Conditions:** Given an opportunity to examine all lesson materials, and the relevant sections of the Instructor Guide.

**Standard:** Instructors will complete a worksheet ("Worksheet 4 for Instructor Training"), using the Instructor Guide.

**Media:** Instructor Guide, Units I and II.  
All lesson materials for Units I and II.

**Maximum Time Required:** 4 hours

#### **Enabling Activities:**

##### **1. Before the lesson begins:**

Make sure that copies of all lesson materials for Units I and II are available. If possible, there should be one complete set for each instructor. Instructors should be informed as to whether they can mark the materials and keep them or not.

##### **2. Self-Instruction (3 hours):**

Instructors examine the materials in order by unit and, within units, by lesson. At the start of each unit, they read the Introduction to the unit in the Instructor Guide. Then they do the following with each lesson within the unit:

- a. Obtain a complete set of materials.
- b. Read in the Student Guide for Instructor Training Course about special instructional needs, if any.
- c. In the Instructor Guide, read the terminal objective, the lesson structure, and enabling objectives.
- d. Leaf through the FBSEP Student Guide, matching each exercise with the corresponding enabling objective.

- e. In the Instructor Guide, read the rules for administering and scoring checkpoints.
- f. Look through the checkpoints.
- g. Skim through the Review Exercise(s).
- h. Write down questions or notes, if any, in the Student Guide for Instructor Training Course.

After doing the above activities with all lessons, instructors complete Worksheet 4 for Instructor Training.

3. Discussion (1 hour):

- a. Deal with questions instructors have about specific lessons in Units I and II, if any.
- b. Discuss the worksheet (Answer key on next page).

WORKSHEET 4 FOR INSTRUCTOR TRAINING

Answer Key

Use the Instructor Guide to answer the following questions.

Unit I

1. Which lessons in this unit have special instructional needs?

Unit I, Lesson 1 (word tests and multiple checkpoints)

Unit I, Lesson 2 (need for instructor intervention and monitoring;  
two checkpoints)

Unit II, Lesson 2 (two checkpoints, two Review Exercises, and  
Soldier's Manual)

Unit II, Lesson 3 (extra Review Exercise)

2. One kind of equipment students learn to work with in the 31M10 AIT course is a multiplexer. Would words like "multiplexer" be taught in Lesson 1 of Unit I? No

Why or why not?

Multiplexer is a technical term taught in the AIT course. it is not a term student should be expected to know prior to starting the course.

3. Some of the sentences which students have to read in Lesson 2 deal with the function of the oscillator in the radio transmitter. Is the student expected to memorize the information in these sentences? No

(The purpose of the sentences is to practice using strategies for sentence comprehension. The purpose is not to learn the content of the sentences.)

4. a. Which lesson in Unit I deals with reading words? Lesson 1  
b. Which lessons deal with interpreting sentences? Lessons 2,3,4  
c. Which lessons deal with following step-by-step instructions in the correct order? Lessons 5, 6  
d. Which lesson deals with reading larger units of discourse, like paragraphs? Lesson 7

5. In Lesson 1, which is the first point at which the student is instructed to have something checked by the instructor?

After taking the test for Word List I

6. In Lesson 1, how many tests for word lists are there? 5
7. In the Test for Word List II in Section B, Charles got 13 items correct. What should Charles do next? Take test for Word List III  
(Charles scored above cutoff, so he does not need to do Section B.)
8. In the Test for Word List III in Section C, Anne got 13 items correct. What should Anne do next? Section C in Student Guide  
(Anne scored below cutoff, so she must complete the Section.)
9. a. How many checkpoints are in Lesson 2? 2  
b. Checkpoint 1 occurs at the end of Section B
10. In Lesson 2, students are taught five guidelines for understanding sentences. These are 5 strategies that students apply to sentences in order to figure out what the sentences say. Students are never really tested on whether they use the guidelines or not. What are some methods you can use to determine whether a student is really using the guidelines as instructed?

Student should come to instructor for information or for checking of work at specified points in Section B.

Students should work slowly and methodically.

Possibly watch for overt signs of strategy use, e.g., lip movements while reading sentences out loud, looking up or closing eyes while forming an image.

11. In Unit 1, Lesson 2 is prerequisite to Lessons 3 and 4
12. In Lesson 4, Joe takes Checkpoint 1, Form A and scores 9 correct. What should the instructor do?

Tutor Joe on the one question he missed. Then have him go on to the next lesson in his prescription.

13. In Lesson 6, Arthur scores 7 correct on Checkpoint 1, Form A. What should the instructor do?

**Tutor Arthur based on his errors. Then give him the Review Exercise for the lesson.**

Unit II

1. Which lesson in this unit has two checkpoints? Lesson 2
2. Which lesson requires students to use the Soldier's Manual?  
Lesson 2

Lesson 7

FBSEP Units III and IV

**Objective:** Instructors will be able to state the purpose of Units III and IV, their relation to the AIT course, and the structure/content of each lesson. They will be able to state specific teaching strategies required by each lesson.

**Conditions:** Given an opportunity to examine all lesson materials, and the relevant sections of the Instructor Guide.

**Standard:** Instructors will complete a worksheet ("Worksheet 5 for Instructor Training"), using the Instructor Guide.

**Media:** Instructor Guide, Units III and IV.  
All lesson materials for Units III and IV, including audiotapes, videotapes, and playback equipment. The specific tapes and equipment needed for each lesson are listed in Table II, pp. 8-9.

**Maximum Time Required:** 4 hours

**Enabling Activities:**

1. Before the lesson begins:

Make sure that copies of all lesson materials for Units III and IV, including audiotapes and videotapes, are available. Tapes, of course, are not consumable. Inform the instructors as to whether they can mark and keep other lesson materials.

2. Self-Instruction (3 1/2 hours):

In the Student Guide for Instructor Training Course, instructors read about unique characteristics of Units III and IV. Then, they examine the lessons in order. At the start of each unit, they read the Introduction to the unit in the Instructor Guide. Then they do the following with each lesson within the unit:

- a. Obtain a complete set of materials.
- b. In the Instructor Guide, read the terminal objective, the lesson structure, and the enabling objectives.
- c. Leaf through the Student Guide. Listen to or watch part of the tape of practice exercises.

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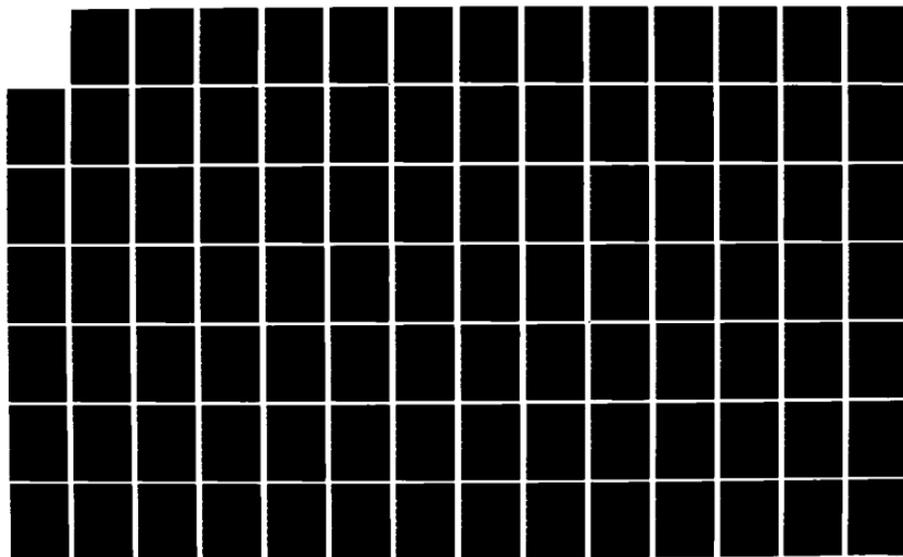
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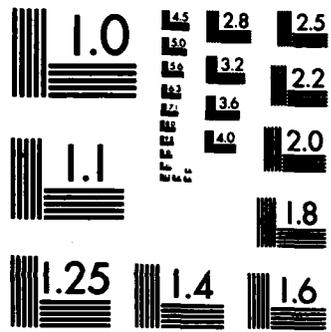
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- d. Match exercises in the Student Guide with the corresponding enabling objectives in the Instructor Guide.
- e. In the Instructor Guide, read the rules for administering and scoring the checkpoints.
- f. Look through the script or outline of the checkpoint tape, and examine the checkpoint questions.
- g. Skim through the Review Exercise, if any.
- g. Write down questions about the lesson, if any, for later discussion.

After doing the above activities for all lessons, instructors complete Worksheet 5 for Instructor Training.

3. Discussion (1/2 hour):

- a. Deal with questions instructors have about specific lessons in Units III and IV, if any.
- b. Discuss the worksheet (Answer key on next page).

WORKSHEET 5 FOR INSTRUCTOR TRAINING

Answer Key

1. Which lessons in Units III and IV require the use of audiotapes?

Unit III, Lessons 1 and 3

2. Which lesson in Unit III requires both an audiotape and a videotape of practice exercises? Lesson 3

3. Pvt. Tom Jones missed items 3, 5, 6, and 8 in the checkpoint for Unit III, Lesson 2.

- a. What kind of feedback do you give Pvt. Jones about his examination performance?

His score: 6/10.

Which questions he missed: 3, 5, 6, and 8.

The kinds of errors he made.

- b. After you have tutored Pvt. Jones about the types of errors he has made, what must he do next?

(1) Do the Review Exercise for Unit III, Lesson 2

(2) Take the checkpoint again - only the questions missed the first time.

- c. When Pvt. Jones takes the checkpoint a second time, which questions must he answer? 3, 5, 6, 8

4. A student just starting Lesson 1 of Unit IV asks you, "Am I allowed to rewind the tape and watch sections over again?" What do you answer? Yes X No

5. Pvt. Mary Smith missed items 1, 2, 6, 7, and 9 in Checkpoint 1, Form A for Unit IV, Lesson 2.

a. What do you do with Pvt. Smith's notes?

Compare her notes with the Demonstration Notes in the Instructor Guide. Tutor her concerning the types of inadequacies in her notes (but not specifically the information that is missing).

b. What must Pvt. Smith do next?

(1) Review the relevant parts of the lesson.

(2) Watch the checkpoint videotape again, and revise her notes.

(3) Wait 1/2 hour.

(4) Take Checkpoint 1, Form B.

6. Cpl. John Doe has just finished watching the videotape for the checkpoint in Unit IV, Lesson 1 and taking notes. What must he do next?

Wait 1/2 hour before answering the checkpoint questions.

7. In Unit IV, Pvt. Alice Brown has been assigned to Lessons 2 and 3 only. What is wrong with her prescription?

She should have been assigned to Unit IV, Lesson 1, first. Lesson 1 is prerequisite to Lessons 2 and 3.

Lesson 8

FBSEP Units V, VI, VII, VIII, IX

**Objective:** Instructors will be able to state the purpose of Units V, VI, VII, VIII, and IX, their relation to the AIT course, and the structure/content of each lesson. They will be able to state specific teaching strategies required by each lesson.

**Conditions:** Given an opportunity to examine all lesson materials, and the relevant sections of the Instructor Guide.

**Standard:** Instructors will complete a worksheet ("Worksheet 6 for Instructor Training"), using the Instructor Guide.

**Media:** Instructor Guide, Units V, VI, VII, VIII, and IX.  
All lesson materials for Units V, VI, VII, VIII, and IX.

**Maximum Time Required:** 4 hours

**Enabling Activities:**

1. Before the lesson begins:

Make sure that copies of all lesson materials for Units V, VI, VII, VIII, and IX are available. Inform the instructors as to whether they can mark and keep lesson materials.

2. Self-Instruction (3 1/2 hours):

Instructors examine the materials in order by unit and, within units, by lesson. At the start of each unit, they read the Introduction to the unit in the Instructor Guide. Then they do the following with each lesson within the unit.

- a. Obtain a complete set of materials.
- b. In the Instructor Guide, read the terminal objective, the lesson structure, and the enabling objectives.
- c. Skim through the Student Guide, matching each exercise with its corresponding enabling objective in the Instructor Guide.
- d. In the Instructor Guide, read the rules for administering and scoring the checkpoints.

- e. Look through the checkpoints.
- f. Skim through the Review Exercise.
- g. Write down questions about the lesson, if any, for later discussion.

After doing the above activities for all lessons, instructors complete Worksheet 6 for Instructor Training.

3. Group discussion (1/2 hour):

- a. Deal with questions instructors have about specific lessons, if any.
- b. Discuss the worksheet (Answer key on next page).
- c. Ask if there are any additional comments, questions, or concerns about the content and structure of any FBSEP units or lessons. Discuss.

**WORKSHEET 6 FOR INSTRUCTOR TRAINING**

**Answer Key**

1. Pvt. White's prescription assigns him to Unit VIII, Lessons 3 and 4. When will he receive instruction in these lessons?

**During Week 4 of the AIT course.**

2. Pvt. Blue has been assigned to all the lessons of Units VI and VII. List all the lessons she must complete.

**Unit VI(VII), Lesson 1**

**Unit VI, Lesson 2**

**Unit VI, Lesson 3**

**Unit VII, Lesson 2**

3. In Unit VI, Lesson 2, Pvt. Blue (of Item #2 above) scored 10/10 on Checkpoint 1, Form A. What should she do next?

**Go on to her next assigned lesson. (Unit VI, Lesson 3)**

4. In Unit VI, Lesson 3, Pvt. Blue scored 7/10 on Checkpoint 1, Form A. Should she now go on to her next assigned lesson? No

**(She scored below cutoff and should do the Review Exercise next.)**

5. In most FBSEP lessons, a Review Exercise is assigned if

**a student scores below cutoff on Checkpoint 1, Form A**

6. Pvt. Black scored 5/10 on Checkpoint 1, Form B of Unit VIII, Lesson 2. What happens next?

**He/she is tutored about errors and misconceptions.**

**Then he/she goes on to the next lesson.**

**(There are no additional Review Exercises after Form B of FBSEP checkpoints.)**

## Lesson 9

### Discussion Session on Administrative Problems

**Objective:** Instructors will arrive at possible solutions to five cases illustrating problems in administering FBSEP lessons.

**Conditions:** Given descriptions of five administrative problems.

**Standard:** Instructors will first write their own proposed solutions, individually, then will discuss each case as a group.

**Media:** Worksheet 7: Discussion Session on Administrative Problems

**Maximum Time Required:** 1 hour

**Enabling Activities:**

1. Self-Instruction (1/2 hour):

Instructors should spend one-half hour reading the five cases and writing down their own solutions.

2. Discussion (5-7 minutes per case; 1/2 hour over all cases):

Use the following guidelines:

- a. Refrain from offering solutions. Ask questions if the discussion lags. Ask instructors to justify and support the solutions which they offer. If possible, guide the group to a consensus concerning one "best" solution, though this may not always be possible.
- b. In general, try to keep the discussion on target. However, the discussion may be broadened to encompass a larger issue. For example, Case 4 may lead to a general discussion about how to deal with students who fall asleep or otherwise show lack of motivation during FBSEP lessons.
- c. These cases have no single correct answer. The "Answer Key" on the next pages provides a few possible answers, which you may wish to offer if they are not brought up by the instructors.

## WORKSHEET 7 FOR INSTRUCTOR TRAINING

### DISCUSSION SESSION ON ADMINISTRATIVE PROBLEMS

#### "Answer Key"

#### Introduction

This session is designed to give you an opportunity to discuss student problems you might encounter during lessons that have special media requirements and exceptions to the general instructional procedures. There are five cases for you to discuss as a group. There are no right or wrong answers for the cases. Group consensus will decide the "best" way to handle a given situation. Each case is followed by a YOUR SOLUTION section and a NOTES section in which you can write down possible solutions to the problems. You can then use your notes as a quick reference later on during the actual FBSEP course.

#### Case 1

Private Simpson is working on Unit I, Lesson 1, Vocabulary. He took the test for Word List I without listening to the tape, and brings it to you for scoring. He says he knows the definitions of the words on the first test.

What would you do here? Score the test? Make him take the test again, using the tape as designated?

1. Suggest that before you score his test, he should listen to the tape and check over his answers to see whether he wants to change any.
2. Score his test anyway. If he made many errors, do not mark them, but have him listen to the tape and try again. If he made no or few errors, forget about the tape.

In any case, make sure he listens to the tape with the remaining Word Tests. Point out to him that the tape shows him how the word is used in the 3IM context, which may be somewhat different from the ordinary context.

### Case 2

Four students have been working on Unit 1, Lesson 2, Strategies for Understanding Sentences, for at least 20 minutes. No one has asked you for a definition and no one is reading statements aloud.

What would you do here?

1. Circulate about the room, checking their work. If they are beyond the point where they should have requested something, ask them to go back and do what they missed.
2. Make a brief announcement reminding students that they have to go to the instructor at certain points in this lesson.
3. Do nothing. If they do badly on the checkpoint, have them review earlier parts of the lesson and practice using the strategies. Point out that, had they used them properly, they probably would have passed the checkpoint.

### Case 3

Private Ellington is working on Unit III, Lesson 1, Remembering Information Heard in Lectures. He has failed Checkpoint 1, Form A/B for a second time. (He scored 7 correct the second time around. This is an improvement over his first checkpoint score of 4 correct.)

What would you do here?

1. Make a positive comment about his improvement. Then try to clear up misconceptions or errors or deficiencies by tutoring.
2. Have him listen to the checkpoint tape again with you. Ask him questions during the tape, or have him paraphrase what is on the tape, or point out how his checkpoint answers are discrepant from the information on the tape.

#### Case 4

Private Frederickson is working on Unit III, Lesson 2, Remembering Information Seen in Demonstrations. She keeps falling asleep while watching the videotape.

What would you do here?

1. Give Pvt. Frederickson a 10-minute break to walk around, wash her face with cold water, etc., to wake up.
2. Ask whether she got too little sleep last night. If so, let her do a different lesson and come back to this one the next day.
3. Remind her that the demonstration on the videotape is like those in the 3IM course classroom, and that staying awake now will pay off later in the course.

#### Case 5

Private Lawson is working on Unit IV, Lesson 3, Taking Notes to Show Relationships. He is on Exercise 4, and he wants to see part of the tape over again, but he forgot to reset the counter to zero.

What would you do here?

1. Tell him to find the place by trial-and-error, by alternately rewinding and replaying.
2. Check the outline or script in the Instructor Guide, then rewind to the appropriate place for him.

In any case, remind Pvt. Lawson about the importance of resetting the counter to zero whenever the Student Guide tells him to do so.

## Lesson 10

### Effective Communication in FBSEP

**Objective:** Instructors will be able to describe appropriate techniques for tutoring, questioning, and communicating with students in FBSEP.

**Condition:** Given information sheets on communication techniques.

**Standard:** Instructors will complete Worksheet 8 for Instructor Training, based on the information sheets.

**Media:** Instructor Guide, Introduction, pp. 1-1  
Three information sheets included in the Student Guide:

- #1. Effective Communications/Interpersonal Skills
- #2. Questioning Techniques
- #3. Effective Communication

**Maximum Time Required:** 1 hour

#### **Enabling Activities:**

##### **1. Self-Instruction (1/2 hour):**

- a. Instructors re-read the section in the Instructor Guide on "Learning/Teaching Strategies" (pp. 3-10).
- b. Instructors read the three information sheets on effective communication, tutoring, and questioning in the Student Guide for Instructor Training Course.
- c. Instructors complete Worksheet 8 for Instructor Training.

##### **2. Discussion (1/2 hour):**

While conducting the discussion about the worksheet, remember that almost all the questions have no single correct answer. The "Answer Key" on the next pages provides you with some sample answers. However, elicit as many answers as possible from the instructors before you offer any of your own.

## WORKSHEET 8 FOR INSTRUCTOR TRAINING

### "Answer Key"

NOTE: Most of these questions do not have a single "correct" answer.

1. It might be said that a FBSEP instructor is always a facilitator, even while he/she is being a tutor or a manager. Do you agree? Why or why not?

Yes. A facilitator is one who takes actions that make it easier for the student to move toward the goal of mastery of FBSEP materials. The tutoring and managing roles also make it easier for the student to move forward toward his/her goal - mastery of the FBSEP materials. Thus, the tutor or manager is also a facilitator.

2. You are about to tutor a student who did badly on a checkpoint (score 4/10). What might you say first in order to set a positive tone for the tutoring session?

"You got 4 of these right. Let's look at the questions you got right first. Then we can compare them with the others and see what the problem is."

3. While scoring Pvt. Green's checkpoint, you notice two students conversing loudly at the back of the room. How might you handle this situation?

Ask Pvt. Green to wait a moment. Go to the two students and quietly suggest that they continue their lessons so that they can finish.

Ask the students whether they are having a problem you can help them with.

Go to the students and quietly remind them of the classroom rules.

Probably finish scoring the checkpoint - unless this will take too much time. Before going over it with Pvt. Green, I'd go back and talk to the two students. I'd find out why they aren't busy; tell them where the break area is; etc.

Note: Do not criticize the students in front of the class.

4. In reply to your question, "What did you find difficult about this lesson?" a student answers, "I don't know. I just had trouble with it. That's all." What might you do, say, or ask in order to get more specific information about the source of the student's difficulties?

Say, "Let's look at the exercises in the lesson and try to figure out what gave you trouble by looking at your answers."

Ask about his problems in a specific section, e.g., Section A.

Use a probing question here, such as:

"Could you give me a specific example of what gave you trouble in this lesson?" or "Can you tell me what you mean when you say you had trouble?"

5. Direct questions are especially useful for (Choose one):
- getting a tutoring session started.
  - obtaining more specific information after a student has answered an initial question.
6. Give an example of a non-directive question other than the examples in Information Sheet #2.

"Is this what you are saying?" followed by a paraphrase of the student's response.

"Could you expand on that a little?"

"Could you explain to me how you arrived at that answer?"

"Could you give me another example of a problem you had with the lesson?"

7. Pvt. Ritchie has failed a checkpoint. In reply to your question, "What did you have trouble with in this lesson," he replies, "I didn't have any trouble. I know this stuff. The questions in the test aren't clear." How could you respond?

"Let's look at some of the questions and see why you had trouble with them."

Let's go over the questions individually, so that you can explain to me what problems you had with each."

8. In the column on the left are inappropriate statements or questions a teacher might make to students. Write a better way of saying the same thing in the space on the right.

a. "Why aren't you working on this lesson?"

a. "Is there anything I can help you with in this lesson?"

"You don't seem interested in this lesson. Am I right? Then let's talk about it."

b. "This is really a simple procedure. I don't understand why you can't do it right."

b. "I'm confused about your answers concerning this procedure. Could you explain your reasoning there?"

"You seem to be having problems with this procedure. Let's see if we can figure out why."

"Let's go over this procedure together, step-by-step. What would you do first... second... etc."

c. "Most of your answers on this checkpoint are wrong."

c. "You got      questions right. Let's look at the ones you missed and see what happened."

"You answered several questions on the checkpoint correctly. That's good. But you did answer some incorrectly. Let's go over the ones you missed now to see what happened."

d. "You shouldn't read this material so fast."

d. "Try reading more slowly. You'll get more out of it that way."

"By carefully reading the materials you can get more information out of the lesson."

"You'll do better in this lesson if you read the materials slowly and carefully."

"Read this material slowly and carefully so you will understand it all."

e. "Why didn't you follow the instructions in the Student Guide?"

e. "Let's look at the instructions again, so you'll be sure to do the right thing."

Let's start our review back at the beginning by going over the directions. Did you have any problems with these instructions?"

f. "Your approach to these questions is all wrong."

f. "What are some other ways of arriving at answers to these questions?"

"Let's see whether we can figure out what you are doing wrong on these questions."

g. "You are taking too long getting through this lesson!"

g. "I am glad to see you working slowly and methodically."  
(Note: Students should work at their own pace. If the pace is right for the student, it is, by definition, neither too fast nor too slow.)

## Lesson 11

### Role Play

**Objective:** Instructors will demonstrate appropriate behaviors when playing the role of "instructor" in six situations that require instructor intervention and call on the use of effective interpersonal communication/tutoring skills. Each instructor will play the role of "instructor" in at least one situation.

**Conditions:** Given printed instructions for playing all roles, and given all the necessary information and materials for playing each specific role.

**Standard:** In each role-play situation, observers will complete a checklist to evaluate the "instructor."

**Media:** Role-Play Checklist (One copy is appended)  
Handouts describing student and instructor roles for each situation. (One copy is appended)  
Consumable FBSEP lesson materials required for each specific situation

**Maximum Time Required:** 4 hours

#### **Enabling Activities:**

1. Give the instructors 5 minutes to read the instructions for role-playing in their Student Guide.
2. Distribute several copies of the "Role-Play Checklist" to each instructor. Each instructor uses one copy each time he/she is an observer in a role-play situation. Go through the directions for using the checklist with the instructors. Give the instructors time to read over the entire checklist themselves. Clarify particular points if necessary.
3. Do the six role-play situations in order. In each one, do the following:
  - a. Ask for volunteers to play the "instructor" and "student" roles. If no one volunteers, appoint someone to each role. Remember that each instructor must play the "instructor" role at least once.

- b. Give the "student" the sheet describing the student role for the given situation, as well as any lesson materials (consumable) that are required.\*

Note: It is important that the "instructor" does not see this.

- c. Give the "instructor" the sheet describing the instructor role for the given situation, as well as any lesson materials (consumable) that are required.\* Make sure the "instructor" has his/her copy of the Instructor Guide for reference.
  - d. Have the observers fill in the "instructor's" name and the situation number on a copy of the Role-Play Checklist.
  - e. Give the "student" and the "instructor" 5 minutes to prepare their roles.
  - f. Role-play for about 10 minutes. Make sure that the observers are marking their checklists.
  - g. Lead a 15-minute discussion about the role-play situation. Allow the instructors to do the talking and to make suggestions. As the trainer, you should;
    - (1) Keep the discussion from straying off the subject.
    - (2) Ensure that comments and criticisms are constructive. Step in if criticism becomes destructive and/or personal.
    - (3) Contribute your own additional suggestions only after the instructors have finished making theirs.
    - (4) Summarize the discussion briefly at the end.
4. On the next page are listed the consumable materials that must be provided to the "student" and "instructor" in each role-play situation.
  5. At the end of role-play, provide a summary of what has been accomplished by the role-playing situation. Point out that instructors should now be able to play these roles confidently with actual FBSEP students.
  6. Collect all filled-in Role-Play Checklists.

\* Required materials are listed on the next page.

SituationConsumable Materials

	<u>FBSEP Lesson</u>		<u>Specific Materials</u>
#1	Unit II, Lesson 1	Student:	Student Guide, Section C
		Instructor:	Checkpoint 1, Form A Review Exercise Student Record Form
#2	Unit V, Lesson 1	Student:	Student Guide, Sections A and B
		Instructor:	Checkpoint 1, Form A Student Record Form
#3	Unit VI, Lesson 2	Student:	None
		Instructor:	Checkpoint 1, Form A Review Exercise Checkpoint 1, Form B Student Record Form
#4	Unit VII, Lesson 2	Student:	None
		Instructor:	Student Guide Checkpoint 1, Form A Student Record Form
#5	Unit I, Lesson 5	Student:	Checkpoint 1, Form A
		Instructor:	Student Record Form
#6	Unit IX, Lesson 3	Student:	None
		Instructor:	Student Guide

## ROLE-PLAY CHECKLIST

"Instructor's" Name \_\_\_\_\_

Situation Number \_\_\_\_\_

**Directions:** This checklist is used to evaluate the person playing the role of the "instructor." You should observe most items on the checklist. The items are not necessarily performed in the order listed.

- Check YES if the instructor performs the checklist item.
- Check NO if the instructor does not perform the checklist item.
- Check N/A if this term is not applicable to the role-play situation.
- Use the COMMENTS column to make remarks about the instructor's behaviors you would like to discuss later. Record both favorable and unfavorable comments. (Remember to use constructive criticism.)
- If you observe anything - good or bad - that is not covered by the checklist, use the section headed NOTES to describe exactly what the instructor did or did not do.

	Yes	No	N/A	Comments
<u>Management Skills</u>				
1. Performs introductory activities for a new student, if applicable.				
2. Supplies materials, as necessary.				
3. Intervenes at appropriate time.				
4. Handles minor problems.				

	Yes	No	N/A	Comments
<b><u>Management Skills (cont'd)</u></b>				
5. Deals with inappropriate student behaviors in a positive, constructive, and supportive manner.				
6. Manages audiovisual equipment needs and problems.				
7. Scores checkpoint.				
8. Makes appropriate decision based on checkpoint score.				
9. Completes all necessary paperwork.				
<b><u>Tutoring</u></b>				
1. Makes student feel at ease.				
2. Gives full attention to student.				
3. Keeps on task.				
4. Rewards and encourages good performance by using positive statements.				

	Yes	No	N/A	Comments
<b><u>Questioning Techniques</u></b>				
1. Uses probing questions effectively to determine student problems.				
2. Uses other questioning techniques effectively.				
3. Avoids leading or accusatory statements or questions.				
<b><u>Effective Communication</u></b>				
1. Uses two-way communication. That is, gets student involved in discussion.				
2. Uses active listening.				
3. Uses paraphrasing.				
4. Motivates student by being encouraging, friendly, and accepting.				
5. Displays sensitivity to student's feelings.				
6. Displays an awareness of non-verbal communication.				

	Yes	No	N/A	Comments
<u>Facilitation</u>				
1. Is sure student understands directions.				
2. Is pleasant and non-threatening - builds rapport.				
3. Answers questions appropriately.				
4. Handles problems calmly and effectively.				

NOTES

**ROLE PLAY WITH FBSEP LESSONS: SITUATION 1**

**Student Role #1**

**FBSEP Lesson to Use:  
Unit II, Lesson 1**

**Background:** You are working on Unit II, Lesson 1. You are now working on Section C of that lesson.

**Role:** You have a history of doing poorly in school. You try hard enough, but can't seem to do better than average. You joined the Army with the hope that you could get some good job training.

You have had problems on some of the self-correcting exercises in this lesson. You just can't seem to understand the page numbering system, nor the difference between a section and a chapter. (When you were in high school, these terms were used to mean the same things.)

**Directions:** As you work through Section C, miss 2 or 3 self-correcting items and then request the first checkpoint. Miss 4 items on the checkpoint. The errors you make on both the self-correcting exercises and the checkpoint must reflect your confusion on the page numbering and telling the difference between chapter and section.

During the tutoring session, explain that you don't understand the numbering system and the difference between chapter and section. Don't explain what or why you don't understand. Make the instructor use appropriate questioning techniques to find out about your confusion. Have the "instructor" tutor you a while before you do "understand."

**ROLE PLAY WITH FBSEP LESSONS: SITUATION 1**

**Instructor Information for Role #1**

**FBSEP Lesson to Use:  
Unit II, Lesson 1**

**Background:** This student is working on Unit II, Lesson 1, Section C.

**Directions:** Materials you will need for this role play are Checkpoint 1, Form A, and the Review Exercises. Attend to instructor tasks as needed.

ROLE PLAY WITH FBSEP LESSONS: SITUATION 2

Student Role #2

FBSEP Lesson to Use:  
Unit V, Lesson 1

**Background:** It's late in the day and you are to begin Unit V, Lesson 1. This is the third lesson you've worked on today. You scored 100% on all checkpoints taken so far.

**Role:** You are very tired. You did not sleep well last night. You are also anxious for the day to be over because you have a date this evening. So you really don't want to get started on a new lesson. In fact, you're hoping the day will end early.

**Directions:** As the instructor gets you started on the lesson, act mildly disappointed (e.g., sigh, shift about in your seat, etc.). Ask no questions about directions. After you get the lesson, begin to exhibit non-verbal signs of being tired and bored (e.g., slouching, day dreaming, yawning, etc.).

---

**NOTE:** If the instructor intervenes at any point during your role play (that is, reacts to your non-verbal communication), go along with her, but stay in character. Do not alter your role. You are tired and want to end this school day.

---

When doing this lesson, flip through the pages, not reading much of anything. Do a few of the items (3 or 4) on each self-correcting exercise. (You don't care if the answers are right or wrong.) Take only a few minutes to do the lesson. (You should only have sections A and B.) Then ask for the checkpoint.

---

**NOTE:** If questioned by the instructor, insist that you are ready for the checkpoint.

---

On the checkpoint, miss 3 items. To conserve time, select these answers on the checkpoint. Circles indicate wrong answers.

1-B. 2-C. 3-D. (4-A). 5-C. 6-A. (7-B). (8-D). 9-B. 10-D.

During the tutoring session, admit that you are tired and talk about your date planned for this evening.

ROLE PLAY WITH FBSEP LESSONS: SITUATION 2

Instructor Information for Role #2

FBSEP Lesson to Use:  
Unit V, Lesson 1

**Background:** It is late in the day and this student is to begin Unit V, Lesson 1. This will be the third lesson the student has worked on today. He/she scored 100% on all checkpoints taken so far.

**Directions:** Do everything necessary to get the student started on Unit V, Lesson 1. Give the student the checkpoint when requested. Attend to other instructor tasks as needed.

ROLE PLAY WITH FBSEP LESSONS: SITUATION 3

Student Role #3

FBSEP Lesson to Use:  
Unit VI, Lesson 2

Background: Assume that you have just finished this unit. You are ready for Checkpoint 1, Form A.

Role: You have trouble concentrating on your work. That is, you have a short attention span. This problem seems to disappear when you're working with your hands. But in the FBSEP class, you're having real problems concentrating on the lesson you have to do.

Directions: Request the checkpoint from the instructor and miss four items. To conserve time, give these answers on the checkpoint. Circles indicate wrong answers.

1: 4-7c    2: Normal Indication.    3: Fault symptom  
4: What is wrong.    5: Malfunction.    6: Item No.  
7: Probable cause.    8: Quarterly.    9: Reference.  
10: Item to be Inspected.

NOTE: Do think of plausible reasons why you would miss each item before handing the checkpoint in to the instructor.

During the tutoring session, occasionally seem to be in "your own world." If asked what or why you don't understand, give vague answers, such as, "I don't know" or "I forgot." If probing questions are used, respond positively by giving additional information. Once the instructor explains things, you say that you understand your mistakes.

Do the review exercises, again occasionally exhibiting non-verbal signs of a short attention span. Request the second checkpoint. On the second checkpoint, score 100%. To conserve time, the correct answers are provided for you below.

1: Table 4-3.    2: Action.    3: Unit.    4: Normal result.  
5: Possible trouble.    6: Symptom.    7: Possible trouble.  
8: Equipment is not ready/available if.    9: A.  
10: Procedure

**ROLE PLAY WITH FBSEP LESSONS: SITUATION 3**

**Instructor Information for Role #3**

**FBSEP Lesson to Use:  
Unit VI, Lesson 2**

**Background:** Assume that this student has just finished this unit. The student is ready for Checkpoint 1, Form A.

**Directions:** Materials you will need for this role play are:

Checkpoint 1, Form A  
Review Exercises  
Checkpoint 1, Form B

Administer these materials and attend to the instructor tasks as needed.

ROLE PLAY WITH FBSEP LESSONS: SITUATION 4

Student Role #4

FBSEP Lesson to Use:  
Unit VII, Lesson 2

Background: You are about to begin this lesson. The instructor will get you started.

Role: You are not an expressive person. Your ability to verbalize your thoughts are limited.

Directions: Let the instructor get you started. Say as little as possible. Usually respond by nodding your head. Ask no questions.

---

NOTE: To conserve time, you will not work through the entire lesson. Look it over for a few minutes, but do not try to complete it.

---

Request the checkpoint. Miss 2 questions. To conserve time, select these answers on the checkpoint. Circles indicate wrong answers:

1-C. 2-B. (3-D). 4-C. (5-D). 6-B. 7-C. 8-D. 9-C. 10-B.

During the tutoring session again don't say much. Try to limit your answers to things like "Yes," "No," "Uh-huh." Also, use head nods and shoulder shrugs as answers to questions. Make the instructor work to get information from you. Respond to probing questions when they are asked. But keep in mind that you are a person of few words.

**ROLE PLAY WITH FBSEP LESSONS: SITUATION 4**

**Instructor Information for Role #4**

**FBSEP Lesson to Use:  
Unit VII, Lesson 2**

**Background:** This student is to begin this lesson.

**Directions:** Get the student started on the materials. Provide the attached checkpoint, as required. Attend to the instructor tasks as needed.

**ROLE PLAY WITH FBSEP LESSONS: SITUATION 5**

**Student Role #5**

**FBSEP Lesson to Use:  
Unit I, Lesson 5**

**Background:** You are assigned to lessons in only two units of FBSEP instructions - Units I and VIII. Both units concern reading skills. You just missed the cutoff point for each lesson. You are now completing Checkpoint 1, Form A for Unit I, Lesson 5.

**Role:** You are a bit upset about being assigned to FBSEP. You feel that you are too smart to be taking such simple lessons. After all, you learned how to read in grade school. Besides, you don't think you need to be an expert at reading to be a 31M. You need to know how to work with equipment. You've always been good at working with mechanical things. You want to prove to the instructor (and yourself) that you don't have reading problems. When you miss items on the checkpoint, you feel you have to justify yourself.

**Directions:** Complete Checkpoint 1, Form A. Answer questions 7 and 10 incorrectly. (Check your Instructor's Guide for correct answers.)

**Hint:** One way to justify yourself is to blame someone or something else.

During the tutoring session, try to blame the materials for your mistakes (e.g., checkpoint question confusing - "Anyone would get that one wrong").

**ROLE PLAY WITH FBSEP LESSONS: SITUATION 5**

**Instructor Information for Role #5**

**FBSEP Lesson to Use:  
Unit I, Lesson 5**

**Background:** This student is assigned to lessons in only two units of FBSEP instruction: Units I and VIII. Both units concern reading skills. This student scored just below the cutoff point for each lesson. The student is now completing Checkpoint 1, Form A, Lesson 5.

**Directions:** You will need no additional materials for this role play. Attend to instructor tasks as needed.

ROLE PLAY WITH FBSEP LESSONS: SITUATION 6

Student Role #6

FBSEP Lesson to Use:  
Unit IX, Lesson 3

Background: You are just beginning this lesson.

Role: You are to ask the instructor questions which will require him/her to clarify the directions or materials.

Directions: While the instructor is getting you started, ask as many questions as you can (e.g., ask the instructor to repeat directions or rephrase them).

As you work through the materials, ask a lot of questions. Listed below are examples of questions you might ask. Use them, if you choose.

- Questions on meanings of words ("What does \_\_\_ mean?")
- Request clarification of:
  - . Paragraphs
  - . Directions
- Miscellaneous information:
  - . "What time is it?"
  - . "How many lessons are there in this unit?"
  - . "Is this the last lesson I have to take?"

When doing the first set of self-correcting exercises, answer only one correctly. Ask the instructor for assistance.

**ROLE PLAY WITH FBSEP LESSONS: SITUATION 6**

**Instructor Information for Role #6**

**FBSEP Lesson to Use:  
Unit IX, Lesson 3**

**Background:** The student is to begin this lesson.

**Directions:** Get the student started on the materials. Attend to the instructor tasks as needed.

**INSTRUCTOR GUIDE**  
**APPENDIX – CHECKPOINTS**

**31M10 Functional Basic  
Skills Education Package**

**Contract No. DABT60-81-C-0006**  
**Sequence No. A020**

**Prepared for:**  
**Department of the Army**  
**U. S. Training Support Center**  
**Fort Eustis, Virginia 23604**

**Prepared by:**  
**Applied Science Associates, Inc.**  
**4616 Henry Street**  
**Pittsburgh, Pennsylvania 15213**

**September 1982**

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 1, Form A

Directions: Put the letter of the correct definition for the word in the space provided.

- |                     |  |
|---------------------|--|
| ___ 1. appropriate  | a. a little bit at a time; moving slowly                       |
| ___ 2. component    | b. correct   |
| ___ 3. detect       | c. a particular way of doing something                         |
| ___ 4. distribution | d. part of a larger piece of equipment or system               |
| ___ 5. electronics  | e. highest possible level                                      |
| ___ 6. gradually    | f. lowest possible level                                       |
| ___ 7. insert       | g. to put in   |
| ___ 8. maximum      | h. suitable or right for a certain person or purpose           |
| ___ 9. minimum      | i. related to radios, transistors, and communication equipment |
| ___ 10. orient      | j. how far something can be transmitted                        |
| ___ 11. procedure   | k. type of countryside or land                                 |
| ___ 12. proper      | l. plants, trees, and other plant life                         |
| ___ 13. range       | m. something spread out over a large area                      |
| ___ 14. terrain     | n. to turn to the required position                            |
| ___ 15. vegetation  | o. to notice if something is there                             |

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 2, Form A

Directions: Put the letter of the correct definition for the word in the space provided.

NOTE: Two words have the same meaning. So one definition is used twice.

- |     |                     |  |
|-----|---------------------|--|
| ___ | 1. adequate         | a. to specify, name, or point out                            |
| ___ | 2. clockwise        | b. a defect or flaw; something wrong                         |
| ___ | 3. counterclockwise | c. the expected action of something; to carry on normal work |
| ___ | 4. depress          | d. enough for some purpose                                   |
| ___ | 5. designate        | e. straight up and down                                      |
| ___ | 6. energize         | f. level, like the horizon                                   |
| ___ | 7. engage           | g. to push down  |
| ___ | 8. extend           | h. to stretch out to fullest length                          |
| ___ | 9. fault            | i. an electrical socket or outlet                            |
| ___ | 10. function        | j. a change in something                                     |
| ___ | 11. horizontal      | k. supply power for operation; start up                      |
| ___ | 12. indicate        | l. to put in gear; to use; to interlock                      |
| ___ | 13. modification    | m. in the opposite direction from the hands of a clock       |
| ___ | 14. receptacle      | n. in the direction that hands of a clock move               |
| ___ | 15. vertical        |  |

Unit I, Lesson 1  
Checkpoint 2, Form A

1

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 3, Form A

Directions: Put the letter of the correct definition for the word in the space provided.

- |     |                  |  |
|-----|------------------|--|
| ___ | 1. approximately | a. by sight; can be seen   |
| ___ | 2. automatically | b. to be greater than  |
| ___ | 3. cable         | c. an alphabetical list that helps in finding a certain part of a book       |
| ___ | 4. capacity      | d. lacking something; broken   |
| ___ | 5. character     | e. ability of equipment  |
| ___ | 6. defective     | f. to send a message   |
| ___ | 7. exceed        | g. cannot be made right  |
| ___ | 8. excess        | h. a collection of wires carrying electrical current; to hook up those wires |
| ___ | 9. index         |  |
| ___ | 10. insure       | i. too much of something   |
| ___ | 11. manually     | j. a car, truck, or van  |
| ___ | 12. monitor      | k. acting without help from anything else                                    |
| ___ | 13. standard     | l. a sign that something is wrong  |
| ___ | 14. symptom      | m. to check on the operation of equipment without disturbing it              |
| ___ | 15. technical    |  |

(continued on next page)

Unit I, Lesson 1  
Checkpoint 3, Form A

1

- |                     |  |
|---------------------|--|
| — 16. terminal      | n. an end-point along a communication system   |
| — 17. transmit      | o. a letter or simple number   |
| — 18. uncorrectable | p. a gauge or rule used in measuring something; a statement of how something is to be done |
| — 19. vehicle       | q. to make certain   |
| — 20. visual        | r. special knowledge about a mechanical subject  |
|                     | s. almost exactly  |
|                     | t. by hand   |

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 4, Form A

Directions: Put the letter of the correct definition for the word in the space provided.

- |     |                  |  |
|-----|------------------|--|
| ___ | 1. action        | a. carefulness; a warning to be careful                        |
| ___ | 2. adjust        | b. to make something unfit for use or impure                   |
| ___ | 3. applicable    | c. to lift up  |
| ___ | 4. cause         | d. a physical movement; a thing done                           |
| ___ | 5. caution       | e. a necessary part of a piece of equipment                    |
| ___ | 6. configuration | f. stopping something from happening                           |
| ___ | 7. contaminate   | g. grouping; outward shape, form, or figure                    |
| ___ | 8. deficiency    | h. a series of actions needed to complete some product or goal |
| ___ | 9. detach        | i. the purpose for which something is done                     |
| ___ | 10. effective    | j. to reposition parts of equipment (usually slowly)           |
| ___ | 11. element      | k. what is to be done first                                    |
| ___ | 12. elevate      | l. missing some necessary quality or activity                  |
| ___ | 13. exterior     | m. the condition of something                                  |
| ___ | 14. extinguish   | n. powerful; produces desired result                           |
| ___ | 15. meter        |  |
| ___ | 16. mission      |  |

(continued on the next page)

- |                     |   |
|---------------------|---|
| ___ 17. process     | o. to make something happen                                 |
| ___ 18. preliminary | p. to go out, put out, or turn off                          |
| ___ 19. preventive  | q. the outside  |
| ___ 20. status      | r. an instrument used for measuring the amount of something |
|                     | s. to separate  |
|                     | t. suitable to use  |

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 5, Form A

Directions: Put the letter of the correct definition for the word in the space provided.

NOTE: Two words have the same meaning. So one definition is used twice.

- |       |                 |   |
|-------|-----------------|---|
| _____ | 1. assign       | a. for a short time                                 |
| _____ | 2. authorize    | b. give the power to do something                   |
| _____ | 3. auxiliary    | c. in the correct space or place                    |
| _____ | 4. establish    | d. tautness; stretched until tight                  |
| _____ | 5. interval     | e. failure to operate normally; something wrong     |
| _____ | 6. location     | f. to adjust again                                  |
| _____ | 7. maintenance  | g. to narrow down; to lessen                        |
| _____ | 8. malfunction  | h. appoint; give a task to do                       |
| _____ | 9. momentarily  | i. to fasten tightly                                |
| _____ | 10. obstruction | j. to turn around                                   |
| _____ | 11. operational | k. procedure for keeping equipment in working order |
| _____ | 12. preset      | l. in working order; ready to perform               |
| _____ | 13. proficient  | m. good at doing some task                          |
| _____ | 14. readjust    | n. blockage   |
| _____ | 15. reduce      |   |

(continued on the next page)

- |                     |   |
|---------------------|---|
| — 16. reference     | o. a space into which something fits              |
| — 17. rotate        | p. appropriate or correct to use for some purpose |
| — 18. seated        | q. providing help; back-up                        |
| — 19. secure        | r. to set beforehand                              |
| — 20. select        | s. to choose                                      |
| — 21. sequence      | t. ordering of steps to do something              |
| — 22. serial number | u. where to find information                      |
| — 23. site          | v. identifying number                             |
| — 24. slot          | w. to prove beyond doubt                          |
| — 25. suitable      | x. time between                                   |
| — 26. tension       | y. a placement or position                        |

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 6, Form A

Directions: Choose the best definition for the underlined word.  
Put an "X" beside the correct answer.

1. Perform the tasks in this sequence.

- \_\_\_\_\_ a. number of steps
- \_\_\_\_\_ b. order of steps
- \_\_\_\_\_ c. amount of time
- \_\_\_\_\_ d. way

2. The minimum allowable level is 35.

- \_\_\_\_\_ a. best for the purpose
- \_\_\_\_\_ b. most flexible amount
- \_\_\_\_\_ c. highest possible level
- \_\_\_\_\_ d. lowest possible level

3. The standard is that the system must be operational in 30 minutes.

- \_\_\_\_\_ a. list of defects
- \_\_\_\_\_ b. proper way to do the task
- \_\_\_\_\_ c. reason for doing something
- \_\_\_\_\_ d. rule used in measuring

4. The standard is that the system must be operational in 30 minutes.

- \_\_\_\_\_ a. in working order
- \_\_\_\_\_ b. packed and ready to move
- \_\_\_\_\_ c. checked for defects
- \_\_\_\_\_ d. at full volume

5. The transmitter has the capacity to send the signal 50 miles.

- a. need
- b. ability
- c. room
- d. defect

6. The signal has a distribution of 50 square miles.

- a. difficulty in transmission
- b. spread out over a large area
- c. interference at this point
- d. reason for being there

7. Find the auxiliary equipment in the van.

- a. broken
- b. suitable for greater range
- c. generator
- d. back-up

8. If the receiver is deficient, the troubleshooting table will help you to solve the problem.

- a. too heavy
- b. having too many settings
- c. missing some quality
- d. too hot

9. Visually inspect the exterior of the generator.

- a. operation of
- b. inside
- c. outside
- d. problem

10. The visual inspection can save you a lot of time.

- a. by sight
- b. by hand
- c. quick
- d. nightly

11. Each component must work properly in order to receive the signal.
- a. person authorized to do the job
  - b. gear
  - c. part of a piece of equipment
  - d. clock
12. Orient the antenna to 40° W.
- a. turn to the required position
  - b. the East
  - c. take it down
  - d. repair
13. Put the plug into the receptacle.
- a. machine
  - b. outlet
  - c. wire
  - d. ladder used in raising the antenna
14. The reading must not exceed 60 Hz.
- a. match
  - b. be the same as
  - c. be less than
  - d. be greater than
15. In troubleshooting, you look for the fault.
- a. defect or flaw
  - b. result
  - c. telephone book
  - d. sergeant
16. We take preventive measures to avoid problems later.
- a. doing something quick
  - b. stopping something from happening
  - c. easy
  - d. hard

17. Use caution when working with electrical equipment.
- a. a buddy
  - b. carefulness
  - c. speed
  - d. a lot of light
18. The location of the receiving terminal is at Station Z.
- a. fault or defect
  - b. covering for
  - c. person who looks after something
  - d. placement or position
19. Traffic could not move because of the obstruction on the road.
- a. blockage
  - b. cat
  - c. hole
  - d. line
20. This section explains the procedure for preventive maintenance.
- a. disadvantages of
  - b. advantages of
  - c. troubleshooting manual
  - d. way to do something.
21. This section explains the procedure for preventive maintenance.
- a. health care
  - b. storing broken equipment in shelters
  - c. keeping equipment in working order
  - d. enemy attacks
22. Now is the time to conduct preliminary checks.
- a. to be done first
  - b. necessary
  - c. electrical
  - d. concerning faint signals

23. The needle is horizontal.

- a. level like the horizon
- b. straight up and down
- c. moving slightly
- d. moving quickly

24. Find a level site for the task.

- a. set of directions
- b. tree
- c. lid
- d. placement

25. Secure the cover on the vehicle.

- a. take it off
- b. fasten tightly
- c. spread it loosely
- d. double

26. Secure the cover on the vehicle.

- a. straight up and down
- b. plant life
- c. a car, truck, or van
- d. equipment

27. With practice you will become proficient at transmitting signals.

- a. bad at some task
- b. good at some task
- c. able to send louder
- d. able to send faster

28. With practice you will become proficient at transmitting signals.

- a. stopping
- b. changing
- c. sending
- d. understanding

29. You may need to clear the terrain if there is a lot of vegetation.

- a. type of land
- b. type of vehicle that runs on tracks
- c. a collection of wires
- d. radio equipment

30. You may need to clear the terrain if there is a lot of vegetation.

- a. insects
- b. hills
- c. mud
- d. plant life

WHEN YOU HAVE FINISHED WITH THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE,  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 1, Form B

Directions: Put the letter of the correct definition for the word in the space provided.

- |                     |  |
|---------------------|--|
| ___ 1. appropriate  | a. to notice if something is there                             |
| ___ 2. component    | b. to turn to the required position                            |
| ___ 3. detect       | c. something spread out over a large area                      |
| ___ 4. distribution | d. plants, trees, and other plant life                         |
| ___ 5. electronics  | e. type of countryside or land                                 |
| ___ 6. gradually    | f. how far something can be transmitted                        |
| ___ 7. insert       | g. related to radios, transistors, and communication equipment |
| ___ 8. maximum      | h. suitable or right for a certain person or purpose           |
| ___ 9. minimum      | i. to put in   |
| ___ 10. orient      | j. lowest possible level                                       |
| ___ 11. procedure   | k. highest possible level                                      |
| ___ 12. proper      | l. part of a larger piece of equipment or system               |
| ___ 13. range       | m. a particular way of doing something                         |
| ___ 14. terrain     | n. a little bit at a time; moving slowly                       |
| ___ 15. vegetation  | o. correct   |

Unit I, Lesson 1  
Checkpoint 1, Form B

1

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 2, Form B

Directions: Put the letter of the correct definition for the word in the space provided.

NOTE: Two words have the same meaning. So one definition is used twice.

- |       |                     |  |
|-------|---------------------|--|
| _____ | 1. adequate         | a. in the direction that hands of a clock move               |
| _____ | 2. clockwise        | b. in the opposite direction from the hands of a clock       |
| _____ | 3. counterclockwise | c. to put in gear; to use; to interlock                      |
| _____ | 4. depress          | d. supply power for operation; start up                      |
| _____ | 5. designate        | e. a change in something                                     |
| _____ | 6. energize         | f. an electrical socket or outlet                            |
| _____ | 7. engage           | g. to stretch out to fullest length                          |
| _____ | 8. extend           | h. to push down  |
| _____ | 9. fault            | i. level, like the horizon _____                             |
| _____ | 10. function        | j. straight up and down                                      |
| _____ | 11. horizontal      | k. enough for some purpose                                   |
| _____ | 12. indicate        | l. the expected action of something; to carry on normal work |
| _____ | 13. modification    | m. a defect or flaw; something wrong                         |
| _____ | 14. receptacle      | n. to specify, name, or point out                            |
| _____ | 15. vertical        |  |

Unit I, Lesson 1  
Checkpoint 2, Form B

1

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 3, Form B

Directions: Put the letter of the correct definition for the word in the space provided.

- |       |                  |  |
|-------|------------------|--|
| _____ | 1. approximately | a. by hand   |
| _____ | 2. automatically | b. almost exactly  |
| _____ | 3. cable         | c. special knowledge about a mechanical subject  |
| _____ | 4. capacity      | d. to make certain   |
| _____ | 5. character     | e. a gauge or rule used in measuring something; a statement of how something is to be done |
| _____ | 6. defective     | f. a letter or simple number   |
| _____ | 7. exceed        | g. an end-point along a communication system   |
| _____ | 8. excess        | h. to check on the operation of equipment without disturbing it                            |
| _____ | 9. index         | i. a sign that something is wrong  |
| _____ | 10. insure       | j. acting without help from anything else  |
| _____ | 11. manually     | k. a car, truck, or van  |
| _____ | 12. monitor      | l. too much of something   |
| _____ | 13. standard     |  |
| _____ | 14. symptom      |  |
| _____ | 15. technical    |  |

(continued on the next page)

Unit I, Lesson 1  
Checkpoint 3, Form B

1

- |                       |  |
|-----------------------|--|
| ___ 16. terminal      | m. a collection of wires carrying electrical current; to hook up those wires |
| ___ 17. transmit      |  |
| ___ 18. uncorrectable | n. cannot be made right  |
| ___ 19. vehicle       | o. to send a message   |
| ___ 20. visual        | p. ability of equipment  |
|                       | q. lacking something; broken   |
|                       | r. an alphabetical list that helps in finding a certain part of a book       |
|                       | s. to be greater than  |
|                       | t. by sight; can be seen   |

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 4, Form B

Directions: Put the letter of the correct definition for the word in the space provided.

- |       |                  |  |
|-------|------------------|--|
| _____ | 1. action        | a. suitable to use   |
| _____ | 2. adjust        | b. to separate   |
| _____ | 3. applicable    | c. an instrument used for measuring the amount of something    |
| _____ | 4. cause         | d. the outside   |
| _____ | 5. caution       | e. to go out, put out, or turn off                             |
| _____ | 6. configuration | f. to make something happen                                    |
| _____ | 7. contaminate   | g. powerful; produces desired result                           |
| _____ | 8. deficiency    | h. the condition of something                                  |
| _____ | 9. detach        | i. missing some necessary quality or activity                  |
| _____ | 10. effective    | j. what is to be done first                                    |
| _____ | 11. element      | k. to reposition parts of equipment (usually slowly)           |
| _____ | 12. elevate      | l. the purpose for which something is done                     |
| _____ | 13. exterior     | m. a series of actions needed to complete some product or goal |
| _____ | 14. extinguish   |  |
| _____ | 15. meter        |  |

(continued on the next page)

Unit I, Lesson 1  
Checkpoint 1, Form B

1

- |                       |  |
|-----------------------|--|
| _____ 16. mission     | n. grouping; outward shape, form, or figure  |
| _____ 17. process     | o. stopping something from happening         |
| _____ 18. preliminary | p. a necessary part of a piece of equipment  |
| _____ 19. preventive  | q. a physical movement; a thing done         |
| _____ 20. status      | r. to lift up                                |
|                       | s. to make something unfit for use or impure |
|                       | t. carefulness; a warning to be careful      |

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 5, Form B

Directions: Put the letter of the correct definition for the word in the space provided.

NOTE: Two words have the same meaning. So one definition is used twice.

- |     |                 |   |
|-----|-----------------|---|
| ___ | 1. assign       | a. a placement or position                        |
| ___ | 2. authorize    | b. time between                                   |
| ___ | 3. auxiliary    | c. to prove beyond doubt                          |
| ___ | 4. establish    | d. identifying number                             |
| ___ | 5. interval     | e. where to find information                      |
| ___ | 6. location     | f. ordering of steps to do something              |
| ___ | 7. maintenance  | g. to choose                                      |
| ___ | 8. malfunction  | h. to set beforehand                              |
| ___ | 9. momentarily  | i. providing help; back-up                        |
| ___ | 10. obstruction | j. appropriate or correct to use for some purpose |
| ___ | 11. operational | k. a space into which something fits              |
| ___ | 12. preset      | l. blockage                                       |
| ___ | 13. proficient  | m. good at doing some task                        |
| ___ | 14. readjust    | n. in working order; ready to perform             |
| ___ | 15. reduce      |   |

Unit I, Lesson 1  
Checkpoint 5, Form B

- |                       |   |
|-----------------------|---|
| ___ 16. reference     | o. procedure for keeping equipment in working order |
| ___ 17. rotate        | p. to turn around                                   |
| ___ 18. seated        | q. to fasten tightly                                |
| ___ 19. secure        | r. appoint; give a task to do                       |
| ___ 20. select        | s. to narrow down; to lessen                        |
| ___ 21. sequence      | t. to adjust again                                  |
| ___ 22. serial number | u. failure to operate normally; something wrong     |
| ___ 23. site          | v. tautness; stretched until tight                  |
| ___ 24. slot          | w. in the correct space or place                    |
| ___ 25. suitable      | x. give the power to do something                   |
| ___ 26. tension       | y. for a short time                                 |

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 6, Form B

Directions: Choose the best definition for the underlined word.  
Put an "X" beside the correct answer.

1. Designate one person to depress the button.  
 a. change  
 b. make certain  
 c. cause  
 d. name or specify
  
2. Designate one person to depress the button.  
 a. press down  
 b. pull up  
 c. find the fault with  
 d. do maintenance tasks
  
3. Turn the dial clockwise gradually.  
 a. moving quickly  
 b. moving slowly  
 c. looking for problems  
 d. straight up and down
  
4. Turn the dial clockwise gradually.  
 a. moving quickly  
 b. moving slowly  
 c. in the direction that hands of a clock move  
 d. in the opposite direction from the hands of a clock

5. The light will extinguish automatically.
- a. turn brighter
  - b. flash
  - c. come on
  - d. go out
6. The light will extinguish automatically.
- a. without help from anything else
  - b. with help from the operator
  - c. by hand
  - d. quickly
7. Insure that the guy wire does not have too much tension on it.
- a. sound waves
  - b. oil
  - c. tautness
  - d. paint
8. Insure that the guy wire does not have too much tension on it.
- a. troubleshoot
  - b. pay someone to see
  - c. make certain
  - d. guess whether
9. If the buzzer does not sound, that is a symptom.
- a. signal for lunch
  - b. question of the existence
  - c. sign that nothing is wrong
  - d. sign that something is wrong
10. This system will transmit the signal far.
- a. send a message
  - b. garble
  - c. interfere with
  - d. stop the message from going

11. The interval between beeps will be 15 seconds.

- a. time between
- b. loops
- c. ladder
- d. relationship between

12. Use your Soldier's Manual as a reference.

- a. shelf to store things on
- b. doorstop
- c. weight for holding down the tarpaulin
- d. where to find information

13. The wire will be under tension when you hang weights on it.

- a. agony
- b. stretched tight
- c. the roof of the shelter
- d. the ground

14. Use the jack to elevate the van.

- a. lift up
- b. hold tight
- c. push down
- d. turn around

15. The components will always be in this configuration.

- a. color
- b. grouping
- c. size
- d. housing

16. Troubleshooting is effective if you find the fault.

- a. easy enough to do by yourself
- b. big enough to cause problems
- c. produces the desired effect
- d. hectic

17. Refer to the index when looking for a certain topic.
- a. inside cover that lists the author, publisher, and date of publication
  - b. table of contents
  - c. binding that secures all of the pages together
  - d. alphabetical listing that helps in finding a certain part of a book
18. A loud hum was a symptom that something was malfunctioning.
- a. sign that something is wrong
  - b. high tone that is hard on the ears
  - c. a slow person
  - d. annoying
19. The receiver performs the function of receiving the signal.
- a. the public debate
  - b. having a good time
  - c. critical analysis of
  - d. the expected action
20. This transmitter has a broadcast range of 10 miles.
- a. something to cook on
  - b. what usually sits beside a window
  - c. how far something can be transmitted
  - d. where cattle live
21. Insert the cable here.
- a. lengthen
  - b. turn sideways
  - c. take out
  - d. put in

22. Insert the cable here.

- a. bolt
- b. a shallow waterway for boats to travel in
- c. a collection of wires to carry electricity
- d. rope

23. Use caution when working with electrical components.

- a. carefulness
- b. proper tools
- c. insulation
- d. a team

24. Use caution when working with electrical components.

- a. wires
- b. outlets
- c. vans for carrying equipment
- d. parts of a system

25. If you detect a malfunction, you must find what causes it.

- a. notice
- b. correct
- c. cannot correct
- d. like

26. If you detect a malfunction, you must find what causes it.

- a. corrects it
- b. makes it happen
- c. does not correct it
- d. makes it worse

27. Find the appropriate manual.

- a. most convenient
- b. right
- c. nearest
- d. biggest

28. The reading should be approximately 150.

- a. almost exactly
- b. far from
- c. greater than
- d. less than

29. If the power is not adequate, the signal will be lost.

- a. enough
- b. loud
- c. monitored well
- d. checked often

30. This will explain the process used to extend the antenna.

- a. reference manuals
- b. weather condition
- c. series of actions
- d. tools

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE,  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 2

Checkpoint 1, Form A

In each question below, there is a sentence to read, followed by a question. Read the sentence carefully. Make sure you understand it. Then read the question carefully and answer it.

1. Tuning the receiver insures that radio waves of the desired frequency are amplified more than radio waves of other frequencies.

This sentence says that:

- a. In the receiver some radio waves are strengthened more than others.
- b. The receiver can be tuned to any frequency within the radio frequency range.
- c. Radio waves are amplified before they are received.

2. Multiplex equipment connected to a radio enables the radio to transmit and receive on several telephone channels simultaneously.

Which of the following sentences says the same thing?

- a. A radio cannot transmit and receive without multiplex equipment.
- b. The purpose of telephone channels is to enable the radio to use multiplex equipment simultaneously.
- c. If you want to transmit and receive on several telephone channels simultaneously, you must connect the radio to multiplex equipment.

3. The force of an electric current through a circuit is measured in volts, the volume of flow in amps, and the resistance of the circuit in ohms.

An ohmmeter measures:

- a. how much electricity is flowing through a circuit.
- b. how much resistance is in the circuit.
- c. the force of the current through the circuit.

4. The TT-4/TG is a lightweight, transportable unit.

According to the sentence, the TT-4/TG is:

- a. easy to move.
- b. heavy.
- c. hard to transport.
- d. a useful piece of equipment.

5. In amplitude modulation, the amplitude of the carrier wave is modified by incoming audio frequencies.

What do incoming audio frequencies do in amplitude modulation?

---

6. The useful operating distance between two radio sets is generally limited to between 30 and 40 miles.

This sentence says that:

- a. No radio set can transmit over 40 miles.
- b. Two radio sets, transmitting together, can transmit farther than one radio set.
- c. If you want to transmit from one radio set to another, make sure that they are at least 40 miles apart.
- d. If you want to transmit from one radio set to another, the radio sets should be within 30 or 40 miles of each other.

7. The air filter must be cleaned frequently, at least once a week, and also immediately after a sand or dust storm.

After a dust storm, you should clean the air filter:

- a. frequently.
- b. at the end of the week.
- c. immediately.

8. The use of separate antenna masts for transmitters and receivers at a station will reduce the transmitter-to-receiver interference at that station.

What should you do to decrease the amount of interference?

- a. Use different masts for transmitting to different stations.
- b. Use one mast for both transmitters and receivers.
- c. Use different masts for transmitters and receivers.
- d. Use the antenna for transmission and reception.

Use this short passage to answer questions 9 and 10:

In the receiver, intelligence is extracted from the carrier wave through the process of demodulation. The intelligence is converted from electric energy to sound by a speaker.

9. What does demodulation do?
- a. It extracts the radio wave from the process.
  - b. It converts electric energy to sound energy.
  - c. It processes the carrier wave of the intelligence.
  - d. It separates the message from the carrier wave.
10. The speaker changes \_\_\_\_\_ to \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 2

Checkpoint 2, Form A

Here are conditions and standards for installing a 10 KW Generator Set. Read them carefully. Then answer questions 1 to 5. Refer back to the Conditions and Standards whenever you need to.

CONDITIONS

This task is performed under all weather conditions in a field or a garrison location. You will need a 10 KW Generator Set, TM 5-6115-275-14, 5-pound sledge hammer, ground rod, ground strap, 8-inch flat tip screwdriver, 8-inch adjustable wrench, and standard pliers.

STANDARDS

This task has been performed correctly when, in 10 minutes, the generator set has been sited, grounded, power cable connected, fuel supply determined and connected without causing damage to any connectors or the generator set, and the generator is ready to be operated.

1. List all the equipment and tools needed for this task.

---

---

---

2. What reference is needed for this task? \_\_\_\_\_

3. Cpl. Mary Jones has sited her generator set, grounded it, and attached the power cable. What does she still have to do to meet the standards?

---

---

---

4. Cpl. Jones began installation at 0845. She must be finished no later than \_\_\_\_\_.
5. According to the Standards, the generator set must be sited. This means (Choose one):
- a. It must be visible.
  - b. It must be clean and well lubricated.
  - c. It must be inspected before proceeding.
  - d. It must be located in an appropriate place.

Read the following performance step:

Check for indication in green band on TEST ALIGN meter.

For sentences 6 to 8 below, write S if the sentence says the same thing as the performance step. Write D if it says something different.

- \_\_\_\_\_ 6. Monitor the TEST ALIGN meter for indication in the green band.
- \_\_\_\_\_ 7. Operate the TEST ALIGN meter to obtain an indication in the green band.
- \_\_\_\_\_ 8. Insure that TEST ALIGN meter reading is in green band.

Read the following performance step:

Set selector switch to OSC and MX sequentially.

For sentences 9 and 10, write S if the sentence says the same thing as the performance step and D if it does not.

\_\_\_\_\_ 9. Operate selector switch to OSC. Then operate selector switch to MX.

\_\_\_\_\_ 10. Adjust selector switch until meter reads OSC, then MX.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 2

Checkpoint 1, Form B

In each question below, there is a sentence to read, followed by a question. Read the sentence carefully. Make sure you understand it. Then read the question carefully and answer it.

1. When transmitting over distances of 40 miles or less, the antenna radiates ground waves, which follow the curvature of the earth.

Ground waves can be used for sending messages up to \_\_\_\_\_

2. Two radio terminals more than 40 miles apart can communicate if there is a repeater station between them.

Which of the following sentences says the same thing?

- a. A repeater makes it possible to increase the range of radio transmission over 40 miles.
- b. Repeater stations are necessary for communication.
- c. If two radio terminals are more than 80 miles apart, they cannot communicate.

3. The force of an electric current through a circuit is measured in volts, the volume of flow in amps, and the resistance of the circuit in ohms.

A voltmeter measures:

- a. how much electricity is flowing through a circuit.
- b. how much resistance is in the current.
- c. the force of the current through the circuit.

4. A radio terminal in a field location requires a transmitter, a receiver, modulating equipment, a generator, and an antenna.

Sgt. Sue Williams is setting up a field radio terminal. She has an antenna, a transmitter, a receiver, and modulating equipment. What else does she need? \_\_\_\_\_

5. The switches for regulating the output of the generator are located in the control box.

In the control box, you will find:

- a. outputs.
- b. regulatings.
- c. generators.
- d. switches.

6. The use of multiplex equipment enables a radio to accommodate many telephone channels.

Many telephone channels can go through the same radio if the radio terminal contains \_\_\_\_\_

Use the following sentence to answer questions 7 and 8:

The receiver intercepts RF waves of the appropriate frequency, extracts the message from the carrier wave, and converts the message from electric energy to sound energy.

7. After the receiver has completed its work, the message is in the form of:

- a. electric energy.
- b. sound waves.
- c. radio waves.

8. The sentence above says that:

- a. The message is separated from the carrier wave in the receiver.
- b. The receiver picks up RF waves of all frequencies.
- c. The carrier wave generates both electric energy and sound energy.

Use the following sentence to answer questions 9 and 10.

In amplitude modulation, audio frequencies change the strength of radio waves produced by the oscillator.

9. The process of changing the strength of radio waves is called

---

10. The oscillator:

- a. modulates radio waves.
- b. produces sounds.
- c. generates radio waves.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

## UNIT I - LESSON 2

### Checkpoint 2, Form B

Here are conditions and standards for system alignment of a repeater radio called the AN/MRC-54(V). Read them. Then answer questions 1 to 5. Refer back to the Conditions and Standards whenever you need to.

#### CONDITIONS

This task may be performed in a tactical situation. To accomplish this task, you will need an operable AN/MRC-54(V) to include associated TMs, basic issue tools, and safety equipment. You will be provided with a multichannel systems diagram. There is an operable radio terminal at the distant station (ALFA). You will perform the system alignment under the direction of ALFA terminal.

#### STANDARDS

Standards are met when the system is in operation and all 12 channels are aligned and capable of passing traffic within 30 minutes.

1. Who directs your performance of the system alignment?

\_\_\_\_\_

2. Besides the AN/MRC-54(V) and the radio terminal at the distant station, what kinds of equipment or tools do you need?

\_\_\_\_\_

3. What references are needed for this task?

\_\_\_\_\_

4. In the Standards, the term "passing traffic" probably means:

- a. transmitting and receiving.
- b. exceeding the speed of other vehicles.
- c. following the directions of the other station.

5. How much time do you have to complete this task? \_\_\_\_\_

Read the following performance step:

Momentarily operate MANUAL-AUTOMATIC switch to MANUAL.

Now read each of the two sentences below. If a sentence means the same thing as the performance step, write S. If it does not, write D.

\_\_\_\_\_ 6. Operate the MANUAL-AUTOMATIC switch to MANUAL sequentially.

\_\_\_\_\_ 7. Set the MANUAL-AUTOMATIC switch to MANUAL for a short time.

Read the following performance step; then answer questions 8 to 10.

Adjust LEVEL control until receiver meter reads in green area of scale.

8. Adjust means the same thing as (Choose one):

- a. Rotate fast.
- b. Press.
- c. Turn slowly.
- d. Fix.

9. What indicator do you need to watch while you are adjusting the LEVEL control? \_\_\_\_\_

10. When should you stop moving the LEVEL control? \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Unit I, Lesson 2  
Checkpoint 2, Form B

2

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 3

Checkpoint 1, Form A

In each question, read the performance step. Then answer the question which follows.

1. If the engine has not reached operating temperature in 5 minutes, check the current level.

Suppose that the operating temperature is 185°. At the end of 5 minutes, the engine temperature is 150°. What should you do?

---

2. Insure that distance between A and B is not greater than 10 feet.

The distance between A and B should be:

- a. exactly 10 feet.
- b. more than 10 feet.
- c. 10 feet or less.
- d. 10 feet or more.

3. Failure to adjust control results in not receiving signal.

Sgt. Smith did not adjust the control. What will happen?

---

4. Repairs that cannot be completed within 15 minutes must be reported to the field officer.

A certain repair will require 30 minutes. Should it be reported to the field officer? \_\_\_\_\_

5. Do not allow engine oil pressure to exceed 60 psi.

Which of the following oil pressures are all right?

- a. Pressures that exceed 60 psi.
- b. Pressures up to 60 psi.
- c. Pressures more than 60 psi.
- d. Pressures of 60 psi or more.

6. No control should be adjusted to more than 80%.

All controls should be adjusted to:

- a. 80% or less.
- b. exactly 80%.
- c. more than 80%.
- d. 80% or more.

7. Dig a hole no wider or deeper than necessary.

The hole should be:

- a. wide and deep.
- b. wide and shallow.
- c. narrow and deep.
- d. narrow and shallow.

8. Press FIELD FLASH switch only if voltage fails to build up automatically.

The voltage has reached a high level. Should you press the FIELD FLASH switch? \_\_\_\_\_

9. Meter reading should not exceed 75%.

The meter should read:

- a. 75% or less.
- b. at least 75%.
- c. 75% or more.
- d. more than 75%.

10. Check gage to insure no operation in excess of 50.

This means that all operations should be \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 3

Checkpoint 1, Form B

In each question, read the performance step. Then answer the question which follows.

1. Failure to install the cables results in not receiving PCM signals.

If you do not install the cables, you will \_\_\_\_\_

2. Multimeter should not exceed 40 with meter select switch at XYZ.

The meter select switch is at XYZ. What should the multimeter reading be? \_\_\_\_\_

3. Insure that field wire is not longer than 50 feet.

The field wire should be:

- a. exactly 50 feet long.
- b. more than 50 feet long.
- c. 50 feet long or more.
- d. 50 feet long or less.

4. No control should be adjusted to more than 30° from the vertical.

All the controls are adjusted to 0° to 20° from the vertical. Is that all right? \_\_\_\_\_

5. Corrective actions that cannot be performed by replacing panels must be referred to a higher level of maintenance.

Which corrective actions must be reported to a higher level of maintenance?

- a. Any corrective actions.
- b. Those which require replacing panels.
- c. Those which do not require replacing panels.

6. Do not allow operating temperature to exceed 185°.

The operating temperature should be:

- a. 185° or less.
- b. 185° or more.
- c. more than 185°.
- d. exactly 185°.

7. If the signal lamp is not lit, push the POWER button.

You should push the POWER button if:

- a. the signal lamp is on.
- b. the signal lamp is off.
- c. the power is too low.
- d. the power is too high.

8. Check meter at all settings of selector switch to insure no reading in excess of 100%.

The meter should show:

- a. no reading under 100%.
- b. all readings over 100%.
- c. all readings 100% or less.

9. Hold the switch in the GO position no longer than necessary.

You should hold the switch in GO:

- a. for a short time.
- b. for a long time.

10. Open air vent if engine fails to cool down by itself.

The engine is too hot. What should you do? \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 4

Checkpoint 1, Form A

In this checkpoint, you will find sentences to read. Each sentence is followed by two questions. Read each sentence carefully before answering the questions.

Raise the mast section in the launcher by pumping the jacking lever until the automatic stop prevents further motion.

1. What does pumping the jacking lever do?
  - a. It stops automatically.
  - b. It raises the mast section.
  - c. It prevents further motion.
  
2. What does the operator have to do to prevent further motion?
  - a. Place the mast section in the launcher.
  - b. Pump the jacking lever.
  - c. Nothing. Motion stops automatically.

Place air intake shutter in the summer position when temperature is above 32°F (0°C) and winter position when temperature is below 32°F (0°C).

3. The correct position for the intake shutter depends upon the \_\_\_\_\_
  
4. If the temperature is 40°F, what position should you put the air intake shutter in? \_\_\_\_\_

Stop operation immediately if a deficiency is noted during operation that would damage the equipment.

5. Which of the following says the same thing?
- a. If you see something wrong that could cause damage while you are operating the equipment, turn the equipment off right away.
  - b. Stop operation right away if damage to the equipment occurs.
  - c. Damage to the equipment during operation will stop operation immediately.
  - d. Stopping the operation immediately if a deficiency is noted during operation will damage the equipment.
6. You notice a bare wire which could cause a short circuit inside the equipment. What should you do right away?
- a. Tell the team chief.
  - b. Repair the wire.
  - c. Shut down the equipment.

If high reflected power is indicated on the receiver meter, the transmitter meter, or both, and adjustment of the control does not bring the meter indications within prescribed tolerances, check the entire system for poor connections, broken cables, and similar defects.

7. In this sentence, "bring the meter indications within prescribed tolerances" probably means:
- a. reduce the meter indications.
  - b. raise the meter indications.
  - c. adjust the control.
8. According to the sentence, what kinds of defects can cause high reflected power?
-

Meter should indicate 400 Hz or 60 Hz, depending on which machine is being operated.

9. Which of the following says the same thing?

- a. If you are operating one machine, the meter reading should be 400 Hz. On the other machine, the meter reading should be 60 Hz
- b. Set the meter to 400 Hz or 60 Hz, depending on which machine you are operating.
- c. If you are operating a machine, the meter should read 400 Hz and 60 Hz.

10. The correct meter reading depends on \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 4

Checkpoint 1, Form B

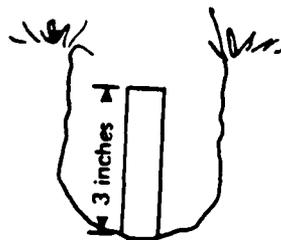
In this checkpoint, you will find sentences to read. Each sentence is followed by two questions. Read each sentence carefully before answering the questions.

Place the circuit breaker in the OFF position and turn variable resistor knob counterclockwise until it stops.

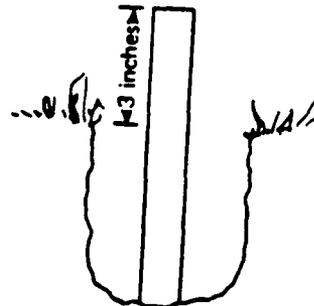
1. The two things you must do are:
  - a. place and turn off the circuit breaker.
  - b. place the circuit breaker to OFF and turn variable resistor knob.
  - c. place the OFF switch and turn variable resistor knob.
  - d. place circuit breaker to OFF and stop the variable resistor knob.
  
2. How long should you turn the variable resistor knob?
  - a. Until it is in the OFF position.
  - b. Until it is counterclockwise.
  - c. Until it stops.

Drive the sections of the ground rod (one at a time) into the hole until the top of the complete rod is about 3 inches above the bottom of the hole.

3. Which picture below shows the correct position of the ground rod?



a.



b.

4. Does the ground rod come in one section or several sections?

\_\_\_\_\_

If the circuit breaker will not stay closed, it is defective and must be referred to organizational maintenance.

5. What should you do with a circuit breaker that will not stay closed?
- a. Defect it.
  - b. Close it.
  - c. Refer it to organizational maintenance.
6. There is something wrong with the circuit breaker if it

\_\_\_\_\_

Defects that cannot be repaired or are beyond the scope of operator maintenance must be recorded on Form ABC.

7. Something is wrong with your equipment. It cannot be fixed. What should you do? \_\_\_\_\_

8. The sentence above says that:

- a. uncorrectable defects should be recorded on Form ABC.
- b. defects that are beyond the scope of operator maintenance cannot be repaired.
- c. defects on Form ABC cannot be repaired.

If the frequency reading is incorrect, the engine governor must be adjusted.

9. This sentence says:

- a. The frequency reading will be incorrect unless the engine governor is adjusted.
- b. Adjusting the engine governor is necessary if you get a wrong frequency reading.
- c. Read the frequency wrong, then adjust the engine governor.

10. "The frequency reading is incorrect" probably means:

- a. the indicator on the frequency meter is not what it should be.
- b. the operator makes a mistake reading the frequency.
- c. the meter is not reading the frequency correctly.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 5

Checkpoint 1, Form A

Directions: Read the statement below and answer the questions that follow.

Readjust the variable resistor before placing the circuit breaker in the OFF position.

1. What happens first in the above statement?

- a. Readjust the variable resistor.
- b. Readjust the circuit breaker.
- c. Place the circuit breaker in the OFF position.
- d. Place the readjustment in the variable resistor.

2. What happens second in the above statement?

- a. Readjust the variable resistor.
- b. Readjust the circuit breaker.
- c. Place the circuit breaker in the OFF position.
- d. Place the readjustment in the variable resistor.

3. Which of the following describes the tasks in the same order?

- a. After readjusting the variable resistor, place the circuit breaker in the OFF position.
- b. After placing the circuit breaker in the OFF position, readjust the variable resistor.
- c. Before readjusting the variable resistor, place the circuit breaker in the OFF position.
- d. Place the circuit breaker in the OFF position, then readjust the variable resistor.

Before setting the ON/OFF switch to ON, determine the current draw on each terminal and then stop the generator set.

4. What happens first in the above statement?

- a. Set the ON/OFF switch to ON.
- b. Determine the current draw.
- c. Stop the generator set.
- d. Set the current draw to ON.

5. What happens second in the above statement?

- a. Set the ON/OFF switch to ON.
- b. Determine the current draw.
- c. Stop the generator set.
- d. Set the current draw to ON.

6. What happens third in the above statement?

- a. Set the ON/OFF switch to ON.
- b. Determine the current draw.
- c. Stop the generator set.
- d. Set the current draw to ON.

7. Which of the following describes the tasks in the same order?

- a. Stop the generator set and determine the current draw on each terminal before setting the ON/OFF switch to ON.
- b. Set the ON/OFF switch to ON before determining the current draw. Then stop the generator set.
- c. Determine the current draw before setting the ON/OFF switch to ON. Then stop the generator set.
- d. Determine the current draw before stopping the generator set. Then set the ON/OFF switch to ON.

Continue operating procedures after positioning the Transfer Box Switch and turning the circuit breaker switch to ON.

8. Which of the following lists the tasks as they should be performed?

- a. Continue operating procedures. Position Transfer Box Switch. Turn circuit breaker to ON.
- b. Position Transfer Box Switch. Turn circuit breaker to ON. Continue operating procedures.
- c. Turn circuit breaker to ON. Continue operating procedures. Position Transfer Box Switch.
- d. Turn circuit breaker to ON. Position Transfer Box Switch. Continue operating procedures.

9. Which of the following describes the tasks in the same order?

- a. Before continuing operating procedures, position the Transfer Box Switch and then turn the circuit breaker switch to ON.
- b. Before positioning the Transfer Box Switch, turn the circuit breaker switch to ON and then continue operating procedures.
- c. Before turning the circuit breaker switch to ON, continue operating procedures and then position the Transfer Box Switch.
- d. Turn the circuit breaker switch to ON and then continue operating procedures and position the Transfer Box Switch.

Dismantle the shelter after disconnecting the cables and destroying the equipment.

10. Which of the following lists the tasks as they should be performed?

- a. Dismantle shelter. Disconnect cables. Destroy equipment.
- b. Disconnect cables. Destroy equipment. Dismantle shelter.
- c. Destroy equipment. Disconnect cables. Dismantle shelter.
- d. Destroy equipment. Dismantle shelter. Disconnect cables.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 5

Checkpoint 1, Form B

Directions: Read the statement below and answer the questions which follow.

Select test channels and then connect BQ-894 to transmitter.

1. Which of the tasks listed below is to be done first?
  - a. Select test channels.
  - b. Select BQ-894.
  - c. Connect BQ-894 to transmitter.
  - d. Connect BQ-894 to cable.
  
2. Which of the tasks listed below is to be done second?
  - a. Select test channels.
  - b. Select BQ-894.
  - c. Connect BQ-894 to transmitter.
  - d. Connect BQ-894 to cable.
  
3. Which of the following directions means the same thing?
  - a. Select test channels after connecting BQ-894 to transmitter.
  - b. Connect BQ-894 to transmitter and then select test channels.
  - c. Connect BQ-894 to transmitter before selecting test channels.
  - d. Select test channels before connecting BQ-894 to transmitter.

Read the statement below and answer the questions which follow.

Depress the handset switch after lifting the handset from the bracket, then wait for the order wire message.

4. Which of the tasks listed below is to be done first?

- a. Depress handset switch.
- b. Wait for the order wire message.
- c. Lift the handset from the bracket.
- d. Depress the order wire.

5. Which of the tasks listed below is to be done second?

- a. Depress handset switch.
- b. Wait for the order wire message.
- c. Lift the handset from the bracket.
- d. Depress the order wire.

6. Which of the tasks listed below is to be done third?

- a. Depress the handset switch.
- b. Wait for the order wire message.
- c. Lift the handset from the bracket.
- d. Depress the order wire.

7. Which of the following directions means the same thing?

- a. After waiting for the order wire message, depress the handset switch and then lift the handset from the bracket.
- b. After waiting for the order wire message, lift the handset from the bracket and then depress the handset switch.
- c. Before depressing the handset switch, lift the handset from the bracket. Then wait for the order wire message.
- d. Lift the handset from the bracket before waiting for the order wire message and then depress the handset switch.

Read the statement below and answer the question which follows.

Before setting the multimeter switch to 1 KC IN, request a test signal. Then adjust the FDM LEVELS.

8. Which of the following lists the tasks in the order they are to be performed?
- a. Set multimeter switch. Request test signal. Adjust FDM LEVELS.
  - b. Adjust FDM LEVELS. Request test signal. Set multimeter switch.
  - c. Request test signal. Set multimeter switch. Adjust FDM LEVELS.
  - d. Set multimeter switch. Adjust FDM LEVELS. Request test signal.

Read the statement below and answer the questions which follow.

Set the transmitter multimeter selector switch to PCM IN after setting the TEST TONE switch to ON.

9. Which of the tasks listed below is to be done first?
- a. Set transmitter multimeter switch.
  - b. Set the TEST TONE switch to ON.
  - c. Set the PCM to IN.
  - d. Set the TEST to TONE.

10. Which of the following means the same thing?

- a. Set the transmitter multimeter selector switch to PCM IN before setting the TEST TONE switch to ON.
- b. Set the TEST TONE switch to ON after setting the transmitter multimeter selector switch to PCM IN.
- c. Set the TEST TONE switch to ON before setting the transmitter multimeter selector switch to PCM IN.
- d. Set the transmitter multimeter selector switch to PCM IN and then set the TEST TONE switch to ON.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 6

Checkpoint 1, Form A

Read the following directions.

Turn on the XY-777 and wait several seconds. Then operate the switch to TALK and turn on the receiver.

1. Which of the following tasks happens first?
  - a. Wait several seconds.
  - b. Turn on the receiver.
  - c. Turn on the XY-777.
  - d. Operate the switch to TALK.
  
2. Which of the following tasks happens second?
  - a. Wait several seconds.
  - b. Turn on the receiver.
  - c. Turn on the XY-777.
  - d. Operate the switch to TALK.
  
3. Which of the following tasks happens third?
  - a. Wait several seconds.
  - b. Turn on the receiver.
  - c. Turn on the XY-777.
  - d. Operate the switch to TALK.
  
4. Which of the following tasks happens fourth?
  - a. Wait several seconds.
  - b. Turn on the receiver.
  - c. Turn on the XY-777.
  - d. Operate the switch to TALK.

Unit I, Lesson 6  
Checkpoint 1, Form A

1

5. Which of the following summarizes the directions best?
- a. Wait. Turn on receiver. Turn switch to TALK. Turn on XY-777.
  - b. Turn switch to TALK. Turn on XY-777. Wait. Turn on receiver.
  - c. Turn on receiver. Turn switch to TALK. Wait. Turn on XY-777.
  - d. Turn on XY-777. Wait. Turn switch to TALK. Turn on receiver.

Read the following directions:

Remove the tire assembly. Loosen the anchor pin lock nuts and align the anchor pins. Turn brake shoe adjusting pins and then insert a gauge through the inspection hole.

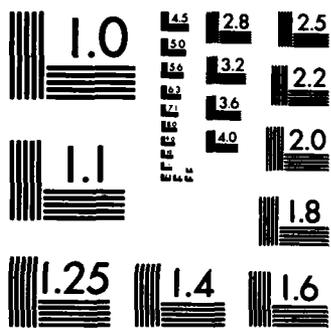
6. Which task is to be done just before turning the brake shoe adjusting pins?
- a. Remove the tire assembly.
  - b. Loosen the anchor pin lock nuts.
  - c. Align the anchor pins.
  - d. Insert a gauge through the inspection hole.
7. Which task is to be done just after turning the brake shoe adjusting pins?
- a. Remove the tire assembly.
  - b. Loosen the anchor pin lock nuts.
  - c. Align the anchor pins.
  - d. Insert a gauge through the inspection hole.
8. Which task is to be done just after removing the tire assembly?
- a. Loosen the anchor pin lock nuts.
  - b. Align the anchor pins.
  - c. Turn brake shoe adjusting pins.
  - d. Insert a gauge through the inspection hole.

9. Which task is to be done just before loosening anchor pin lock nuts?
- a. Remove the tire assembly.
  - b. Align the anchor pins.
  - c. turn brake shoe adjusting pins.
  - d. Insert a gauge through the inspection hole.
10. Which of the following summarizes the directions best?
- a. Insert gauge. Turn adjusting pins. Align anchor pins. Loosen nuts. Remove tire.
  - b. Loosen nuts. Turn adjusting pins. Align anchor pins. Remove tire. Insert gauge.
  - c. Turn adjusting pin. Remove tire. Align anchor pins. Insert gauge. Loosen nuts.
  - d. Remove tire. Loosen nuts. Align anchor pins. Turn adjusting pins. Insert gauge.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.





MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 6

Checkpoint 1, Form B

Read the following directions.

Operate the POWER switch to OFF. Send a line person out and then give instructions to connect into the cable link. Give instructions to perform the loopback check.

1. Which task is to be performed first?
  - a. Send line person out.
  - b. Give instructions to connect into cable link.
  - c. Give instructions to perform loopback check.
  - d. Operate the POWER switch to OFF.
  
2. Which task is to be performed second?
  - a. Send line person out.
  - b. Give instructions to connect into cable link.
  - c. Give instructions to perform loopback check.
  - d. Operate the POWER switch to OFF.
  
3. Which task is to be done just after sending a line person out?
  - a. Send line person out.
  - b. Give instructions to connect into cable link.
  - c. Give instructions to perform loopback check.
  - d. Operate the POWER switch to OFF.
  
4. Which task is to be done just before sending a line person out?
  - a. Send line person out.
  - b. Give instructions to connect into cable link.
  - c. Give instruction to perform loopback check.
  - d. Operate the POWER switch to OFF.

Unit I, Lesson 6  
Checkpoint 1, Form B

1

5. Which of the following summarizes the directions best?
- a. Tell him to connect into cable link. Tell him to operate switch to OFF. Send out line person. Do loopback check.
  - b. Operate switch to OFF. Send out line person. Tell him to connect into cable link. Tell him to do loopback check.
  - c. Send out line person. Operate switch to OFF. Tell him to connect into cable link. Tell him to do loopback check.
  - d. Tell him to do loopback check. Operate switch to OFF. Tell him to connect into cable link. Send out line person.

Read the following directions and answer the questions.

Recheck the area for loose items and then secure the power cable reel. Make sure that the drain plug is tightly closed. Close and lock the door.

6. Which task is to be done second?
- a. Recheck area for items.
  - b. Secure the power cable reel.
  - c. Close the door.
  - d. Lock the door.
7. Which task is to be done fifth?
- a. Recheck area for items.
  - b. Secure the power cable reel.
  - c. Close the door.
  - d. Lock the door.
8. Which of the following is to be done just before securing the power cable reel?
- a. Lock door.
  - b. Recheck area for loose items.
  - c. Close door.
  - d. Make sure drain plug is tightly closed.

9. Which of the following is to be done just after securing the power cable?

- a. Lock door.
- b. Recheck area for loose items.
- c. Close door.
- d. Make sure drain plug is tightly closed.

10. Which of the following summarizes the directions best?

- a. Secure power cable reel. Close door. Lock door. Check drain plug. Recheck area.
- b. Close door. Lock door. Recheck area. Secure power cable reel. Check drain plug.
- c. Recheck area. Secure power cable reel. Check drain plug. Close door. Lock door.
- d. Check drain plug. Secure power cable reel. Recheck area. Close door. Lock door.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 7

Checkpoint 1, Form A

Use the lists below to answer questions 1 through 5.

STANDARDS

1. Insure that the counseling site is private and free from distractions.
2. Give the soldier advance notice of the counseling session.
3. Give specific reasons for believing that the soldier has a problem.
4. Use active listening by making statements indicating your respect for, sensitivity to, and understanding of the soldier's comments.
5. Eliminate or modify working conditions that cause the soldier problems.

PERFORMANCE MEASURES

1. Select and schedule a site for the counseling session.
2. Notify the soldier of the time, place, and purpose of the counseling session.
3. Gather facts about the soldier's performance.
4. Determine whether or not a problem exists.
5. Write down suggestions and plans that will help the soldier.

1. Which of the following is exactly the same as point 4 of Standards?
  - a. Insure that the counseling site is private and free from distractions.
  - b. Notify the soldier of the time, place, and purpose of the counseling session.
  - c. Determine whether or not a problem exists.
  - d. Use active listening by making statements indicating your respect for, sensitivity to, and understanding of the soldier's comments.
  
2. Which of the following is exactly the same as point 3 of Performance Measures?
  - a. Give the soldier advance notice of the counseling session.
  - b. Gather facts about the soldier's performance.
  - c. Write down suggestions and plans that will help the soldier.
  - d. Eliminate or modify working conditions that cause the soldier problems.
  
3. Which of the following means the same thing as point 2 of Performance Measures?
  - a. Tell the soldier the when, where, and why of the counseling session.
  - b. List reasons of why the soldier has a problem.
  - c. Pick and reserve a location for the counseling session.
  - d. Working conditions that cause problems should be changed or eliminated.
  
4. Does point 1 of Standards tell you how large the counseling site should be?
  - a. Yes
  - b. No
  
5. Does point 5 of Standards tell you what to do to working conditions that cause problems for the soldier?
  - a. Yes
  - b. No

For questions 6 through 8, refer to Paragraph A.

PARAGRAPH A

This task may be performed in a tactical situation. To accomplish this task, you will need an operable AN/MRC-54(V) to include associated TMs, basic issue tools, and safety equipment. The antennas and generator set have been installed and the shelter equipment has been loopback tested in accordance with task 113-593-2017. You will be provided with a multichannel systems diagram. There are operable radio terminals at the distant end, one of which is the control terminal (ALFA terminal). You will perform the system alignment under the direction of the ALFA terminal.

6. Which one of the following is mentioned in Paragraph A?
- a. You will work in a team with four other soldiers.
  - b. You need an operable AB/CDE-100(T).
  - c. You will have a multichannel systems diagram.
  - d. You will be directing ALPHA terminal.
7. Which one of the following is not mentioned in Paragraph A?
- a. The generator set and antenna should already be installed.
  - b. Loopback testing will have been done in accordance with task 113-593-2017.
  - c. Do the task in a tactical situation.
  - d. You will have one hour to complete the task.

### PARAGRAPH B

Do this task in a tactical situation. You will need an AN/MRC-54(V) in working order, associated TMs, basic issue tools, and safety equipment. The generator set and antennas have all been installed and the shelter equipment has been tested according to task 113-593-2017. There are operating radio terminals at the distant end. One of those terminals is ALFA terminal which is the control terminal that will direct the system alignment that you will do.

8. Which of the following needs to be added to Paragraph B to make it match Paragraph A?
- a. You will work in a team with four other soldiers.
  - b. ALFA terminal will be directed by you.
  - c. A multichannel system diagram will also be provided to you.
  - d. You will have one hour to complete the task.

For questions 9 and 10, refer to Paragraph C.

### PARAGRAPH C

To check the cables, you must first locate the cable connections in the box. Refer to CABLE-123 to determine which cables you are using and how tight they should be. Check your cables for the proper connections and tightness.

9. Which one of the following is mentioned in Paragraph C?
- a. CABLE-123 will identify the cables and tell you how tight they should be.
  - b. You should first disconnect all of the cables.
  - c. The power should be turned off.
  - d. This task should be done weekly.

10. Which one of the following is not mentioned in Paragraph C?

- a. CABLE-123 will identify the cables and tell you how tight they should be.
- b. First find the cable connections.
- c. The power should be turned off.
- d. Your job is to check the correctness and tightness of the cables.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

**UNIT I - LESSON 7**

**Checkpoint 1, Form B**

Use the lists below to answer questions 1 through 6.

**STANDARDS**

1. Insure that the counseling site is private and free from distractions.
2. Give the soldier advance notice of the counseling session.
3. Give specific reasons for believing that the soldier has a problem.
4. Use active listening by making statements indicating your respect for, sensitivity to, and understanding of the soldier's comments.
5. Eliminate or modify working conditions that cause the soldier problems.

**PERFORMANCE MEASURES**

1. Select and schedule a site for the counseling session.
2. Notify the soldier of the time, place, and purpose of the counseling session.
3. Gather facts about the soldier's performance.
4. Determine whether or not a problem exists.
5. Write down suggestions and plans that will help the soldier.

Unit I, Lesson 7  
Checkpoint 1, Form B

1

1. Which of the following is exactly the same as point 3 of Standards?
  - a. Give specific reasons for believing that the soldier has a problem.
  - b. Gather facts about the soldier's performance.
  - c. Eliminate or modify working conditions that cause the soldier problems.
  - d. Determine whether or not a problem exists.
  
2. Which of the following is exactly the same as point 4 of Performance Measures?
  - a. Give specific reasons for believing that the soldier has a problem.
  - b. Gather facts about the soldier's performance.
  - c. Eliminate or modify working conditions that cause the soldier problems.
  - d. Determine whether or not a problem exists.
  
3. Which of the following means the same thing as point 1 of Standards?
  - a. Be sure to get authorization to use the room you choose.
  - b. Be sure that the location you choose gives privacy and is one where you will not be bothered.
  - c. Counseling should be done at lunch-time so others will not bother you.
  - d. Have a pad and pencil nearby to jot down ideas.
  
4. Which of the following means the same thing as point 4 of Performance Measures?
  - a. Make statements showing that you respect, are sensitive to, and understand the soldier's comments.
  - b. You must list reasons for the problem.
  - c. You must determine if the site is appropriate or not.
  - d. You must decide if there is a problem or not.

5. Does point 2 of Standards say to tell the soldier of the time of, the place of, and the reason for the counseling session?
- a. Yes
  - b. No
6. Does point 3 of Performance Measures tell you what form to use to gather facts?
- a. Yes
  - b. No

For questions 7 through 10, refer to Paragraph A.

PARAGRAPH A

Your task is to complete the installation of AN/MRC-54(V) as a radio repeater in accordance with RADIO-LINK. The equipment circuit breaker will remain in the OFF position during this task. And in order to allow easy access to the shelter during this task, secure the vehicle tailgate in the horizontal position and install the boarding ladder.

7. Which one of the following is mentioned in Paragraph A?
- a. You must have basic tools and safety equipment before beginning.
  - b. Refer to RADIO-LINK when installing the AN/MRC-54(V) as a radio repeater.
  - c. The task can be performed in a tactical situation.
  - d. Antennas should be extended before you begin.
8. Which of the following is not mentioned in Paragraph A?
- a. The circuit breaker will be at OFF during the entire task.
  - b. You will install the AN/MRC-54(V) as a radio repeater.
  - c. You must install a boarding ladder.
  - d. The generator set will be installed before you begin.

9. Which of the following is not mentioned in Paragraph A.
- a. Fasten the tailgate in a horizontal position.
  - b. Standards are met when the radio receiver works.
  - c. You will complete the installation of AN/MRC-54(V)
  - d. To access the shelter, install a boarding ladder.

PARAGRAPH B

You will install the AN/MRC-54(V) as a radio repeater (refer to RADIO-LINK). While doing this, have the circuit breaker at OFF. To access the shelter more easily, lower the tailgate to the horizontal.

10. Which of the following needs to be added to Paragraph B to make it match Paragraph A?
- a. Do this in a tactical situation.
  - b. Put a ladder from the tailgate to the shelter.
  - c. You will need to refer to issued TMs.
  - d. You will need safety equipment.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

**UNIT II - LESSON 1**

**Checkpoint 1, Form A**

The Table of Contents below doesn't look like any you will ever see. But it works the same way as any other Table of Contents. Look it over very quickly. Then use it to answer the questions on the next page.

	Page
<b>INDIA</b>	<b>1-1</b>
Kilo	1-2
Victor	1-7
Zulu	1-10
<b>ECHO TASKS</b>	<b>2-1</b>
Papa List	2-1
Golf Level	2-43
Sierra Level	2-106
<b>DELTA TASKS</b>	<b>3-1</b>
Papa List	3-1
Yankee Level	3-25
Quebec Level	3-79
Zulu Level	3-157
<b>QUEBEC TASKS</b>	<b>4-1</b>
Papa List	4-1
Golf Level	4-14
Tango Level	4-85
Yankee Level	4-193
Delta Level	4-205
<b>UNIFORM TASKS</b>	<b>5-1</b>
Papa List	5-1
Sierra Level	5-38
Tango Level	5-100
Zulu Level	5-211

1. How many chapters are in this Table of Contents? \_\_\_\_\_
2. How many sections are in the chapter DELTA TASKS? \_\_\_\_\_
3. You are told to look up Papa List. What other information must you be told before you can do that?  
\_\_\_\_\_
4. On what page will you find Zulu? (Give both parts of the page number.) \_\_\_\_\_
5. What is the title of the section in Chapter 4 on page 85?  
\_\_\_\_\_
6. What is the title of the section on page 43 of Chapter 2?  
\_\_\_\_\_
7. On what page will you find ECHO TASKS, Sierra Level?  
(Give both parts of the page number.) \_\_\_\_\_
8. On what page will you find Tango Level, UNIFORM TASKS?  
(Give both parts of the page number.) \_\_\_\_\_
9. You need to read about Quebec Level, DELTA TASKS. What page should you turn to? (Give both parts of the page number.) \_\_\_\_\_
10. You must look up QUEBEC TASKS, Tango Level. What page should you turn to? (Give both parts of the page number.) \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

**UNIT II - LESSON 1**

**Checkpoint 1, Form B**

The Table of Contents below doesn't look like any you will ever see. But it works the same way as any other Table of Contents. Look it over very quickly. Then use it to answer the questions on the next page.

	Page
<b>UNIFORM</b>	1-1
Golf	1-3
Sierra	1-5
India	1-11
<b>HOTEL TASKS</b>	2-1
Romeo List	2-1
Delta Level	2-34
Papa Level	2-98
<b>ALFA TASKS</b>	3-1
Romeo List	3-1
Tango Level	3-37
Golf Level	3-68
Papa Level	3-125
Yankee Level	3-207
<b>ZULU TASKS</b>	4-1
Romeo List	4-1
Oscar Level	4-41
Papa Level	4-97
Tango Level	4-257
<b>TANGO TASKS</b>	5-1
Romeo List	5-1
Charlie Level	5-83
Alfa Level	5-165
Delta Level	5-280
Quebec Level	5-347

Unit II, Lesson 1  
Checkpoint 1, Form B

1

NOTE: When a page number is asked for, give both parts.

1. You must look up ZULU TASKS, Papa Level. What page should you turn to? \_\_\_\_\_
2. You need to read about Charlie Level, TANGO TASKS. What page should you turn to? \_\_\_\_\_
3. On what page will you find Papa Level, HOTEL TASKS? \_\_\_\_\_
4. On what page will you find ALFA TASKS, Yankee Level? \_\_\_\_\_
5. What is the title of the section on page 68 of Chapter 3?  
\_\_\_\_\_
6. What is the title of the section in Chapter 2 on page 96?  
\_\_\_\_\_
7. How many sections are in the Chapter UNIFORM? \_\_\_\_\_
8. You are told to look up Romeo List. What else must you be told to before you can do that?  
\_\_\_\_\_
9. How many chapters are in this Table of Contents? \_\_\_\_\_
10. On what page will you find Golf? (Note: just Golf, not Golf Level.) \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Unit II, Lesson 1  
Checkpoint 1, Form B

2

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT II - LESSON 2

Checkpoint 1, Form A

Directions: You will need to look in both Chapter 2 and Chapter 3 Task Lists to answer the following questions.

1. You are told to look up Task 031-503-1010. Where would you have to look? Check the correct answer.

- a. Chapter 2 Task List only  
 b. Chapter 3 Task List only  
 c. Both Chapter 2 and Chapter 3 Task Lists

2. To find a Task Number quickly, this lesson teaches that you should look first at:

- a. the whole number  
 b. the first section of the number  
 c. the middle section of the number  
 d. the last section of the number

3. Write the title of Task 081-851-1001.

\_\_\_\_\_

4. What is the title of Task 071-327-0202?

\_\_\_\_\_

5. What is the title of Task 113-593-2002?

\_\_\_\_\_

6. Is Task 113-593-2002 in the Chapter 2 or Chapter 3 Task List?

\_\_\_\_\_

7. What is the title of Task 113-593-7004?

\_\_\_\_\_

Unit II, Lesson 2  
Checkpoint 1, Form A

8. Is Task 113-593-7004 in the Chapter 2 or Chapter 3 Task List?

---

NOTE: Use the Chapter 3 Task List to answer questions 9 and 10.

9. What is the Task Number for the Task on Troubleshooting a Repeater Set, Radio, AN/TRC-110(V)?

---

10. What is the Task Number for the Task on Installing the Terminal, Telegraph-Telephone AN/MCC-6?

---

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE.

GO ON TO THE NEXT PART OF THE LESSON.

---

Name \_\_\_\_\_

Date \_\_\_\_\_

**UNIT II - LESSON 2**

**Checkpoint 2, Form A**

**Directions:** You will need to look in both Chapter 2 and Chapter 3 Task Lists to answer the following questions. Give both parts of the page numbers.

1. The Task Description for Task 113-593-7004 is on what page?  
\_\_\_\_\_
2. Information on Task No. 081-851-1001 is on what page? \_\_\_\_\_
3. If you want to read about Task 113-593-2002, you must go to what page? \_\_\_\_\_
4. Information on Task 071-327-0202 is on what page? \_\_\_\_\_
5. The Task Description for Task No. 113-593-1005 is on what page?  
\_\_\_\_\_

Directions: Use only the Chapter 3 Task List to answer the following questions.

6. If you want to read how to Troubleshoot a Repeater Set, AN/TRC-110(V), what page should you go to? \_\_\_\_\_
7. What is the page number for the task on Installing the AN/TRC-24 Antenna System? \_\_\_\_\_
8. If you want to Perform System Alignment of a Radio Terminal in the AN/TRC-145(V), what page would you go to? \_\_\_\_\_
9. You want to Troubleshoot a Repeater Set, AN/MRC-54(V). What page should you turn to? \_\_\_\_\_
10. What is the page number for the task that is called "Performing System Alignment on a 12-Channel Radio Terminal in the AN/MRC-69(V) or AN/MRC-73(V)"? \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

**UNIT II - LESSON 2**

**Checkpoint 1, Form B**

**Directions:** Turn to the first page of the Chapter 3 Task List in your Soldier's Manual. You can use the Table of Contents to find the page number if you need to.

1. Write the task number of the second task in the list, "Install the AN/GRC-103(V) Antenna System." \_\_\_\_\_

**Directions:** You will need to look in both Chapter 2 and Chapter 3 Task Lists to answer the following questions.

2. Write the Title of Task 113-593-2007.  
\_\_\_\_\_

3. What is the title of Task 113-573-4001?  
\_\_\_\_\_

4. Write the title of Task 113-593-2013.  
\_\_\_\_\_

5. What is the title of Task 081-831-1006?  
\_\_\_\_\_

**Directions:** Use only the Chapter 3 Task List to answer the following questions.

6. Write the Task Number for the Task on Installing a Terminal Set, Telephone, AN/TCC-61. \_\_\_\_\_

7. What is the Task Number for the task on Operating Terminal Set, Telephone, AN/TCC-60 or AN/TCC-69? \_\_\_\_\_

8. What is the Task Number for the task on Performing Monthly Preventive Maintenance on a Telephone Terminal Set, AN/TCC-73?  
\_\_\_\_\_

9. What is the Task Number for the task on Operating a Radio Terminal Set, AN/TRC-145(V)? \_\_\_\_\_

10. What is the title of Task 113-593-4002?  
\_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE.  
GO ON TO REVIEW EXERCISE 2.

Name \_\_\_\_\_

Date \_\_\_\_\_

**UNIT II - LESSON 2**

**Checkpoint 2, Form B**

**Directions:** Use only the Chapter 3 Task List to answer these questions.

1. What is the page number for Task 113-593-2014? \_\_\_\_\_
2. You need to read about Task 113-593-2015. What page does the task description start on. \_\_\_\_\_
3. The task description for Task 113-593-4005 is on what page?  
\_\_\_\_\_
4. What is the page number for Task 113-593-3027? \_\_\_\_\_
5. If you want to read about Task 113-593-3042, what page must you turn to? \_\_\_\_\_
6. What is the page number for the task description on Troubleshooting Radio Terminal Set AN/TRC-145? \_\_\_\_\_
7. You want to Operate the Radio Repeater Set AN/TRC-113(V). What page should you turn to? \_\_\_\_\_
8. If you want to read how to Perform Monthly Preventive Maintenance on a Terminal Telephone Set, AN/TCC-61, what page should you go to? \_\_\_\_\_
9. What is the page number for the task description on Performing Operator's Daily Preventive Maintenance on the Repeater Set, Radio, AN/TRC-110(V)? \_\_\_\_\_
10. What is the page number of the task description on Installing the AN/GRC-50 Antenna System? \_\_\_\_\_

**WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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**YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.**

Unit II, Lesson 2  
Checkpoint 2, Form B

1

Name \_\_\_\_\_

Date \_\_\_\_\_

**UNIT II - LESSON 3**

**Checkpoint 1, Form A**

The Table of Contents below is from a TM. Look it over very quickly. Then use it to answer the questions on the following page.

CHAPTER Section		Paragraph	Page
CHAPTER Section	1. INTRODUCTION		
	I. General		
	Scope .....	1-1	1-1
	Indexes of publications .....	1-2	1-1
	Forms and records .....	1-3	1-1
	II. Description and Data		
	Purpose and use .....	1-4	1-1
	Technical characteristics .....	1-5	1-3
	Components comprising the operable end item .....	1-6	1-9
	Description .....	1-7	1-9
	Additional equipment required .....	1-8	1-9
	Administrative storage .....	1-9	1-9
	CHAPTER Section	2. INSTALLATION	
I. Service Upon Receipt of Equipment			
Unpacking .....		2-1	2-1
Checking unpacked equipment .....		2-2	2-1
II. Installation			
Siting .....		2-3	2-1
Installing .....		2-4	2-2
Connecting .....		2-5	2-2
Preliminary operation of controls .....		2-6	2-2
Preliminary checks and adjustments .....		2-7	2-6
III. System Lineup			
Adjusting order-wire level .....		2-8	2-16
Adjusting video level .....		2-9	2-16
Adjusting channel gain .....	2-10	2-17	
CHAPTER Section	3. OPERATING INSTRUCTIONS		
	I. Controls, Indicators and Connectors		
	Multiplexer TD-202/U or TD-203/U .....	3-1	3-1
	Multiplexer TD-204 U .....	3-2	3-7
	Multiplexer TD-352 U or TD-353 U .....	3-3	3-13
	Converter, Telephone Signal CV-1548 G .....	3-4	3-22
	II. Operating Procedures		
	Starting procedure .....	3-5	3-26
	Operating order wire .....	3-6	3-27
	Monitoring channels of TD-352/U or TD-353/U .....	3-7	3-27
	Stopping procedure .....	3-8	3-28
	Operation under unusual conditions .....	3-9	3-28

(Continued on the next page.)

Unit II, Lesson 3  
Checkpoint 1, Form A

		Paragraph	Page
<b>CHAPTER 4.</b>	<b>MAINTENANCE</b>		
<b>Section I.</b>	<b>Preventive Maintenance</b>		
	Scope of maintenance .....	4-1	4-1
	Operator's daily preventive maintenance checks and services .....	4-2	4-2
	Operator's weekly preventive maintenance checks and services .....	4-4	4-5
	Organizational monthly preventive maintenance checks and services .....	4-3	4-4
<b>II.</b>	<b>Troubleshooting</b>		
	System troubleshooting .....	4-5	4-8
	Cable link troubleshooting .....	4-6	4-18
	Component troubleshooting .....	4-7	4-20
<b>III.</b>	<b>Repairs and Adjustments</b>		
	Replacement of plug-in panels .....	4-8	4-26
	Replacement of power supply assemblies .....	4-9	4-26
	Replacement of lightning arresters (TD-204 U) .....	4-10	4-26
	Servicing air filters .....	4-11	4-27
	TD-204 U overcurrent dropout adjustment .....	4-12	4-27
<b>CHAPTER 5.</b>	<b>BASIC PULSE CODE MODULATION THEORY</b>		
<b>Section I.</b>	<b>Introduction</b>		
	General .....	5-1	5-1
	Principles of multiplexing .....	5-2	5-1
<b>II.</b>	<b>Principles of Pulse Code Modulation</b>		
	General .....	5-3	5-2
	Voice transmission by pulse code modulation .....	5-4	5-2
	Pulse code modulation TD-352 U and TD-353 U .....	5-5	5-3
<b>CHAPTER 6.</b>	<b>SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE</b>		
<b>Section I.</b>	<b>Shipment and Limited Storage</b>		
	Disassembly .....	6-1	6-1
	Repackaging .....	6-2	6-1
<b>II.</b>	<b>Demolition of Material to Prevent Enemy Use</b>		
	Authority for demolition .....	6-3	6-1
	Methods of destruction .....	6-4	6-1

ANSWER THE FOLLOWING QUESTIONS:

1. On what page will you find "Principles of multiplexing"? \_\_\_\_\_
2. What is the paragraph number of the paragraph called "Stopping procedure"? \_\_\_\_\_
3. On what page does paragraph 4-8 start? \_\_\_\_\_
4. What is the title of paragraph 2-2?  
\_\_\_\_\_
5. On what page will you find "Voice transmission by pulse code modulation"? \_\_\_\_\_
6. What is the paragraph number of the paragraph called "Purpose and Use"? \_\_\_\_\_
7. On what page does paragraph 3-7 start? \_\_\_\_\_
8. What is the title of paragraph 4-5?  
\_\_\_\_\_
9. On what page will you find "Authority for demolition"? \_\_\_\_\_
10. What is the paragraph number of the paragraph called "Connecting"? \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

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AND TELL YOU WHAT TO DO NEXT.

Unit II, Lesson 3  
Checkpoint 1, Form A

3

Name \_\_\_\_\_

Date \_\_\_\_\_

**UNIT II - LESSON 3**

**Checkpoint 1, Form B**

The Table of Contents below is from a TM. Look it over very quickly. Then use it to answer the questions on the page following the Table of Contents.

	Paragraph	Page
<b>CHAPTER 1. INTRODUCTION</b>		
General		
Scope .....	1-1	1-1
Indexes of publications .....	1-2	1-1
Forms and records .....	1-3	1-1
II. Description and data		
Purpose and use .....	1-4	1-2
Technical characteristics .....	1-5	1-2
Components of radio sets .....	1-6	1-4
Description of radio set .....	1-7	1-4.6
Transmitting equipment .....	1-8	1-4.6
Receiving equipment .....	1-9	1-4.7
Antenna components .....	1-10	1-6.1
Regulator, Voltage CN-514/GRC .....	1-11	1-7
Minor components .....	1-12	1-8
Additional equipment required .....	1-13	1-10
Differences in models and configurations .....	1-14	1-10
III. System application		
General .....	1-15	1-20
Two-terminal system .....	1-16	1-20
Repeater station system .....	1-17	1-20
Interoperation with Radio Set AN/TRC-24 Configurations, fdm operation only ..	1-18	1-21
<b>CHAPTER 2. INSTALLATION</b>		
Section I. Service upon receipt of equipment		
Unpacking .....	2-1	2-1
Checking unpacked equipment .....	2-2	2-2
II. Installation		
Preliminary installation data .....	2-3	2-4
Shelter requirements .....	2-4	2-40
Tools required for installation .....	2-5	2-40
Antenna site .....	2-6	2-40
Antenna AT-903/G adjustment .....	2-7	2-40
Cable connections and grounding .....	2-8	2-41
Wavemeter vernier scale interpretation .....	2-9	2-41

(Continued on the next page.)

Unit II, Lesson 3  
Checkpoint 1, Form B

	Paragraph	Page
<b>CHAPTER 3. OPERATING INSTRUCTIONS</b>		
<b>Section I. Operator's controls and indicators</b>		
Transmitter controls and indicators .....	3-1	3-1
Receiver controls and indicators .....	3-2	3-3
Regulator, Voltage CN-514/GRC controls and indicators .....	3-3	3-4
<b>II. Tuning procedures</b>		
General .....	3-4	3-13
Installation of tuning units .....	3-5	3-14
Determination of channel frequency .....	3-6	3-14
Preliminary starting procedures .....	3-7	3-14
Receiver tuning procedures .....	3-8	3-15
Transmitter tuning requirements .....	3-9	3-19
Transmitter tuning procedures .....	3-10	3-21
Single stack loop-back operational tests .....	3-11	3-27
<b>III. System lineup procedures</b>		
General .....	3-12	3-30
Fdm system lineup .....	3-13	3-31
Pcm system lineup .....	3-14	3-32
System checks and adjustments .....	3-15	3-33
Multiplex terminal adjustments .....	3-16	3-34
<b>IV. Routine operating procedures</b>		
General .....	3-17	3-34
Order wire operation .....	3-18	3-34
Monitoring equipment .....	3-19	3-35
Stopping procedure .....	3-20	3-36
<b>CHAPTER 4. OPERATOR'S MAINTENANCE</b>		
Scope of operator's maintenance .....	4-1	4-1
Operator's preventive maintenance .....	4-2	4-1
Preventive maintenance checks and services periods .....	4-3	4-1
Daily preventive maintenance checks and services chart .....	4-4	4-2
Weekly preventive maintenance checks and services chart .....	4-5	4-2
Cleaning .....	4-6	4-3
Visual inspection .....	4-7	4-3
Operational checklist .....	4-8	4-3
Replacement of indicator lamps .....	4-9	4-5
Replacement of fuses .....	4-10	4-5
Replacement of aid filter .....	4-11	4-6

1. What is the paragraph number of the paragraph in Chapter 2, called "Antenna Site"? \_\_\_\_\_
2. On what page will you find information on "Components of radio sets"? \_\_\_\_\_
3. What is the title of paragraph 3-13?  
\_\_\_\_\_
4. On what page does paragraph 1-4 start? \_\_\_\_\_
5. What is the paragraph number of the paragraph titled "Transmitter tuning procedures"? \_\_\_\_\_
6. On what page will you find information on "Order wire operation"?  
\_\_\_\_\_
7. What is the title of paragraph 1-8?  
\_\_\_\_\_
8. On what page does paragraph 4-8 start? \_\_\_\_\_
9. What is the paragraph number of the paragraph titled "Cleaning"?  
\_\_\_\_\_
10. On what page will you find information on "Replacement of fuses"?  
\_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT III - LESSON 1

Checkpoint 1, Form A/B

Directions:

NOTE: Do not look at the questions until after you are done listening to the tape.

1. Listen to the first short lecture on the audiotape that goes with this checkpoint.
2. Stop the tape when you are directed to do so.
3. Do not take notes.
4. You may replay the tape, but do not look at the questions beforehand. After you stop the tape, answer questions 1 through 6.

START THE TAPE NOW.

1. How many major points were covered in the lecture?
  - a. 5
  - b. 2
  - c. 3
  - d. 7
2. The second major point discussed was:
  - a. advantages of night river crossing.
  - b. lighting under blackout conditions.
  - c. disadvantages of night river crossing.
  - d. weighing advantages and disadvantages.
3. The best natural lighting condition for a night river crossing is:
  - a. a quarter moon behind you.
  - b. a half moon behind you.
  - c. a quarter moon in front of you.
  - d. a full moon in front of you.

Unit III, Lesson 1  
Checkpoint 1, Form A/B

1

4. Look at each of the statements below.

1. Keep an attack going
2. Enemy air superiority over crossing area
3. Assembling of rafts requires more time
4. Surprise the enemy

Which of the above were mentioned as advantages of crossing a river at night?

- a. 1, 2, and 3
- b. 2, 3, and 4
- c. 1, 2, and 4
- d. All of the above

5. Look at each of the statements below.

1. Open land by the river
2. More confusion
3. Extra measures needed to prevent vehicle accidents
4. Need for artificial lighting

Which of the above were mentioned as disadvantages of crossing a river at night?

- a. 1, 2, 3
- b. 3 and 4
- c. 1 and 4
- d. 2 and 3

6. Look at each of the items below.

1. Infrared binoculars
2. Flashlights
3. Vehicle lights
4. Starlight scopes

Which of the above were mentioned as night vision devices?

- a. 2 and 3
- b. 1 and 4
- c. 1 and 3
- d. All of the above

Directions:

NOTE: Do not look at the questions until after you hear the tape.

1. Listen to the second short lecture on the audiotape.
2. Stop the tape when you are directed to do so.
3. Do not take notes.
4. After you stop the tape, answer questions 7 through 10.
5. After finishing the checkpoint, rewind the tape.

START THE TAPE NOW.

7. The purpose of the procedure described was:
- a. presetting the PQT-37 Telephone Terminal.
  - b. adjusting the Transmitter Amplifier Gain.
  - c. aligning the Modem 2.
  - d. checking the Receiver Amplifier.

8. Three panels were mentioned in the lecture. They were:
- a. Measure Select Panel, Test Panel, Adjust Gain Panel.
  - b. Adjust Gain Panel, Subgroup Panel, Test Panel.
  - c. Transmitter Panel, Amplifier Panel, Modem 2.
  - d. Test Panel, Subgroup Panel, Modem 2.
9. The Fine Tune control and Measure Select switch are located on the:
- a. Power Supply.
  - b. Receiver.
  - c. Test Panel.
  - d. Modem 2.
10. The Transmitter Amplifier Gain control is located on the:
- a. Subgroup Panel.
  - b. Adjust Gain Panel.
  - c. Transmitter Panel.
  - d. Test Panel.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

REWIND THE AUDIOTAPE TO THE BEGINNING  
SO IT WILL BE READY FOR THE NEXT STUDENT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT III - LESSON 2

Checkpoint 1, Form A/B

Directions:

NOTE: Do not look at the questions until after you are done viewing the tape.

1. Watch the tape all the way through to the end.
2. Do not take notes.
3. You may replay the tape but do not look at the questions beforehand.
4. After you stop the tape, answer the questions below.
5. When you have finished the checkpoint, rewind the tape.

1. What was the demonstration about?
  - a. Presetting parts of the AN/TCC-7 Telephone Terminal
  - b. Adjusting the Orderwire of the AN/TCC-7 Telephone Terminal
  - c. Tuning the Transmitter of the AN/TRC-24 Radio
  - d. Presetting the PP-827 power supply
  
2. These two switches are located next to each other: 68 KC Alarm Cutoff, 120 KC Alarm Cutoff. Which statement below describes how they should be adjusted?
  - a. Both should be switched to ON.
  - b. The first one should be OFF, the second one ON.
  - c. Both should be switched to OFF.
  - d. The first one should be ON, the second one OFF.

3. Here is a statement from the demonstration: "Set this control three quarters of a turn from the full counterclockwise position." Which of the following says the same thing?
- a. Turn it fully clockwise, then stop.
  - b. Turn it three quarters counterclockwise, then stop.
  - c. Turn it three quarters clockwise, then one quarter counterclockwise.
  - d. Turn it fully counterclockwise, then three quarters back to clockwise.
4. Which of the following statements gives the correct order for doing the preset on the Test Panel?
- a. Adjust the 65 KC control, the High Frequency control, the 1 KC control.
  - b. Adjust the High Frequency control, the 65 KC control, the 1 KC control.
  - c. Adjust the 1 KC control, the High Frequency control, the 65 KC control.
  - d. Adjust the High Frequency control, the 1 KC control, the 65 KC control.
5. Where is the 65 kilocycle (or KC) Transmit Control located?
- a. Upper right front of the Carrier Supply panel
  - b. Middle of the Test Panel front
  - c. Lower right front of the Power Supply
  - d. Inside the Test Panel
6. Some of the controls must be adjusted with a screwdriver. How should they be turned?
- a. Three quarters from counterclockwise.
  - b. Fully clockwise
  - c. Fully counterclockwise
  - d. Half-way from clockwise.

7. Two units or pieces of equipment were used in the demonstration. They were:
- a. Transmitter and Test Panel.
  - b. Test Panel and Power Supply.
  - c. Test Panel and Carrier Supply Panel.
  - d. Carrier Supply Panel and Transmitter.
8. One step was to plug a cord into a jack. What was the name of the jack?
- a. Channel In
  - b. Channel Out
  - c. 68 kilocycle
  - d. Measure Out
9. Which of the following needs to be adjusted with a screwdriver?
- a. 68 KC Alarm Cutoff switch
  - b. Carrier Sync switch
  - c. 12 and 28 Send switch
  - d. 65 kilocycle Transmit Control
10. Some of the controls are adjusted with a screwdriver. Which of the statements below correctly describes how those controls are adjusted?
- a. Each is adjusted in its own different way.
  - b. All are adjusted in the same way.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT III - LESSON 3

Checkpoint 1, Form A/B

- Directions:**
1. Watch the first short demonstration on the videotape that goes with this checkpoint.
  2. Stop the tape when you are directed to do so.
  3. Do not take notes.
  4. You may replay the tape but do not look at the questions beforehand.
  5. After you stop the tape, answer questions 1 and 2.
  6. After you have finished the whole checkpoint, rewind the tape.

NOTE: Do not look at the questions until after you are done viewing the taped demonstration.

1. Which of the following pieces of information was not included in Demonstration 1?
  - a. Where to set the Measure Switch
  - b. When to stop adjusting the Mod Adjust control.
  - c. Which direction to turn the Mod Trim control.
  - d. All of the above were included in the demonstration.
  
2. Which of the following statements was not made in Demonstration 1?
  - a. You need a screwdriver to adjust the Mod Adjust control.
  - b. Put the Meter Sensitivity switch in the Increase position.
  - c. Turn the Mod Trim control till you get a maximum reading on the Measure Meter.
  - d. All of the above were included in the demonstration.

Now start the tape and watch Demonstration 2. You will be told when to turn off the tape. Afterwards, answer the next two questions.

3. Which of the following pieces of information was not included in Demonstration 2?
  - a. What this demonstration is about.
  - b. What to do with the 150 Volt control.
  - c. What position to set the 750 Volt DC switch.
  - d. All of the above statements were included in the demonstration.
  
4. Which of the following statements was not included in Demonstration 2?
  - a. The 750 Volt Adjust switch should be set at Position 1.
  - b. The 150 Volt DC switch should be in the OFF position.
  - c. You need a screwdriver for the 150 Volt Adjust control.
  - d. All of the above statements were included in the demonstration.

Now start the tape and watch Demonstration 3. You will be told when to turn off the tape. Afterwards, answer the next two questions.

5. Which of the following pieces of information was not included in Demonstration 3?
  - a. What you should do with the RF Channel Tune control.
  - b. What the decade channel is in this case.
  - c. Usually the index pointer will not point exactly to the decade channel.
  - d. All of the above were included in the demonstration.
  
6. Which of the following pieces of information was not included in Demonstration 3?
  - a. What the reading should be on the Measure Meter.
  - b. What you should do with the Indicator control.
  - c. What to do if the Frequency Drift meter has drifted from zero.
  - d. All of the above were included in the demonstration.

Now start the tape and watch Demonstration 4. You will be told when to turn off the tape. Afterwards, answer the next two questions.

7. Which of the following pieces of information was not included in Demonstration 4?
  - a. What the reading should be on the DC Volt meter.
  - b. What position to put the 750 Volt DC switch in.
  - c. The purpose of the demonstration.
  - d. All of the above were included in the demonstration.
  
8. Which of the following statements was not included in Demonstration 4?
  - a. Set the 750 Volt Adjust switch to Position 1.
  - b. Set the DC Test switch to 750 Volt Lower Scale position.
  - c. Turn the 750 Volt DC switch to the ON position.
  - d. All of the above were included in the demonstration.

Now watch Demonstration 5. You will be told when to turn off the tape. Afterward answer the next two questions.

9. Which of the following pieces of information was not included in Demonstration 5?
  - a. The name of the control you must adjust.
  - b. The name of the meter you must look at.
  - c. The name of the piece of equipment you are working on.
  - d. All of the above were included in the demonstration.
  
10. Which of the following statements was not included in Demonstration 5?
  - a. Turn the AFC switch to ON.
  - b. Turn the AFC control to the +4 mark.
  - c. When you release the AFC control, it automatically returns to zero.
  - d. All of the above were included in the demonstration.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 2

Exercise #3, Part 2 (Alternate)

(To be used if Card Set #1 is not available.)

Use your notes from the demonstration on adjusting the GAIN control to help you number these steps in the right order. Use "1" for the first step, "2" for the second step, etc.

- \_\_\_\_\_ Adjust FINE TUNE
- \_\_\_\_\_ Remove jack
- \_\_\_\_\_ Set MEASURE SEL switch to OFF
- \_\_\_\_\_ Adjust GAIN
- \_\_\_\_\_ Set MEASURE SEL switch to CHECK GAIN

CHECK YOUR ANSWERS ON PAGE 21.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 2

Exercise #4, Part 2 (Alternate)

(To be used if Card Set #2 is not available.)

Use your notes from the demonstration on adjusting the Orderwire Transmitter Amplifier Output to help you number these steps in the right order. Use "1" for the first step, "2" for the second step, etc.

- \_\_\_\_\_ Connect measure jack
- \_\_\_\_\_ Set SEND OW switch to ON, adjust GAIN
- \_\_\_\_\_ Set SEND OW switch to OFF
- \_\_\_\_\_ Slide panel back
- \_\_\_\_\_ Set MEASURE NON-SEL switch to OW TR AMP OUT
- \_\_\_\_\_ Hold ATTENUATOR buttons down
- \_\_\_\_\_ Set MEASURE NON-SEL switch to OFF
- \_\_\_\_\_ Slide panel out
- \_\_\_\_\_ Release ATTENUATOR buttons

CHECK YOUR ANSWERS ON PAGE 22.

INSTRUCTIONS FOR STUDENT - TO BE HANDED WITH VIDEOTAPE

Name \_\_\_\_\_

Date \_\_\_\_\_

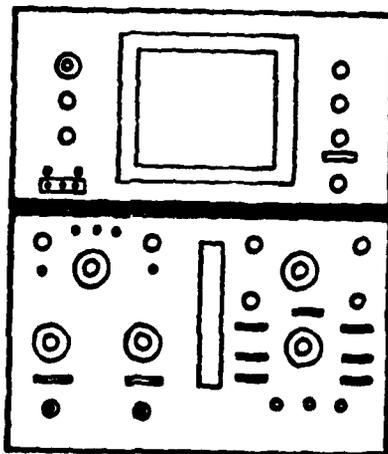
UNIT IV - LESSON 1

Checkpoint 1, Form A/B

To complete this checkpoint,

- . Insert the videotape on the machine and watch the demonstration on the presets for the AN/USM-281A Oscilloscope. Take notes on a separate sheet of paper. Use the drawing below to label the controls.
- . If necessary, rewind the tape and watch the demonstration again.
- . When you are satisfied that your notes are complete, return the tape to the instructor. He will assign you to some other activity for half an hour. Then he will give you a set of questions to answer.

DO NOT LOSE YOUR NOTES.



Unit IV, Lesson 1  
Checkpoint 1, Form A/B

INSTRUCTIONS

TO BE HANDED OUT AFTER VIDEOTAPE HAS BEEN RETURNED.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 1

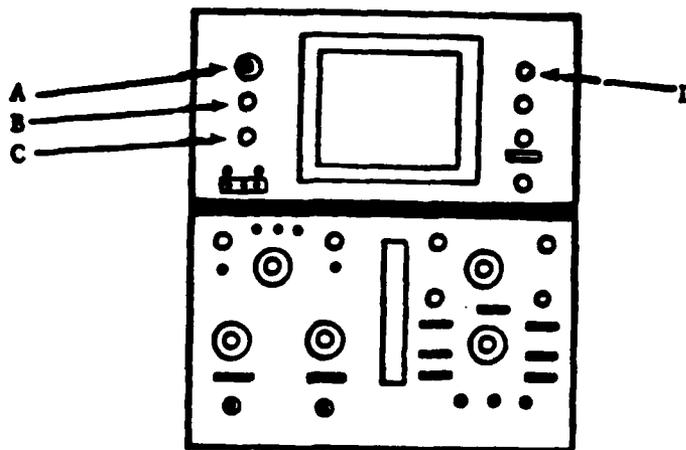
Checkpoint 1, Form A

Use your notes to answer the questions below. Check the one correct answer for each question.

1. The tables in the front of TM 9-6625-2362-12 will tell you:
  - a. the steps in using the AN/USM-281A oscilloscope for troubleshooting.
  - b. where to find additional reference materials on the AN/USM-281A.
  - c. the description and function of each control on the control panel.
  - d. how to locate each procedure in the manual.
  
2. The vertical function controls are located in the \_\_\_\_\_ quarter of the oscilloscope.
  - a. upper left
  - b. lower left
  - c. upper right
  - d. lower right
  
3. The AN/USM-281A cannot be used as:
  - a. an AC voltmeter.
  - b. a DC voltmeter
  - c. a peak-to-peak voltmeter.
  - d. a frequency meter.

4. The BEAM FINDER button is located in the middle of:
- a. the SCALE ILLUMINATION control.
  - b. the HORIZONTAL POSITIONING control.
  - c. the INTENSITY control.
  - d. the FOCUS control.
5. If the controls are set properly but there is no display on the CRT you would:
- a. adjust the SCALE ILLUMINATION control.
  - b. turn the HORIZONTAL POSITIONING control.
  - c. turn the FOCUS control counterclockwise.
  - d. press the BEAM FINDER button.
6. When the POWER OFF/ON switch is turned to ON, what indication do you get?
- a. A buzzer sounds
  - b. A pilot light comes on
  - c. The CRT lights up
  - d. No indication
7. Suppose the trace shows up near the bottom of the CRT. What control would you use to move it to where it should be?
- a. The HORIZONTAL POSITIONING control
  - b. The VERTICAL POSITIONING control
  - c. The BEAM FINDER button
  - d. The SCALE ILLUMINATION control

For the next three questions, refer to the drawing below.



8. If you wanted to move the trace to the left or right, you would use the control marked:

- a. A
- b. B
- c. C
- d. D

9. To light up the up and down lines on the face of the CRT, you would use the control marked:

- a. A
- b. B
- c. C
- d. D

10. To make the CRT beam brighter, you would turn the outer rim of the control marked:

- a. A
- b. B
- c. C
- d. D

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TO BE HANDED OUT AFTER VIDEOTAPE HAS BEEN RETURNED.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 1

Checkpoint 1, Form B

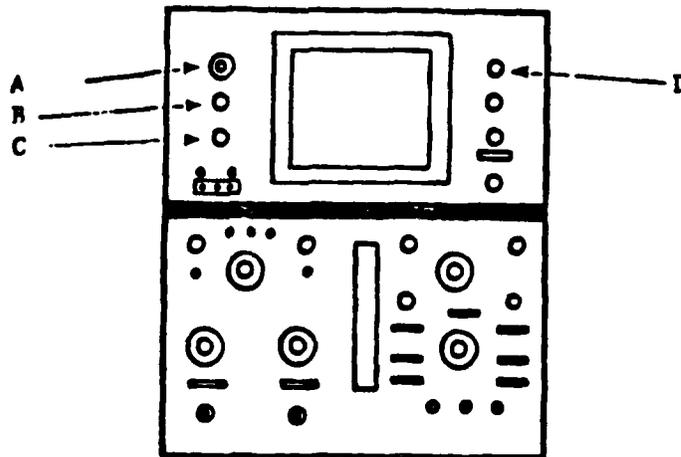
1. The horizontal function controls are located in the \_\_\_\_\_ quarter of the oscilloscope.
  - a. upper right
  - b. lower left
  - c. upper right
  - d. lower right
  
2. The AN/USM-281A is used for troubleshooting using the \_\_\_\_\_ method.
  - a. peak-to-peak
  - b. signal tracing
  - c. horizontal positioning
  - d. trial and error
  
3. To find the description and function of each control on the AN/USM-281A, you would look:
  - a. on the back panel of the oscilloscope.
  - b. in the Soldier's Manual (FM 11-31M 1/2)
  - c. in the front of TM 9-6625-2362-12.
  - d. in the Appendix to TM 9-6625-2362-12.
  
4. The up-and-down lines on the CRT are used for:
  - a. locating the beam.
  - b. horizontal positioning.
  - c. measuring peak-to-peak voltage.
  - d. measuring DC voltage.

Unit IV, Lesson 1  
Checkpoint 1, Form B

1

5. The BEAM FINDER button is used to:
  - a. locate the trace when there is no display.
  - b. move the trace up and down.
  - c. move the trace to left or right.
  - d. control the intensity of the CRT beam.
  
6. The outer rim of the BEAM FINDER button is called the:
  - a. HORIZONTAL POSITIONING control.
  - b. INTENSITY control.
  - c. FOCUS control.
  - d. SCALE illumination control.
  
7. Suppose the trace shows up near the top of the CRT. What control would you use to move it to where it should be?
  - a. The SCALE ILLUMINATION control
  - b. The BEAM FINDER control
  - c. The HORIZONTAL POSITIONING control
  - d. The VERTICAL POSITIONING control

For the next three questions, refer to the drawing below.



8. The control labeled "D" is used to:
- a. move the trace to the left or right.
  - b. move the trace up and down.
  - c. make the CRT beam brighter.
  - d. light up the up-and-down lines on the CRT.
9. The control labeled "B" is used to:
- a. bring the display into focus.
  - b. locate the beam when there is no display
  - c. turn the power on and off.
  - d. move the trace to the left or right.
10. The control labeled "C" is used to:
- a. turn the power on and off.
  - b. move the trace up and down.
  - c. light up the up-and-down lines on the CRT.
  - d. make the CRT beam brighter.

**INSTRUCTIONS FOR STUDENT - TO BE HANDED OUT WITH VIDEOTAPE**

Name \_\_\_\_\_

Date \_\_\_\_\_

**UNIT IV - LESSON 2**

**Checkpoint 1, Form A/B**

To complete this checkpoint,

- . Insert the videotape in the machine and watch the demonstration of how to count a frequency on the AN/TSM 16 Frequency Meter. Take notes on a separate sheet of paper.
- . If necessary, rewind the tape and watch the demonstration again.
- . When you are satisfied that your notes are complete, return the tape to the instructor. He will assign you to some other activity for half an hour. Then he will give you a set of questions to answer.

**DO NOT LOSE YOUR NOTES.**

Unit IV, Lesson 2  
Checkpoint 1, Form A/B

**INSTRUCTIONS**

TO BE HANDED OUT AFTER VIDEOTAPE HAS BEEN RETURNED

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 2

Checkpoint 1, Form A

Use your notes to answer the questions below. Check the one correct answer for each question.

1. Before coupling the frequency to be measured to the COUNTER INPUT receptacle, you should:
  - a. set the FUNCTION switch to FREQUENCY COUNT position.
  - b. rotate the SENSITIVITY control clockwise.
  - c. adjust the DISPLAY TIME control.
  - d. translate the reading into cycles per second.
  
2. After you rotate the TIME SECONDS switch to the desired time sampling period, the next step is to:
  - a. translate the reading into cycles per second.
  - b. rotate the SENSITIVITY control clockwise.
  - c. adjust the DISPLAY TIME control.
  - d. set the FUNCTION switch to the FREQUENCY COUNT position.
  
3. How should the INPUT LEVEL meter look after you adjust the SENSITIVITY control?
  - a. There should be a maximum right-hand deflection.
  - b. There should be a maximum left-hand deflection.
  - c. The indicator needle should be at zero.
  - d. The indicator needle should be within the green area.

4. Several of the steps in counting a frequency involve operating controls and switches. Which of the following shows the correct sequence for operating three of the controls?

a. FUNCTION  
TIME-SECONDS  
SENSITIVITY

b. FUNCTION  
SENSITIVITY  
TIME-SECONDS

c. SENSITIVITY  
FUNCTION  
TIME-SECONDS

d. TIME-SECONDS  
DISPLAY TIME  
SENSITIVITY

5. Of these four steps, which one would you do first?

- a. Adjust the DISPLAY TIME control.  
 b. Adjust the SENSITIVITY control.  
 c. Rotate the TIME-SECONDS switch to the desired time sampling period.  
 d. Couple frequency to be measured to the COUNTER INPUT receptacle.

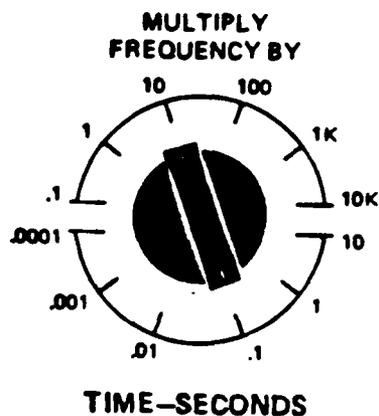
6. Of these four steps, which one do you do last?

- a. Translate reading on frequency counter into cycles per second.  
 b. Set FUNCTION switch to FREQ COUNT position.  
 c. Adjust SENSITIVITY control.  
 d. Adjust DISPLAY TIME control.

7. After adjusting the DISPLAY TIME control, you should:

- a. set the FUNCTION switch to the FREQ COUNT position.  
 b. adjust the SENSITIVITY control.  
 c. translate the reading on the frequency counter into cycles per second.  
 d. rotate the TIME-SECONDS switch to the desired time sampling period.

8. The drawing below shows the display on the counter and the setting of the TIME-SECOND switch. How would you translate the count into cycles per second?



- a. Multiply 8000 times .1  
 b. Multiply 8000 times 10  
 c. Divide 8000 by .1  
 d. Divide 8000 by 10
9. How do you adjust the sensitivity control?
- a. Slide it up  
 b. Rotate it counterclockwise  
 c. Slide it down  
 d. Rotate it clockwise
10. Of these four steps, which one do you do first?
- a. Adjust the DISPLAY TIME control.  
 b. Set the FUNCTION switch to the FREQ COUNT position.  
 c. Adjust the SENSITIVITY control.  
 d. Couple the frequency to be measured to the COUNTER INPUT receptacle.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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AND TELL YOU WHAT TO DO NEXT.

Unit IV, Lesson 2  
Checkpoint 1, Form A

3

TO BE HANDED OUT AFTER VIDEOTAPE HAS BEEN RETURNED

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 2

Checkpoint 1, Form B

Use your notes to answer the questions below. Check the one correct answer for each question.

1. After coupling the frequency to be measured to the COUNTER INPUT receptacle, you should:
  - a. set the FUNCTION switch to FREQ COUNT position.
  - b. rotate the SENSITIVITY control clockwise.
  - c. adjust the DISPLAY TIME control.
  - d. translate the reading into cycles per second.
  
2. Before you rotate the TIME SECONDS switch, you should:
  - a. translate the reading into cycles per second.
  - b. rotate the SENSITIVITY control clockwise.
  - c. adjust the DISPLAY TIME control.
  - d. set the FUNCTION switch to the FREQ COUNT position.
  
3. What control do you use to change the indication on the INPUT LEVEL meter?
  - a. FUNCTION switch
  - b. DISPLAY TIME switch
  - c. TIME-SECONDS switch
  - d. SENSITIVITY control

4. Several of the steps in counting a frequency involve operating controls and switches. Which of the following shows the correct sequence for operating three of the controls?

a. SENSITIVITY  
TIME-SECONDS  
DISPLAY TIME

b. FUNCTION  
TIME-SECONDS  
SENSITIVITY

c. DISPLAY TIME  
TIME-SECONDS  
FUNCTION

d. TIME-SECONDS  
DISPLAY TIME  
FUNCTION

5. Of these four steps, which one would you do last?

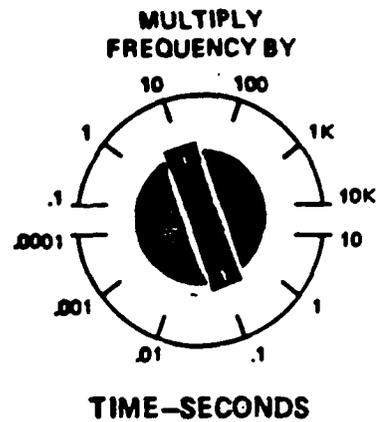
a. Adjust the DISPLAY TIME control.

b. Adjust the SENSITIVITY control.

c. Rotate the TIME-SECONDS switch to the desired time sampling period.

d. Couple frequency to be measured to the COUNTER INPUT receptacle.

6. The drawing below shows the display on the counter and the setting of the TIME-SECOND switch. How would you translate the count into cycles per second?



- a. .01  
 b. .1  
 c. 1  
 d. 10
7. After these four steps, which one do you do first?
- a. Rotate TIME-SECONDS switch to desired time sampling period  
 b. Translate reading into cycles per second  
 c. Couple frequency to be measured to COUNTER INPUT receptacle  
 d. Adjust DISPLAY TIME control
8. After these four steps, which would you do last?
- a. Rotate TIME-SECONDS switch to desired time sampling period  
 b. Translate reading into cycles per second  
 c. Couple frequency to be measured to COUNTER INPUT receptacle  
 d. Adjust DISPLAY TIME control

9. After rotating the SENSITIVITY control, you should:

- a. Couple frequency to be measured to COUNTER INPUT receptacle.
- b. Set FUNCTION switch to FREQ COUNT position.
- c. Rotate TIME-SECONDS switch to desired time sampling period.
- d. Adjust DISPLAY TIME control.

10. What indication should you get on the INPUT LEVEL meter?

- a. Needle within the green area
- b. Needle at zero
- c. Needle all the way to the left
- d. Needle all the way to the right

INSTRUCTIONS FOR STUDENT - TO BE HANDED OUT WITH VIDEOTAPE

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 3

Checkpoint 1, Form A/B

To complete this checkpoint,

- . Insert the videotape on the machine and watch the demonstration on the presets for the AN/TRC-24 radio set. Take notes on a separate sheet of paper.
- . If necessary, rewind the tape and watch the demonstration again.
- . When you are satisfied that your notes are complete, return the tape to the instructor. He will assign you to some other activity for half an hour. Then he will give you a set of questions to answer.

DO NOT LOSE YOUR NOTES.

Unit IV, Lesson 3  
Checkpoint 1, Form A/B

INSTRUCTIONS

TO BE HANDED OUT AFTER VIDEOTAPE HAS BEEN RETURNED

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 3

Checkpoint 1, Form A

Use your notes to answer the questions below. Check the one correct answer for each question.

1. What are the three major parts of this demonstration?
  - a. COARSE TUNE adjustment, FINE TUNE adjustment, and RF AMP adjustment
  - b. Receiver presets, transmitter presets, and power supply presets
  - c. Receiver presets, RF CHANNEL TUNE adjustment, and 150 V adjustment
  - d. COARSE TUNE adjustment, DRIVER TUNE adjustment, and power supply presets
  
2. Which of these steps are part of the transmitter presets?
  - a. Adjust COARSE TUNE control and adjust FINE TUNE control
  - b. Adjust RF AMP control and turn INDEX knob
  - c. Set AFC control at zero and adjust DRIVER TUNE control
  - d. Preset 750 ADJ control and 150 V ADJ control
  
3. How many steps are there in the receiver presets?
  - a. Two
  - b. Three
  - c. Four
  - d. Five

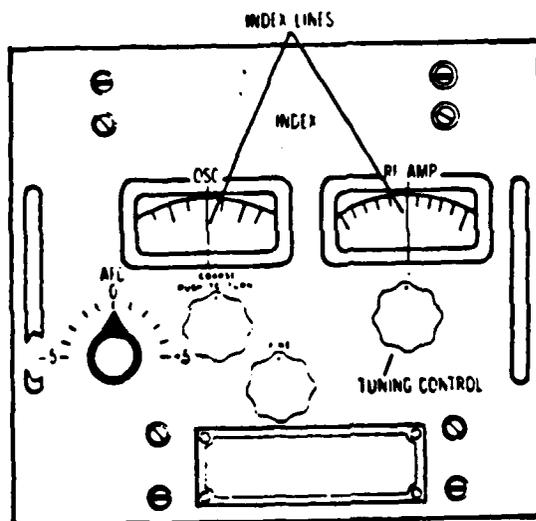
Unit IV, Lesson 3  
Checkpoint 1, Form A

4. Setting the PULSED OSCILLATOR control for ODD or EVEN channels is the first step in:

- a. Receiver presets.
- b. Transmitter presets.
- c. Power supply presets.
- d. Connecting the power supply.

5. Look at the controls shown in the drawing below, and compare the terms with your notes. This is a drawing of the:

- a. Power supply.
- b. Transmitter - upper panel.
- c. Receiver.
- d. Transmitter - lower panel.



6. The last step in the receiver presets is:

- a. adjust the RF CHANNEL TUNE control.
- b. adjust the DRIVER TUNE control.
- c. adjust the RF AMP TUNE control.
- d. adjust the FINE TUNE control.

7. The assigned channel number should appear at the center of a window:

- a. on both the transmitter and receiver.
- b. on the receiver only.
- c. on both the transmitter and the power supply.
- d. on the transmitter only.

8. The last step in the transmitter presets is:

- a. adjust the RF AMP tune control.
- b. adjust the AFC control.
- c. connect the ground wires to the ground binding post.
- d. adjust the DRIVER TUNE control.

9. The first step in the power supply presets is:

- a. adjust the COARSE TUNE control.
- b. set the ODD/EVEN CHANNEL control.
- c. set the 750 V ADJ control.
- d. set the DC test switch.

10. A screwdriver is used to perform one of the steps in the:

- a. Receiver presets.
- b. Transmitter presets.
- c. Power supply presets.
- d. COARSE TUNE adjustment.

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TO BE HANDED OUT AFTER VIDEOTAPE HAS BEEN RETURNED

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 3

Checkpoint 1, Form B

Use your notes to answer the questions below. Check the one correct answer for each question.

1. Which major part of the procedure has steps performed on more than one panel?

- a. Receiver Presets
- b. Transmitter Presets
- c. Power Supply Presets

2. Which of these steps are part of the transmitter presets?

- a. Adjust COARSE TUNE control and adjust FINE TUNE control
- b. Adjust RF AMP control and turn INDEX knob
- c. Set AFC control at zero and adjust DRIVER TUNE control
- d. Preset 750 ADJ control and 150 V ADJ control

3. How many steps are there in the receiver presets?

- a. Two
- b. Three
- c. Four
- d. Five

Unit IV, Lesson 3  
Checkpoint 1, Form A

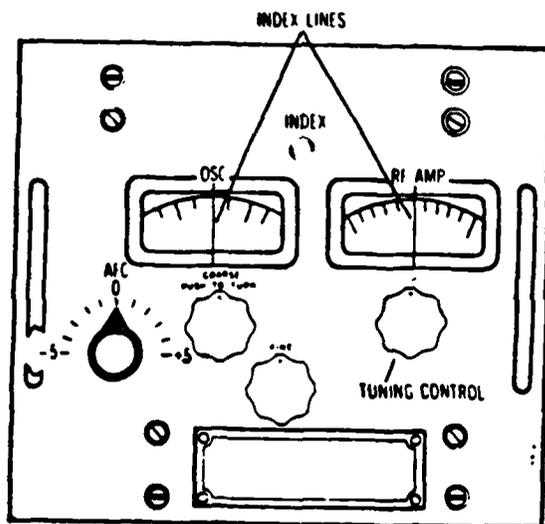
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4. Adapting the DRIVER TUNE control is the last step in:

- a. Receiver presets.
- b. Transmitter presets.
- c. Power supply presets.
- d. Connecting the power supply.

5. Look at the controls shown in the drawing below. Which of these controls do you use in the receiver preset procedures?

- a. AFC control, RF AMP tune control, and COARSE TUNE control
- b. AFC control, COARSE TUNE control, and FINE TUNE control
- c. COARSE TUNE control, FINE TUNE control, and RF AMP tune control
- d. FINE TUNE control, RF AMP tune control, and AFC control



6. After you preset the 750 V ADJ control, what do you do next?

- a. Adjust the DRIVER TUNE control.
- b. Connect the ground wires to the binding post.
- c. Preset the 150 V ADJ control.
- d. Set the DC TEST switch.

7. You need to know the assigned channel in order to do the:

- a. Receiver and power supply presets.
- b. Receiver presets only.
- c. Receiver and transmitter presets
- d. Transmitter presets only.

8. The last step in the receiver presets is:

- a. adjust the RF AMP tune control.
- b. adjust the AFC control.
- c. connect the ground wires to the ground binding post.
- d. adjust the DRIVER TUNE control.

9. The first step in the transmitter presets is:

- a. set the PULSED OSCILLATOR control.
- b. preset the 750 V ADJ control.
- c. adjust the COARSE TUNE control.
- d. adjust the INDEX control.

10. The PULSED OSCILLATOR control is located on the:

- a. receiver.
- b. upper pannel of the transmitter.
- c. lower panel of the transmitter
- d. power supply.

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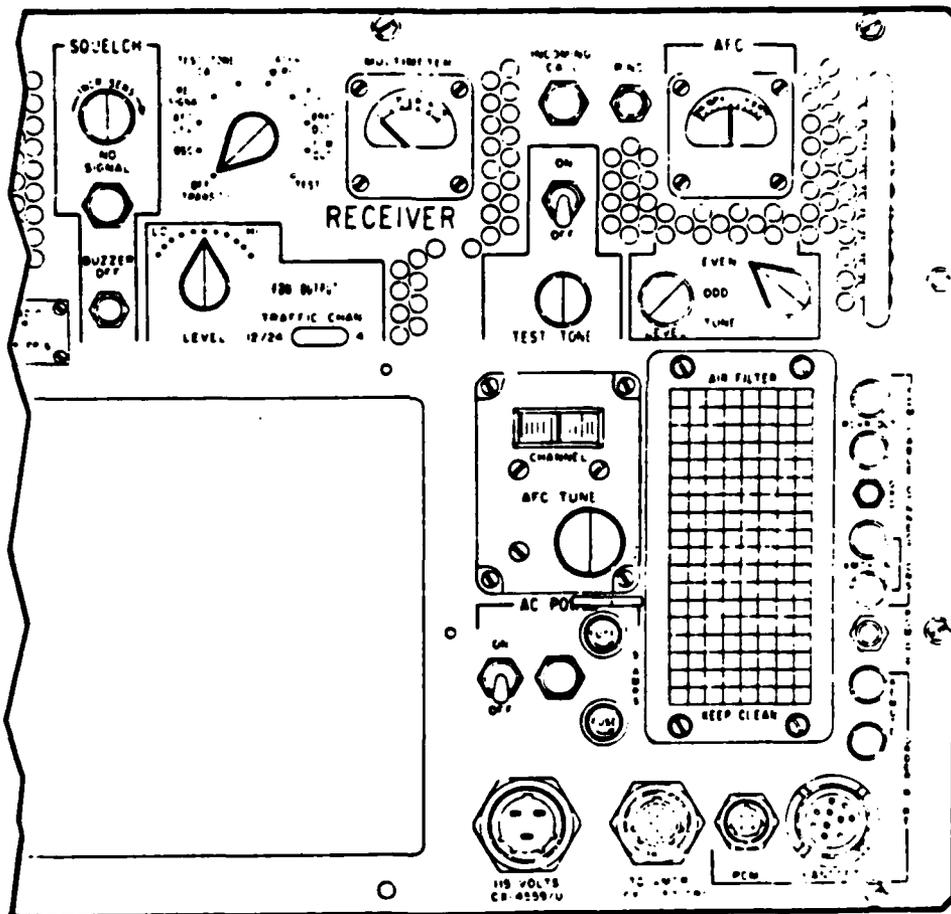
Name \_\_\_\_\_

Date \_\_\_\_\_

### UNIT V - LESSON 1

#### Checkpoint 1, Form A

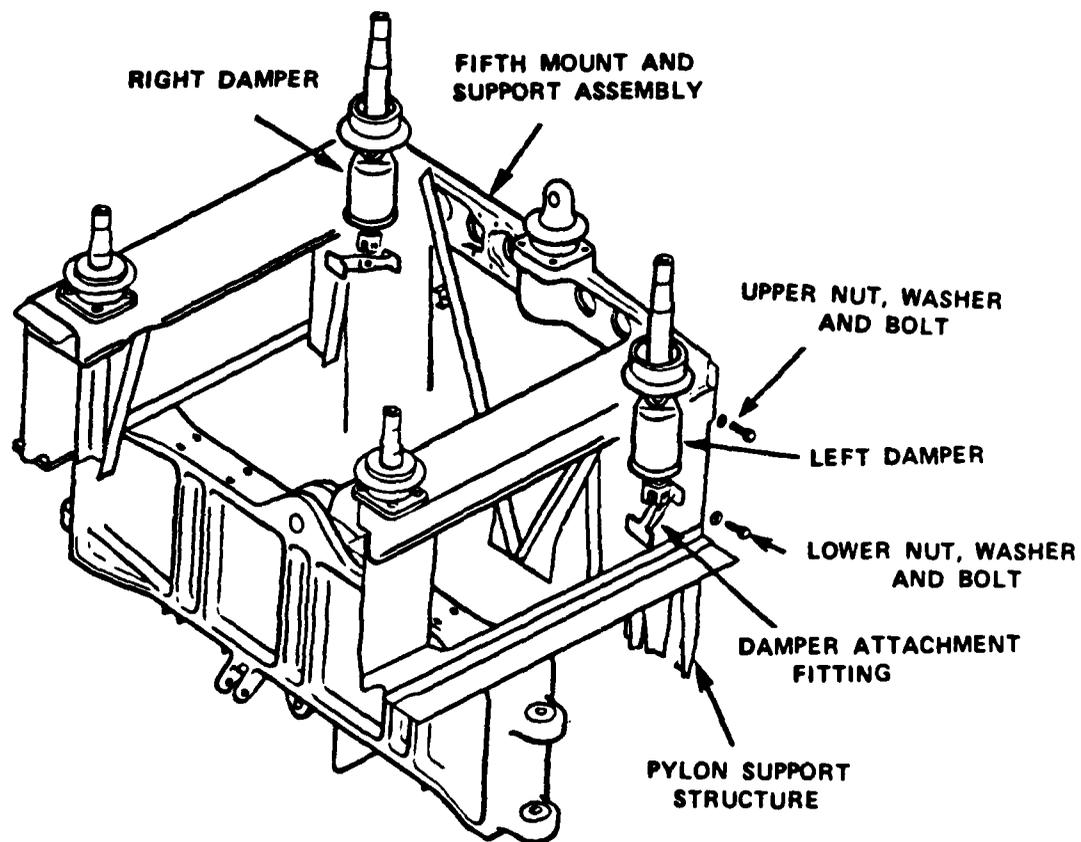
Below is a drawing of part of the front panel of a radio receiver. Look over the parts on this panel. Then answer the questions on the next page.



Unit V, Lesson 1  
Checkpoint 1, Form A

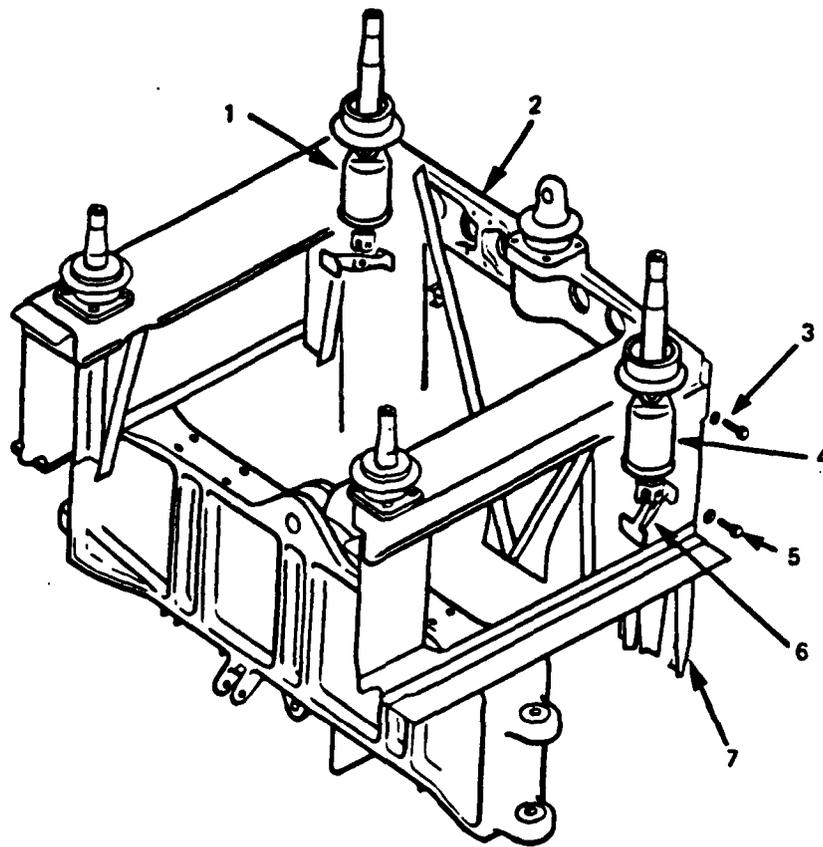
1. The RING label is located:
  - a. Below the part.
  - b. Above the part.
  - c. On the left side of the part.
  - d. On the right side of the part.
  
2. On the panel shown on the previous page, the best way to locate the TEST TONE control is by:
  - a. the shape.
  - b. the color.
  - c. the label.
  - d. the size.

Below is a diagram of a section of a helicopter. Look over the labeled parts. Then turn to the next page and answer the question about the diagram.



Unit V, Lesson 1  
Checkpoint 1, Form A

3



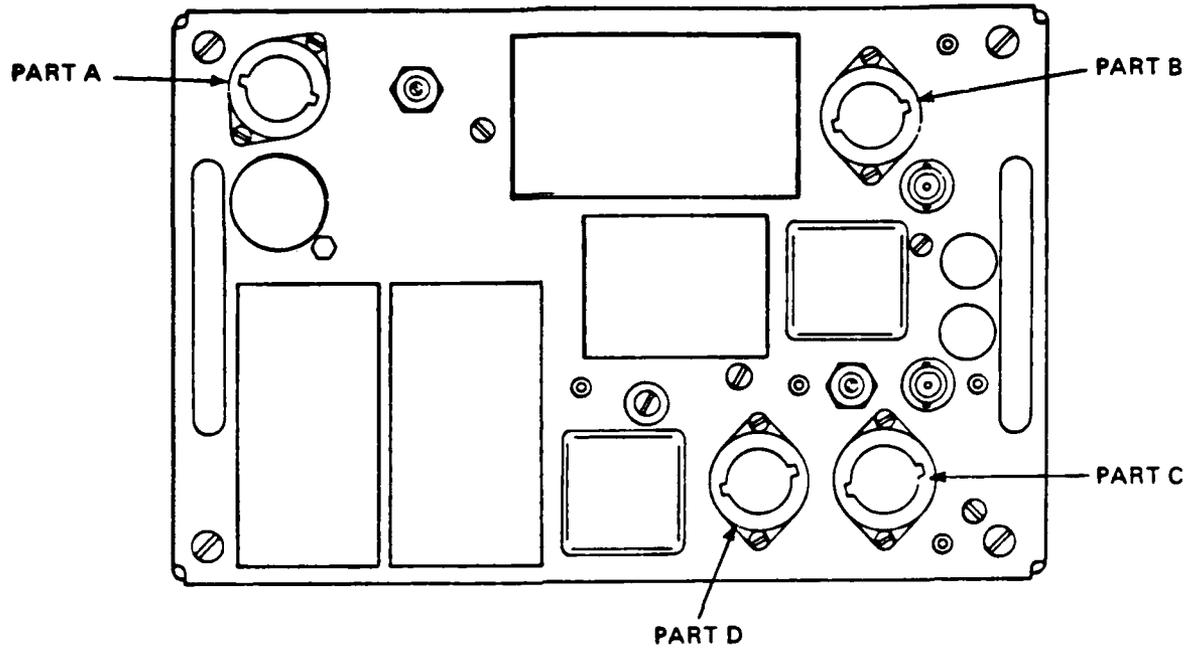
The following question refers to the above diagram. This diagram is identical to the one on the page before, except that the parts have numbers instead of labels. When answering the question, you may refer back to the diagram with the labeled parts.

3. The damper attachment fitting is part number:
- a. 1
  - b. 3
  - c. 5
  - d. 6

Unit V, Lesson 1  
Checkpoint 1, Form A

4

Below is a drawing of a baseband assembly. Pay attention to how the various parts are arranged. Then answer the question that follows the drawing.

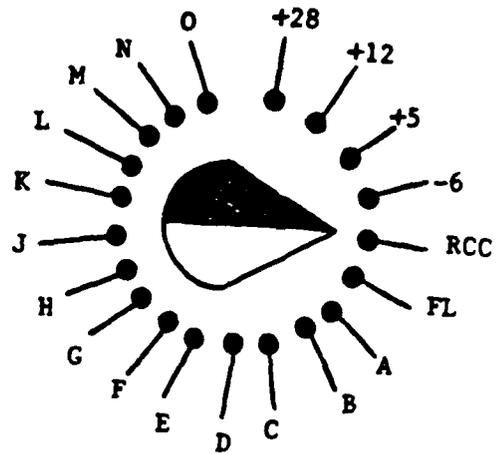


4. Which feature of Part B makes it different from Part D?
- a. The shape.
  - b. The size.
  - c. The location.
  - d. The color.

Unit V, Lesson 1  
Checkpoint 1, Form A

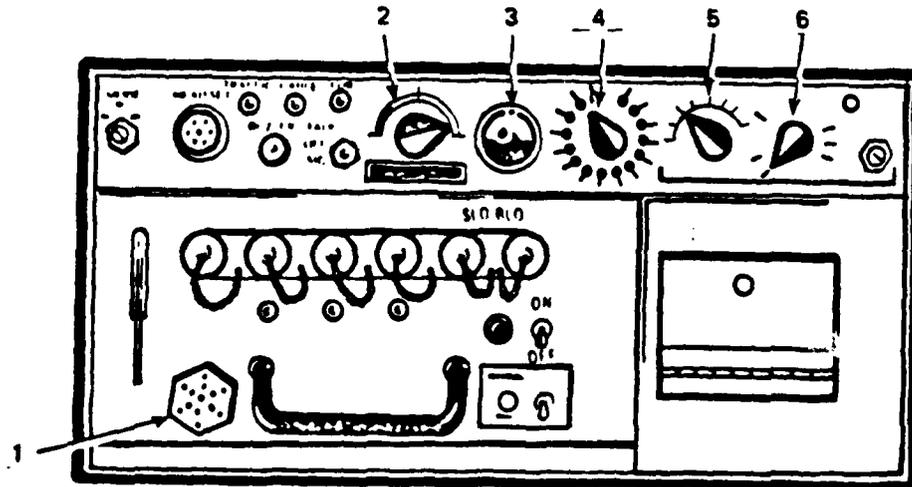
5

On the right is a drawing of a SERV SEL switch.

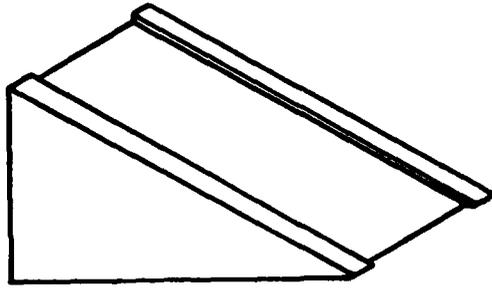


5. On the piece of equipment shown below, which of the numbered parts is the SERV SEL switch?

- a. 2
- b. 3
- c. 4
- d. 5



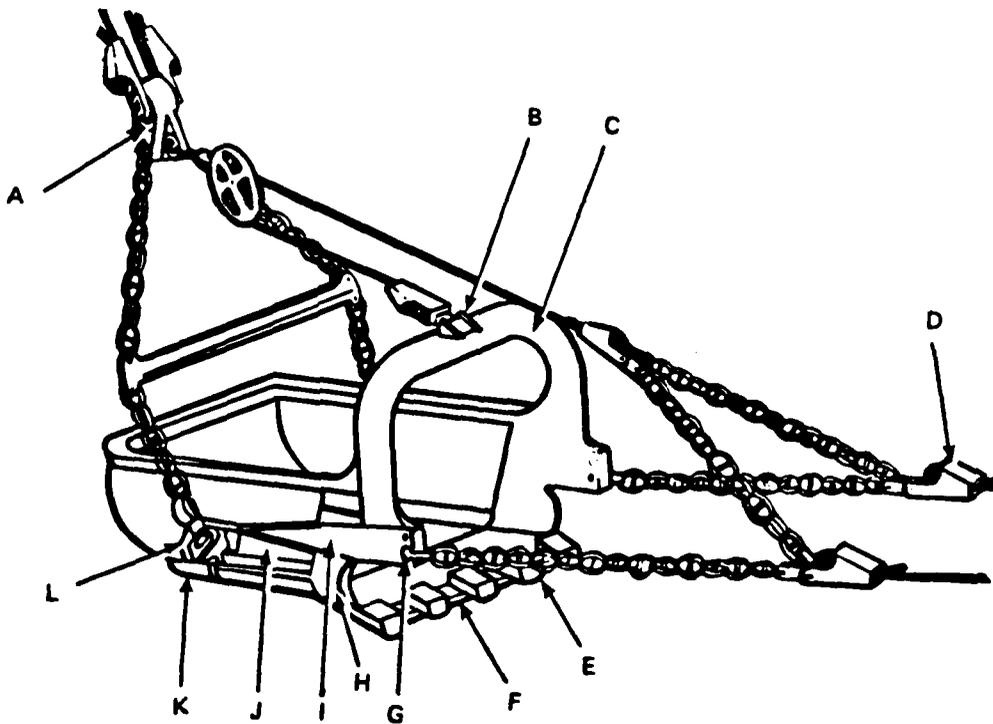
Unit V, Lesson 1  
Checkpoint 1, Form A



On the left is part of a dragline bucket system called an anchor.

6. Below is a drawing of a dragline bucket system. Which of the lettered parts is the anchor?

- a. A
- b. B
- c. C
- d. D



Unit V, Lesson 1  
Checkpoint 1, Form A

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PART A



PART B



PART C



PART D



PART E

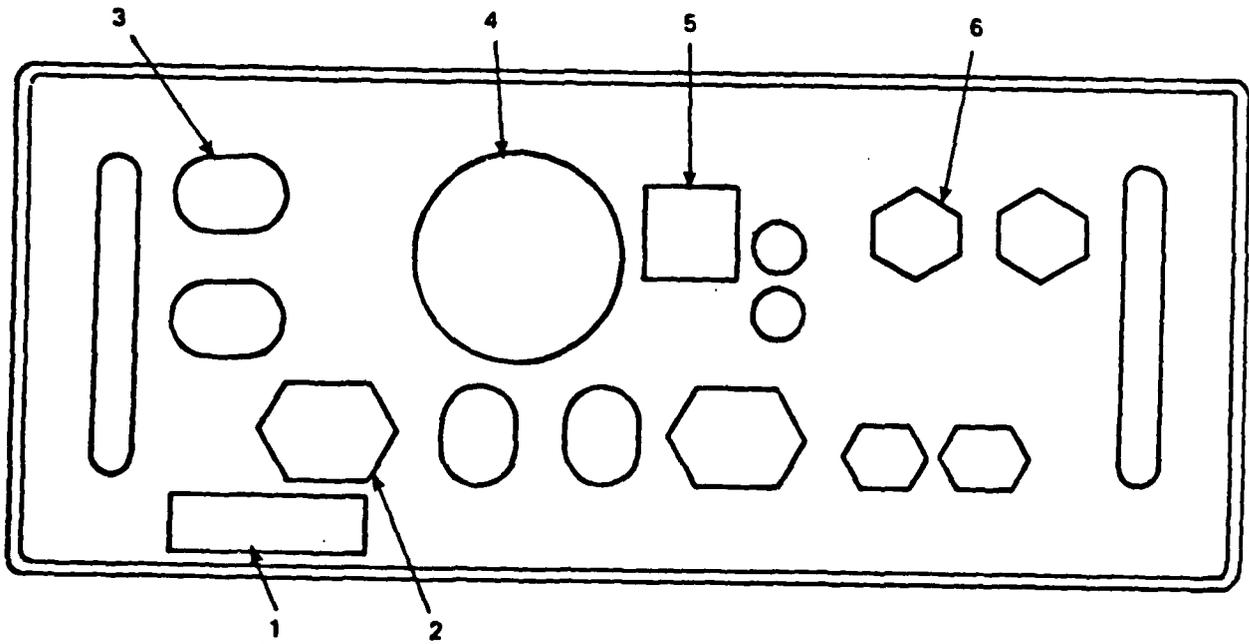
Above are five parts of a whole piece of equipment. Look over each of the parts, then answer the following two questions.

7. On the piece of equipment shown below, Part C is number:

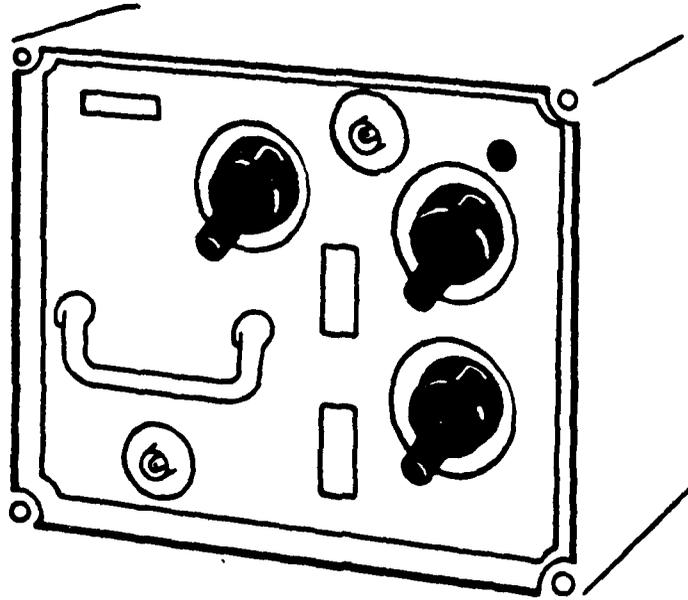
- a. 1
- b. 3
- c. 4
- d. 5

8. Which of the numbered parts matches Part A above?

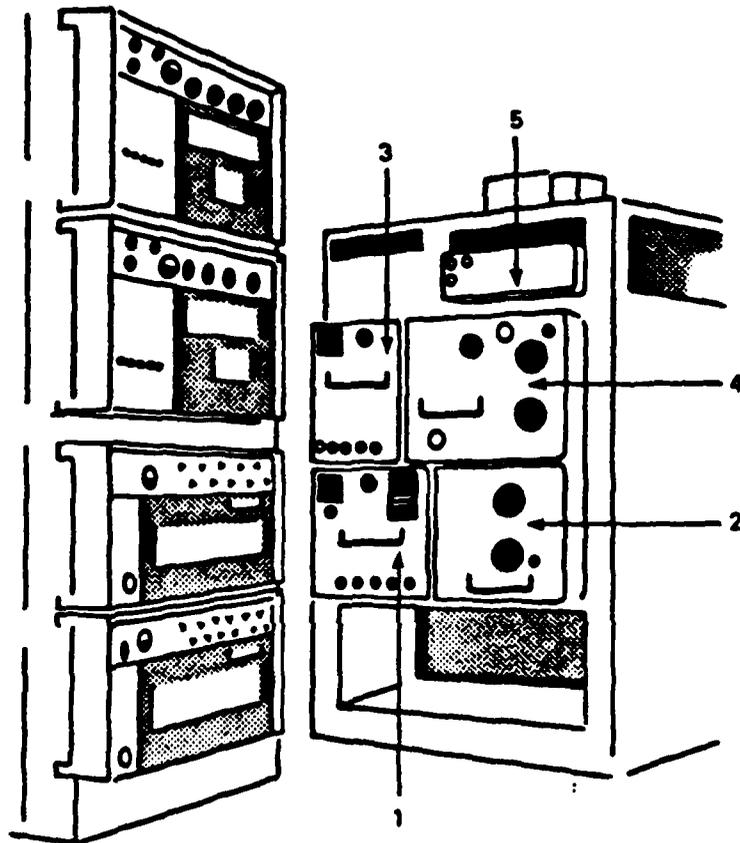
- a. 1
- b. 3
- c. 4
- d. 6



Below is a diagram of an amplifier-converter.



9. In the drawing on the next page, which of the numbered parts is the amplifier-converter?
- a. 3
  - b. 5
  - c. 6
  - d. 7
10. The amplifier-converter can best be recognized by:
- a. the shape of the controls and indicators.
  - b. the presence of air vents and handles.
  - c. the size and color of the equipment.
  - d. the number of large controls.



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Unit V, Lesson 1  
Checkpoint 1, Form A

10

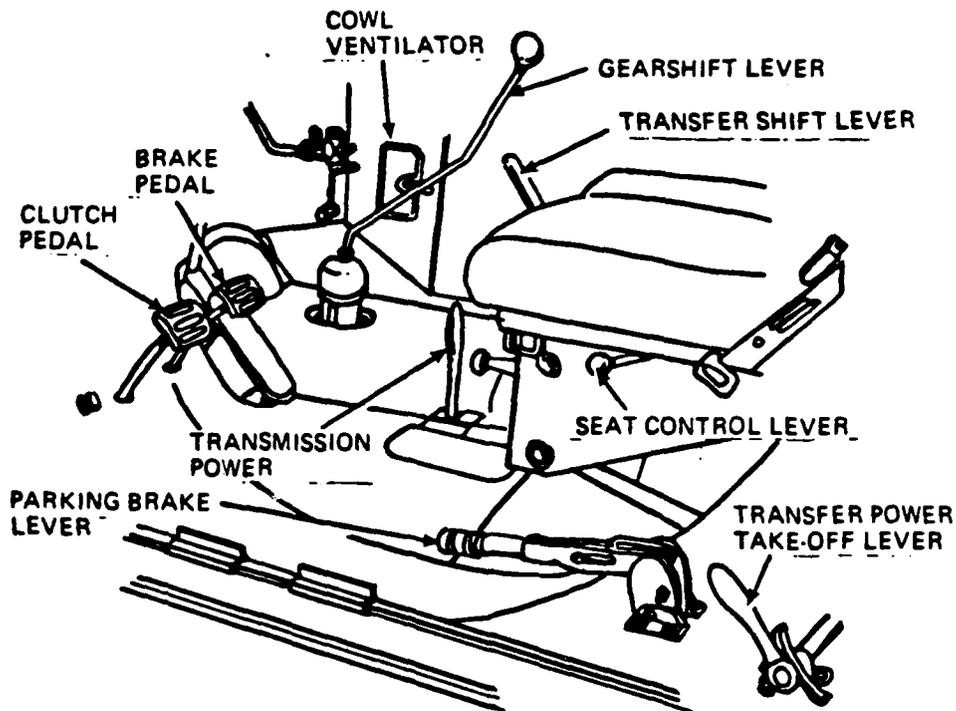
Name \_\_\_\_\_

Date \_\_\_\_\_

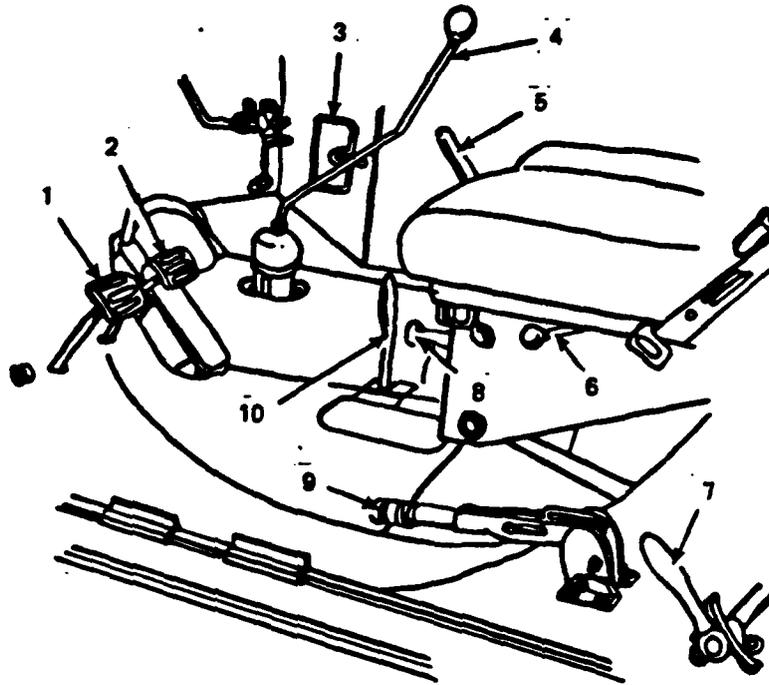
UNIT V - LESSON 1

Checkpoint 1, Form B

Below is a drawing of the interior of an Army truck. Many of the parts are chassis controls. Look over all the labeled parts, then turn to the next page and answer the question concerning the diagram.



Unit V, Lesson 1  
Checkpoint 1, Form B



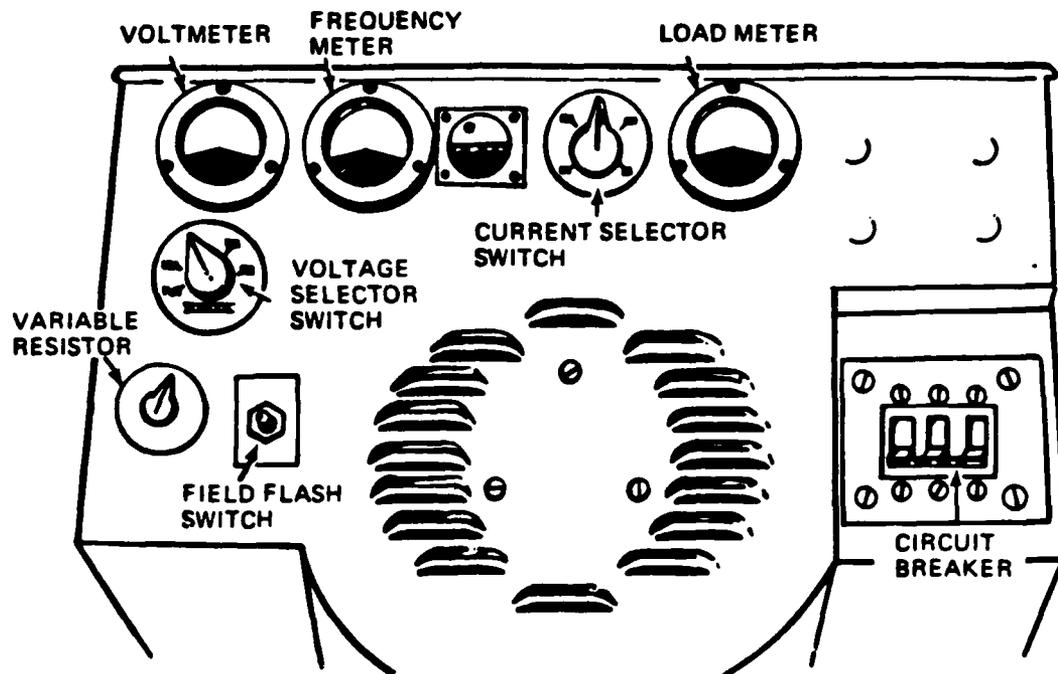
The following question refers to the above diagram. The diagram is identical to the one on the page before, except that the parts have numbers instead of labels. When answering the question, you may refer back to the diagram with the labeled parts.

1. Which of the numbered parts is the transmission power?
  - a. 4
  - b. 5
  - c. 8
  - d. 10

Unit V, Lesson 1  
Checkpoint 1, Form B

2

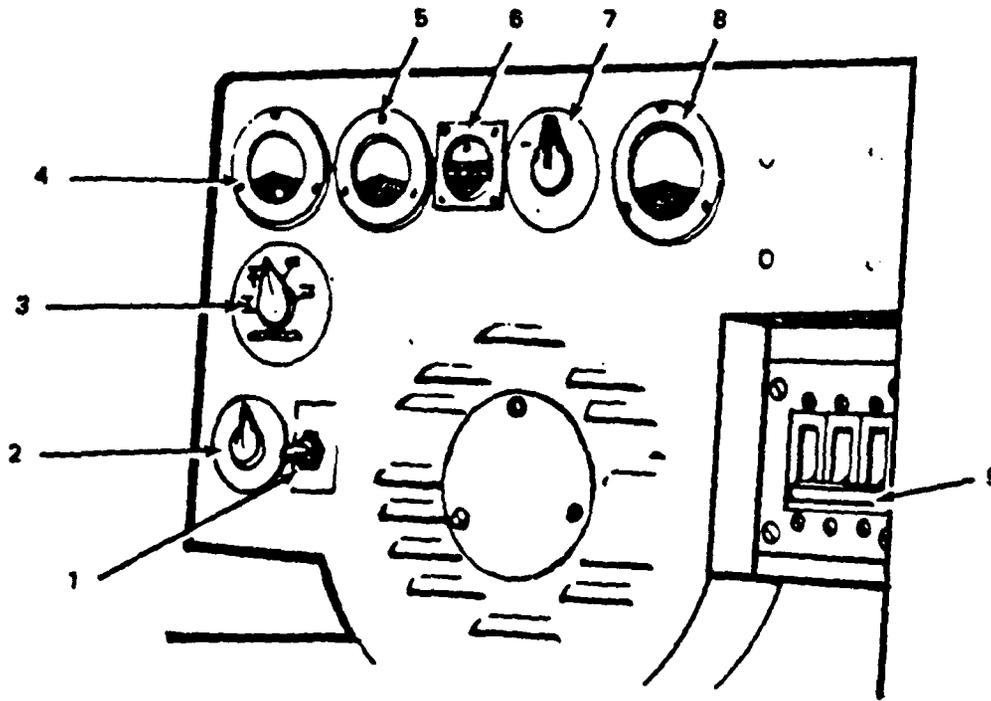
Below is a drawing of a generator panel. Pay attention to how the meters and switches are arranged. Then answer the questions that follow.



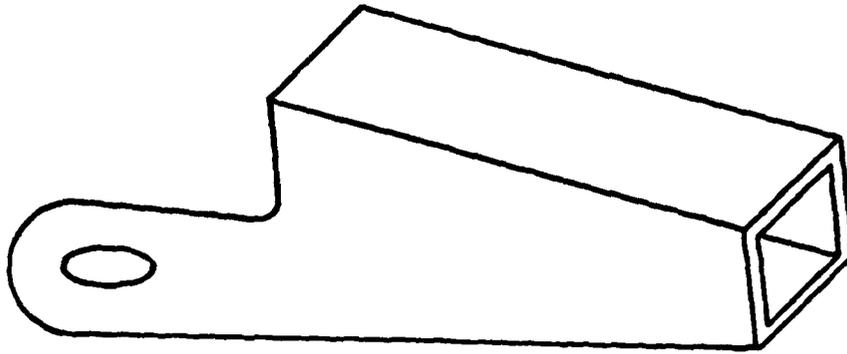
On the following page is a drawing of the same generator panel shown above. Use the drawing to answer the next two questions. You may refer back to the drawing above to help you answer the questions.

2. On the drawing on the next page, which numbered part is the LOAD METER?
  - a. 4
  - b. 5
  - c. 7
  - d. 8
  
3. The LOAD METER can best be recognized by its:
  - a. shape.
  - b. size.
  - c. location.
  - d. color.

Unit V, Lesson 1  
Checkpoint 1, Form B



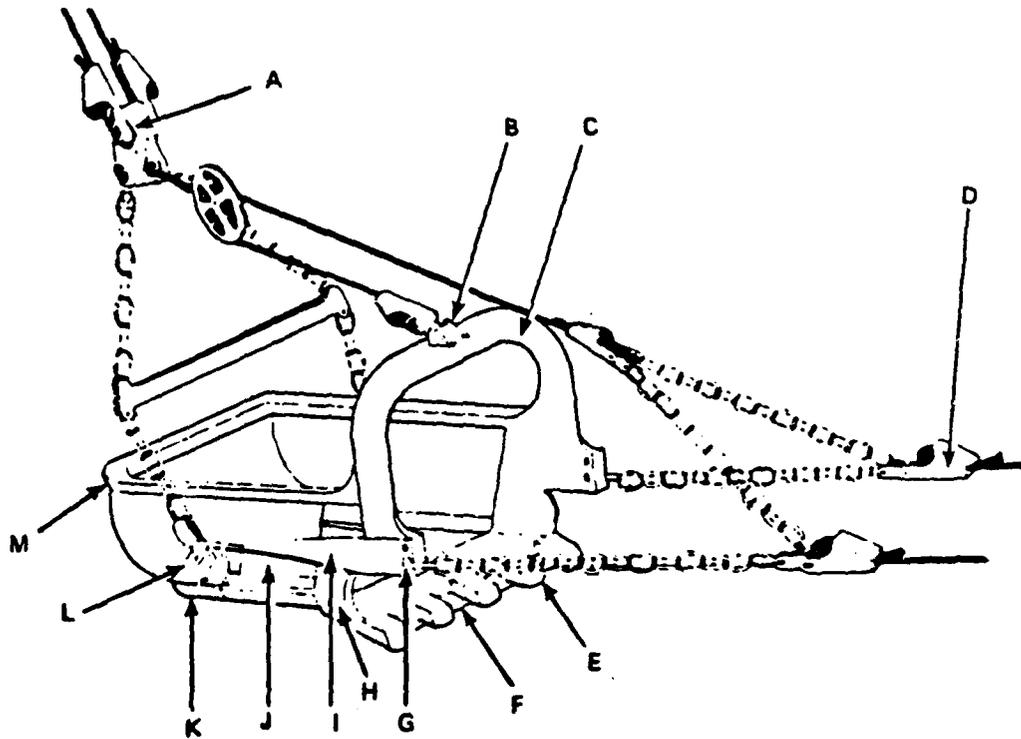
Unit V, Lesson 1  
Checkpoint 1, Form B



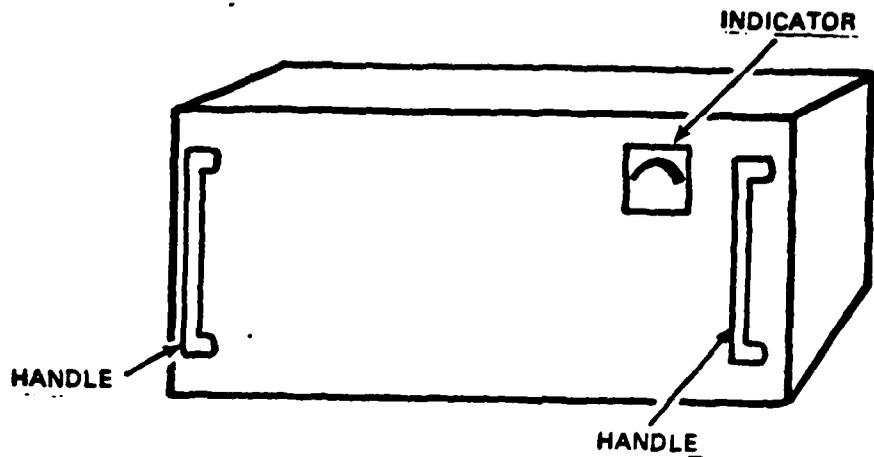
Above is a drawing of one part of a bucket rigging system. It is called a drag socket.

4. Below is a drawing of the entire bucket rigging system. Which of the parts is the drag socket?

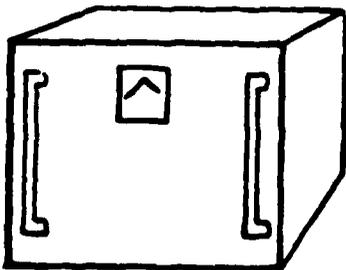
- a. A
- b. B
- c. C
- d. D



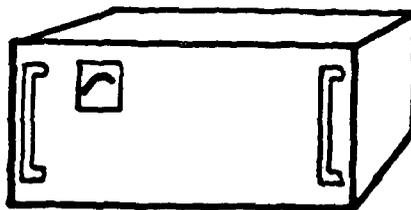
Unit V, Lesson 1  
Checkpoint 1, Form B



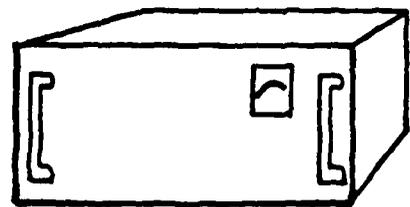
5. Below are drawings of three different multiplexes. Which one matches the drawing above?
- A
  - B
  - C
  - None of the above.
6. In what way are all three multiplexes shown below different?
- Size
  - Location of indicator
  - Presence of handles
  - Location of handles



A



B

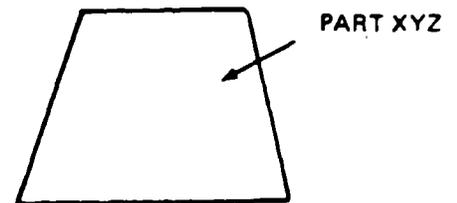
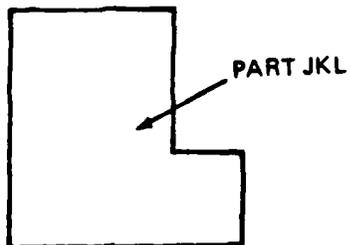
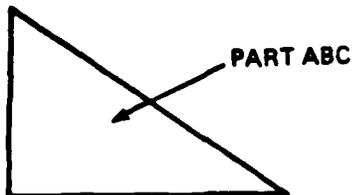


C

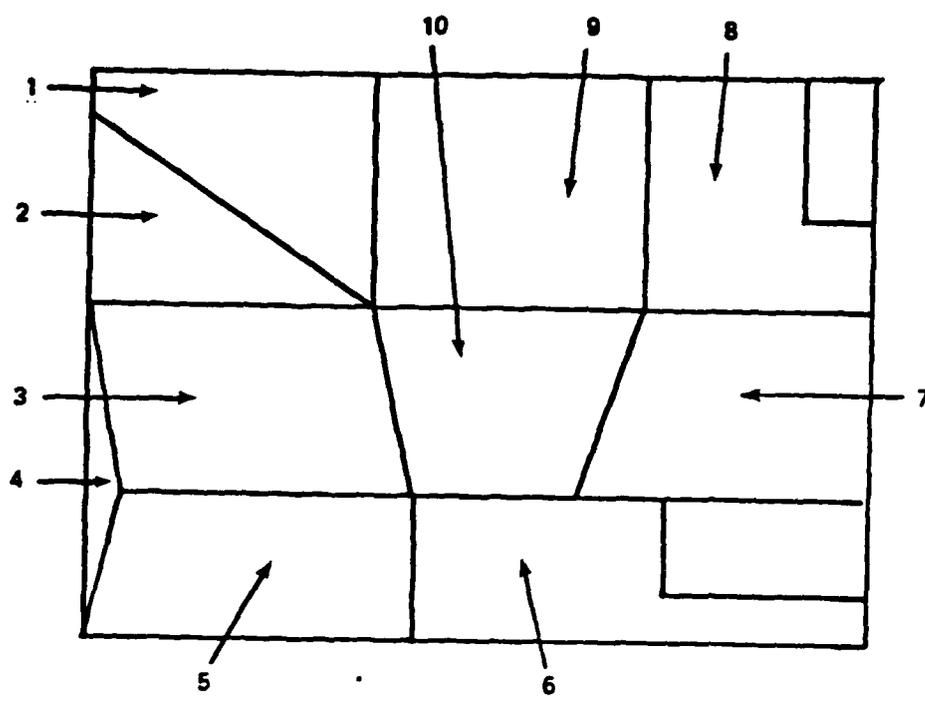
Unit V, Lesson 1  
 Checkpoint 1, Form B

6

Directions: Below are drawings of three parts of a whole: Part ABC, Part JKL, and Part XYZ. Look over each part, then answer the question that follows. Then turn to the next page and answer some questions.

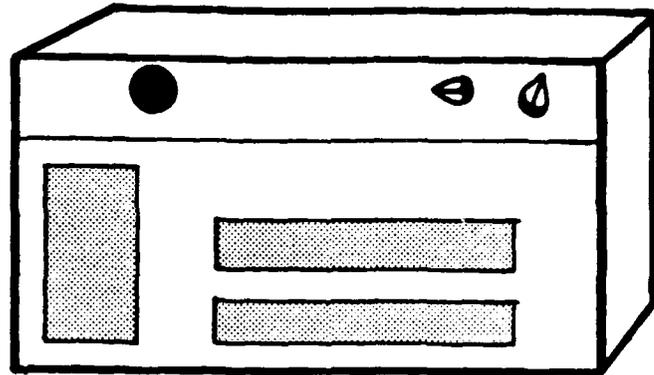


7. What feature makes the three parts different?
- a. The Size
  - b. The Shape
  - c. The Color
  - d. The Design



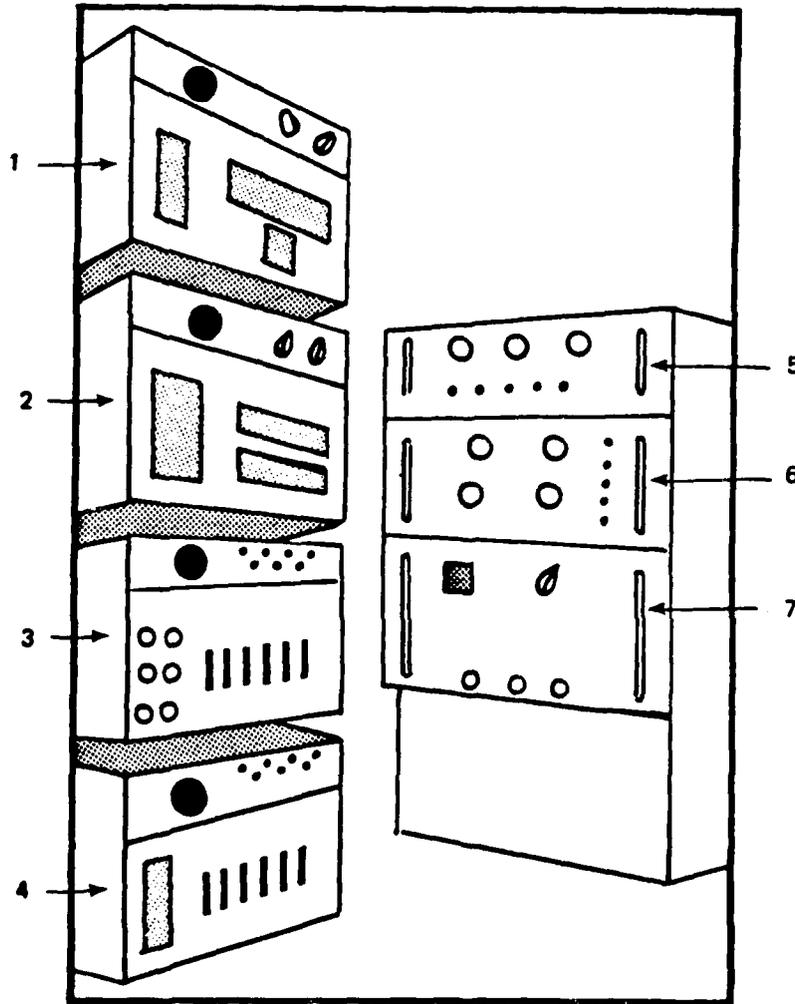
8. Where is Part JKL located in the drawing above?
- a. 1
  - b. 6
  - c. 8
  - d. 10
9. In the drawing above, number 10 is:
- a. Part ABC
  - b. Part JKL
  - c. Part XYZ
  - d. None of the above parts.

On the right is a drawing of a particular piece of equipment.



10. In the drawing below, which of the numbered parts is the piece of equipment shown above?

- a. 1
- b. 2
- c. 3
- d. 4



Unit V, Lesson 1  
Checkpoint 1, Form B

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Unit V, Lesson 1  
Checkpoint 1, Form B

10

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VI - LESSON 1  
UNIT VII - LESSON 1

Checkpoint 1, Form A

Use the diagram below to answer questions 1 to 5.

	SYSTEM 1		SYSTEM 2	
	ABC	XYZ	ABC	XYZ
EAST	D	E	F	G
WEST	H	I	J	K
NORTH	L	M	N	O
SOUTH	P	Q	R	S

1. The letter in SYSTEM 2, ABC, NORTH is \_\_\_\_\_.
2. The letters F, J, N, and R (but not any others) are all in \_\_\_\_\_.
3. The letter in SYSTEM 1, XYZ, EAST is \_\_\_\_\_.
4. List all the letters in SYSTEM 1: \_\_\_\_\_.
5. The letters E, M, and K are all in \_\_\_\_\_.

Use the table below to answer questions 6 to 10.

Item No.	Unit	Procedure	Expected Result
1	Dial	a. Clean b. Check needle	a. No dirt. b. Needle moves.
2	Plug	a. Check cord	a. Tight
3	Case	a. Check lock b. Count items c. Check cover	a. Lock works. b. Nothing missing. c. Cover is tight.
4	Lens	a. Examine b. Turn	a. No cracks. b. Lens turns freely.

6. The procedure in Item No 3b is \_\_\_\_\_.
7. In Item No. 4, the procedure is \_\_\_\_\_.
8. In the table, "Cover is tight" is the \_\_\_\_\_  
in Item No. \_\_\_\_\_.
9. The expected result in Item No. 1b is \_\_\_\_\_.
10. The unit in Item No. 2 is \_\_\_\_\_.

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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VI - LESSON 1  
UNIT VII - LESSON 1

Checkpoint 1, Form B

Use the table below to answer questions 1 to 5.

Item No.	Procedure	Malfunction
1	U	D
2	a. V	a. E
	b. W	b. F
3	a. X	a. G
	b. Y	b. H
	c. Z	c. I

1. How many procedures are there in Item No. 3? \_\_\_\_\_
2. E and F are both \_\_\_\_\_ in Item No. \_\_\_\_\_.
3. The malfunction in Item No. 1 is \_\_\_\_\_.
4. The procedure in Item No. 2a is \_\_\_\_\_.
5. The malfunction in Item No. 3b is \_\_\_\_\_.

Use the diagram below to answer questions 6 to 10.

	SYSTEM 1		SYSTEM 2		SYSTEM 3	
	JKL	MNO	JKL	MNO	JKL	MNO
RED	A	B				
GREEN		C	D	E		F
BLUE		G			H	
YELLOW		I				

6. The letters in MNO, GREEN are \_\_\_\_\_.
7. The letters in SYSTEM 1, MNO are \_\_\_\_\_.
8. The letters in SYSTEM 2, GREEN are \_\_\_\_\_.
9. The letter in SYSTEM 1, JKL, RED is \_\_\_\_\_.
10. The letter H is in \_\_\_\_\_.

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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VI - LESSON 2

Checkpoint 1, Form A

1. Here are the titles of four troubleshooting tables in a TM:

4-7b. TD-202/U and TD-203/U Troubleshooting Chart

4-7c. TD-204/U Troubleshooting Chart

4-7d. TD-352/U or TD-353/U Troubleshooting Chart

4-7e. CV-2548/G Troubleshooting Chart

Which table should you use for troubleshooting a TD-204/U?

\_\_\_\_\_

Below are the column headings of an equipment performance checklist.  
Use them to answer questions 2 to 4.

Step	Unit	Action	Normal indication	Fault symptom	Corrective measure
------	------	--------	-------------------	---------------	--------------------

2. If something goes wrong, which column tells you how to fix it?

\_\_\_\_\_

3. Which column tells you what should not happen if the equipment is operating properly?

\_\_\_\_\_

4. The Action column tells the operator \_\_\_\_\_

\_\_\_\_\_

Below are the column headings of a troubleshooting chart. Use them to answer questions 5 to 7.

Item No.	Malfunction	Probable cause	Suggested remedy
----------	-------------	----------------	------------------

5. Which column lists symptoms that may happen while you are operating equipment? \_\_\_\_\_
6. Something goes wrong while you are operating equipment. You want to know why. Which column will tell you? \_\_\_\_\_
7. Which column heading means the same thing as Corrective measures?  
\_\_\_\_\_

Below are the column headings of a maintenance table. Use them to answer questions 8 to 10.

M - Monthly    Q - Quarterly

Item No.	Interval		Item To Be Inspected	Procedure	Reference
	M	Q			

8. The column heading Q stands for \_\_\_\_\_.
9. If you need more information about a maintenance operation, which column should you look in? \_\_\_\_\_
10. Which column lists the equipment components that are being checked? \_\_\_\_\_

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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VI - LESSON 2

Checkpoint 1, Form B

1. Here are the titles of four tables for performing PMCS:

Table 4-2. Operator's Daily Preventive Maintenance Checks and Services

Table 4-3. Operator's Weekly Preventive Maintenance Checks and Services

Table 4-4. Organizational Monthly Preventive Maintenance Checks and Services

Table 4-5. Organizational Quarterly Preventive Maintenance Checks and Services

You are doing weekly maintenance. Which table should you use?

\_\_\_\_\_

Below are the column headings of an equipment performance checklist. Use them to answer questions 2 to 4.

Step	Unit	Action	Normal result	Corrective measures
------	------	--------	---------------	---------------------

2. Which column tells the operator what to do at each step?

\_\_\_\_\_

3. Which column describes the piece of equipment being checked?

\_\_\_\_\_

4. Which column tells what should happen if the equipment is working properly? \_\_\_\_\_

Unit VI, Lesson 2  
Checkpoint 1, Form B

1

Below are the column headings of a table used for troubleshooting. Use them to answer questions 5 to 7.

Item No.	Symptom	Possible trouble	Suggested remedy
----------	---------	------------------	------------------

5. Which column heading means the same thing as Probable cause?  
\_\_\_\_\_

6. Which column heading means the same thing as Malfunction?  
\_\_\_\_\_

7. Which column lists defects that can cause trouble?  
\_\_\_\_\_

Below are the column headings of a maintenance table. Use them to answer questions 8 to 10.

B-Before Operation    D-During Operation    A-After Operation    W-Weekly

Sequence No.	Interval				Item To Be Inspected	Procedure	Equipment is not ready/available if:
	B	D	A	W			

8. Which column lists symptoms? \_\_\_\_\_

9. Which column should you look in to find out what must be done after operation? \_\_\_\_\_

10. Which column heading means the same thing as Action?  
\_\_\_\_\_

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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VI - LESSON 3

Checkpoint 1, Form A

Part of an equipment performance checklist is on the next page. Use it to answer questions 1 to 3 below.

1. If the equipment is operating properly at Step 33, what should happen?

\_\_\_\_\_

2. In Step 36, if the HV indicator does not light, what is the Corrective measure?

\_\_\_\_\_

3. What should the operator do in Step 33?

\_\_\_\_\_

EQUIPMENT PERFORMANCE

Step	Unit	Action	Normal Indication	Corrective measures
31	CN-514/GRC	Set POWER circuit breaker to ON.	POWER ON indicator light.	Check power source output and power cable connections. Check fuse F2 (20 amp) (fig. 5-11). Check POWER ON indicator lamp.
32	CN-514/GRC	Set MANUAL RAISE-LOWER switch to RAISE then to LOWER.	MANUAL indicator lights. Meter indicates raise in voltage then decrease in voltage.	Check MANUAL indicator lamp. Check MOTOR 1 AMP fuse
33	CN-514/GRC	Set MANUAL-AUTOMATIC switch to AUTOMATIC.	Meter indicates 115 volts. MANUAL indicator goes out.	
34	CN-514/GRC	Set MANUAL-AUTOMATIC switch to MANUAL and MANUAL RAISE-LOWER switch to LOWER until meter indicates approximately 105 volts. Then set MANUAL-AUTOMATIC switch to AUTOMATIC.  Repeat above except operate switch to RAISE until meter indicates approximately 120 volts.	Voltage indication on meter changes back to 115 volts in both operations.	Check V1 and V2. Replace plug-in regulator assembly.
35	PP-2054(*)/GRC	Set AC POWER circuit breaker to ON. Allow equipment to warm up for 5 minutes.	Blower motor operates. FIL indicator lights.	Check 5 AMP FIL fuse. Check FIL indicator lamp. Check silicon rectifiers in PP-2054 (*)/GRC. If they are blistered or discolored, higher maintenance services are required.
36	PP-2054 (*)/GRC	Set OPERATE-STANDBY switch to OPERATE.	Blower motor in T-893(P)/GRC operates.  The LV and HV indicators light. Target bolt (interlock switch (fig. 1-4)) is tight; also all bolts holding amplifier-oscillator are tight.	Check cable connection between TO XMTR on PP-2054 (*)/GRC and TO PWR SUP on T-893(P)/GRC. If LV indicator does not light, check 3 AMP LV fuse. Check LV lamp. If HV indicator does not light, check HV fuse. (This fuse, whether equipment is marked with 5 AMP or 3 AMP should be replaced with 3 amp. time-delay fuse in all equipments (para

Unit VI, Lesson 3  
Checkpoint 1, Form A

Use the Radio Terminal Troubleshooting Chart on the next page to answer questions 4 to 6.

4. The second Probable cause in Item No. 3 is \_\_\_\_\_

\_\_\_\_\_

5. You get the symptom: Order wire very noisy or no reception, but all other indications on TD-660A/G and AN/GRC-103(V) are normal. What is the first Probable cause?

\_\_\_\_\_

6. In Item No. 7, what is the Corrective action for Probable cause e?

\_\_\_\_\_

Item No	Malfunction	Probable cause	Corrective action
1	FRAME ALARM indicator of TD-660A/G lights, buzzer sounds and TEST ALIGN meter indicates in green area with selector switch I at PCM IN or TIM IN.	Defective TD-660A/G.	Troubleshoot TD-660A/G (para 5-5).
2	FRAME ALARM indicator of TD-660AG lights, buzzer sounds, and TEST ALIGN meter does not indicate in green area with selector switch I at PCM IN or TIM IN. AN/GRC-103(V) operates normally. Order wire normal	a. Defective cable between VIDEO patch panel PCM IN connector and TD-660A/G PCM IN connector, or between VIDEO patch panel PCM RCVR connector and R-1329(P)/GRC-103(V) PCM connector. b. Defective VIDEO patch panel cable between PCM IN and PCM RCVR connectors.	a. Check and replace if necessary b. Check and replace if necessary.
3	FRAME ALARM indicator on TD-660A/G lights, buzzer sounds, R-1329(P)/GRC-103(V) ALARMS LOW SIGNAL indicator lights	a. Defective antenna cable or defective cable between VIDEO AND ANTENNA ENTRANCE BOX and ANT connector on R-1329(P)/GRC-103(V). b. Defective or misoriented antenna. c. Defective R-1329(P)/GRC-103(V). d. Defective T-983(P)/GRC-103(V) at distant terminal or repeater.	a. Check and replace if necessary b. Check and replace or reorient if necessary c. Troubleshoot R-1329(P)/GRC-103(V) (para 5-5). d. Keep R-1329(P)/GRC-103(V) operating on assigned frequency. Periodically try order wire and await response. Send person to distant terminal or repeater
4	FRAME ALARM indicator of TD-660A/G lights and buzzer sounds. No indication on R-1329(P)/GRC-103(V) meter with selector switch at 12 CH PCM. Order wire is normal	Defective pcm component at distant terminal	Request distant terminal troubleshooting
5	Order wire very noisy or no reception, but all other indications on TD-660A/G and AN/GRC-103(V) are normal	a. Defective order wire cable between RT-773/GRC-103(V) and R-1329(P)/GRC-103(V). b. Defective RT-773/GRC-103(V). c. Defective power supply in R-1329(P)/GRC-103(V).	a. Check and replace if necessary b. Troubleshoot RT-773/GRC-103(V) (para 5-5) c. Troubleshoot R-1329(P)/GRC-103(V) (para 5-5)
6	Switchboard operator reports high noise level or hum on all channels. All local indications are normal	a. Defective AN/GRC-103(V). b. Defective TD-660A/G.	a. Troubleshoot AN/GRC-103(V) (para 5-5) b. Troubleshoot TD-660A/G (para 5-5)
7	Switchboard operator reports loss of a specific channel or only one way communication on a specific channel. All local indications are normal	a. Defective TD-660A/G. b. Defective CV-1548(*)/G. c. Defective CX-7870/TCC between CV-1548(*)/G and TD-660A/G. d. Defective field wire or 26-pair cable. e. Defective TD-660A/G or CV-1548(*)/G at distant terminal.	a. Troubleshoot TD-660A/G (para 5-5) b. Troubleshoot CV-1548(*)/G (para 5-5) c. Check and replace if necessary d. Check and repair if required e. Request distant terminal troubleshooting
8	Switchboard operator reports that no signaling is available on any 2-wire channel	Defective CV-1548(*)/G.	Troubleshoot CV-1548(*)/G (para 5-5)
9	Switchboard operator reports loss of one group of four channels. All local indications are normal	a. Defective CX-7870/TCC cable between TD-660A/G and CV-1548(*)/G. b. Defective interconnecting cable between CV-1548(*)/G and SIGNAL ENTRANCE panel. c. Defective associated cable at distant terminal.	a. Check and replace if necessary b. Check and replace if necessary c. Request distant terminal troubleshooting

Unit VI, Lesson 3  
Checkpoint 1, Form A

Use the maintenance table on the next two pages to answer questions 7-10.

7. When should the METER SELECT switch (Item No. 14) be inspected?

\_\_\_\_\_

8. List the items which should be inspected weekly: \_\_\_\_\_

\_\_\_\_\_

9. What is the fourth procedure to be carried out on the radio set AN/GRC-103(V)?

\_\_\_\_\_

10. In Item No. 14, the order wire circuit is not ready/available for use if \_\_\_\_\_

\_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

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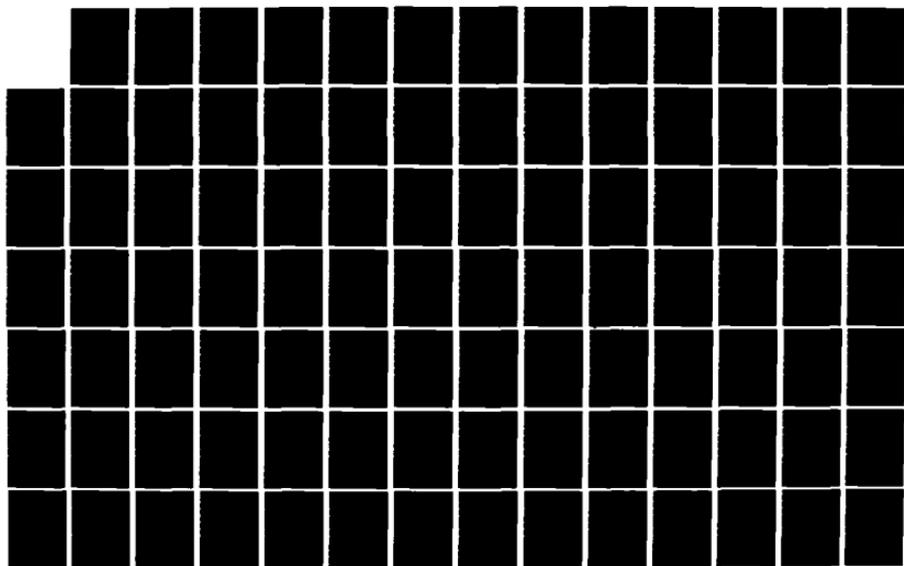
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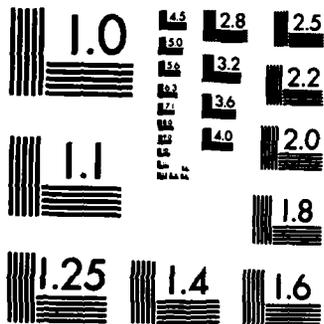
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MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

B—Before operation    D—During operation    A—After operation    W—Weekly

Item No.	Interval				Item to be Inspected	Procedures Check and have repaired or adjusted as necessary	For readiness reporting equipment is not ready/available if:
	B	D	A	W			
13	.	.	.	.	Radio Set AN/GRC-103(V)	<p>Set the transmitter of system 1 and receiver of system 2 to the same channel.</p> <p>Set the transmitter of system 2 and the receiver of system 1 to the same channel, but maintain a minimum of a 50-channel separation from that in 3 above.</p> <p><b>SYSTEM 1</b></p> <p>a. Adjust receiver RCVR CHANNEL, RCVR SIG, and XMTR DUPL controls for correct channel numbers on both RCVR CHANNEL and XMTR CHANNEL indicators.</p> <p>b. Adjust transmitter XMTR CHANNEL and XMTR TUNE controls for correct transmitting frequency.</p> <p>c. Operate transmitter AC POWER switch to ON/RESET.</p> <p>d. Operate receiver AC POWER switch to ON.</p> <p>e. Press BUZZER OFF switch to silence buzzer.</p> <p>f. Operate transmitter selector switch sequentially through 12 VDC, 28 VDC, and 600 VDC.</p> <p>g. Operate transmitter selector switch sequentially through OSC, DOUBLER, and MULT.</p> <p>h. Operate transmitter selector switch to DRIVER (no adjustment for bands II and III); push in PWR OUT PEAK knob and tune for maximum indication on meter.</p> <p>i. Operate transmitter selector switch to PWR OUT (no adjustment for band III); pull out PWR OUT PEAK knob and tune for maximum indication on meter. (Silence buzzer with BUZZER OFF switch upon completion of adjustment.)</p> <p>j. Operate transmitter selector switch to REFL PWR and tune receiver XMTR DUPL control for minimum indication on transmitter meter.</p> <p>k. Operate receiver selector switch to XMTR DUPL.</p> <p>l. Operate receiver selector switch to REFL PWR.</p> <p>m. Operate transmitter selector switch to 12 CH PCM and adjust INPUT control for green band indication on meter.</p>	<p>a. All controls do not adjust to correct channel.</p> <p>b. Both controls do not adjust to correct frequency.</p> <p>c. AC POWER and ALARMS LOW POWER indicator does not light, ALARMS SYNC indicator does not light momentarily, buzzer does not sound, and blower does not operate.</p> <p>d. AC POWER and ALARMS LOW SIGNAL indicator do not light, ALARMS SYNC indicator does not light momentarily and buzzer does not sound.</p> <p>e. POWER indicator on order wire unit does not light, and loud rushing noise is not heard in order wire handset.</p> <p>f. Meter does not indicate in green band for each switch position.</p> <p>g. Meter does not indicate between 25 and 90 percent of full scale.</p> <p>h. Meter does not indicate between 25 and 90 percent of full scale.</p> <p>i. Meter does not indicate between 25 and 90 percent of full scale, and LOW POWER indicator does not extinguish.</p> <p>j. XMTR CHANNEL indicator is not within 10 channels of correct frequency, and meter indicates greater than 20 percent of full scale.</p> <p>k. Meter does not indicate within 25 to 90 percent of full scale.</p> <p>l. Meter does not indicate less than 20 percent of full scale.</p> <p>m. No meter indication.</p>

Unit VI, Lesson 3  
Checkpoint 1, Form A

Item No.	Interval				Item to be Inspected	Procedures Check and have repaired or adjusted as necessary	For readiness reporting equipment is not ready/available if:												
	B	D	A	W															
14					Multiplexer TD-204/U	<p>n. Operate receiver selector switch sequentially through +12 VDC and -12 VDC.</p> <p>o. Operate receiver selector switch sequentially through OSC and DOUBLER.</p> <p>p. Operate receiver selector switch to MULT and adjust MULT PEAK control for maximum indication on meter.</p> <p>q. Check for loud rushing noise in order wire handset when ALARM LOW SIGNAL indicator extinguishes, indicating a signal is being received.</p> <p>r. Operate receiver selector switch to RCVR SIG.</p> <p style="text-align: center;"><b>SYSTEM 2</b></p> <p>s. Repeat procedures a through r above for SYSTEM 2.</p> <p>a. Operate CABLE POWER switch to ON. ALARMS NO CABLE CURRENT indicator goes out.</p> <p>b. Operate TALK-OFF-SIG switch to SIG for 2 seconds or between SIG and OFF for called terminal identification.</p> <p>c. Operate TALK-OFF-SIG switch to TALK and talk with the called station.</p> <p>d. Request distant terminal to signal by order wire and operate TALK-OFF-SIG switch to OFF.</p> <p>e. When buzzer sounds and CALL indicator lights, operate TALK-OFF-SIG switch to TALK and answer the call.</p> <p>f. When the check is completed, set the TALK-OFF-SIG switch to OFF.</p> <p>g. Operate switch to the following positions and check for proper indication on TEST ALIGN meter.</p> <table style="margin-left: 20px;"> <thead> <tr> <th style="text-align: left;">Position</th> <th style="text-align: left;">Indication</th> </tr> </thead> <tbody> <tr> <td>TIMING IN</td> <td>Green area</td> </tr> <tr> <td>PCM IN-1</td> <td>Green area</td> </tr> <tr> <td>PCM IN-2</td> <td>Green area</td> </tr> <tr> <td>CABLE I</td> <td>Yellow area</td> </tr> <tr> <td>CABLE V</td> <td>10.8 times number of TD-206/G's plus 13.</td> </tr> </tbody> </table> <p style="text-align: center;"><b>NOTE</b></p> <p>If CABLE V position is checked with loss of timing in signal, use 14.8 times number of TD-206/G's plus 13.</p>	Position	Indication	TIMING IN	Green area	PCM IN-1	Green area	PCM IN-2	Green area	CABLE I	Yellow area	CABLE V	10.8 times number of TD-206/G's plus 13.	<p>n. Meter does not indicate in green band in either switch position.</p> <p>o. Meter does not indicate between 25 and 90 percent of full scale in either switch position.</p> <p>p. Meter does not indicate between 25 and 90 percent of full scale.</p> <p>q. Loud rushing noise is not heard.</p> <p>r. Meter does not indicate between 25 and 90 percent of full scale.</p> <p>s. Results are the same as a through r above.</p> <p>a. ALARMS NO CABLE CURRENT indicator fails to go out.</p> <p>b. Order wire fails to operate.</p>
	Position	Indication																	
TIMING IN	Green area																		
PCM IN-1	Green area																		
PCM IN-2	Green area																		
CABLE I	Yellow area																		
CABLE V	10.8 times number of TD-206/G's plus 13.																		
				Order wire circuit															
15					METER SELECT switch														
					Multiplexer TD-754/G	<p>h. Operate switch to SERV FAC.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>Perform a and b below only when there is no traffic.</p> <p>a. Operate PWR switch to ON and observe that power and CABLE CUR indicators light. Operate CABLE CURRENT switch to ON and observe that the CABLE CUR indicator goes out.</p> <p>b. Notify operator at opposite end of cable link to momentarily operate POWER switch on TD-660/G to OFF. Observe that TRAFFIC</p>													
					PWR and CABLE CURRENT switches and cable current alarm circuit.														
					Traffic (pcm) alarm circuit														

Name \_\_\_\_\_

Date \_\_\_\_\_

**UNIT VI - LESSON 3**

**Checkpoint 1, Form B**

Use the equipment performance checklist on the next page to answer questions 1-3.

1. If the equipment is operating properly in Step 54, what should happen?

\_\_\_\_\_

2. What equipment component is being checked in Step 56?

\_\_\_\_\_

3. What should the operator do in Step 58?

\_\_\_\_\_

## EQUIPMENT PERFORMANCE

Step	Unit	Action	Normal Indication	Corrective measures
		ation on DA-189/ GRC. Depress BUZZ OFF pushbutton to silence buzzer.		
53	R-1148(P)/GRC or R-1331(*) (P)/GRC.	Set AC POWER switch to ON. Allow 5-min- ute warmup.	AC POWER indicator lights. INCOMING CALL lamp lights mo- mentarily. RING buz- zer sounds momentar- ily. Blower motor oper- ates.	Check silicon rectifiers on bottom of receiver for blistering or discolora- tion. If rectifiers are blistered or discolored, or show any signs of malfunction, higher cat- egory of maintenance is required.
54	R-1148(P)/GRC or R-1331(*) (P)/GRC.	Set multimeter selector switch to TEST TONE CAL. Set TEST TONE switch to ON and ad- just TEST TONE con- trol for indication in green area of receiver multimeter.	Multimeter indicates in green area of meter scale.	Check V2 in signaling unit 3A6.
55	T-893(P)/GRC	Set multimeter selector switch to 1 KC MOD.	Multimeter indicates in green area of meter scale.	Check V1, V2, and V4 on 2A3. Check V5 on afc assembly 2A4. Check all tubes in modu- lator 2A5.
56	AM-1955(*)/ GRC or AM- 1956(*)/GRC.	Set multimeter selector switch on R-1148(P)/ GRC or R-1331(*) (P) GRC to OSC and ad- just OSCILLATOR control for peak indi- cation on multimeter.	Peak indication is ob- tained on multimeter.	Check WAVEMETER control for correct setting. Check diode CR2 in wave- meter.
57	R-1148(P)/GRC. (Omit this step when using AM-1955A/ GRC or AM- 1956A GRC.)	Set multimeter selector switch to AFC LEV. Tune AFC LEVEL control for peak indi- cation on multimeter.	Multimeter indicates 10 or more.	Check V1 through V7 on afc assembly 3A4.
58	R-1148(P)/GRC. (Omit this step when using AM-1955A/ GRC or AM- 1956A GRC.)	Adjust AFC TUNE control for peak indi- cation on multimeter.	Peak is indicated on mul- timeter.	
59	R-1148(P)/GRC. (Omit this step when using AM-1955A/ GRC or AM- 1956A/GRC.)	Set AFC TUNE-ODD- EVEN switch to ODD if receiver channel is odd-numbered, or to EVEN if receiver channel is even-num- bered. Rotate AFC cor- rection control on AM- 1955/GRC or AM- 1956/GRC until AFC meter indicates $\pm 40$ . After normal indica-	AFC meter needle moves back toward center and stops near center. AFC correction control on AM-1955/GRC or AM- 1956/GRC moves away from center position and then returns to original setting.	Adjust R42 on afc assem- bly 3A4 to center AFC meter needle. Check V8 and V9 on afc assembly 3A4. If V8 is replaced, adjust R42 as required.

Unit VI, Lesson 3  
Checkpoint 1, Form B

Use the troubleshooting chart on the next page to answer questions 4 to 6.

4. If you get Malfunction No. 53, what does the chart tell you to do to fix it?

---

5. What is the second probable cause of the malfunction in Item No. 61?

---

6. If the cause of the malfunction in Item No. 57 is a defective receiver head, what should the operator do to fix it?

---

Item No.	Malfunction	Probable cause	Corrective action
	indicator lights and all other indications are normal.		any airflow obstructions.
50	T-983(P)/GRC-103(V) meter has no indication for any position of meter selector switch. All other indications are normal.	a. Defective centrifugal fan 5A2B1. Defective meter STRA1M1 or meter switch STRA1S1.	a. Replace T-983(P)/GRC-103(V). Replace T-983(P)/GRC-103(V)
51	R-1329(P)/GRC-103(V) AC POWER and LOW SIGNAL indicators do not light, and buzzer is silent when AC POWER switch is operated to ON.	a. Defective power cable to R-1329(P)/GRC-103(V). b. Defective power supply 1RE1PS1. c. Defective switch 1RE1A1CB1.	e. Repair assigned to higher category of maintenance. b. Replace power supply (app A). c. Replace R-1329(P)/GRC-103(V). Replace lamp.
52	R-1329(P)/GRC-103(V) LOW SIGNAL indicator lights and buzzer sounds but AC POWER indicator does not light when AC POWER switch is operated to ON.	Defective AC POWER lamp.	Replace lamp.
53	R-1329(P)/GRC-103(V) AC POWER indicator lights and buzzer sounds but LOW SIGNAL indicator does not light when AC POWER switch is operated to ON.	Defective LOW SIGNAL lamp.	Replace lamp.
54	R-1329(P)/GRC-103(V) AC POWER and LOW SIGNAL indicators light but buzzer does not sound when AC POWER switch is operated to ON.	a. BUZ OFF/ALM NOR switch at incorrect setting. b. Defective BUZZER OFF switch or defective buzzer.	a. Check switch (inside of case at left-hand side, front upper corner of receiver head) and reset it if necessary. b. Replace R-1329(P)/GRC-103(V).
55	R-1329(P)/GRC-103(V) SYNC indicator does not extinguish within 10 seconds after AC POWER switch is operated to ON.	a. Defective power supply 1RE1A2. b. Defective electrical frequency synthesizer 1RE1A2.	a. Replace power supply (app A). b. Replace R-1329(P)/GRC-103(V).
56	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at +12 VDC.	a. Defective CX-10763/GRC-103(V) cable. b. Defective receiver head. c. Defective RT-773/GRC-103(V). d. Defective power supply 1RE1PS1.	a. Check and replace if necessary. b. Replace receiver head. c. Replace RT-773/GRC-103(V). d. Replace power supply (app A).
57	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at -12 VDC.	a. Defective power supply 1RE1PS1. b. Defective module in R-1329(P)/GRC-103(V). c. Defective receiver head.	a. Replace power supply (app A). b. Replace R-1329(P)/GRC-103(V). c. Replace receiver head.
58	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at XMTR DUPL. Meter indication normal with T-983(P)/GRC-103(V) meter selector switch at PWR OUT.	a. Incorrect XMTR DUPL control setting. b. Defective CG-3444/U cable. c. Defective duplexer 2A1A1 or power monitor 2A1A5.	a. Reset control. b. Check and replace if necessary. c. Replace R-1329(P)/GRC-103(V).
59	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at OSC.	a. Defective control-indicator 2A2. b. Defective electrical frequency synthesizer 1RE1A2.	a. Replace control-indicator (app A). b. Replace R-1329(P)/GRC-103(V).
60	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at DOUBLER. Normal indication in OSC position.	Defective amplifier-frequency multiplier 1RE1A5.	Replace amplifier-frequency multiplier (app A).
61	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at MULT. Normal indication in DOUBLER position.	a. Incorrect setting of RCVR SIG control. b. Incorrect tuning of MULT PEAK control. c. Defective control-indicator 2A2. d. Defective frequency multiplier 2A1A2A1 or electrical frequency synthesizer 1RE1A2.	a. Reset control. b. Retune control. c. Replace control-indicator (app A). d. Replace R-1329(P)/GRC-103(V).
62	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at RCVR SIG. Normal indication in MULT position but LOW SIGNAL indicator does not extinguish.	a. RCVR SIG or RCVR CHANNEL control incorrectly adjusted. b. Antenna facing wrong direction. c. Defective frequency mixer stage 2A1A2, radiofrequency amplifier 2A1A1 or low pass filter 2A1A1FL1. d. Defective T-983(P)/GRC-103(V) at distant terminal or repeater.	a. Adjust control. b. Check azimuth. c. Replace R-1329(P)/GRC-103(V). d. Request distant terminal or repeater troubleshooting.
63	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch	a. Defective intermediate frequency amplifier 1RE1AP2.	a. Replace intermediate frequency amplifier (app A).

Unit VI, Lesson 3  
Checkpoint 1, Form B

Use the maintenance table on the next page to answer questions 7 to 10.

7. The interior walls, ceilings, and floors (Item No. 5) are not ready/available for use if \_\_\_\_\_

8. How often should the interior walls, ceilings, and floors be inspected? \_\_\_\_\_

9. What is the first procedure you should carry out on the POWER DISTRIBUTION PANEL (Item No. 7)?

10. Which items should be inspected before operation?

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Item No.	Interval				Item to be Inspected	Procedures Check and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if:
	B	D	A	W			
5					<b>INTERIOR</b> Walls, ceilings, and floors	Check for holes, open seams, or signs of water seepage or leaks that may present a shock hazard.	A shock hazard exists.
6	•	•			POWER INDICATOR neon lamp and AC VOLTS METER on POWER DISTRIBUTION PANEL	Apply power to the assemblage by starting generator set or turning on central power source. POWER INDICATOR neon lamp lights and AC VOLTS meter on POWER DISTRIBUTION PANEL indicates 115 vac. No less than 109 volts nor more than 121 volts.	Voltage is less than 109 volts or more than 121 volts.
7	•		•		POWER DISTRIBUTION PANEL	a. Operate MAIN circuit breaker to ON; AMPERES AC meter indicates zero. b. Sequentially operate each circuit breaker to ON; the associated indicator should light. <b>CAUTION</b> Under blackout conditions this check may be made only if the curtains are closed. After testing, operate the BYPASS BLACKOUT switch to the BLACKOUT position.	a. High current reading is noted.
8				•	Door microswitch	Operate the BYPASS BLACKOUT switch to BLACKOUT and open the door. Ceiling lights should go out.	Lights do not go out when the door is open.
9	•		•		BYPASS BLACKOUT switch	Operate the switch to the BYPASS position with the door open. Ceiling lights should light.	
10	•		•		Exhaust blowers	Operate BLOWER switch associated with each exhaust blower to ON. Exhaust blower should operate.	
11	•		•		Heater	a. Operate HEAT-OFF-FAN switch to HEAT, operate TEMPERATURE control and note that warm air blows from the front of the heater. b. Operate HEAT-OFF-FAN switch to FAN; fan blows air and heating element ceases to glow. c. Operate HEAT-OFF-FAN switch to OFF; fan should stop. <b>NOTE</b> Perform the following items on each system. If the AN/TRC-145 is in continuous use, perform only those items that do not interfere with the operation of the equipment.	a. Heater fails to heat, fan does not blow, or excessive current causes circuit breaker to trip (If heater is mission essential.)
12	•		•		Equipment ac power switches	Operate to ON; associated ac power indicators on each unit should light. Blowers should operate. TD-204/U ALARMS NO CABLE CURRENT indicator, or TD-754/G CABLE CUR should light. <b>RADIO TUNING CHECKS</b> <b>NOTES</b> Position each antenna assembly on the ground at least 30 feet apart facing in opposite directions. (This will allow transmission and reception from the weak back lobe radiation pattern on each antenna.) Connect each antenna to the SYSTEM antenna connector of the SIGNAL ENTRANCE BOX associated with the system to be checked.	One or more blowers fail to operate.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VII - LESSON 2

Checkpoint 1, Form A

V I D E O P A T C H				
	System 1		System 2	
	A	B	A	B
Red	o	o	o	o
Blue	o	o	o	o
Green	o	o	o	o

1. For System 1, A-Blue is connected to:
- a. B-Blue
  - b. A-Red
  - c. B-Red
  - d. B-Green

V I D E O P A T C H				
	System 1		System 2	
	M	N	M	N
R1	o	o	o	o
R2	o	o	o	o
R3	o	o	o	o

2. Using the above video patch diagram, locate the cable connecting M-R3 to N-R1. In which system is it located?
- a. System 1
  - b. System 2
  - c. Both System 1 and System 2
  - d. Neither System 1 nor System 2

3. Suppose you have been given the following instructions:

For System 2, connect TD-660-PCM IN to TD-204-TIM IN.

Which of the following four diagrams shows the result of your assigned task?

- a. Diagram 1
- b. Diagram 2
- c. Diagram 3
- d. Diagram 4

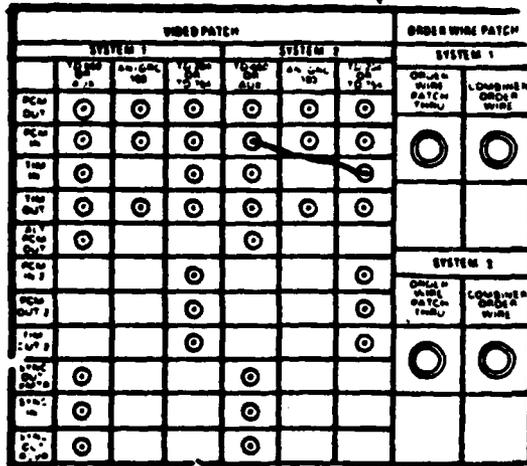


Diagram 1

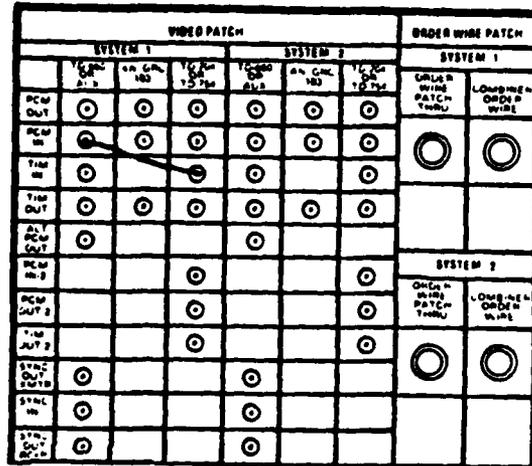


Diagram 2

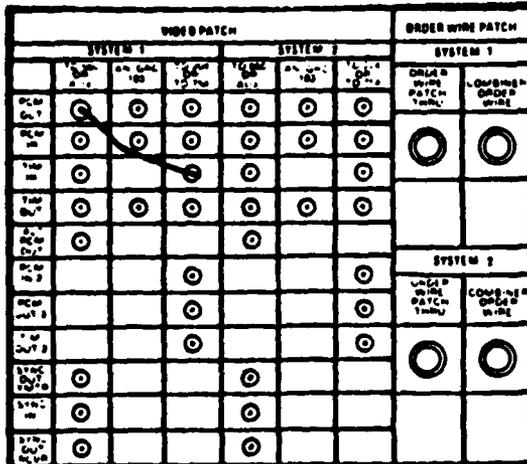


Diagram 3

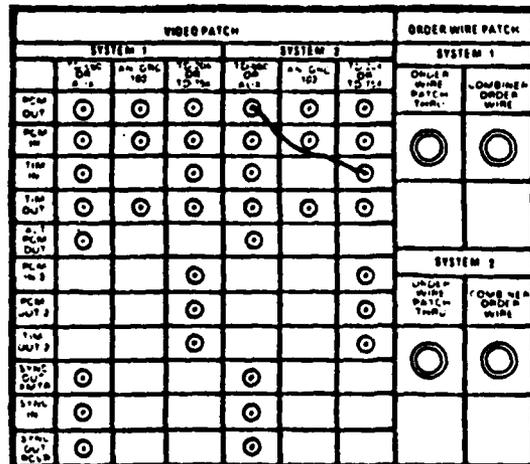


Diagram 4

4. Which of the following diagrams show Systems 1 and 2 interconnected?

- a. Diagrams 1 and 2
- b. Diagrams 1 and 3
- c. Diagrams 2 and 3
- d. Diagrams 2 and 4

VIDEO PATCH						
	System 1			System 2		
	X	Y	Z	X	Y	Z
Blue	o	o	o	o	o	o
White	o	o	o	o	o	o
Green	o	o	o	o	o	o

Diagram 1

VIDEO PATCH						
	System 1			System 2		
	X	Y	Z	X	Y	Z
Blue	o	o	o	o	o	o
White	o	o	o	o	o	o
Green	o	o	o	o	o	o

Diagram 2

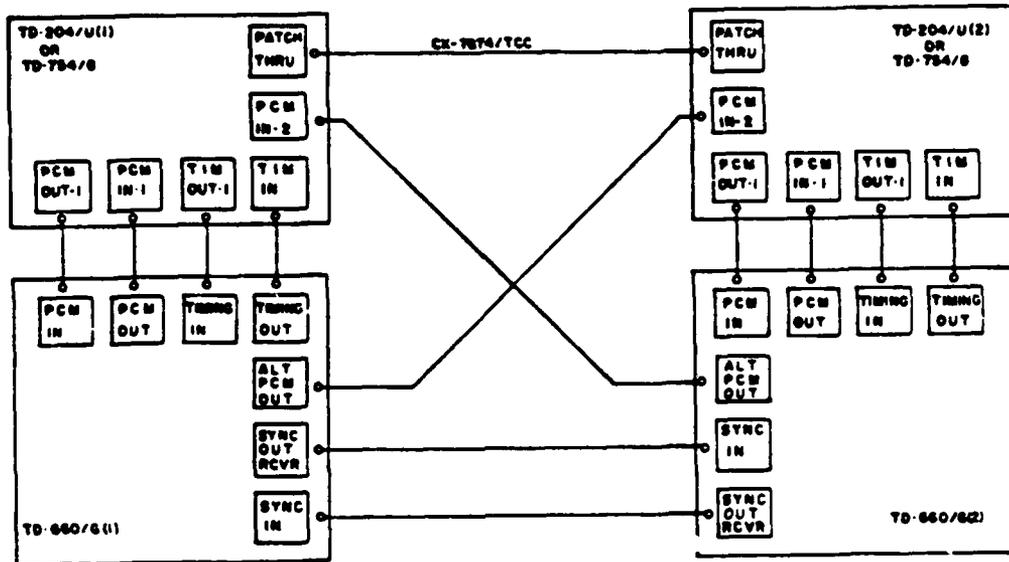
VIDEO PATCH						
	System 1			System 2		
	X	Y	Z	X	Y	Z
Blue	o	o	o	o	o	o
White	o	o	o	o	o	o
Green	o	o	o	o	o	o

Diagram 3

VIDEO PATCH						
	System 1			System 2		
	X	Y	Z	X	Y	Z
Blue	o	o	o	o	o	o
White	o	o	o	o	o	o
Green	o	o	o	o	o	o

Diagram 4

Below is a different kind of cabling diagram. It is called a block diagram. The larger boxes are the components, and the smaller boxes are the connectors. The cables are represented by the solid dark lines.



5. In the block diagram above, TD-204/U(1)-PCM IN-2 is connected to:
- TD-204/U(2)-PCM IN-2.
  - TD-660/G(1)-ALT PCM OUT.
  - TD-660/G(2)-ALT PCM OUT.
  - TD-204/U(2)-PCM OUT-1.

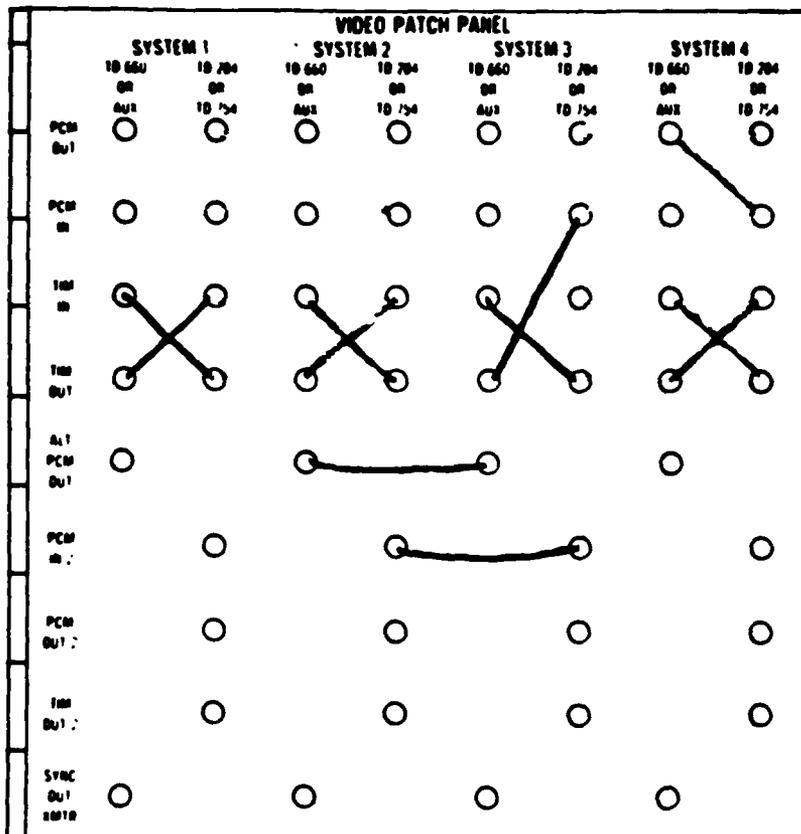
Look over the video patch diagram below. Then answer the two questions that follow the diagram.

VIDEO PATCH								
	System 1		System 2		System 3		System 4	
	M	N	M	N	M	N	M	N
I	o	o	o	o	o	o	o	o
II	o	o	o	o	o	o	o	o
III	o	o	o	o	o	o	o	o
IV	o	o	o	o	o	o	o	o

6. In the above diagram, which systems are being used?
- Systems 1, 2, and 4
  - Systems 1, 2, and 3
  - Systems 1, 3, and 4
  - Systems 2, 3, and 4
7. In System 2:
- M-III is connected to N-I and M-I is connected to M-III.
  - M-II is connected to N-III and M-III is connected to N-I.
  - M-II is connected to N-I and M-IV is connected to N-IV.
  - M-I is connected to N-II and M-IV is connected to N-III.

VIDEO PATCH								
	System 1		System 2		System 3		System 4	
	A	B	A	B	A	B	A	B
I	o	o	o	o	o	o	o	o
II	o	o	o	o	o	o	o	o
III	o	o	o	o	o	o	o	o
IV	o	o	o	o	o	o	o	o

8. In the video patch above, which statement is true concerning System 3?
- B-II is connected to B-III; A-II is connected to B-I.
  - B-I is connected to B-III; A-II is connected to A-IV.
  - A-II is connected to B-IV; A-III is connected to B-IV.
  - B-II is connected to B-IV; A-III is connected to B-I.



On the left is a diagram of a video patch panel. Look closely over the diagram, then answer the following two questions.

9. Which of the following connections is shown in the diagram above?
- a. For System 1, TD-660 TIM IN is connected to TD-204 PCM IN.
  - b. For System 3, TD-660 TIM IN is connected to TD-204 PCM IN.
  - c. For System 4, TD-660 PCM OUT is connected to TD-204 PCM IN.
  - d. For System 2, TD-660 TIM OUT is connected to TD-204 PCM IN.
10. Which systems are interconnected in the above video patch?
- a. Systems 1 and 2
  - b. Systems 2 and 3
  - c. Systems 2 and 4
  - d. Systems 3 and 4

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

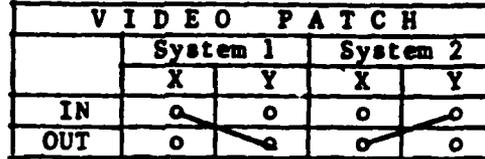
YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

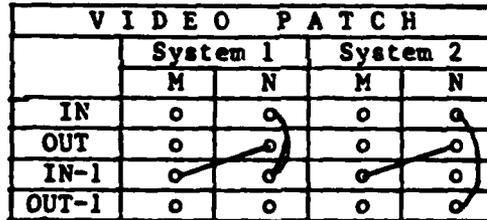
Date \_\_\_\_\_

**UNIT VII - LESSON 2**

**Checkpoint 1, Form B**



1. In the video patch diagram above, which of the following statements accurately describes the cable connection for System 2.
  - a. X-IN is connected to Y-IN.
  - b. X-IN is connected to Y-OUT.
  - c. X-OUT is connected to Y-IN.
  - d. X-OUT is connected to Y-OUT.



2. In which system is the cable connection between N-IN and N-OUT-1 located?
  - a. System 1
  - b. System 2
  - c. Both System 1 and System 2
  - d. Neither System 1 nor System 2

V I D E O P A T C H				
	System 1		System 2	
	A	B	A	B
Blue	o	o	o	o
Brown	o	o	o	o
Black	o	o	o	o

3. In the cabling diagram above, which statement accurately describes the cable connection for System 2?
- A-Black is connected to B-Brown.
  - A-Black is connected to B-Black.
  - A-Brown is connected to B-Black.
  - A-Blue is connected to B-Black.

V I D E O P A T C H						
	System 1			System 2		
	A	B	C	A	B	C
P OUT	o	o	o	o	o	o
P IN	o	o	o	o	o	o
T OUT	o	o	o	o	o	o

4. The diagram above shows the correct way for connecting cables for Systems 1 and 2 on the video patch. Which of the diagrams on the next page shows the correct way to connect the cables for System 1 only?
- Diagram 1
  - Diagram 2
  - Diagram 3
  - Diagram 4

VIDEO PATCH						
	System 1			System 2		
	A	B	C	A	B	C
P OUT	o	o	o	●	●	o
P IN	o	o	o	o	●	●
T OUT	o	o	o	o	o	o

Diagram 1

VIDEO PATCH						
	System 1			System 2		
	A	B	C	A	B	C
P OUT	o	●	o	o	o	o
P IN	●	●	o	o	o	o
T OUT	●	o	o	o	o	o

Diagram 2

VIDEO PATCH						
	System 1			System 2		
	A	B	C	A	B	C
P OUT	o	o	o	o	●	●
P IN	●	●	o	o	●	●
T OUT	●	o	o	o	o	o

Diagram 3

VIDEO PATCH						
	System 1			System 2		
	A	B	C	A	B	C
P OUT	o	●	o	o	o	o
P IN	●	●	o	o	o	o
T OUT	●	o	o	o	o	o

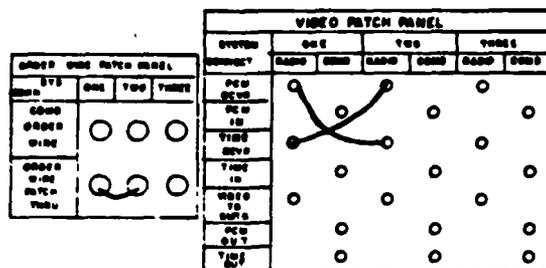
Diagram 4

VIDEO PATCH						
	System 1			System 2		
	X	Y	Z	X	Y	Z
I	o	o	o	o	●	●
II	o	o	●	●	●	o
III	o	●	o	o	o	o
IV	o	o	o	o	o	o
V	o	o	●	o	o	o

5. Which of the following statements is not true about the above video patch diagram?
- For System 1, Y-III is connected to Z-IV.
  - System 1 is connected to System 2.
  - For System 2, Y-I is connected to Z-II.
  - For System 2, Y-II is connected to Z-I.

Unit VII, Lesson 2  
Checkpoint 1, Form B

Below is a diagram which shows typical cable connections for a radio. System 1 and 2 cable connections are shown as examples. This diagram does not show all possible system cable connections.



6. Which of the following diagrams shows the correct cable connections if you were to connect System 1 and System 3? Use the above diagram as a guide.

- a. Diagram 1
- b. Diagram 2
- c. Diagram 3
- d. Diagram 4

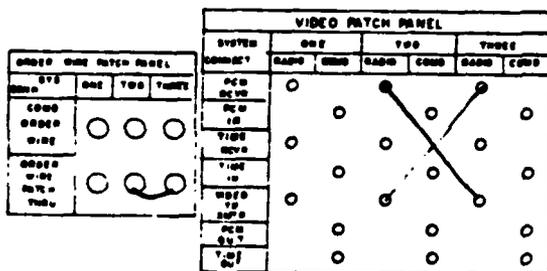


Diagram 1

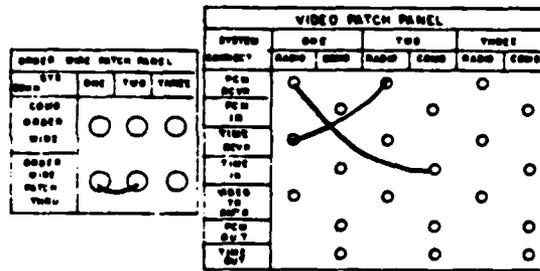


Diagram 2

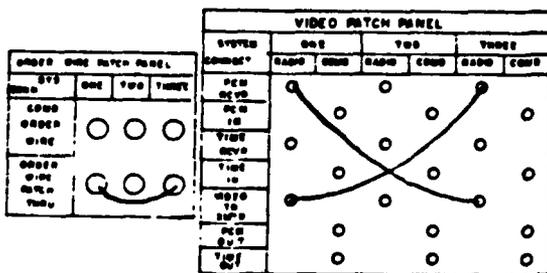


Diagram 3

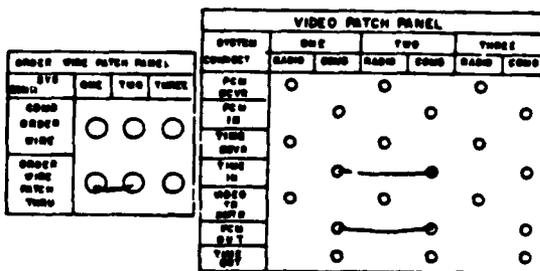
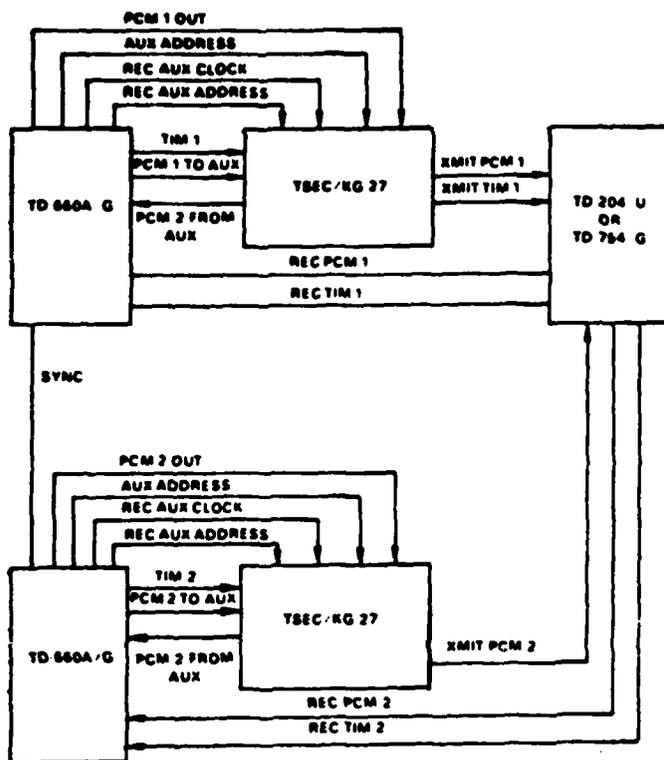


Diagram 4

Unit VII, Lesson 2  
Checkpoint 1, Form B

VIDEO PATCH						
	System 1		System 2		System 3	
	A	B	A	B	A	B
I	o	o	o	o	o	o
II	o	o	o	o	o	o
III	o	o	o	o	o	o
IV	o	o	o	o	o	o

7. In the above video patch diagram, which system(s) is not being used?
- a. System 1
  - b. System 2
  - c. System 3
  - d. Systems 1 and 2



On the left is a different kind of cabling diagram. It is called a block diagram. The labels in the boxes identify the components. The solid dark lines are the cables. The labels directly above or below the lines identify the connectors.

8. In the block diagram above, TD-204/U - REC PCM 2 is connected to:
- a. TD-660A/G
  - b. TD-754/G
  - c. XMIT PCM 1
  - d. TSEC/KG-27

VIDEO PATCH									
	System 1			System 2			System 3		
	X	Y	Z	X	Y	Z	X	Y	Z
P OUT	o	o	o	o	o	o	o	o	o
P IN	o	o	o	o	o	o	o	o	o
T IN	o	o	o	o	o	o	o	o	o
T OUT	o	o	o	o	o	o	o	o	o

9. Which statement is true concerning the video patch above?

- a. For System 1, X - P IN is connected to Z - T IN.
- b. For System 2, X - T OUT is connected to Z - P IN.
- c. For System 2, X - P IN is connected to Z - T IN.
- d. For System 3, X - T IN is connected to Z - P OUT.

VIDEO PATCH									
	System 1		System 2		System 3		System 4		
	A	B	A	B	A	B	A	B	
P OUT	o	o	o	o	o	o	o	o	
P IN	o	o	o	o	o	o	o	o	
T IN	o	o	o	o	o	o	o	o	
T OUT	o	o	o	o	o	o	o	o	
S IN	o	o	o	o	o	o	o	o	

10. Which of the following statements is true concerning the above video patch diagram?

- a. A - P OUT for System 1 is connected to A - T IN for System 3.
- b. B - P OUT for System 2 is connected to A - P IN for System 4.
- c. A - P IN for System 3 is connected to B - P IN for System 4.
- d. B - P OUT for System 2 is connected to B - P IN for System 4.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VIII - LESSON 1

Checkpoint 1, Form A

Here is part of a troubleshooting checklist. Use it to answer the questions on the next page.

<u>Step</u>	<u>Action</u>	<u>Normal Indication</u>
1	Tune AFC LEVEL control for peak indication on multimeter.	Multimeter indicates 10 or more.
2	Rotate AFC correction control.	AFC meter needle moves back toward center and stops near center.
3	Press push-to-talk button on Handset H-156/U.	Side tone is heard in H-156/U receiver.
4	Adjust REC SIG-1 for maximum indication on receiver multimeter.	Multimeter indicates peak or off scale.
5	Detune REC SIG-1 control for minimum indication on multimeter.	Multimeter indicates minimum level.
6	Operate RING switch and listen on handset.	1,600-cps ringing tone should be heard.
7	Set AC POWER circuit breaker to ON.	Blower motor operates.
8	Adjust AFC CORRECTION through its range.	AFC CORRECTION control is not over 10° from midrange.
9	Readjust AMP control and rotate COUPLING control.	DA-189/U meter indicates more than 12 watts.
10	Set multimeter selector switch to PWR OUT.	Multimeter indication is 20 or more.

Unit VIII, Lesson 1  
Checkpoint 1, Form A

1

Questions:

1. You do Action No. 1. The multimeter reading on your equipment is 9. Does this mean that there is something wrong?

\_\_\_\_\_

2. You do Action No. 2. The AFC meter needle moves from  to  and stays there. Is something wrong?

\_\_\_\_\_

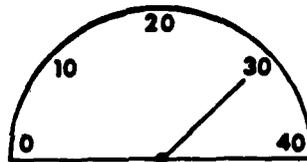
3. You do Action No. 3. You hear a side tone in the H/156/U receiver. Is something wrong?

\_\_\_\_\_

4. You do Action No. 4. The multimeter needle goes off the scale. Is something wrong?

\_\_\_\_\_

5. You do Action No. 5. Here is what the multimeter looks like:



Is something wrong?

\_\_\_\_\_

6. You do Action No. 6. You hear a faint buzz, but it is not a ringing tone. Is something wrong?

\_\_\_\_\_

7. You do Action No. 7. You hear the blower motor go on. Is something wrong?

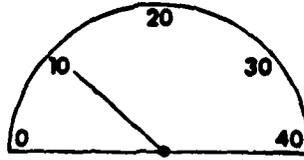
\_\_\_\_\_

8. You do Action No. 8. The AFC CORRECTION control is about 30° from midrange. Is something wrong?

\_\_\_\_\_

9. You do Action No. 9. The DA-189/GRC meter reads 15 watts. Is something wrong? \_\_\_\_\_

10. You do Action No. 10. The multimeter looks like this:



Is something wrong? \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VIII - LESSON 1

Checkpoint 1, Form B

Here is part of a troubleshooting checklist. Use it to answer the questions on the next page.

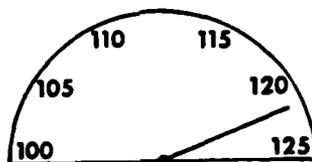
<u>Step</u>	<u>Action</u>	<u>Normal Indication</u>
1	Set POWER circuit breaker to ON.	POWER ON indicator lights.
2	Set MANUAL RAISE-LOWER switch to RAISE then LOWER.	Meter indicates raise in voltage, then decrease in voltage.
3	Set MANUAL-AUTOMATIC switch to AUTOMATIC.	Meter indicates 115 volts.
4	Rotate coupling control to obtain higher DA-189/GRC meter indication.	DA-189/GRC meter indicates more than 8 watts.
5	Set multimeter selector switch to 1 KC MOD.	Multimeter indicates in green area of meter scale.
6	Operate RING switch and listen on handset.	1,600-cps ringing tone should be heard.
7	Set AC POWER circuit breaker to ON.	blower motor operates.
8	Adjust AFC CORRECTION through its range.	AFC CORRECTION control is not over 10° from midrange.
9	Readjust AMP control and rotate COUPLING control.	DA-189/U meter indicates more than 12 watts.
10	Set multimeter selector switch to PWR OUT.	Multimeter indication is 20 or more.

Unit VIII, Lesson 1  
Checkpoint 1, Form B

1

Questions:

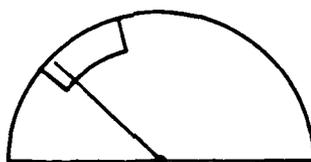
1. You do Action No. 1. The POWER ON indicator stays unlit. Is something wrong? \_\_\_\_\_
2. You do Action No. 2. The meter goes from 30 to 50, then back to 30. Is something wrong? \_\_\_\_\_
3. You Do Action No. 3. Here is how the meter looks.



Is something wrong? \_\_\_\_\_

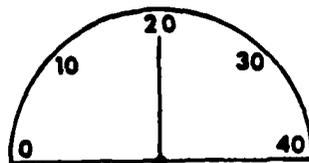
4. You do Action No. 4. The DA-189/GRC meter reads 5 watts. Is something wrong? \_\_\_\_\_

5. You do Action No. 5. Here is how the multimeter looks.



Is something wrong? \_\_\_\_\_

6. You do Action No. 6. There is no sound on the handset. Is something wrong? \_\_\_\_\_
7. You do Action No. 7. The blower motor does not go on. Is something wrong? \_\_\_\_\_
8. You do Action No. 8. The AFC CORRECTION control is about 5° from midrange. Is something wrong? \_\_\_\_\_
9. You do Action No. 9. The DA-189/GRC meter indicates 15 watts Is something wrong? \_\_\_\_\_
10. You do Action No. 10. Here is how the multimeter looks. \_\_\_\_\_



Is something wrong? \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VIII - LESSON 2

Checkpoint 1, Form A

Here is part of a troubleshooting checklist. Use it to answer the questions below.

<u>Step</u>	<u>Action</u>	<u>Normal Indication</u>
1	Set AC POWER circuit breaker to ON. Allow equipment to warm up for 5 minutes.	Blower motor operates. FIL indicator lights.
2	Set multimeter switch to AMP. Adjust AFC CORRECTION through its range for peak indication.	Indication on multimeter is more than 10. AFC CORRECTION control is not over 10° from midrange.
3	Set multimeter selector switch to PWR OUT.	Multimeter indication should be no less than 20. LOW POWER indicator should be extinguished.
4	Rotate AFC CORRECTION control 30° to the right from its original setting.	AFC meter indication moves off center then slowly returns to center. AFC CORRECTION control returns to original setting.

Use the checklist above to answer the following questions.

1. You do Action No. 1. The blower motor goes on, and the FIL indicator lights. Is something wrong? \_\_\_\_\_
2. You do Action No. 1. The blower motor goes on. The FIL indicator does not light. Is something wrong? \_\_\_\_\_

Unit VIII, Lesson 2  
Checkpoint 1, Form A

1

3. You do Action No. 2. The multimeter shows a reading of 20. The AFC CORRECTION control is about 15° from midrange. Is something wrong? \_\_\_\_\_
4. You do Action No. 2. The multimeter reading is 5. The AFC CORRECTION control is far to the left of midrange. Is something wrong? \_\_\_\_\_
5. You do Action No. 2. The multimeter reading is 9. The AFC CORRECTION control is at midrange. Is something wrong? \_\_\_\_\_
6. You do Action No. 3. The multimeter indication is 25. The LOW POWER indicator goes out. Is something wrong? \_\_\_\_\_
7. You do Action No. 3. The multimeter indication is 15. The LOW POWER indicator goes out. Is something wrong? \_\_\_\_\_
8. You do Action No. 3. The multimeter indication is 15. The LOW POWER indicator is lit. Is something wrong? \_\_\_\_\_
9. Before you do Action No. 4, the AFC CORRECTION control is at midrange. Now you do Action No. 4. The AFC meter needle moves to the right then back to the center. The AFC CORRECTION control returns to midrange. Is something wrong? \_\_\_\_\_
10. Before you do Action No. 4, The AFC CORRECTION control is at midrange. Now you do Action No. 4. The AFC meter needle moves to the right and stays there. The AFC CORRECTION control returns to midrange. Is something wrong? \_\_\_\_\_

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AND TELL YOU WHAT TO DO NEXT.

Unit VIII, Lesson 2  
Checkpoint 1, Form A

2

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VIII - LESSON 2

Checkpoint 1, Form B

Here is part of a checklist for troubleshooting radio equipment. Do not try to read it now, but use it to answer the questions on the next page.

<u>Step</u>	<u>Action</u>	<u>Normal Indication</u>
1	Press BUZZER OFF switch.	POWER INDICATOR lights. Loud rushing noise is heard on handset.
2	Set AC POWER circuit breaker to ON.	Blower motor operates. Overhead fan starts. FIL indicator lights.
3	Set multimeter selector switch to PWR OUT. Set multimeter switch to AMP.	Multimeter indicates no more than 20. LOW POWER indicator goes out.
4	Adjust AFC CORRECTION through its range for peak indication.	Indication on multimeter is more than 10. AFC CORRECTION control is not over 10° from midrange.
5	Rotate AFC CORRECTION control 30° to the right from its midrange setting.	AFC meter indication moves off center then slowly returns to center. AFC CORRECTION control returns to midrange.

USE THE TABLE ON THE PREVIOUS PAGE TO ANSWER THE FOLLOWING QUESTIONS:

1. You do Action No. 1. The POWER INDICATOR lights. You hear a crackling sound on the handset. Is something wrong? \_\_\_\_\_
2. You do Action No. 1. The POWER INDICATOR remains off. There is no sound on the handset. Is something wrong? \_\_\_\_\_
3. You do Action No. 2. The blower motor operates. The overhead fan does not move. The FIL indicator lights. Is something wrong? \_\_\_\_\_
4. You do Action No. 2. The blower motor and the overhead fan start running. The FIL indicator lights. Is something wrong? \_\_\_\_\_
5. You do Action No. 3. The multimeter registers 18. The LOW POWER indicator stays on. Is something wrong? \_\_\_\_\_
6. You do Action No. 3. The multimeter registers 25. The LOW POWER indicator goes out. Is something wrong? \_\_\_\_\_
7. You do Action No. 4. There is no indication on the multimeter. The AFC CORRECTION control is about 40° from midrange. Is something wrong? \_\_\_\_\_
8. You do Action No. 4. The multimeter indicates 20. The AFC CORRECTION control is about 5° from midrange. Is something wrong? \_\_\_\_\_
9. You do Action No. 5. The AFC meter needle moves to the right then returns to the center. The AFC CORRECTION control goes back to midrange. Is something wrong? \_\_\_\_\_
10. You do Action No. 5. The AFC meter needle moves to the right then returns to the center. The AFC CORRECTION control remains in a setting 30° to the right of midrange. Is something wrong? \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VIII - LESSON 3

Checkpoint 1, Form A

Each question below tells you something that happened while operating equipment. Look in the table on the following pages for the symptom description that matches what happened on the equipment, and write its Item No. in the space provided.

- |  | <u>Item No.</u> |
|--|-----------------|
| 1. You are operating a TD-660(*)/G. You set selector switch III at OSC. The TEST ALIGN meter indicates outside the green area.                           | _____           |
| 2. You are operating a T-983(P)/GRC-103(V). You set the meter selector switch at 12 VDC. The meter reads below normal.                                   | _____           |
| 3. You are operating a TD-660(*)/G. You set selector switch I at SW II and selector switch II at A. The TEST ALIGN meter registers zero.                 | _____           |
| 4. You are operating an R-1329(P)/GRC-103(V). You set the meter selector switch at DOUBLER. The meter reading is below normal.                           | _____           |
| 5. You are operating a TD-660(*)/G. You set the POWER switch at ON, but the indicator lamp does not go on.   | _____           |
| 6. You are operating a TD-204/U. You set the METER SELECT switch at SERV FAC and the SERV SEL switch at D. The TEST ALIGN meter indication is incorrect. | _____           |
| 7. You are operating a TD-660(*)/G. You set selector switch I at NOISE GEN. The TEST ALIGN meter needle is not in the yellow.                            | _____           |
| 8. You are operating an R-1329(P)/GRC-103(V). You set the meter selector switch at MULT. The meter reading is below normal.                              | _____           |

Item No.

9. You are operating a TD-204/U. You set the METER SELECT switch at SERV FAC and the SERV SEL switch at -10. The TEST ALIGN meter gives an incorrect indication. \_\_\_\_\_
10. You are operating an R-1329(P)/GRC-103(V). You set the meter selector switch to OSC. The meter reading is below normal. \_\_\_\_\_

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Unit VIII, Lesson 3  
Checkpoint 1, Form A

2

List of Symptoms from a Troubleshooting Table.

<u>Item No.</u>	<u>Malfunction (Symptom)</u>
1	Incorrect indication on TD-204/U TEST ALIGN meter with METER SELECT switch at SERV FAC and SERV SEL switch at: a. -10. b. +10 c. SUM + 3. d. BAL.
2	Incorrect indication on TD-204/U TEST ALIGN meter with METER SELECT switch at SERV FAC and SERV SEL switch at: a. A b. B c. C d. D e. E
3	T-983(P)/GRC-103(V) OVERHEAT indicator lights when AC POWER switch is operated to ON/RESET.
4	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at 12 VDC or 28 VDC.
5	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at PWR OUT.
6	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at OSC.
7	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at DOUBLER.

(continued on the next page)

<u>Item No.</u>	<u>Malfuction (Symptom)</u>
8	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at MULT.
9	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at RCVR SIG.
10	TD-660(*)/G indicator lamp does not light when POWER switch is operated to ON.
11	Incorrect indication on TD-660(*)/G TEST ALIGN meter with selector switch I at; <ul style="list-style-type: none"> <li>a. +12</li> <li>b. +4</li> <li>c. -12</li> <li>d. -6</li> <li>e. -4</li> </ul>
12	TEST ALIGN meter fails to indicate yellow when selector switch I is at +7 on TD-660(*)/G.
13	TEST ALIGN meter fails to indicate yellow when selector switch I of TD-660(*)/G is at NOISE GEN.
14	TEST ALIGN meter of TD-660(*)/G fails to indicate green with selector switch I at SW II and selector switch II at: <ul style="list-style-type: none"> <li>a. A</li> <li>b. B</li> <li>c. C</li> <li>d. D</li> </ul>
15	TEST ALIGN meter of TD-660(*)/G does not indicate in green area with selector switch III at OSC.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VIII - LESSON 3

Checkpoint 1, Form B

Each question below tells about a symptom that occurred while operating equipment. Find the symptom description that matches the symptom, using the table on the two pages following the questions. Then write its Item No. in the space provided.

- |  | <u>Item No.</u> |
|--|-----------------|
| 1. You are operating a TD-660(*)/G. You set selector switch I at -6. The TEST ALIGN meter indicates incorrectly.   | _____           |
| 2. You are operating a TD-204/U. You set the METER SELECT switch at SERV FAC and the SERV SEL switch at +10. The TEST ALIGN meter shows an incorrect indication. | _____           |
| 3. You are operating a TD-660(*). You set selector switch I at SW II and selector switch II at D. The needle on the TEST ALIGN meter is out of the green area.   | _____           |
| 4. You are operating a T-983(P)/GRC-103(V). You set the meter selector switch at PWR OUT. The meter reading is below normal.                                     | _____           |
| 5. You are operating a TD-660(*)/G. You set selector switch I to NOISE GEN. The TEST ALIGN meter indication is not in the yellow.                                | _____           |
| 6. You are operating an R-1329(P)/GRC-103(V). You set the meter selector switch to RCVR SIG. The meter indicates below normal.                                   | _____           |
| 7. You are operating a T-983(P)/GRC-103(V). You set the AC POWER switch to ON/RESET. The OVERHEAT indicator lights.  | _____           |
| 8. You are operating a TD-660(*)/G. You set selector switch I at +4. The TEST ALIGN meter shows an incorrect indication.   | _____           |

9. You are operating a T-983(P)/GRC-103(V). You set the meter selector switch at 28 VDC. The meter reading is below normal. \_\_\_\_\_
10. You are operating a TD-660(\*)/G. You set selector switch I to +7. the TEST ALIGN meter needle is not in the yellow area. \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

List of Symptoms from a Troubleshooting Table.

<u>Item No.</u>	<u>Malfunction (Symptom)</u>
1	Incorrect indication on TD-204/U TEST ALIGN meter with METER SELECT switch at SERV FAC and SERV SEL switch at: a. -10. b. +10 c. SUM + 3. d. BAL.
2	Incorrect indication on TD-204/U TEST ALIGN meter with METER SELECT switch at SERV FAC and SERV SEL switch at: a. A b. B c. C d. D e. E
3	T-983(P)/GRC-103(V) OVERHEAT in- dicator lights when AC POWER switch is operated to ON/RESET.
4	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at 12 VDC or 28 VDC.
5	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at PWR OUT.
6	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at OSC.
7	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at DOUBLER.

(continued on the next page)

<u>Item No.</u>	<u>Malfunction (Symptom)</u>
8	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at MULT.
9	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at RCVR SIG.
10	TD-660(*)/G indicator lamp does not light when POWER switch is operated to ON.
11	Incorrect indication on TD-660(*)/G TEST ALIGN meter with selector switch I at; <ul style="list-style-type: none"> <li>a. +12</li> <li>b. +4</li> <li>c. -12</li> <li>d. -6</li> <li>e. -4</li> </ul>
12	TEST ALIGN meter fails to indicate yellow when selector switch I is at +7 on TD-660(*)/G.
13	TEST ALIGN meter fails to indicate yellow when selector switch I of TD-660(*)/G is at NOISE GEN.
14	TEST ALIGN meter of TD-660(*)/G fails to indicate green with selector switch I at SW II and selector switch II at: <ul style="list-style-type: none"> <li>a. A</li> <li>b. B</li> <li>c. C</li> <li>d. D</li> </ul>
15	TEST ALIGN meter of TD-660(*)/G does not indicate in green area with selector switch III at OSC.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VIII - LESSON 4

Checkpoint 1, Form A

Each of the ten questions below describes an equipment symptom. On the following two pages, you will find a list of symptoms from a trouble-shooting table. Read each question. Then find the matching symptom description in the table, and write its Item No. in the space provided.

Item No.

1. You are operating a T-983(P)/GRC-103(V). You set the AC POWER switch to ON/RESET. The AC POWER indicator lights. The LOW POWER indicator lights. The buzzer sounds. The blower does not go on. \_\_\_\_\_
  
2. You are checking out an RT-773/GRC-103(V). An order wire signal is coming in. The buzzer sounds, but the CALL indicator does not light. \_\_\_\_\_
  
3. You are working with a medium capacity system including a TD-352/U, TD-202/U, and AN/GRC-50A(V). You set the METER SELECT switch of the TD-202/U at FROM RADIO RCVR. The TD-202/U TEST ALIGN meter does not indicate in the green area, and the ALARMS TRAFFIC indicator lights. The TD-352/U ALARMS FRAME indicator also lights, and the buzzer sounds. The AN/GRC-50A(V) and order wire are operating normally. \_\_\_\_\_
  
4. You are operating a T-983(P)/GRC-103(V). You set the AC POWER switch to ON/RESET. The AC POWER indicator does not light, but the LOW POWER indicator lights, the buzzer sounds, and the blower goes on. \_\_\_\_\_
  
5. You are operating an R-1329(P)/GRC-103(V). You set the AC POWER switch to ON. The AC POWER indicator does not light. The LOW SIGNAL indicator does not light. The buzzer does not sound. \_\_\_\_\_

Item No.

6. You are operating an R-1329(P)/GRC-103(V). You set the AC POWER switch to ON. The LOW SIGNAL indicator does not light, but the AC POWER indicator lights and the buzzer sounds. \_\_\_\_\_
  
7. You are operating an R-1329(P)/GRC-103(V). You set the AC POWER switch to ON. The POWER indicator on the RT-773/GRC-103(V) does not light, but all other indications are normal. \_\_\_\_\_
  
8. You are operating a T-983(P)/GRC-103(V). You set the AC POWER switch to ON/RESET and the meter selector switch to 600 VDC. The LOW POWER indicator stays on, and the meter indicates below normal. \_\_\_\_\_
  
9. You are operating an R-1329(P)/GRC-103(V). You set the AC POWER switch to ON. The AC POWER indicator does not light, but the LOW SIGNAL indicator lights and the buzzer sounds. \_\_\_\_\_
  
10. You are operating an R-1329(P)/GRC-103(V). You set the AC POWER switch to ON. The buzzer does not sound, but both the AC POWER and the LOW SIGNAL indicators light. \_\_\_\_\_

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Unit VIII, Lesson 4  
Checkpoint 1, Form A

2

List of Symptom Descriptions from a Troubleshooting Table

<u>Item No.</u>	<u>Symptom</u>
1	T-983(P)/GRC-103(V) LOW POWER indicator does not extinguish within 60 seconds after AC POWER switch is operated to ON/RESET and meter indication is below normal with meter selector switch at 600 VDC.
2	T-983(P)/GRC-103(V) AC POWER and LOW POWER indicators do not light, buzzer is silent, and blower does not operate when AC POWER switch is operated to ON/RESET.
3	T-983(P)/GRC-103(V) AC POWER and LOW POWER indicators light, buzzer sounds, but blower does not operate when AC POWER switch is operated to ON/RESET.
4	T-983(P)/GRC-103(V) LOW POWER indicator lights, buzzer sounds, and blower operates, but AC POWER indicator does not light when AC POWER switch is operated to ON/RESET.
5	R-1329(P)/GRC-103(V) AC POWER and LOW SIGNAL indicators do not light, and buzzer is silent when AC POWER switch is operated to ON.
6	R-1329(P)/GRC-103(V) LOW SIGNAL indicator lights and buzzer sounds but AC POWER indicator does not light when AC POWER switch is operated to ON.
7	R-1329(P)/GRC-103(V) AC POWER indicator lights and buzzer sounds but LOW SIGNAL indicator does not light when AC POWER switch is operated to ON.
8	R-1329(P)/GRC-103(V) AC POWER and LOW SIGNAL indicators light but buzzer does not sound when AC POWER switch is operated to ON.
9	RT-773/GRC-103(V) POWER indicator does not light when R-1329(P)/GRC-103(V) AC POWER switch is operated to ON and there is no order wire communications.

(continued on the next page)

<u>Item No.</u>	<u>Symptom</u>
10	RT-773/GRC-103(V) POWER indicator does not light when R-1329(P)/GRC-103(V) AC POWER switch is operated to ON. All other indications are normal.
11	RT-773/GRC-103(V) CALL indicator does not light when order wire signal is received, but buzzer sounds.
12	RT-773/GRC-103(V) CALL indicator lights, but buzzer does not sound when order wire signal is received.
13	ALARMS FRAME indicator of TD-352/U lights, buzzer sounds, and TEST ALIGN meter indicates in green area with METER SELECT switch at PCM IN and TIMING IN.
14	ALARMS FRAME indicator of TD-352/U lights, buzzer sounds, and TEST ALIGN meter does not indicate in green area with METER SELECT switch at PCM IN and/or TIMING IN. TD-202/U and AN/GRC-50A(V) indicate normally.
15	ALARMS FRAME indicator of TD-352/U and ALARMS TRAFFIC indicator of TD-202/U light, buzzer sounds, TEST ALIGN meter of TD-202/U does not indicate in green area with METER SELECT switch at FROM RADIO RCVR. AN/GRC-50A(V) operates normally, order wire normal.
16	ALARMS FRAME indicator of TD-352/U and ALARMS TRAFFIC indicator of TD-202/U light and TEST METER does not indicate in green area with METER SELECT switch at FROM RADIO RCVR, all indications on AN/GRC-50A(V) are normal except for noisy or no order wire.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VIII - LESSON 4

Checkpoint 1, Form B

Each of the ten questions below describes an equipment symptom. Read each question. Then go to the table following the questions and find the symptom description which matches the equipment symptom. Write its Item No. in the space provided.

- |  | <u>Item No.</u> |
|--|-----------------|
| 1. You are operating a T-983(P)/GRC-103(V). You set the AC POWER switch to ON/RESET. The AC POWER indicator lights. The LOW POWER indicator lights. The buzzer sounds. The blower does not go on.  | _____           |
| 2. You are operating an R-1329(P)/GRC-103(V). You set the AC POWER switch to ON. The indicators on the R-1329 are normal, but the RT-773/GRC-103(V) POWER indicator does not light.  | _____           |
| 3. You are operating an R-1329(P)/GRC-103(V). You set the AC POWER switch to ON. The AC POWER indicator lights and the buzzer sounds, but the LOW SIGNAL indicator does not light.   | _____           |
| 4. You are operating a T-983(P)/GRC-103(V). You set the meter selector switch at DRIVER. The meter reading is normal. Next, you set the meter selector switch at PWR OUT. The meter indicates below normal. You set the meter selector switch of the R-1329(P)/GRC-103(V) at XMTR DUPL. The R-1329 meter indicates below normal. | _____           |
| 5. You receive an order wire signal. The buzzer sounds, but the CALL indicator on the RT-773/GRC-103(V) does not light.  | _____           |

6. You are operating a T-983(P)/GRC-103(V). You set the meter selector switch at REFL PWR. The meter reading is above normal. You set the meter selector switch of the R-1329(P)/GRC-103(V) at REFL PWR. The R-1329 meter also indicates above normal. \_\_\_\_\_
  
7. You are operating an R-1329(P)/GRC-103(V). You set the AC POWER switch to ON. The AC POWER indicator does not light. The LOW SIGNAL indicator does not light. The buzzer does not sound. \_\_\_\_\_
  
8. You are operating a T-983(P)/GRC-103(V). You set the AC POWER switch to ON/RESET and the meter selector switch to 600 VDC. The LOW POWER indicator goes on and stays on. The meter indication is below normal. \_\_\_\_\_
  
9. You are operating a T-983(P)/GRC-103(V). You set the meter selector switch at DRIVER. The meter indication is normal. You set the meter selector switch at PWR OUT. The meter reads below normal. You set the meter selector switch of the R-1329(P)/GRC-103(V) at XMTR DUPL. The R-1329 meter indication is normal. \_\_\_\_\_
  
10. You are operating a T-983(P)/GRC-103(V). You set the AC POWER switch to ON/RESET. The AC POWER indicator does not light. The LOW POWER indicator does not light. The buzzer does not sound. \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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AND TELL YOU WHAT TO DO NEXT.

List of Symptom Descriptions from a Troubleshooting Table

<u>Item No.</u>	<u>Symptom</u>
1	T-983(P)/GRC-103(V) LOW POWER indicator does not extinguish within 60 seconds after AC POWER switch is operated to ON/RESET and meter indication is below normal with meter selector switch at 600 VDC.
2	T-983(P)/GRC-103(V) AC POWER and LOW POWER indicators do not light, buzzer is silent, and blower does not operate when AC POWER switch is operated to ON/RESET.
3	T-983(P)/GRC-103(V) AC POWER and LOW POWER indicators light, buzzer sounds, but blower does not operate when AC POWER switch is operated to ON/RESET.
4	T-983(P)/GRC-103(V) LOW POWER indicator lights, buzzer sounds, and blower operates, but AC POWER indicator does not light when AC POWER switch is operated to ON/RESET.
5	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at PWR OUT. Normal indication in DRIVER position, but R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at XMTR DUPL.
6	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at PWR OUT. Normal indication in DRIVER position, and R-1329(P)/GRC-103(V) meter indicates normal with meter selector switch at XMTR DUPL.
7	T-983(P)/GRC-103(V) LOW POWER indicator does not extinguish, but meter indication is normal with meter selector switch at PWR OUT.
8	T-983(P)/GRC-103(V) meter indicates above normal with meter selector switch at REFL PWR. R-1329(P)/GRC-103(V) meter indicates above normal with meter selector switch at REFL PWR.

(continued on the next page)

<u>Item No.</u>	<u>Symptom</u>
9	R-1329(P)/GRC-103(V) AC POWER and LOW SIGNAL indicators do not light, and buzzer is silent when AC POWER switch is operated to ON.
10	R-1329(P)/GRC-103(V) LOW SIGNAL indicator lights and buzzer sounds but AC POWER indicator does not light when AC POWER switch is operated to ON.
11	R-1329(P)/GRC-103(V) AC POWER indicator lights and buzzer sounds but LOW SIGNAL indicator does not light when AC POWER switch is operated to ON.
12	R-1329(P)/GRC-103(V) AC POWER and LOW SIGNAL indicators light but buzzer does not sound when AC POWER switch is operated to ON.
13	RT-773/GRC-103(V) POWER indicator does not light when R-1329(P)/GRC-103(V) AC POWER switch is operated to ON and there is no order wire communications.
14	RT-773/GRC-103(V) POWER indicator does not light when R-1329(P)/GRC-103(V) AC POWER switch is operated to ON. All other indications are normal.
15	RT-773/GRC-103(V) CALL indicator does not light when order wire signal is received, but buzzer sounds.
16	RT-773/GRC-103(V) CALL indicator lights, but buzzer does not sound when order wire signal is received.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IX - LESSON 1

Checkpoint 1, Form A

1. Write the number having:

- a. 1 in the tenths place
- b. 2 in the ones place
- c. 3 in the tens place
- d. 3 in the hundreds place

ANSWER: \_\_\_\_\_

2. Write the number having:

- a. 6 in the hundreds place
- b. 3 in the tens place
- c. 1 in the ones place
- d. 7 in the tenths place

ANSWER: \_\_\_\_\_

3. Write the number having:

- a. 2 in the ones place
- b. 7 in the hundreds place
- c. 5 in the tenths place
- d. 5 in the tens place

ANSWER: \_\_\_\_\_

4. Write the number having:

- a. 9 in the hundreds place
- b. 3 in the ones place
- c. 0 in the tens place
- d. 6 in the tenths place

ANSWER: \_\_\_\_\_

Unit IX, Lesson 1  
Checkpoint 1, Form A

5. Write the number having:
- a. 8 in the ones place
  - b. 7 in the hundreds place
  - c. 3 in the tens place
  - d. 9 in the tenths place

ANSWER: \_\_\_\_\_

6. Write the number having:
- a. 5 in the tenths place
  - b. 6 in the ones place
  - c. 2 in the tens place
  - d. 8 in the hundreds place

ANSWER: \_\_\_\_\_

7. Write the number having:
- a. 2 in the tenths place
  - b. 2 in the ones place
  - c. 2 in the tens place
  - d. 2 in the hundreds place

ANSWER: \_\_\_\_\_

8. Write the number having:
- a. 7 in the tens place
  - b. 0 in the ones place
  - c. 1 in the hundreds place
  - d. 6 in the tenths place

ANSWER: \_\_\_\_\_

Put the place value in the blank for the number below.

9. 3 0 3 . 0

|

ANSWER: \_\_\_\_\_

10. 2 1 6 . 7

|

ANSWER: \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKLIST,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IX - LESSON 1

Checkpoint 1, Form B

1. Write the number having:
- a. 6 in the hundreds place
  - b. 8 in the tens place
  - c. 9 in the ones place
  - d. 2 in the tenths place

ANSWER: \_\_\_\_\_

2. Write the number having:
- a. 7 in the tenths place
  - b. 2 in the ones place
  - c. 1 in the tens place
  - d. 9 in the hundreds place

ANSWER: \_\_\_\_\_

3. Write the number having:
- a. 3 in the ones place
  - b. 7 in the hundreds place
  - c. 5 in the tenths place
  - d. 6 in the tens place

ANSWER: \_\_\_\_\_

4. Write the number having:
- a. 0 in the ones place
  - b. 1 in the tens place
  - c. 2 in the tenths place
  - d. 3 in the hundreds place

ANSWER: \_\_\_\_\_

5. Write the number having:
- a. 5 in the hundreds place
  - b. 2 in the tens place
  - c. 1 in the ones place
  - d. 3 in the tenths place

ANSWER: \_\_\_\_\_

6. Write the number having:
- a. 6 in the tenths place
  - b. 8 in the ones place
  - c. 9 in the tens place
  - d. 5 in the hundreds place

ANSWER: \_\_\_\_\_

7. Write the number having:
- a. 4 in the tens place
  - b. 7 in the ones place
  - c. 4 in the tenths place
  - d. 2 in the hundreds place

ANSWER: \_\_\_\_\_

8. Write the number having:
- a. 3 in the hundreds place
  - b. 8 in the ones place
  - c. 7 in the tenths place
  - d. 1 in the tens place

ANSWER: \_\_\_\_\_

Put the place value in the blanks for the numbers below.

9. 4 9 0 . 3

|

ANSWER: \_\_\_\_\_

10. 1 2 0 . 3

|

ANSWER: \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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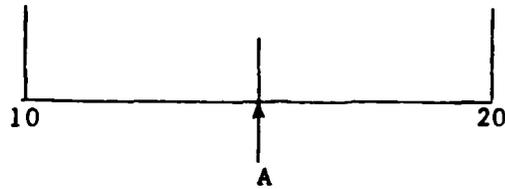
Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IX - LESSON 2

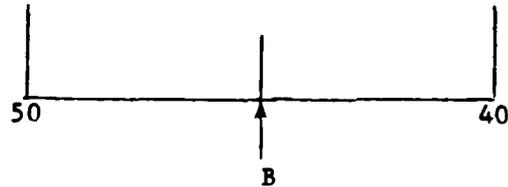
Checkpoint 1, Form A

1. What number does A stand for?



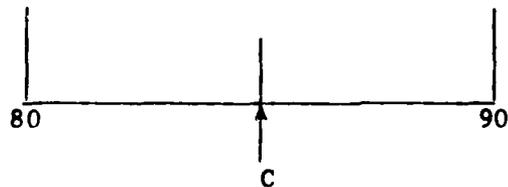
ANSWER: \_\_\_\_\_

2. What number does B stand for?



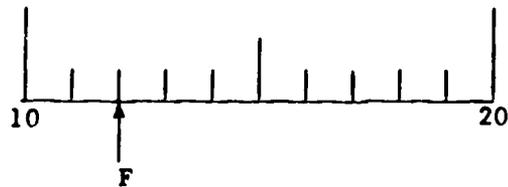
ANSWER: \_\_\_\_\_

3. What number does C stand for?



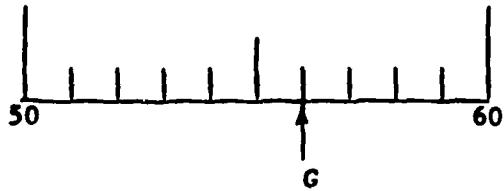
ANSWER: \_\_\_\_\_

4. What number does F stand for?



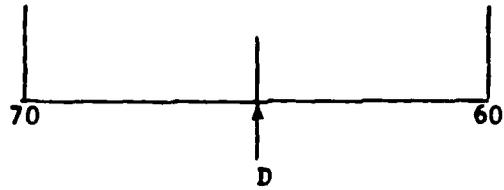
ANSWER: \_\_\_\_\_

5. What number does G stand for?



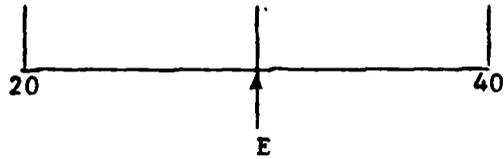
ANSWER: \_\_\_\_\_

6. What number does D stand for?



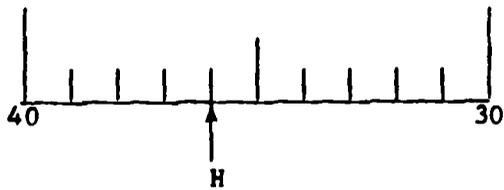
ANSWER: \_\_\_\_\_

7. What number does E stand for?



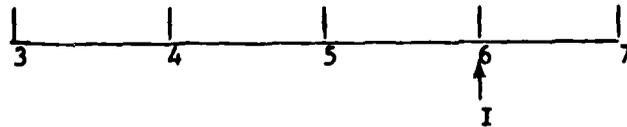
ANSWER: \_\_\_\_\_

8. What number does H stand for?



ANSWER: \_\_\_\_\_

9. The scale below is a hundreds scale.  
What number does the letter I stand for?

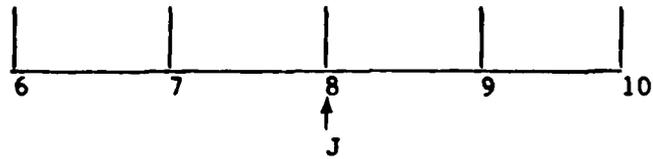


ANSWER: \_\_\_\_\_

Unit IX, Lesson 2  
Checkpoint 1, Form A

2

10. The scale below is a hundreds scale.  
What number does the letter J stand for?



ANSWER: \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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AND TELL YOU WHAT TO DO NEXT.

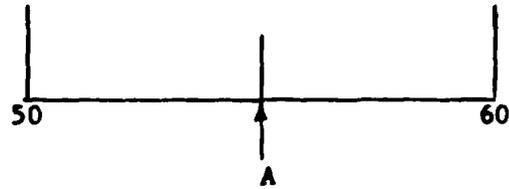
Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IX - LESSON 2

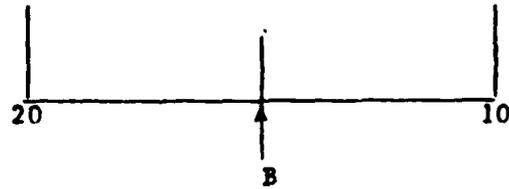
Checkpoint 1, Form B

1. What number does A stand for?



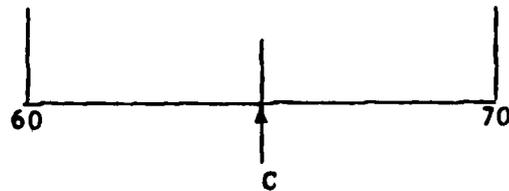
ANSWER: \_\_\_\_\_

2. What number does B stand for?



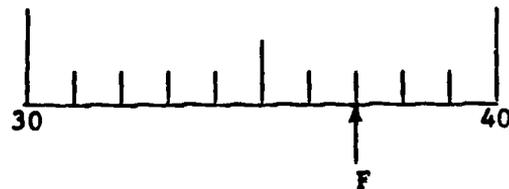
ANSWER: \_\_\_\_\_

3. What number does C stand for?



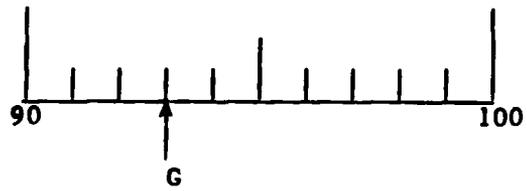
ANSWER: \_\_\_\_\_

4. What number does F stand for?



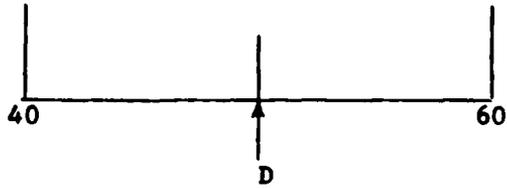
ANSWER: \_\_\_\_\_

5. What number does G stand for?



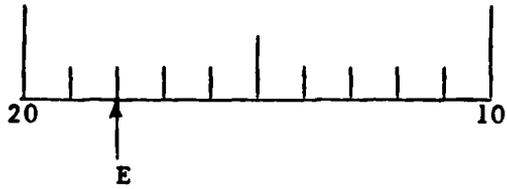
ANSWER: \_\_\_\_\_

6. What number does D stand for?



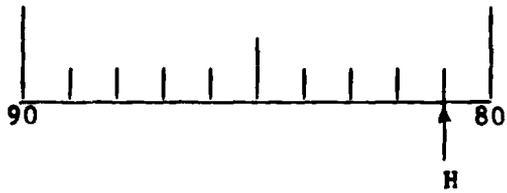
ANSWER: \_\_\_\_\_

7. What number does E stand for?



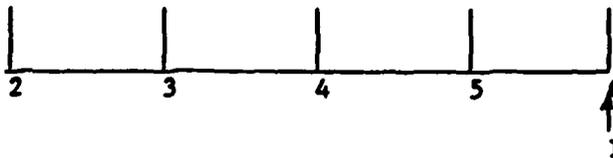
ANSWER: \_\_\_\_\_

8. What number does H stand for?



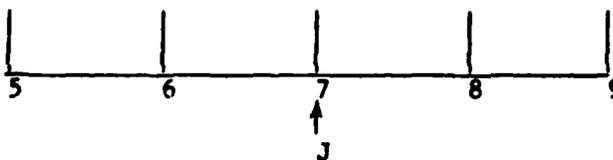
ANSWER: \_\_\_\_\_

9. The scale below is a hundreds scale? What does the letter I stand for?



ANSWER: \_\_\_\_\_

10. The scale below is a hundreds scale. What does the letter J stand for?



ANSWER: \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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Name \_\_\_\_\_

Date \_\_\_\_\_

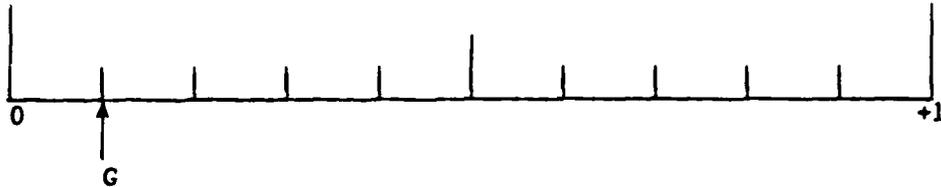
UNIT IX - LESSON 3

Checkpoint 1, Form A

Read the directions and answer the questions.

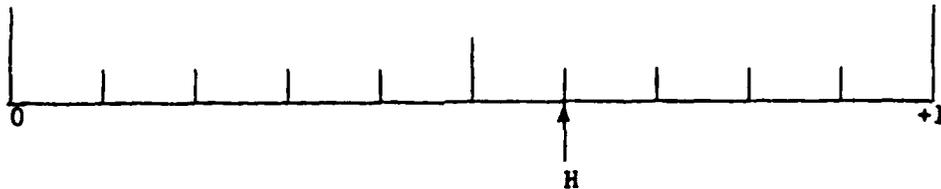
Put an "X" beside the best answer for the following questions:

1. What number does the letter G stand for?



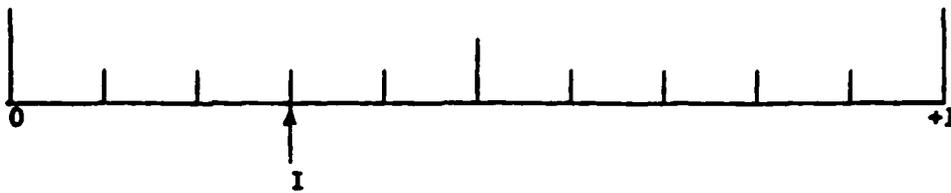
- \_\_\_\_\_ a. .01
- \_\_\_\_\_ b. 0.1
- \_\_\_\_\_ c. 0.9
- \_\_\_\_\_ d. one-ninth

2. What number does the letter H stand for?



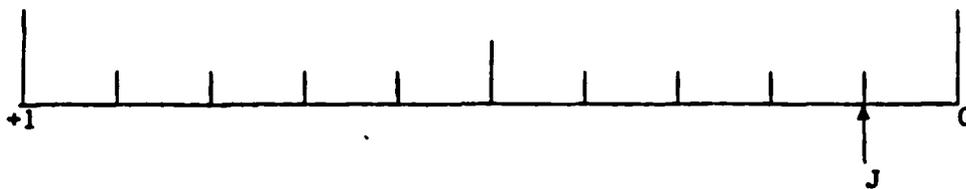
- \_\_\_\_\_ a. 0.6
- \_\_\_\_\_ b. 6.0
- \_\_\_\_\_ c. one-sixth
- \_\_\_\_\_ d. one-tenth

3. What number does the letter I stand for?



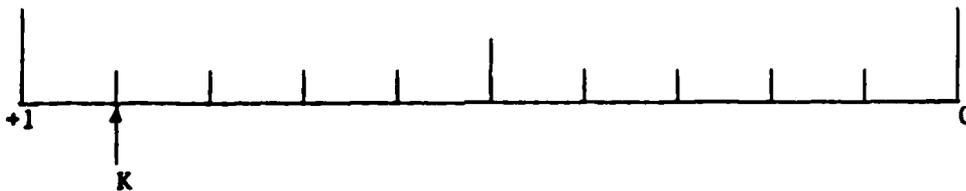
- a. 0.7
- b. 0.4
- c. .04
- d. 0.3

4. What number does the letter J stand for?



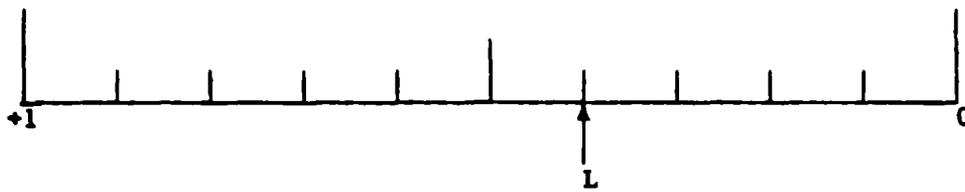
- a. 0.9
- b. .01
- c. one-tenth
- d. one-ninth

5. What number does the letter K stand for?



- a. 0.9
- b. .01
- c. one-tenth
- d. one-ninth

6. What number does the letter L stand for?



- \_\_\_\_\_ a. four-tenths
- \_\_\_\_\_ b. one-tenth
- \_\_\_\_\_ c. one-sixth
- \_\_\_\_\_ d. 0.6

Supply the answers for the following questions.

7. Nine-tenths means what number? ANSWER: \_\_\_\_\_
8. Five-tenths means what number? ANSWER: \_\_\_\_\_
9. Write the name for the number 0.3. ANSWER: \_\_\_\_\_
10. Write the name for the number 0.8. ANSWER: \_\_\_\_\_

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Date \_\_\_\_\_

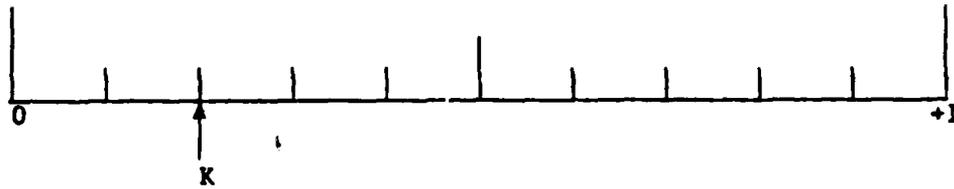
UNIT IX - LESSON 3

Checkpoint 1, Form B

Read the directions and answer the questions.

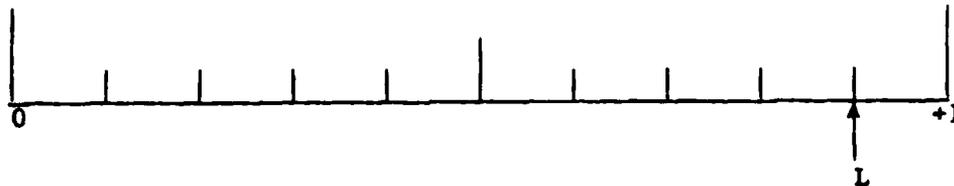
Put an "X" beside the best answer for the following questions:

1. What number does the letter K stand for?



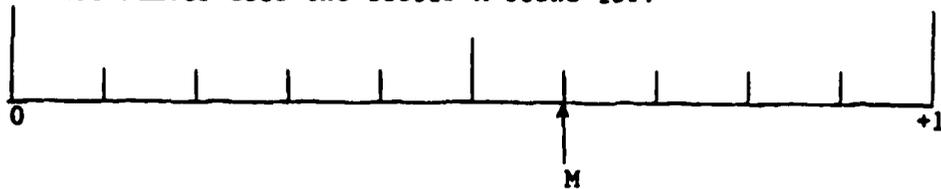
- \_\_\_\_\_ a. .02
- \_\_\_\_\_ b. 0.2
- \_\_\_\_\_ c. 0.8
- \_\_\_\_\_ d. .08

2. What number does the letter L stand for?



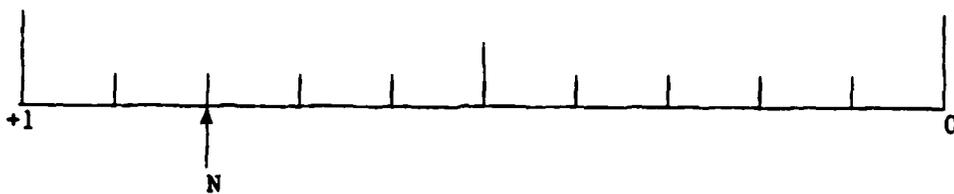
- \_\_\_\_\_ a. one-ninth
- \_\_\_\_\_ b. nine-tenths
- \_\_\_\_\_ c. one-tenth
- \_\_\_\_\_ d. .09

3. What number does the letter M stand for?



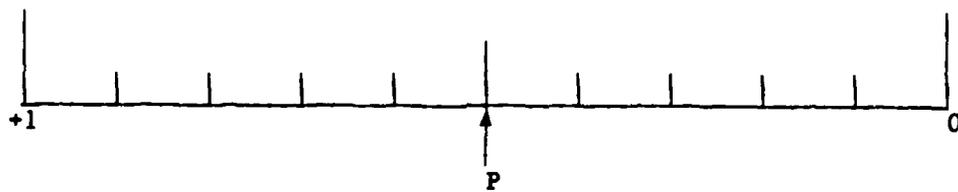
- a. one-tenth
- b. 0.4
- c. one-sixth
- d. 0.6

4. What number does the letter J stand for?



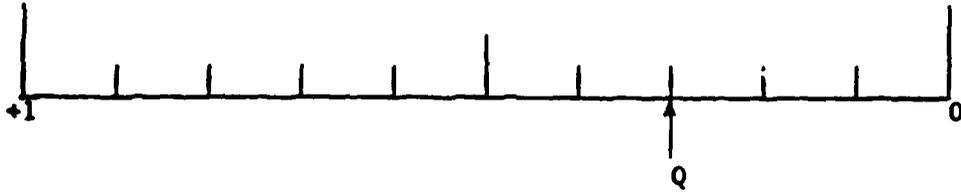
- a. 0.8
- b. 0.2
- c. 0.8
- d. 0.2

5. What number does the letter P stand for?



- a. one-fifth
- b. 5.0
- c. five-tenths
- d. .05

6. What number does the letter Q stand for?



- \_\_\_\_\_ a. 0.7
- \_\_\_\_\_ b. 0.4
- \_\_\_\_\_ c. one-third
- \_\_\_\_\_ d. 0.3

Supply the answers for the following questions.

- 7. Six-tenths means what number? ANSWER: \_\_\_\_\_
- 8. Seven-tenths means what number? ANSWER: \_\_\_\_\_
- 9. Write the name for the number 0.4. ANSWER: \_\_\_\_\_
- 10. Write the name for the number 0.2. ANSWER: \_\_\_\_\_

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Date \_\_\_\_\_

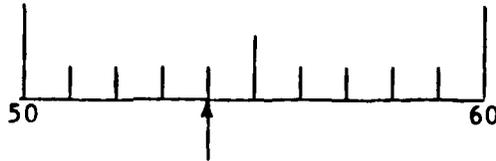
UNIT IX - LESSON 4

Checkpoint 1, Form A

Read the directions and answer the questions.

Look at the straight line scale. Note the reading on the scale.

Scale A.



1. On Scale A above, is the reading within two marks from the value of 59?

ANSWER: \_\_\_\_\_

2. On Scale A above, is the reading within three marks from the value of 52?

ANSWER: \_\_\_\_\_

Look at the straight line scale below. Note the reading on the scale.

Scale B.



3. On Scale B above, is the reading within two marks from the value of 29?

ANSWER: \_\_\_\_\_

4. On Scale B above, is the reading within two marks from the value of 24?

ANSWER: \_\_\_\_\_

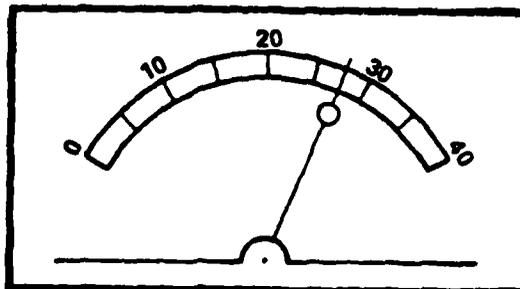
5. On Scale B above, is the reading within three marks from the value of 25?

ANSWER: \_\_\_\_\_

6. On Scale B above, is the reading within three marks from the value of 30?

ANSWER: \_\_\_\_\_

Look at the meter below. Note the reading on the scale.



Meter A

7. On Meter A above, is the reading within two marks from the value of 10?

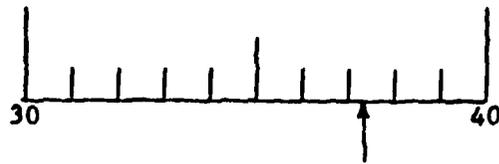
ANSWER: \_\_\_\_\_

8. On Meter A above, is the reading within two marks from the value of 40?

ANSWER: \_\_\_\_\_

Look at the straight line scale below. Note the reading on the scale.

Scale C

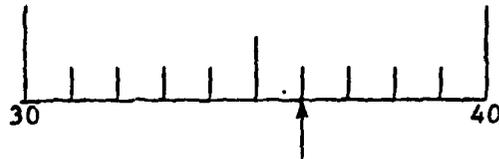


9. Is the reading on this scale within two marks from the reading on Scale C?



ANSWER: \_\_\_\_\_

10. Is the reading on this scale within two marks from the reading on Scale C?



ANSWER: \_\_\_\_\_

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Name \_\_\_\_\_

Date \_\_\_\_\_

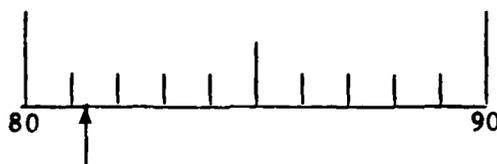
UNIT IX - LESSON 4

Checkpoint 1, Form B

Read the directions and answer the questions. Mark your answers on the answer sheet.

Look at the straight line scale. Note the reading on the scale.

Scale 0

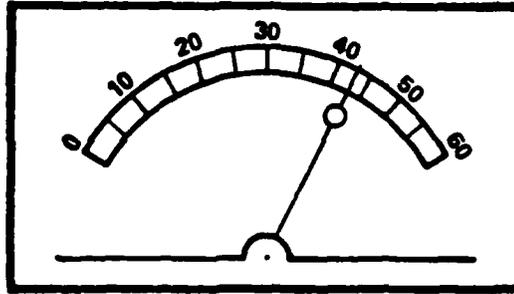


1. On Scale 0 above, is the reading within two marks from the value of 85?
  - a. Yes
  - b. No
  
2. On Scale 0 above, is the reading within two marks from the value of 80?
  - a. Yes
  - b. No
  
3. On Scale 0 above, is the reading within three marks from the value of 90?
  - a. Yes
  - b. No
  
4. On Scale 0 above, is the reading within three marks from the value of 80?
  - a. Yes
  - b. No

Unit IX, Lesson 4  
Checkpoint 1, Form B

1

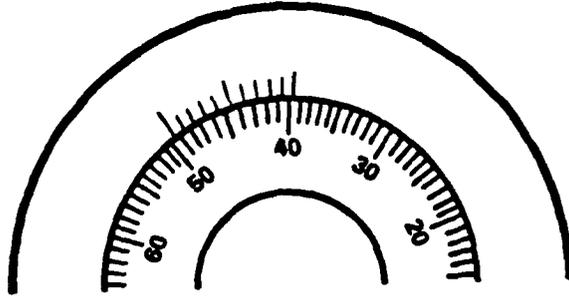
Look at Meter D shown below. Note the reading on the scale of the meter.



Meter D

5. On Meter D above, is the reading within two marks from the value of 50?
- a. Yes
  - b. No
6. On Meter D above, is the reading within two marks from the value of 30?
- a. Yes
  - b. No

Look at part of a Dial Z shown below. Note the reading on the scale of the dial.

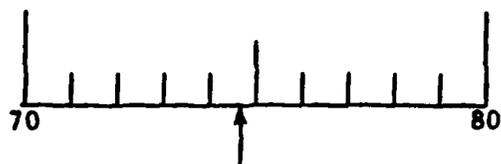


Dial Z

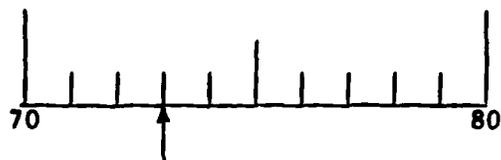
7. On Dial Z above, is the reading within two marks from the value of 38?
- a. Yes
  - b. No
8. On Dial Z above, is the reading within two marks from the value of 45?
- a. Yes
  - b. No

Look at the scale below. Note the reading on the scale.

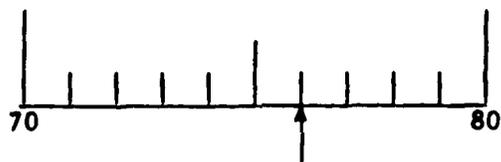
Scale X



9. Is the reading on this scale within two marks from the reading on Scale X?



- a. Yes  
b. No
10. Is the reading on the scale below within two marks from the reading on Scale X?



- a. Yes  
b. No

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**COURSE MANAGEMENT PLAN**

**APPENDIX B — INSTRUCTOR GUIDE — CHECKPOINTS**

# **31M10 Functional Basic Skills Education Package**

**Contract No. DABT60-81-C-0006  
Sequence No. A014**

**Prepared for:  
Department of the Army  
U. S. Training Support Center  
Fort Eustis, Virginia 23604**

**Prepared by:  
Applied Science Associates, Inc.  
4616 Henry Street  
Pittsburgh, Pennsylvania 15213**

**September 1982**

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 1, Form A

Directions: Put the letter of the correct definition for the word in the space provided.

- |                       |  |
|-----------------------|--|
| _____ 1. appropriate  | a. a little bit at a time; moving slowly                       |
| _____ 2. component    | b. correct   |
| _____ 3. detect       | c. a particular way of doing something                         |
| _____ 4. distribution | d. part of a larger piece of equipment or system               |
| _____ 5. electronics  | e. highest possible level                                      |
| _____ 6. gradually    | f. lowest possible level                                       |
| _____ 7. insert       | g. to put in   |
| _____ 8. maximum      | h. suitable or right for a certain person or purpose           |
| _____ 9. minimum      | i. related to radios, transistors, and communication equipment |
| _____ 10. orient      | j. how far something can be transmitted                        |
| _____ 11. procedure   | k. type of countryside or land                                 |
| _____ 12. proper      | l. plants, trees, and other plant life                         |
| _____ 13. range       | m. something spread out over a large area                      |
| _____ 14. terrain     | n. to turn to the required position                            |
| _____ 15. vegetation  | o. to notice if something is there                             |

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 2, Form A

Directions: Put the letter of the correct definition for the word in the space provided.

NOTE: Two words have the same meaning. So one definition is used twice.

- |       |                     |  |
|-------|---------------------|--|
| _____ | 1. adequate         | a. to specify, name, or point out                            |
| _____ | 2. clockwise        | b. a defect or flaw; something wrong                         |
| _____ | 3. counterclockwise | c. the expected action of something; to carry on normal work |
| _____ | 4. depress          | d. enough for some purpose                                   |
| _____ | 5. designate        | e. straight up and down                                      |
| _____ | 6. energize         | f. level, like the horizon _____                             |
| _____ | 7. engage           | g. to push down  |
| _____ | 8. extend           | h. to stretch out to fullest length                          |
| _____ | 9. fault            | i. an electrical socket or outlet                            |
| _____ | 10. function        | j. a change in something                                     |
| _____ | 11. horizontal      | k. supply power for operation; start up                      |
| _____ | 12. indicate        | l. to put in gear; to use; to interlock                      |
| _____ | 13. modification    | m. in the opposite direction from the hands of a clock       |
| _____ | 14. receptacle      | n. in the direction that hands of a clock move               |
| _____ | 15. vertical        |  |

Unit I, Lesson 1  
Checkpoint 2, Form A

1

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 3, Form A

Directions: Put the letter of the correct definition for the word in the space provided.

- |       |                  |  |
|-------|------------------|--|
| _____ | 1. approximately | a. by sight; can be seen   |
| _____ | 2. automatically | b. to be greater than  |
| _____ | 3. cable         | c. an alphabetical list that helps in finding a certain part of a book       |
| _____ | 4. capacity      | d. lacking something; broken   |
| _____ | 5. character     | e. ability of equipment  |
| _____ | 6. defective     | f. to send a message   |
| _____ | 7. exceed        | g. cannot be made right  |
| _____ | 8. excess        | h. a collection of wires carrying electrical current; to hook up those wires |
| _____ | 9. index         |  |
| _____ | 10. insure       | i. too much of something   |
| _____ | 11. manually     | j. a car, truck, or van  |
| _____ | 12. monitor      | k. acting without help from anything else                                    |
| _____ | 13. standard     | l. a sign that something is wrong  |
| _____ | 14. symptom      | m. to check on the operation of equipment without disturbing it              |
| _____ | 15. technical    |  |

(continued on next page)

- |     |                   |  |
|-----|-------------------|--|
| ___ | 16. terminal      | n. an end-point along a communication system   |
| ___ | 17. transmit      |  |
| ___ | 18. uncorrectable | o. a letter or simple number   |
| ___ | 19. vehicle       | p. a gauge or rule used in measuring something; a statement of how something is to be done |
| ___ | 20. visual        | q. to make certain   |
|     |                   | r. special knowledge about a mechanical subject  |
|     |                   | s. almost exactly  |
|     |                   | t. by hand   |

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 4, Form A

Directions: Put the letter of the correct definition for the word in the space provided.

- |                        |  |
|------------------------|--|
| _____ 1. action        | a. carefulness; a warning to be careful                        |
| _____ 2. adjust        | b. to make something unfit for use or impure                   |
| _____ 3. applicable    | c. to lift up  |
| _____ 4. cause         | d. a physical movement; a thing done                           |
| _____ 5. caution       | e. a necessary part of a piece of equipment                    |
| _____ 6. configuration | f. stopping something from happening                           |
| _____ 7. contaminate   | g. grouping; outward shape, form, or figure                    |
| _____ 8. deficiency    | h. a series of actions needed to complete some product or goal |
| _____ 9. detach        | i. the purpose for which something is done                     |
| _____ 10. effective    | j. to reposition parts of equipment (usually slowly)           |
| _____ 11. element      | k. what is to be done first                                    |
| _____ 12. elevate      | l. missing some necessary quality or activity                  |
| _____ 13. exterior     | m. the condition of something                                  |
| _____ 14. extinguish   | n. powerful; produces desired result                           |
| _____ 15. meter        |  |
| _____ 16. mission      |  |

(continued on the next page)

Unit I, Lesson 1  
Checkpoint 4, Form A

- |                     |   |
|---------------------|---|
| ___ 17. process     | o. to make something happen                                 |
| ___ 18. preliminary | p. to go out, put out, or turn off                          |
| ___ 19. preventive  | q. the outside  |
| ___ 20. status      | r. an instrument used for measuring the amount of something |
|                     | s. to separate  |
|                     | t. suitable to use  |

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 5, Form A

Directions: Put the letter of the correct definition for the word in the space provided.

NOTE: Two words have the same meaning. So one definition is used twice.

- |       |                 |   |
|-------|-----------------|---|
| _____ | 1. assign       | a. for a short time                                 |
| _____ | 2. authorize    | b. give the power to do something                   |
| _____ | 3. auxiliary    | c. in the correct space or place                    |
| _____ | 4. establish    | d. tautness; stretched until tight                  |
| _____ | 5. interval     | e. failure to operate normally; something wrong     |
| _____ | 6. location     | f. to adjust again                                  |
| _____ | 7. maintenance  | g. to narrow down; to lessen                        |
| _____ | 8. malfunction  | h. appoint; give a task to do                       |
| _____ | 9. momentarily  | i. to fasten tightly                                |
| _____ | 10. obstruction | j. to turn around                                   |
| _____ | 11. operational | k. procedure for keeping equipment in working order |
| _____ | 12. preset      | l. in working order; ready to perform               |
| _____ | 13. proficient  | m. good at doing some task                          |
| _____ | 14. readjust    | n. blockage   |
| _____ | 15. reduce      |   |

(continued on the next page)

Unit I, Lesson 1  
Checkpoint 5, Form A

1

- |                       |   |
|-----------------------|---|
| ___ 16. reference     | o. a space into which something fits              |
| ___ 17. rotate        | p. appropriate or correct to use for some purpose |
| ___ 18. seated        | q. providing help; back-up                        |
| ___ 19. secure        | r. to set beforehand                              |
| ___ 20. select        | s. to choose                                      |
| ___ 21. sequence      | t. ordering of steps to do something              |
| ___ 22. serial number | u. where to find information                      |
| ___ 23. site          | v. identifying number                             |
| ___ 24. slot          | w. to prove beyond doubt                          |
| ___ 25. suitable      | x. time between                                   |
| ___ 26. tension       | y. a placement or position                        |

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 6, Form A

Directions: Choose the best definition for the underlined word.  
Put an "X" beside the correct answer.

1. Perform the tasks in this sequence.

- \_\_\_\_\_ a. number of steps
- \_\_\_\_\_ b. order of steps
- \_\_\_\_\_ c. amount of time
- \_\_\_\_\_ d. way

2. The minimum allowable level is 35.

- \_\_\_\_\_ a. best for the purpose
- \_\_\_\_\_ b. most flexible amount
- \_\_\_\_\_ c. highest possible level
- \_\_\_\_\_ d. lowest possible level

3. The standard is that the system must be operational in 30 minutes.

- \_\_\_\_\_ a. list of defects
- \_\_\_\_\_ b. proper way to do the task
- \_\_\_\_\_ c. reason for doing something
- \_\_\_\_\_ d. rule used in measuring

4. The standard is that the system must be operational in 30 minutes.

- \_\_\_\_\_ a. in working order
- \_\_\_\_\_ b. packed and ready to move
- \_\_\_\_\_ c. checked for defects
- \_\_\_\_\_ d. at full volume

5. The transmitter has the capacity to send the signal 50 miles.
- a. need
  - b. ability
  - c. room
  - d. defect
6. The signal has a distribution of 50 square miles.
- a. difficulty in transmission
  - b. spread out over a large area
  - c. interference at this point
  - d. reason for being there
7. Find the auxiliary equipment in the van.
- a. broken
  - b. suitable for greater range
  - c. generator
  - d. back-up
8. If the receiver is deficient, the troubleshooting table will help you to solve the problem.
- a. too heavy
  - b. having too many settings
  - c. missing some quality
  - d. too hot
9. Visually inspect the exterior of the generator.
- a. operation of
  - b. inside
  - c. outside
  - d. problem
10. The visual inspection can save you a lot of time.
- a. by sight
  - b. by hand
  - c. quick
  - d. nightly

11. Each component must work properly in order to receive the signal.

- a. person authorized to do the job
- b. gear
- c. part of a piece of equipment
- d. clock

12. Orient the antenna to 40° W.

- a. turn to the required position
- b. the East
- c. take it down
- d. repair

13. Put the plug into the receptacle.

- a. machine
- b. outlet
- c. wire
- d. ladder used in raising the antenna

14. The reading must not exceed 60 Hz.

- a. match
- b. be the same as
- c. be less than
- d. be greater than

15. In troubleshooting, you look for the fault.

- a. defect or flaw
- b. result
- c. telephone book
- d. sergeant

16. We take preventive measures to avoid problems later.

- a. doing something quick
- b. stopping something from happening
- c. easy
- d. hard

17. Use caution when working with electrical equipment.
- a. a buddy
  - b. carefulness
  - c. speed
  - d. a lot of light
18. The location of the receiving terminal is at Station Z.
- a. fault or defect
  - b. covering for
  - c. person who looks after something
  - d. placement or position
19. Traffic could not move because of the obstruction on the road.
- a. blockage
  - b. cat
  - c. hole
  - d. line
20. This section explains the procedure for preventive maintenance.
- a. disadvantages of
  - b. advantages of
  - c. troubleshooting manual
  - d. way to do something.
21. This section explains the procedure for preventive maintenance.
- a. health care
  - b. storing broken equipment in shelters
  - c. keeping equipment in working order
  - d. enemy attacks
22. Now is the time to conduct preliminary checks.
- a. to be done first
  - b. necessary
  - c. electrical
  - d. concerning faint signals

23. The needle is horizontal.

- a. level like the horizon
- b. straight up and down
- c. moving slightly
- d. moving quickly

24. Find a level site for the task.

- a. set of directions
- b. tree
- c. lid
- d. placement

25. Secure the cover on the vehicle.

- a. take it off
- b. fasten tightly
- c. spread it loosely
- d. double

26. Secure the cover on the vehicle.

- a. straight up and down
- b. plant life
- c. a car, truck, or van
- d. equipment

27. With practice you will become proficient at transmitting signals.

- a. bad at some task
- b. good at some task
- c. able to send louder
- d. able to send faster

28. With practice you will become proficient at transmitting signals.

- a. stopping
- b. changing
- c. sending
- d. understanding

29. You may need to clear the terrain if there is a lot of vegetation.

- a. type of land
- b. type of vehicle that runs on tracks
- c. a collection of wires
- d. radio equipment

30. You may need to clear the terrain if there is a lot of vegetation.

- a. insects
- b. hills
- c. mud
- d. plant life

WHEN YOU HAVE FINISHED WITH THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE,  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 1, Form B

Directions: Put the letter of the correct definition for the word in the space provided.

- |                     |  |
|---------------------|--|
| ___ 1. appropriate  | a. to notice if something is there                             |
| ___ 2. component    | b. to turn to the required position                            |
| ___ 3. detect       | c. something spread out over a large area                      |
| ___ 4. distribution | d. plants, trees, and other plant life                         |
| ___ 5. electronics  | e. type of countryside or land                                 |
| ___ 6. gradually    | f. how far something can be transmitted                        |
| ___ 7. insert       | g. related to radios, transistors, and communication equipment |
| ___ 8. maximum      | h. suitable or right for a certain person or purpose           |
| ___ 9. minimum      | i. to put in   |
| ___ 10. orient      | j. lowest possible level                                       |
| ___ 11. procedure   | k. highest possible level                                      |
| ___ 12. proper      | l. part of a larger piece of equipment or system               |
| ___ 13. range       | m. a particular way of doing something                         |
| ___ 14. terrain     | n. a little bit at a time; moving slowly                       |
| ___ 15. vegetation  | o. correct   |

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 2, Form B

Directions: Put the letter of the correct definition for the word in the space provided.

NOTE: Two words have the same meaning. So one definition is used twice.

- |       |                     |  |
|-------|---------------------|--|
| _____ | 1. adequate         | a. in the direction that hands of a clock move               |
| _____ | 2. clockwise        | b. in the opposite direction from the hands of a clock       |
| _____ | 3. counterclockwise | c. to put in gear; to use; to interlock                      |
| _____ | 4. depress          | d. supply power for operation; start up                      |
| _____ | 5. designate        | e. a change in something                                     |
| _____ | 6. energize         | f. an electrical socket or outlet                            |
| _____ | 7. engage           | g. to stretch out to fullest length                          |
| _____ | 8. extend           | h. to push down  |
| _____ | 9. fault            | i. level, like the horizon _____                             |
| _____ | 10. function        | j. straight up and down                                      |
| _____ | 11. horizontal      | k. enough for some purpose                                   |
| _____ | 12. indicate        | l. the expected action of something; to carry on normal work |
| _____ | 13. modification    | m. a defect or flaw; something wrong                         |
| _____ | 14. receptacle      | n. to specify, name, or point out                            |
| _____ | 15. vertical        |  |

Unit I, Lesson 1  
Checkpoint 2, Form B

1

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 3, Form B

Directions: Put the letter of the correct definition for the word in the space provided.

- |       |                  |  |
|-------|------------------|--|
| _____ | 1. approximately | a. by hand   |
| _____ | 2. automatically | b. almost exactly  |
| _____ | 3. cable         | c. special knowledge about a mechanical subject  |
| _____ | 4. capacity      | d. to make certain   |
| _____ | 5. character     | e. a gauge or rule used in measuring something; a statement of how something is to be done |
| _____ | 6. defective     | f. a letter or simple number   |
| _____ | 7. exceed        | g. an end-point along a communication system   |
| _____ | 8. excess        | h. to check on the operation of equipment without disturbing it                            |
| _____ | 9. index         | i. a sign that something is wrong  |
| _____ | 10. insure       | j. acting without help from anything else  |
| _____ | 11. manually     | k. a car, truck, or van  |
| _____ | 12. monitor      | l. too much of something   |
| _____ | 13. standard     |  |
| _____ | 14. symptom      |  |
| _____ | 15. technical    |  |

(continued on the next page)

- |                         |  |
|-------------------------|--|
| _____ 16. terminal      | m. a collection of wires carrying electrical current; to hook up those wires |
| _____ 17. transmit      |  |
| _____ 18. uncorrectable | n. cannot be made right  |
| _____ 19. vehicle       | o. to send a message   |
| _____ 20. visual        | p. ability of equipment  |
|                         | q. lacking something; broken   |
|                         | r. an alphabetical list that helps in finding a certain part of a book       |
|                         | s. to be greater than  |
|                         | t. by sight; can be seen   |

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 4, Form B

Directions: Put the letter of the correct definition for the word in the space provided.

- |     |                  |  |
|-----|------------------|--|
| ___ | 1. action        | a. suitable to use   |
| ___ | 2. adjust        | b. to separate   |
| ___ | 3. applicable    | c. an instrument used for measuring the amount of something    |
| ___ | 4. cause         | d. the outside   |
| ___ | 5. caution       | e. to go out, put out, or turn off                             |
| ___ | 6. configuration | f. to make something happen                                    |
| ___ | 7. contaminate   | g. powerful; produces desired result                           |
| ___ | 8. deficiency    | h. the condition of something                                  |
| ___ | 9. detach        | i. missing some necessary quality or activity                  |
| ___ | 10. effective    | j. what is to be done first                                    |
| ___ | 11. element      | k. to reposition parts of equipment (usually slowly)           |
| ___ | 12. elevate      | l. the purpose for which something is done                     |
| ___ | 13. exterior     | m. a series of actions needed to complete some product or goal |
| ___ | 14. extinguish   |  |
| ___ | 15. meter        |  |

(continued on the next page)

- |                       |  |
|-----------------------|--|
| _____ 16. mission     | n. grouping; outward shape, form, or figure  |
| _____ 17. process     | o. stopping something from happening         |
| _____ 18. preliminary | p. a necessary part of a piece of equipment  |
| _____ 19. preventive  | q. a physical movement; a thing done         |
| _____ 20. status      | r. to lift up                                |
|                       | s. to make something unfit for use or impure |
|                       | t. carefulness; a warning to be careful      |

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 5, Form B

Directions: Put the letter of the correct definition for the word in the space provided.

NOTE: Two words have the same meaning. So one definition is used twice.

- |       |                 |   |
|-------|-----------------|---|
| _____ | 1. assign       | a. a placement or position                        |
| _____ | 2. authorize    | b. time between                                   |
| _____ | 3. auxiliary    | c. to prove beyond doubt                          |
| _____ | 4. establish    | d. identifying number                             |
| _____ | 5. interval     | e. where to find information                      |
| _____ | 6. location     | f. ordering of steps to do something              |
| _____ | 7. maintenance  | g. to choose                                      |
| _____ | 8. malfunction  | h. to set beforehand                              |
| _____ | 9. momentarily  | i. providing help; back-up                        |
| _____ | 10. obstruction | j. appropriate or correct to use for some purpose |
| _____ | 11. operational | k. a space into which something fits              |
| _____ | 12. preset      | l. blockage                                       |
| _____ | 13. proficient  | m. good at doing some task                        |
| _____ | 14. readjust    | n. in working order; ready to perform             |
| _____ | 15. reduce      |   |

Unit I, Lesson 1  
Checkpoint 5, Form B

1

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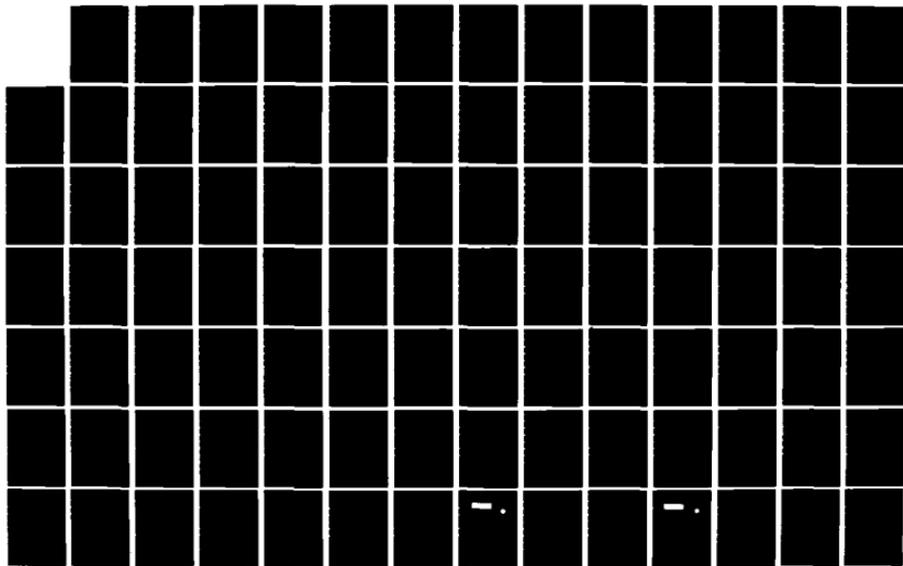
31M10 FUNCTIONAL BASIC SKILLS EDUCATION PACKAGE(U)  
APPLIED SCIENCE ASSOCIATES INC PITTSBURGH PA SEP 82  
DABT60-81-C-0006

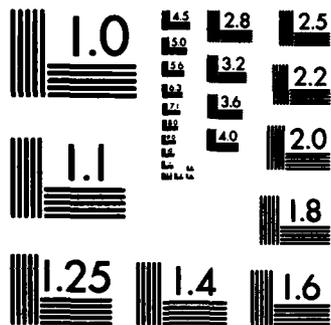
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MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

- |                       |   |
|-----------------------|---|
| ___ 16. reference     | o. procedure for keeping equipment in working order |
| ___ 17. rotate        | p. to turn around                                   |
| ___ 18. seated        | q. to fasten tightly                                |
| ___ 19. secure        | r. appoint; give a task to do                       |
| ___ 20. select        | s. to narrow down; to lessen                        |
| ___ 21. sequence      | t. to adjust again                                  |
| ___ 22. serial number | u. failure to operate normally; something wrong     |
| ___ 23. site          | v. tautness; stretched until tight                  |
| ___ 24. slot          | w. in the correct space or place                    |
| ___ 25. suitable      | x. give the power to do something                   |
| ___ 26. tension       | y. for a short time                                 |

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 6, Form B

Directions: Choose the best definition for the underlined word.  
Put an "X" beside the correct answer.

1. Designate one person to depress the button.

- a. change
- b. make certain
- c. cause
- d. name or specify

2. Designate one person to depress the button.

- a. press down
- b. pull up
- c. find the fault with
- d. do maintenance tasks

3. Turn the dial clockwise gradually.

- a. moving quickly
- b. moving slowly
- c. looking for problems
- d. straight up and down

4. Turn the dial clockwise gradually.

- a. moving quickly
- b. moving slowly
- c. in the direction that hands of a clock move
- d. in the opposite direction from the hands of a clock

5. The light will extinguish automatically.
- a. turn brighter
  - b. flash
  - c. come on
  - d. go out
6. The light will extinguish automatically.
- a. without help from anything else
  - b. with help from the operator
  - c. by hand
  - d. quickly
7. Insure that the guy wire does not have too much tension on it.
- a. sound waves
  - b. oil
  - c. tautness
  - d. paint
8. Insure that the guy wire does not have too much tension on it.
- a. troubleshoot
  - b. pay someone to see
  - c. make certain
  - d. guess whether
9. If the buzzer does not sound, that is a symptom.
- a. signal for lunch
  - b. question of the existence
  - c. sign that nothing is wrong
  - d. sign that something is wrong
10. This system will transmit the signal far.
- a. send a message
  - b. garble
  - c. interfere with
  - d. stop the message from going

11. The interval between beeps will be 15 seconds.

- a. time between
- b. loops
- c. ladder
- d. relationship between

12. Use your Soldier's Manual as a reference.

- a. shelf to store things on
- b. doorstep
- c. weight for holding down the tarpaulin
- d. where to find information

13. The wire will be under tension when you hang weights on it.

- a. agony
- b. stretched tight
- c. the roof of the shelter
- d. the ground

14. Use the jack to elevate the van.

- a. lift up
- b. hold tight
- c. push down
- d. turn around

15. The components will always be in this configuration.

- a. color
- b. grouping
- c. size
- d. housing

16. Troubleshooting is effective if you find the fault.

- a. easy enough to do by yourself
- b. big enough to cause problems
- c. produces the desired effect
- d. hectic

17. Refer to the index when looking for a certain topic.

- a. inside cover that lists the author, publisher, and date of publication
- b. table of contents
- c. binding that secures all of the pages together
- d. alphabetical listing that helps in finding a certain part of a book

18. A loud hum was a symptom that something was malfunctioning.

- a. sign that something is wrong
- b. high tone that is hard on the ears
- c. a slow person
- d. annoying

19. The receiver performs the function of receiving the signal.

- a. the public debate
- b. having a good time
- c. critical analysis of
- d. the expected action

20. This transmitter has a broadcast range of 10 miles.

- a. something to cook on
- b. what usually sits beside a window
- c. how far something can be transmitted
- d. where cattle live

21. Insert the cable here.

- a. lengthen
- b. turn sideways
- c. take out
- d. put in

22. Insert the cable here.

- a. bolt
- b. a shallow waterway for boats to travel in
- c. a collection of wires to carry electricity
- d. rope

23. Use caution when working with electrical components.

- a. carefulness
- b. proper tools
- c. insulation
- d. a team

24. Use caution when working with electrical components.

- a. wires
- b. outlets
- c. vans for carrying equipment
- d. parts of a system

25. If you detect a malfunction, you must find what causes it.

- a. notice
- b. correct
- c. cannot correct
- d. like

26. If you detect a malfunction, you must find what causes it.

- a. corrects it
- b. makes it happen
- c. does not correct it
- d. makes it worse

27. Find the appropriate manual.

- a. most convenient
- b. right
- c. nearest
- d. biggest

28. The reading should be approximately 150.

- a. almost exactly
- b. far from
- c. greater than
- d. less than

29. If the power is not adequate, the signal will be lost.

- a. enough
- b. loud
- c. monitored well
- d. checked often

30. This will explain the process used to extend the antenna.

- a. reference manuals
- b. weather condition
- c. series of actions
- d. tools

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE,  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 2

Checkpoint 1, Form A

In each question below, there is a sentence to read, followed by a question. Read the sentence carefully. Make sure you understand it. Then read the question carefully and answer it.

1. Tuning the receiver insures that radio waves of the desired frequency are amplified more than radio waves of other frequencies.

This sentence says that:

- a. In the receiver some radio waves are strengthened more than others.
  - b. The receiver can be tuned to any frequency within the radio frequency range.
  - c. Radio waves are amplified before they are received.
- 
2. Multiplex equipment connected to a radio enables the radio to transmit and receive on several telephone channels simultaneously.

Which of the following sentences says the same thing?

- a. A radio cannot transmit and receive without multiplex equipment.
- b. The purpose of telephone channels is to enable the radio to use multiplex equipment simultaneously.
- c. If you want to transmit and receive on several telephone channels simultaneously, you must connect the radio to multiplex equipment.

3. The force of an electric current through a circuit is measured in volts, the volume of flow in amps, and the resistance of the circuit in ohms.

An ohmmeter measures:

- a. how much electricity is flowing through a circuit.
- b. how much resistance is in the circuit.
- c. the force of the current through the circuit.

4. The TT-4/TG is a lightweight, transportable unit.

According to the sentence, the TT-4/TG is:

- a. easy to move.
- b. heavy.
- c. hard to transport.
- d. a useful piece of equipment.

5. In amplitude modulation, the amplitude of the carrier wave is modified by incoming audio frequencies.

What do incoming audio frequencies do in amplitude modulation?

---

6. The useful operating distance between two radio sets is generally limited to between 30 and 40 miles.

This sentence says that:

- a. No radio set can transmit over 40 miles.
- b. Two radio sets, transmitting together, can transmit farther than one radio set.
- c. If you want to transmit from one radio set to another, make sure that they are at least 40 miles apart.
- d. If you want to transmit from one radio set to another, the radio sets should be within 30 or 40 miles of each other.

7. The air filter must be cleaned frequently, at least once a week, and also immediately after a sand or dust storm.

After a dust storm, you should clean the air filter:

- a. frequently.
- b. at the end of the week.
- c. immediately.

8. The use of separate antenna masts for transmitters and receivers at a station will reduce the transmitter-to-receiver interference at that station.

What should you do to decrease the amount of interference?

- a. Use different masts for transmitting to different stations.
- b. Use one mast for both transmitters and receivers.
- c. Use different masts for transmitters and receivers.
- d. Use the antenna for transmission and reception.

Use this short passage to answer questions 9 and 10:

In the receiver, intelligence is extracted from the carrier wave through the process of demodulation. The intelligence is converted from electric energy to sound by a speaker.

9. What does demodulation do?
- a. It extracts the radio wave from the process.
  - b. It converts electric energy to sound energy.
  - c. It processes the carrier wave of the intelligence.
  - d. It separates the message from the carrier wave.
10. The speaker changes \_\_\_\_\_ to \_\_\_\_\_

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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 2

Checkpoint 2, Form A

Here are conditions and standards for installing a 10 KW Generator Set. Read them carefully. Then answer questions 1 to 5. Refer back to the Conditions and Standards whenever you need to.

CONDITIONS

This task is performed under all weather conditions in a field or a garrison location. You will need a 10 KW Generator Set, TM 5-6115-275-14, 5-pound sledge hammer, ground rod, ground strap, 8-inch flat tip screwdriver, 8-inch adjustable wrench, and standard pliers.

STANDARDS

This task has been performed correctly when, in 10 minutes, the generator set has been sited, grounded, power cable connected, fuel supply determined and connected without causing damage to any connectors or the generator set, and the generator is ready to be operated.

1. List all the equipment and tools needed for this task.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. What reference is needed for this task? \_\_\_\_\_

3. Cpl. Mary Jones has sited her generator set, grounded it, and attached the power cable. What does she still have to do to meet the standards?

---

---

---

4. Cpl. Jones began installation at 0845. She must be finished no later than \_\_\_\_\_.
5. According to the Standards, the generator set must be sited. This means (Choose one):
- a. It must be visible.
  - b. It must be clean and well lubricated.
  - c. It must be inspected before proceeding.
  - d. It must be located in an appropriate place.

Read the following performance step:

Check for indication in green band on TEST ALIGN meter.

For sentences 6 to 8 below, write S if the sentence says the same thing as the performance step. Write D if it says something different.

- \_\_\_\_\_ 6. Monitor the TEST ALIGN meter for indication in the green band.
- \_\_\_\_\_ 7. Operate the TEST ALIGN meter to obtain an indication in the green band.
- \_\_\_\_\_ 8. Insure that TEST ALIGN meter reading is in green band.

Read the following performance step:

Set selector switch to OSC and MX sequentially.

For sentences 9 and 10, write S if the sentence says the same thing as the performance step and D if it does not.

\_\_\_\_\_ 9. Operate selector switch to OSC. Then operate selector switch to MX.

\_\_\_\_\_ 10. Adjust selector switch until meter reads OSC, then MX.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

**UNIT I - LESSON 2**

**Checkpoint 1, Form B**

In each question below, there is a sentence to read, followed by a question. Read the sentence carefully. Make sure you understand it. Then read the question carefully and answer it.

1. When transmitting over distances of 40 miles or less, the antenna radiates ground waves, which follow the curvature of the earth.

Ground waves can be used for sending messages up to \_\_\_\_\_

2. Two radio terminals more than 40 miles apart can communicate if there is a repeater station between them.

Which of the following sentences says the same thing?

- a. A repeater makes it possible to increase the range of radio transmission over 40 miles.
  - b. Repeater stations are necessary for communication.
  - c. If two radio terminals are more than 80 miles apart, they cannot communicate.
3. The force of an electric current through a circuit is measured in volts, the volume of flow in amps, and the resistance of the circuit in ohms.

A voltmeter measures:

- a. how much electricity is flowing through a circuit.
- b. how much resistance is in the current.
- c. the force of the current through the circuit.

4. A radio terminal in a field location requires a transmitter, a receiver, modulating equipment, a generator, and an antenna.

Sgt. Sue Williams is setting up a field radio terminal. She has an antenna, a transmitter, a receiver, and modulating equipment. What else does she need? \_\_\_\_\_

5. The switches for regulating the output of the generator are located in the control box.

In the control box, you will find:

- a. outputs.
- b. regulatings.
- c. generators.
- d. switches.

6. The use of multiplex equipment enables a radio to accommodate many telephone channels.

Many telephone channels can go through the same radio if the radio terminal contains \_\_\_\_\_

Use the following sentence to answer questions 7 and 8:

The receiver intercepts RF waves of the appropriate frequency, extracts the message from the carrier wave, and converts the message from electric energy to sound energy.

7. After the receiver has completed its work, the message is in the form of:

- a. electric energy.
- b. sound waves.
- c. radio waves.

8. The sentence above says that:

- a. The message is separated from the carrier wave in the receiver.
- b. The receiver picks up RF waves of all frequencies.
- c. The carrier wave generates both electric energy and sound energy.

Use the following sentence to answer questions 9 and 10.

In amplitude modulation, audio frequencies change the strength of radio waves produced by the oscillator.

9. The process of changing the strength of radio waves is called

---

10. The oscillator:

- a. modulates radio waves.
- b. produces sounds.
- c. generates radio waves.

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AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

## UNIT I - LESSON 2

### Checkpoint 2, Form B

Here are conditions and standards for system alignment of a repeater radio called the AN/MRC-54(V). Read them. Then answer questions 1 to 5. Refer back to the Conditions and Standards whenever you need to.

#### CONDITIONS

This task may be performed in a tactical situation. To accomplish this task, you will need an operable AN/MRC-54(V) to include associated TMs, basic issue tools, and safety equipment. You will be provided with a multichannel systems diagram. There is an operable radio terminal at the distant station (ALFA). You will perform the system alignment under the direction of ALFA terminal.

#### STANDARDS

Standards are met when the system is in operation and all 12 channels are aligned and capable of passing traffic within 30 minutes.

1. Who directs your performance of the system alignment?

\_\_\_\_\_

2. Besides the AN/MRC-54(V) and the radio terminal at the distant station, what kinds of equipment or tools do you need?

\_\_\_\_\_

3. What references are needed for this task?

\_\_\_\_\_

4. In the Standards, the term "passing traffic" probably means:

- a. transmitting and receiving.
- b. exceeding the speed of other vehicles.
- c. following the directions of the other station.

5. How much time do you have to complete this task? \_\_\_\_\_

Read the following performance step:

Momentarily operate MANUAL-AUTOMATIC switch to MANUAL.

Now read each of the two sentences below. If a sentence means the same thing as the performance step, write S. If it does not, write D.

\_\_\_\_\_ 6. Operate the MANUAL-AUTOMATIC switch to MANUAL sequentially.

\_\_\_\_\_ 7. Set the MANUAL-AUTOMATIC switch to MANUAL for a short time.

Read the following performance step; then answer questions 8 to 10.

Adjust LEVEL control until receiver meter reads in green area of scale.

8. Adjust means the same thing as (Choose one):

- a. Rotate fast.
- b. Press.
- c. Turn slowly.
- d. Fix.

9. What indicator do you need to watch while you are adjusting the LEVEL control? \_\_\_\_\_

10. When should you stop moving the LEVEL control? \_\_\_\_\_

---

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AND TELL YOU WHAT TO DO NEXT.

Unit I, Lesson 2  
Checkpoint 2, Form B

2

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 3

Checkpoint 1, Form A

In each question, read the performance step. Then answer the question which follows.

1. If the engine has not reached operating temperature in 5 minutes, check the current level.

Suppose that the operating temperature is 185°. At the end of 5 minutes, the engine temperature is 150°. What should you do?

---

2. Insure that distance between A and B is not greater than 10 feet.

The distance between A and B should be:

- a. exactly 10 feet.
- b. more than 10 feet.
- c. 10 feet or less.
- d. 10 feet or more.

3. Failure to adjust control results in not receiving signal.

Sgt. Smith did not adjust the control. What will happen?

---

4. Repairs that cannot be completed within 15 minutes must be reported to the field officer.

A certain repair will require 30 minutes. Should it be reported to the field officer? \_\_\_\_\_

5. Do not allow engine oil pressure to exceed 60 psi.

Which of the following oil pressures are all right?

- a. Pressures that exceed 60 psi.
- b. Pressures up to 60 psi.
- c. Pressures more than 60 psi.
- d. Pressures of 60 psi or more.

6. No control should be adjusted to more than 80%.

All controls should be adjusted to:

- a. 80% or less.
- b. exactly 80%.
- c. more than 80%.
- d. 80% or more.

7. Dig a hole no wider or deeper than necessary.

The hole should be:

- a. wide and deep.
- b. wide and shallow.
- c. narrow and deep.
- d. narrow and shallow.

8. Press FIELD FLASH switch only if voltage fails to build up automatically.

The voltage has reached a high level. Should you press the FIELD FLASH switch? \_\_\_\_\_

9. Meter reading should not exceed 75%.

The meter should read:

- a. 75% or less.
- b. at least 75%.
- c. 75% or more.
- d. more than 75%.

10. Check gage to insure no operation in excess of 50.

This means that all operations should be \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 3

Checkpoint 1, Form B

In each question, read the performance step. Then answer the question which follows.

1. Failure to install the cables results in not receiving PCM signals.

If you do not install the cables, you will \_\_\_\_\_

2. Multimeter should not exceed 40 with meter select switch at XYZ.

The meter select switch is at XYZ. What should the multimeter reading be? \_\_\_\_\_

3. Insure that field wire is not longer than 50 feet.

The field wire should be:

- a. exactly 50 feet long.
- b. more than 50 feet long.
- c. 50 feet long or more.
- d. 50 feet long or less.

4. No control should be adjusted to more than 30° from the vertical.

All the controls are adjusted to 0° to 20° from the vertical. Is that all right? \_\_\_\_\_

5. Corrective actions that cannot be performed by replacing panels must be referred to a higher level of maintenance.

Which corrective actions must be reported to a higher level of maintenance?

- a. Any corrective actions.
- b. Those which require replacing panels.
- c. Those which do not require replacing panels.

6. Do not allow operating temperature to exceed 185°.

The operating temperature should be:

- a. 185° or less.
- b. 185° or more.
- c. more than 185°.
- d. exactly 185°.

7. If the signal lamp is not lit, push the POWER button.

You should push the POWER button if:

- a. the signal lamp is on.
- b. the signal lamp is off.
- c. the power is too low.
- d. the power is too high.

8. Check meter at all settings of selector switch to insure no reading in excess of 100%.

The meter should show:

- a. no reading under 100%.
- b. all readings over 100%.
- c. all readings 100% or less.

9. Hold the switch in the GO position no longer than necessary.

You should hold the switch in GO:

- a. for a short time.
- b. for a long time.

10. Open air vent if engine fails to cool down by itself.

The engine is too hot. What should you do? \_\_\_\_\_

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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 4

Checkpoint 1, Form A

In this checkpoint, you will find sentences to read. Each sentence is followed by two questions. Read each sentence carefully before answering the questions.

Raise the mast section in the launcher by pumping the jacking lever until the automatic stop prevents further motion.

1. What does pumping the jacking lever do?
  - a. It stops automatically.
  - b. It raises the mast section.
  - c. It prevents further motion.
  
2. What does the operator have to do to prevent further motion?
  - a. Place the mast section in the launcher.
  - b. Pump the jacking lever.
  - c. Nothing. Motion stops automatically.

Place air intake shutter in the summer position when temperature is above 32°F (0°C) and winter position when temperature is below 32°F (0°C).

3. The correct position for the intake shutter depends upon the \_\_\_\_\_
  
4. If the temperature is 40°F, what position should you put the air intake shutter in? \_\_\_\_\_

Stop operation immediately if a deficiency is noted during operation that would damage the equipment.

5. Which of the following says the same thing?
  - a. If you see something wrong that could cause damage while you are operating the equipment, turn the equipment off right away.
  - b. Stop operation right away if damage to the equipment occurs.
  - c. Damage to the equipment during operation will stop operation immediately.
  - d. Stopping the operation immediately if a deficiency is noted during operation will damage the equipment.
  
6. You notice a bare wire which could cause a short circuit inside the equipment. What should you do right away?
  - a. Tell the team chief.
  - b. Repair the wire.
  - c. Shut down the equipment.

If high reflected power is indicated on the receiver meter, the transmitter meter, or both, and adjustment of the control does not bring the meter indications within prescribed tolerances, check the entire system for poor connections, broken cables, and similar defects.

7. In this sentence, "bring the meter indications within prescribed tolerances" probably means:
    - a. reduce the meter indications.
    - b. raise the meter indications.
    - c. adjust the control.
  
  8. According to the sentence, what kinds of defects can cause high reflected power?
-

Meter should indicate 400 Hz or 60 Hz, depending on which machine is being operated.

9. Which of the following says the same thing?

- a. If you are operating one machine, the meter reading should be 400 Hz. On the other machine, the meter reading should be 60 Hz
- b. Set the meter to 400 Hz or 60 Hz, depending on which machine you are operating.
- c. If you are operating a machine, the meter should read 400 Hz and 60 Hz.

10. The correct meter reading depends on \_\_\_\_\_

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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 4

Checkpoint 1, Form B

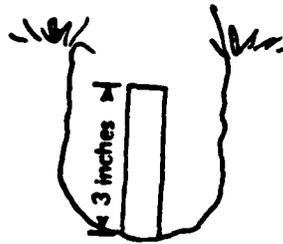
In this checkpoint, you will find sentences to read. Each sentence is followed by two questions. Read each sentence carefully before answering the questions.

Place the circuit breaker in the OFF position and turn variable resistor knob counterclockwise until it stops.

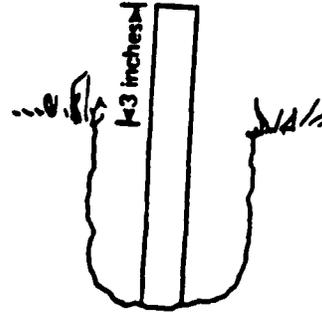
1. The two things you must do are:
  - a. place and turn off the circuit breaker.
  - b. place the circuit breaker to OFF and turn variable resistor knob.
  - c. place the OFF switch and turn variable resistor knob.
  - d. place circuit breaker to OFF and stop the variable resistor knob.
  
2. How long should you turn the variable resistor knob?
  - a. Until it is in the OFF position.
  - b. Until it is counterclockwise.
  - c. Until it stops.

Drive the sections of the ground rod (one at a time) into the hole until the top of the complete rod is about 3 inches above the bottom of the hole.

3. Which picture below shows the correct position of the ground rod?



a.



b.

4. Does the ground rod come in one section or several sections?

---

If the circuit breaker will not stay closed, it is defective and must be referred to organizational maintenance.

5. What should you do with a circuit breaker that will not stay closed?

- a. Defect it.
- b. Close it.
- c. Refer it to organizational maintenance.

6. There is something wrong with the circuit breaker if it

---

Defects that cannot be repaired or are beyond the scope of operator maintenance must be recorded on Form ABC.

7. Something is wrong with your equipment. It cannot be fixed. What should you do? \_\_\_\_\_

8. The sentence above says that:

- a. uncorrectable defects should be recorded on Form ABC.
- b. defects that are beyond the scope of operator maintenance cannot be repaired.
- c. defects on Form ABC cannot be repaired.

If the frequency reading is incorrect, the engine governor must be adjusted.

9. This sentence says:

- a. The frequency reading will be incorrect unless the engine governor is adjusted.
- b. Adjusting the engine governor is necessary if you get a wrong frequency reading.
- c. Read the frequency wrong, then adjust the engine governor.

10. "The frequency reading is incorrect" probably means:

- a. the indicator on the frequency meter is not what it should be.
- b. the operator makes a mistake reading the frequency.
- c. the meter is not reading the frequency correctly.

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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 5

Checkpoint 1, Form A

**Directions:** Read the statement below and answer the questions that follow.

Readjust the variable resistor before placing the circuit breaker in the OFF position.

1. What happens first in the above statement?
  - a. Readjust the variable resistor.
  - b. Readjust the circuit breaker.
  - c. Place the circuit breaker in the OFF position.
  - d. Place the readjustment in the variable resistor.
  
2. What happens second in the above statement?
  - a. Readjust the variable resistor.
  - b. Readjust the circuit breaker.
  - c. Place the circuit breaker in the OFF position.
  - d. Place the readjustment in the variable resistor.
  
3. Which of the following describes the tasks in the same order?
  - a. After readjusting the variable resistor, place the circuit breaker in the OFF position.
  - b. After placing the circuit breaker in the OFF position, readjust the variable resistor.
  - c. Before readjusting the variable resistor, place the circuit breaker in the OFF position.
  - d. Place the circuit breaker in the OFF position, then readjust the variable resistor.

Before setting the ON/OFF switch to ON, determine the current draw on each terminal and then stop the generator set.

4. What happens first in the above statement?

- a. Set the ON/OFF switch to ON.
- b. Determine the current draw.
- c. Stop the generator set.
- d. Set the current draw to ON.

5. What happens second in the above statement?

- a. Set the ON/OFF switch to ON.
- b. Determine the current draw.
- c. Stop the generator set.
- d. Set the current draw to ON.

6. What happens third in the above statement?

- a. Set the ON/OFF switch to ON.
- b. Determine the current draw.
- c. Stop the generator set.
- d. Set the current draw to ON.

7. Which of the following describes the tasks in the same order?

- a. Stop the generator set and determine the current draw on each terminal before setting the ON/OFF switch to ON.
- b. Set the ON/OFF switch to ON before determining the current draw. Then stop the generator set.
- c. Determine the current draw before setting the ON/OFF switch to ON. Then stop the generator set.
- d. Determine the current draw before stopping the generator set. Then set the ON/OFF switch to ON.

Continue operating procedures after positioning the Transfer Box Switch and turning the circuit breaker switch to ON.

8. Which of the following lists the tasks as they should be performed?

- a. Continue operating procedures. Position Transfer Box Switch. Turn circuit breaker to ON.
- b. Position Transfer Box Switch. Turn circuit breaker to ON. Continue operating procedures.
- c. Turn circuit breaker to ON. Continue operating procedures. Position Transfer Box Switch.
- d. Turn circuit breaker to ON. Position Transfer Box Switch. Continue operating procedures.

9. Which of the following describes the tasks in the same order?

- a. Before continuing operating procedures, position the Transfer Box Switch and then turn the circuit breaker switch to ON.
- b. Before positioning the Transfer Box Switch, turn the circuit breaker switch to ON and then continue operating procedures.
- c. Before turning the circuit breaker switch to ON, continue operating procedures and then position the Transfer Box Switch.
- d. Turn the circuit breaker switch to ON and then continue operating procedures and position the Transfer Box Switch.

Dismantle the shelter after disconnecting the cables and destroying the equipment.

10. Which of the following lists the tasks as they should be performed?

- a. Dismantle shelter. Disconnect cables. Destroy equipment.
- b. Disconnect cables. Destroy equipment. Dismantle shelter.
- c. Destroy equipment. Disconnect cables. Dismantle shelter.
- d. Destroy equipment. Dismantle shelter. Disconnect cables.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 5

Checkpoint 1, Form B

Directions: Read the statement below and answer the questions which follow.

Select test channels and then connect BQ-894 to transmitter.

1. Which of the tasks listed below is to be done first?
  - a. Select test channels.
  - b. Select BQ-894.
  - c. Connect BQ-894 to transmitter.
  - d. Connect BQ-894 to cable.
  
2. Which of the tasks listed below is to be done second?
  - a. Select test channels.
  - b. Select BQ-894.
  - c. Connect BQ-894 to transmitter.
  - d. Connect BQ-894 to cable.
  
3. Which of the following directions means the same thing?
  - a. Select test channels after connecting BQ-894 to transmitter.
  - b. Connect BQ-894 to transmitter and then select test channels.
  - c. Connect BQ-894 to transmitter before selecting test channels.
  - d. Select test channels before connecting BQ-894 to transmitter.

Read the statement below and answer the questions which follow.

Depress the handset switch after lifting the handset from the bracket, then wait for the order wire message.

4. Which of the tasks listed below is to be done first?

- a. Depress handset switch.
- b. Wait for the order wire message.
- c. Lift the handset from the bracket.
- d. Depress the order wire.

5. Which of the tasks listed below is to be done second?

- a. Depress handset switch.
- b. Wait for the order wire message.
- c. Lift the handset from the bracket.
- d. Depress the order wire.

6. Which of the tasks listed below is to be done third?

- a. Depress the handset switch.
- b. Wait for the order wire message.
- c. Lift the handset from the bracket.
- d. Depress the order wire.

7. Which of the following directions means the same thing?

- a. After waiting for the order wire message, depress the handset switch and then lift the handset from the bracket.
- b. After waiting for the order wire message, lift the handset from the bracket and then depress the handset switch.
- c. Before depressing the handset switch, lift the handset from the bracket. Then wait for the order wire message.
- d. Lift the handset from the bracket before waiting for the order wire message and then depress the handset switch.

Read the statement below and answer the question which follows.

Before setting the multimeter switch to 1 KC IN, request a test signal. Then adjust the FDM LEVELS.

8. Which of the following lists the tasks in the order they are to be performed?

- a. Set multimeter switch. Request test signal. Adjust FDM LEVELS.
- b. Adjust FDM LEVELS. Request test signal. Set multimeter switch.
- c. Request test signal. Set multimeter switch. Adjust FDM LEVELS.
- d. Set multimeter switch. Adjust FDM LEVELS. Request test signal.

Read the statement below and answer the questions which follow.

Set the transmitter multimeter selector switch to PCM IN after setting the TEST TONE switch to ON.

9. Which of the tasks listed below is to be done first?

- a. Set transmitter multimeter switch.
- b. Set the TEST TONE switch to ON.
- c. Set the PCM to IN.
- d. Set the TEST to TONE.

10. Which of the following means the same thing?

- a. Set the transmitter multimeter selector switch to PCM IN before setting the TEST TONE switch to ON.
- b. Set the TEST TONE switch to ON after setting the transmitter multimeter selector switch to PCM IN.
- c. Set the TEST TONE switch to ON before setting the transmitter multimeter selector switch to PCM IN.
- d. Set the transmitter multimeter selector switch to PCM IN and then set the TEST TONE switch to ON.

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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 6

Checkpoint 1, Form A

Read the following directions.

Turn on the XY-777 and wait several seconds. Then operate the switch to TALK and turn on the receiver.

1. Which of the following tasks happens first?
  - a. Wait several seconds.
  - b. Turn on the receiver.
  - c. Turn on the XY-777.
  - d. Operate the switch to TALK.
  
2. Which of the following tasks happens second?
  - a. Wait several seconds.
  - b. Turn on the receiver.
  - c. Turn on the XY-777.
  - d. Operate the switch to TALK.
  
3. Which of the following tasks happens third?
  - a. Wait several seconds.
  - b. Turn on the receiver.
  - c. Turn on the XY-777.
  - d. Operate the switch to TALK.
  
4. Which of the following tasks happens fourth?
  - a. Wait several seconds.
  - b. Turn on the receiver.
  - c. Turn on the XY-777.
  - d. Operate the switch to TALK.

Unit I, Lesson 6  
Checkpoint 1, Form A

1

5. Which of the following summarizes the directions best?
- a. Wait. Turn on receiver. Turn switch to TALK. Turn on XY-777.
  - b. Turn switch to TALK. Turn on XY-777. Wait. Turn on receiver.
  - c. Turn on receiver. Turn switch to TALK. Wait. Turn on XY-777.
  - d. Turn on XY-777. Wait. Turn switch to TALK. Turn on receiver.

Read the following directions:

Remove the tire assembly. Loosen the anchor pin lock nuts and align the anchor pins. Turn brake shoe adjusting pins and then insert a gauge through the inspection hole.

6. Which task is to be done just before turning the brake shoe adjusting pins?
- a. Remove the tire assembly.
  - b. Loosen the anchor pin lock nuts.
  - c. Align the anchor pins.
  - d. Insert a gauge through the inspection hole.
7. Which task is to be done just after turning the brake shoe adjusting pins?
- a. Remove the tire assembly.
  - b. Loosen the anchor pin lock nuts.
  - c. Align the anchor pins.
  - d. Insert a gauge through the inspection hole.
8. Which task is to be done just after removing the tire assembly?
- a. Loosen the anchor pin lock nuts.
  - b. Align the anchor pins.
  - c. Turn brake shoe adjusting pins.
  - d. Insert a gauge through the inspection hole.

9. Which task is to be done just before loosening anchor pin lock nuts?
- a. Remove the tire assembly.
  - b. Align the anchor pins.
  - c. turn brake shoe adjusting pins.
  - d. Insert a gauge through the inspection hole.
10. Which of the following summarizes the directions best?
- a. Insert gauge. Turn adjusting pins. Align anchor pins. Loosen nuts. Remove tire.
  - b. Loosen nuts. Turn adjusting pins. Align anchor pins. Remove tire. Insert gauge.
  - c. Turn adjusting pin. Remove tire. Align anchor pins. Insert gauge. Loosen nuts.
  - d. Remove tire. Loosen nuts. Align anchor pins. Turn adjusting pins. Insert gauge.

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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 6

Checkpoint 1, Form B

Read the following directions.

Operate the POWER switch to OFF. Send a line person out and then give instructions to connect into the cable link. Give instructions to perform the loopback check.

1. Which task is to be performed first?
  - a. Send line person out.
  - b. Give instructions to connect into cable link.
  - c. Give instructions to perform loopback check.
  - d. Operate the POWER switch to OFF.
  
2. Which task is to be performed second?
  - a. Send line person out.
  - b. Give instructions to connect into cable link.
  - c. Give instructions to perform loopback check.
  - d. Operate the POWER switch to OFF.
  
3. Which task is to be done just after sending a line person out?
  - a. Send line person out.
  - b. Give instructions to connect into cable link.
  - c. Give instructions to perform loopback check.
  - d. Operate the POWER switch to OFF.
  
4. Which task is to be done just before sending a line person out?
  - a. Send line person out.
  - b. Give instructions to connect into cable link.
  - c. Give instruction to perform loopback check.
  - d. Operate the POWER switch to OFF.

5. Which of the following summarizes the directions best?
- a. Tell him to connect into cable link. Tell him to operate switch to OFF. Send out line person. Do loopback check.
  - b. Operate switch to OFF. Send out line person. Tell him to connect into cable link. Tell him to do loopback check.
  - c. Send out line person. Operate switch to OFF. Tell him to connect into cable link. Tell him to do loopback check.
  - d. Tell him to do loopback check. Operate switch to OFF. Tell him to connect into cable link. Send out line person.

Read the following directions and answer the questions.

Recheck the area for loose items and then secure the power cable reel. Make sure that the drain plug is tightly closed. Close and lock the door.

6. Which task is to be done second?
- a. Recheck area for items.
  - b. Secure the power cable reel.
  - c. Close the door.
  - d. Lock the door.
7. Which task is to be done fifth?
- a. Recheck area for items.
  - b. Secure the power cable reel.
  - c. Close the door.
  - d. Lock the door.
8. Which of the following is to be done just before securing the power cable reel?
- a. Lock door.
  - b. Recheck area for loose items.
  - c. Close door.
  - d. Make sure drain plug is tightly closed.

9. Which of the following is to be done just after securing the power cable?
- a. Lock door.
  - b. Recheck area for loose items.
  - c. Close door.
  - d. Make sure drain plug is tightly closed.
10. Which of the following summarizes the directions best?
- a. Secure power cable reel. Close door. Lock door. Check drain plug. Recheck area.
  - b. Close door. Lock door. Recheck area. Secure power cable reel. Check drain plug.
  - c. Recheck area. Secure power cable reel. Check drain plug. Close door. Lock door.
  - d. Check drain plug. Secure power cable reel. Recheck area. Close door. Lock door.

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Name \_\_\_\_\_

Date \_\_\_\_\_

**UNIT I - LESSON 7**

**Checkpoint 1, Form A**

Use the lists below to answer questions 1 through 5.

**STANDARDS**

1. Insure that the counseling site is private and free from distractions.
2. Give the soldier advance notice of the counseling session.
3. Give specific reasons for believing that the soldier has a problem.
4. Use active listening by making statements indicating your respect for, sensitivity to, and understanding of the soldier's comments.
5. Eliminate or modify working conditions that cause the soldier problems.

**PERFORMANCE MEASURES**

1. Select and schedule a site for the counseling session.
2. Notify the soldier of the time, place, and purpose of the counseling session.
3. Gather facts about the soldier's performance.
4. Determine whether or not a problem exists.
5. Write down suggestions and plans that will help the soldier.

1. Which of the following is exactly the same as point 4 of Standards?
  - a. Insure that the counseling site is private and free from distractions.
  - b. Notify the soldier of the time, place, and purpose of the counseling session.
  - c. Determine whether or not a problem exists.
  - d. Use active listening by making statements indicating your respect for, sensitivity to, and understanding of the soldier's comments.
  
2. Which of the following is exactly the same as point 3 of Performance Measures?
  - a. Give the soldier advance notice of the counseling session.
  - b. Gather facts about the soldier's performance.
  - c. Write down suggestions and plans that will help the soldier.
  - d. Eliminate or modify working conditions that cause the soldier problems.
  
3. Which of the following means the same thing as point 2 of Performance Measures?
  - a. Tell the soldier the when, where, and why of the counseling session.
  - b. List reasons of why the soldier has a problem.
  - c. Pick and reserve a location for the counseling session.
  - d. Working conditions that cause problems should be changed or eliminated.
  
4. Does point 1 of Standards tell you how large the counseling site should be?
  - a. Yes
  - b. No
  
5. Does point 5 of Standards tell you what to do to working conditions that cause problems for the soldier?
  - a. Yes
  - b. No

For questions 6 through 8, refer to Paragraph A.

PARAGRAPH A

This task may be performed in a tactical situation. To accomplish this task, you will need an operable AN/MRC-54(V) to include associated TMs, basic issue tools, and safety equipment. The antennas and generator set have been installed and the shelter equipment has been loopback tested in accordance with task 113-593-2017. You will be provided with a multichannel systems diagram. There are operable radio terminals at the distant end, one of which is the control terminal (ALFA terminal). You will perform the system alignment under the direction of the ALFA terminal.

6. Which one of the following is mentioned in Paragraph A?
- a. You will work in a team with four other soldiers.
  - b. You need an operable AB/CDE-100(T).
  - c. You will have a multichannel systems diagram.
  - d. You will be directing ALPHA terminal.
7. Which one of the following is not mentioned in Paragraph A?
- a. The generator set and antenna should already be installed.
  - b. Loopback testing will have been done in accordance with task 113-593-2017.
  - c. Do the task in a tactical situation.
  - d. You will have one hour to complete the task.

### PARAGRAPH B

Do this task in a tactical situation. You will need an AN/MRC-54(V) in working order, associated TMs, basic issue tools, and safety equipment. The generator set and antennas have all been installed and the shelter equipment has been tested according to task 113-593-2017. There are operating radio terminals at the distant end. One of those terminals is ALFA terminal which is the control terminal that will direct the system alignment that you will do.

8. Which of the following needs to be added to Paragraph B to make it match Paragraph A?
- a. You will work in a team with four other soldiers.
  - b. ALFA terminal will be directed by you.
  - c. A multichannel system diagram will also be provided to you.
  - d. You will have one hour to complete the task.

For questions 9 and 10, refer to Paragraph C.

### PARAGRAPH C

To check the cables, you must first locate the cable connections in the box. Refer to CABLE-123 to determine which cables you are using and how tight they should be. Check your cables for the proper connections and tightness.

9. Which one of the following is mentioned in Paragraph C?
- a. CABLE-123 will identify the cables and tell you how tight they should be.
  - b. You should first disconnect all of the cables.
  - c. The power should be turned off.
  - d. This task should be done weekly.

10. Which one of the following is not mentioned in Paragraph C?
- a. CABLE-123 will identify the cables and tell you how tight they should be.
  - b. First find the cable connections.
  - c. The power should be turned off.
  - d. Your job is to check the correctness and tightness of the cables.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 7

Checkpoint 1, Form B

Use the lists below to answer questions 1 through 6.

STANDARDS

1. Insure that the counseling site is private and free from distractions.
2. Give the soldier advance notice of the counseling session.
3. Give specific reasons for believing that the soldier has a problem.
4. Use active listening by making statements indicating your respect for, sensitivity to, and understanding of the soldier's comments.
5. Eliminate or modify working conditions that cause the soldier problems.

PERFORMANCE MEASURES

1. Select and schedule a site for the counseling session.
2. Notify the soldier of the time, place, and purpose of the counseling session.
3. Gather facts about the soldier's performance.
4. Determine whether or not a problem exists.
5. Write down suggestions and plans that will help the soldier.

1. Which of the following is exactly the same as point 3 of Standards?
  - a. Give specific reasons for believing that the soldier has a problem.
  - b. Gather facts about the soldier's performance.
  - c. Eliminate or modify working conditions that cause the soldier problems.
  - d. Determine whether or not a problem exists.
  
2. Which of the following is exactly the same as point 4 of Performance Measures?
  - a. Give specific reasons for believing that the soldier has a problem.
  - b. Gather facts about the soldier's performance.
  - c. Eliminate or modify working conditions that cause the soldier problems.
  - d. Determine whether or not a problem exists.
  
3. Which of the following means the same thing as point 1 of Standards?
  - a. Be sure to get authorization to use the room you choose.
  - b. Be sure that the location you choose gives privacy and is one where you will not be bothered.
  - c. Counseling should be done at lunch-time so others will not bother you.
  - d. Have a pad and pencil nearby to jot down ideas.
  
4. Which of the following means the same thing as point 4 of Performance Measures?
  - a. Make statements showing that you respect, are sensitive to, and understand the soldier's comments.
  - b. You must list reasons for the problem.
  - c. You must determine if the site is appropriate or not.
  - d. You must decide if there is a problem or not.

5. Does point 2 of Standards say to tell the soldier of the time of, the place of, and the reason for the counseling session?
- a. Yes
  - b. No
6. Does point 3 of Performance Measures tell you what form to use to gather facts?
- a. Yes
  - b. No

For questions 7 through 10, refer to Paragraph A.

#### PARAGRAPH A

Your task is to complete the installation of the AN/MRC-54(V) as a radio repeater in accordance with RADIO-LINK. The equipment circuit breaker will remain in the OFF position during this task. And in order to allow easy access to the shelter during this task, secure the vehicle tailgate in the horizontal position and install the boarding ladder.

7. Which one of the following is mentioned in Paragraph A?
- a. You must have basic tools and safety equipment before beginning.
  - b. Refer to RADIO-LINK when installing the AN/MRC-54(V) as a radio repeater.
  - c. The task can be performed in a tactical situation.
  - d. Antennas should be extended before you begin.
8. Which of the following is not mentioned in Paragraph A?
- a. The circuit breaker will be at OFF during the entire task.
  - b. You will install the AN/MRC-54(V) as a radio repeater.
  - c. You must install a boarding ladder.
  - d. The generator set will be installed before you begin.

9. Which of the following is not mentioned in Paragraph A.
- a. Fasten the tailgate in a horizontal position.
  - b. Standards are met when the radio receiver works.
  - c. You will complete the installation of AN/MRC-54(V)
  - d. To access the shelter, install a boarding ladder.

PARAGRAPH B

You will install the AN/MRC-54(V) as a radio repeater (refer to RADIO-LINK). While doing this, have the circuit breaker at OFF. To access the shelter more easily, lower the tailgate to the horizontal.

10. Which of the following needs to be added to Paragraph B to make it match Paragraph A?
- a. Do this in a tactical situation.
  - b. Put a ladder from the tailgate to the shelter.
  - c. You will need to refer to issued TMs.
  - d. You will need safety equipment.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT II - LESSON 1

Checkpoint 1, Form A

The Table of Contents below doesn't look like any you will ever see. But it works the same way as any other Table of Contents. Look it over very quickly. Then use it to answer the questions on the next page.

	Page
INDIA	1-1
Kilo	1-2
Victor	1-7
Zulu	1-10
ECHO TASKS	2-1
Papa List	2-1
Golf Level	2-43
Sierra Level	2-106
DELTA TASKS	3-1
Papa List	3-1
Yankee Level	3-25
Quebec Level	3-79
Zulu Level	3-157
QUEBEC TASKS	4-1
Papa List	4-1
Golf Level	4-14
Tango Level	4-85
Yankee Level	4-193
Delta Level	4-205
UNIFORM TASKS	5-1
Papa List	5-1
Sierra Level	5-38
Tango Level	5-100
Zulu Level	5-211

Unit II, Lesson 1  
Checkpoint 1, Form A

1. How many chapters are in this Table of Contents? \_\_\_\_\_
2. How many sections are in the chapter DELTA TASKS? \_\_\_\_\_
3. You are told to look up Papa List. What other information must you be told before you can do that?  
\_\_\_\_\_
4. On what page will you find Zulu? (Give both parts of the page number.) \_\_\_\_\_
5. What is the title of the section in Chapter 4 on page 85?  
\_\_\_\_\_
6. What is the title of the section on page 43 of Chapter 2?  
\_\_\_\_\_
7. On what page will you find ECHO TASKS, Sierra Level?  
(Give both parts of the page number.) \_\_\_\_\_
8. On what page will you find Tango Level, UNIFORM TASKS?  
(Give both parts of the page number.) \_\_\_\_\_
9. You need to read about Quebec Level, DELTA TASKS. What page should you turn to? (Give both parts of the page number.) \_\_\_\_\_
10. You must look up QUEBEC TASKS, Tango Level. What page should you turn to? (Give both parts of the page number.) \_\_\_\_\_

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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT II - LESSON 1

Checkpoint 1, Form B

The Table of Contents below doesn't look like any you will ever see. But it works the same way as any other Table of Contents. Look it over very quickly. Then use it to answer the questions on the next page.

	Page
UNIFORM	1-1
Golf	1-3
Sierra	1-5
India	1-11
HOTEL TASKS	2-1
Romeo List	2-1
Delta Level	2-34
Papa Level	2-98
ALFA TASKS	3-1
Romeo List	3-1
Tango Level	3-37
Golf Level	3-68
Papa Level	3-125
Yankee Level	3-207
ZULU TASKS	4-1
Romeo List	4-1
Oscar Level	4-41
Papa Level	4-97
Tango Level	4-257
TANGO TASKS	5-1
Romeo List	5-1
Charlie Level	5-83
Alfa Level	5-165
Delta Level	5-280
Quebec Level	5-347

Unit II, Lesson 1  
Checkpoint 1, Form B

NOTE: When a page number is asked for, give both parts.

1. You must look up ZULU TASKS, Papa Level. What page should you turn to? \_\_\_\_\_
2. You need to read about Charlie Level, TANGO TASKS. What page should you turn to? \_\_\_\_\_
3. On what page will you find Papa Level, HOTEL TASKS? \_\_\_\_\_
4. On what page will you find ALFA TASKS, Yankee Level? \_\_\_\_\_
5. What is the title of the section on page 68 of Chapter 3?  
\_\_\_\_\_
6. What is the title of the section in Chapter 2 on page 98?  
\_\_\_\_\_
7. How many sections are in the Chapter UNIFORM? \_\_\_\_\_
8. You are told to look up Romeo List. What else must you be told to before you can do that?  
\_\_\_\_\_
9. How many chapters are in this Table of Contents? \_\_\_\_\_
10. On what page will you find Golf? (Note: just Golf, not Golf Level.) \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT II - LESSON 2

Checkpoint 1, Form A

Directions: You will need to look in both Chapter 2 and Chapter 3 Task Lists to answer the following questions.

1. You are told to look up Task 031-503-1010. Where would you have to look? Check the correct answer.

- a. Chapter 2 Task List only  
 b. Chapter 3 Task List only  
 c. Both Chapter 2 and Chapter 3 Task Lists

2. To find a Task Number quickly, this lesson teaches that you should look first at:

- a. the whole number  
 b. the first section of the number  
 c. the middle section of the number  
 d. the last section of the number

3. Write the title of Task 081-851-1001.

\_\_\_\_\_

4. What is the title of Task 071-327-0202?

\_\_\_\_\_

5. What is the title of Task 113-593-2002?

\_\_\_\_\_

6. Is Task 113-593-2002 in the Chapter 2 or Chapter 3 Task List?

\_\_\_\_\_

7. What is the title of Task 113-593-7004?

\_\_\_\_\_

8. Is Task 113-593-7004 in the Chapter 2 or Chapter 3 Task List?

---

NOTE: Use the Chapter 3 Task List to answer questions 9 and 10.

9. What is the Task Number for the Task on Troubleshooting a Repeater Set, Radio, AN/TRC-110(V)?

---

10. What is the Task Number for the Task on Installing the Terminal, Telegraph-Telephone AN/MCC-6?

---

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE.

GO ON TO THE NEXT PART OF THE LESSON.

---

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT II - LESSON 2

Checkpoint 2, Form A

Directions: You will need to look in both Chapter 2 and Chapter 3 Task Lists to answer the following questions. Give both parts of the page numbers.

1. The Task Description for Task 113-593-7004 is on what page?

\_\_\_\_\_

2. Information on Task No. 081-851-1001 is on what page? \_\_\_\_\_

3. If you want to read about Task 113-593-2002, you must go to what page? \_\_\_\_\_

4. Information on Task 071-327-0202 is on what page? \_\_\_\_\_

5. The Task Description for Task No. 113-593-1005 is on what page?

\_\_\_\_\_

Directions: Use only the Chapter 3 Task List to answer the following questions.

6. If you want to read how to Troubleshoot a Repeater Set, AN/TRC-110(V), what page should you go to? \_\_\_\_\_
7. What is the page number for the task on Installing the AN/TRC-24 Antenna System? \_\_\_\_\_
8. If you want to Perform System Alignment of a Radio Terminal in the AN/TRC-145(V), what page would you go to? \_\_\_\_\_
9. You want to Troubleshoot a Repeater Set, AN/MRC-54(V). What page should you turn to? \_\_\_\_\_
10. What is the page number for the task that is called "Performing System Alignment on a 12-Channel Radio Terminal in the AN/MRC-69(V) or AN/MRC-73(V)"? \_\_\_\_\_

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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT II - LESSON 2

Checkpoint 1, Form B

Directions: Turn to the first page of the Chapter 3 Task List in your Soldier's Manual. You can use the Table of Contents to find the page number if you need to.

1. Write the task number of the second task in the list, "Install the AN/GRC-103(V) Antenna System." \_\_\_\_\_

Directions: You will need to look in both Chapter 2 and Chapter 3 Task Lists to answer the following questions.

2. Write the Title of Task 113-593-2007.  
\_\_\_\_\_

3. What is the title of Task 113-573-4001?  
\_\_\_\_\_

4. Write the title of Task 113-593-2013.  
\_\_\_\_\_

5. What is the title of Task 081-831-1006?  
\_\_\_\_\_

**Directions: Use only the Chapter 3 Task List to answer the following questions.**

6. Write the Task Number for the Task on Installing a Terminal Set, Telephone, AN/TCC-61. \_\_\_\_\_
  
7. What is the Task Number for the task on Operating Terminal Set, Telephone, AN/TCC-60 or AN/TCC-69? \_\_\_\_\_
  
8. What is the Task Number for the task on Performing Monthly Preventive Maintenance on a Telephone Terminal Set, AN/TCC-73?  
\_\_\_\_\_
  
9. What is the Task Number for the task on Operating a Radio Terminal Set, AN/TRC-145(V)? \_\_\_\_\_
  
10. What is the title of Task 113-593-4002?  
\_\_\_\_\_

**WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.**

**YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE.  
GO ON TO REVIEW EXERCISE 2.**

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT II - LESSON 2

Checkpoint 2, Form B

Directions: Use only the Chapter 3 Task List to answer these questions.

1. What is the page number for Task 113-593-2014? \_\_\_\_\_
2. You need to read about Task 113-593-2015. What page does the task description start on. \_\_\_\_\_
3. The task description for Task 113-593-4005 is on what page?  
\_\_\_\_\_
4. What is the page number for Task 113-593-3027? \_\_\_\_\_
5. If you want to read about Task 113-593-3042, what page must you turn to? \_\_\_\_\_
6. What is the page number for the task description on Troubleshooting Radio Terminal Set AN/TRC-145? \_\_\_\_\_
7. You want to Operate the Radio Repeater Set AN/TRC-113(V). What page should you turn to? \_\_\_\_\_
8. If you want to read how to Perform Monthly Preventive Maintenance on a Terminal Telephone Set, AN/TCC-61, what page should you go to? \_\_\_\_\_
9. What is the page number for the task description on Performing Operator's Daily Preventive Maintenance on the Repeater Set, Radio, AN/TRC-110(V)? \_\_\_\_\_
10. What is the page number of the task description on Installing the AN/GRC-50 Antenna System? \_\_\_\_\_

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AND TELL YOU WHAT TO DO NEXT.

Unit II, Lesson 2  
Checkpoint 2, Form B

1

Name \_\_\_\_\_

Date \_\_\_\_\_

**UNIT II - LESSON 3**

**Checkpoint 1, Form A**

The Table of Contents below is from a TM. Look it over very quickly. Then use it to answer the questions on the following page.

CHAPTER	Section		Paragraph	Page
	<b>1. INTRODUCTION</b>			
	<b>I. General</b>			
	Scope .....		1-1	1-1
	Indexes of publications .....		1-2	1-1
	Forms and records .....		1-3	1-1
	<b>II. Description and Data</b>			
	Purpose and use .....		1-4	1-1
	Technical characteristics .....		1-5	1-3
	Components comprising the operable end item .....		1-6	1-9
	Description .....		1-7	1-9
	Additional equipment required .....		1-8	1-9
	Administrative storage .....		1-9	1-9
<b>CHAPTER</b>	<b>2. INSTALLATION</b>			
<b>Section</b>	<b>I. Service Upon Receipt of Equipment</b>			
	Unpacking .....		2-1	2-1
	Checking unpacked equipment .....		2-2	2-1
	<b>II. Installation</b>			
	Siting .....		2-3	2-1
	Installing .....		2-4	2-2
	Connecting .....		2-5	2-2
	Preliminary operation of controls .....		2-6	2-2
	Preliminary checks and adjustments .....		2-7	2-6
	<b>III. System Lineup</b>			
	Adjusting order-wire level .....		2-8	2-16
	Adjusting video level .....		2-9	2-16
	Adjusting channel gain .....		2-10	2-17
<b>CHAPTER</b>	<b>3. OPERATING INSTRUCTIONS</b>			
<b>Section</b>	<b>I. Controls, Indicators and Connectors</b>			
	Multiplexer TD-202/U or TD-203/U .....		3-1	3-1
	Multiplexer TD-204/U .....		3-2	3-7
	Multiplexer TD-352/U or TD-353/U .....		3-3	3-13
	Converter, Telephone Signal CV-1548/G .....		3-4	3-23
	<b>II. Operating Procedures</b>			
	Starting procedure .....		3-5	3-26
	Operating order wire .....		3-6	3-27
	Monitoring channels of TD-352/U or TD-353/U .....		3-7	3-27
	Stopping procedure .....		3-8	3-28
	Operation under unusual conditions .....		3-9	3-28

(Continued on the next page.)

		Paragraph	Page
<b>CHAPTER 4.</b>	<b>MAINTENANCE</b>		
<b>Section I.</b>	<b>Preventive Maintenance</b>		
	Scope of maintenance .....	4-1	4-1
	Operator's daily preventive maintenance checks and services .....	4-2	4-2
	Operator's weekly preventive maintenance checks and services .....	4-4	4-5
	Organizational monthly preventive maintenance checks and services .....	4-3	4-4
<b>II.</b>	<b>Troubleshooting</b>		
	System troubleshooting .....	4-5	4-8
	Cable link troubleshooting .....	4-6	4-18
	Component troubleshooting .....	4-7	4-20
<b>III.</b>	<b>Repairs and Adjustments</b>		
	Replacement of plug-in panels .....	4-8	4-26
	Replacement of power supply assemblies .....	4-9	4-26
	Replacement of lightning arresters (TD-204 U) .....	4-10	4-26
	Servicing air filters .....	4-11	4-27
	TD-204 U overcurrent dropout adjustment .....	4-12	4-27
<b>CHAPTER 5.</b>	<b>BASIC PULSE CODE MODULATION THEORY</b>		
<b>Section I.</b>	<b>Introduction</b>		
	General .....	5-1	5-1
	Principles of multiplexing .....	5-2	5-1
<b>II.</b>	<b>Principles of Pulse Code Modulation</b>		
	General .....	5-3	5-2
	Voice transmission by pulse code modulation .....	5-4	5-2
	Pulse code modulation TD-352 U and TD-353 U .....	5-5	5-3
<b>CHAPTER 6.</b>	<b>SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE</b>		
<b>Section I.</b>	<b>Shipment and Limited Storage</b>		
	Disassembly .....	6-1	6-1
	Repackaging .....	6-2	6-1
<b>II.</b>	<b>Demolition of Material to Prevent Enemy Use</b>		
	Authority for demolition .....	6-3	6-1
	Methods of destruction .....	6-4	6-1

ANSWER THE FOLLOWING QUESTIONS:

1. On what page will you find "Principles of multiplexing"? \_\_\_\_\_
2. What is the paragraph number of the paragraph called "Stopping procedure"? \_\_\_\_\_
3. On what page does paragraph 4-8 start? \_\_\_\_\_
4. What is the title of paragraph 2-2?  
\_\_\_\_\_
5. On what page will you find "Voice transmission by pulse code modulation"? \_\_\_\_\_
6. What is the paragraph number of the paragraph called "Purpose and Use"? \_\_\_\_\_
7. On what page does paragraph 3-7 start? \_\_\_\_\_
8. What is the title of paragraph 4-5?  
\_\_\_\_\_
9. On what page will you find "Authority for demolition"? \_\_\_\_\_
10. What is the paragraph number of the paragraph called "Connecting"? \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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Unit II, Lesson 3  
Checkpoint 1, Form A

3

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT II - LESSON 3

Checkpoint 1, Form B

The Table of Contents below is from a TM. Look it over very quickly. Then use it to answer the questions on the page following the Table of Contents.

	Paragraph	Page
<b>CHAPTER 1. INTRODUCTION</b>		
General		
Scope .....	1-1	1-1
Indexes of publications .....	1-2	1-1
Forms and records .....	1-3	1-1
II. Description and data		
Purpose and use .....	1-4	1-2
Technical characteristics .....	1-5	1-2
Components of radio sets .....	1-6	1-4
Description of radio set .....	1-7	1-4.6
Transmitting equipment .....	1-8	1-4.6
Receiving equipment .....	1-9	1-4.7
Antenna components .....	1-10	1-6.1
Regulator, Voltage CN-514/GRC .....	1-11	1-7
Minor components .....	1-12	1-8
Additional equipment required .....	1-13	1-10
Differences in models and configurations .....	1-14	1-10
III. System application		
General .....	1-15	1-20
Two-terminal system .....	1-16	1-20
Repeater station system .....	1-17	1-20
Interoperation with Radio Set AN/TRC-24 Configurations, fdm operation only..	1-18	1-21
<b>CHAPTER 2. INSTALLATION</b>		
Section I. Service upon receipt of equipment		
Unpacking .....	2-1	2-1
Checking unpacked equipment .....	2-2	2-2
II. Installation		
Preliminary installation data .....	2-3	2-4
Shelter requirements .....	2-4	2-40
Tools required for installation .....	2-5	2-40
Antenna site .....	2-6	2-40
Antenna AT-903/G adjustment .....	2-7	2-40
Cable connections and grounding .....	2-8	2-41
Wavemeter vernier scale interpretation .....	2-9	2-41

(Continued on the next page.)

Unit II, Lesson 3  
Checkpoint 1, Form B

	Paragraph	Page
<b>CHAPTER 3. OPERATING INSTRUCTIONS</b>		
<b>Section I. Operator's controls and indicators</b>		
Transmitter controls and indicators .....	3-1	3-1
Receiver controls and indicators .....	3-2	3-3
Regulator, Voltage CN-514/GRC controls and indicators .....	3-2	3-4
<b>II. Tuning procedures</b>		
General .....	3-4	3-13
Installation of tuning units .....	3-5	3-14
Determination of channel frequency .....	3-6	3-14
Preliminary starting procedures .....	3-7	3-14
Receiver tuning procedures .....	3-8	3-15
Transmitter tuning requirements .....	3-9	3-19
Transmitter tuning procedures .....	3-10	3-21
Single stack loop-back operational tests .....	3-11	3-27
<b>III. System lineup procedures</b>		
General .....	3-12	3-30
Fdm system lineup .....	3-13	3-31
Pcm system lineup .....	3-14	3-32
System checks and adjustments .....	3-15	3-33
Multiplex terminal adjustments .....	3-16	3-34
<b>IV. Routine operating procedures</b>		
General .....	3-17	3-34
Order wire operation .....	3-18	3-34
Monitoring equipment .....	3-19	3-35
Stopping procedure .....	3-20	3-36
<b>CHAPTER 4. OPERATOR'S MAINTENANCE</b>		
Scope of operator's maintenance .....	4-1	4-1
Operator's preventive maintenance .....	4-2	4-1
Preventive maintenance checks and services periods .....	4-3	4-1
Daily preventive maintenance checks and services chart .....	4-4	4-2
Weekly preventive maintenance checks and services chart .....	4-5	4-2
Cleaning .....	4-6	4-3
Visual inspection .....	4-7	4-3
Operational checklist .....	4-8	4-3
Replacement of indicator lamps .....	4-9	4-5
Replacement of fuses .....	4-10	4-5
Replacement of aid filter .....	4-11	4-6

1. What is the paragraph number of the paragraph in Chapter 2, called "Antenna Site"? \_\_\_\_\_
2. On what page will you find information on "Components of radio sets"? \_\_\_\_\_
3. What is the title of paragraph 3-13?  
\_\_\_\_\_
4. On what page does paragraph 1-4 start? \_\_\_\_\_
5. What is the paragraph number of the paragraph titled "Transmitter tuning procedures"? \_\_\_\_\_
6. On what page will you find information on "Order wire operation"?  
\_\_\_\_\_
7. What is the title of paragraph 1-8?  
\_\_\_\_\_
8. On what page does paragraph 4-8 start? \_\_\_\_\_
9. What is the paragraph number of the paragraph titled "Cleaning"?  
\_\_\_\_\_
10. On what page will you find information on "Replacement of fuses"?  
\_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT III - LESSON 1

Checkpoint 1, Form A/B

Directions:

NOTE: Do not look at the questions until after you are done listening to the tape.

1. Listen to the first short lecture on the audiotape that goes with this checkpoint.
2. Stop the tape when you are directed to do so.
3. Do not take notes.
4. You may replay the tape, but do not look at the questions beforehand. After you stop the tape, answer questions 1 through 6.

START THE TAPE NOW.

1. How many major points were covered in the lecture?
  - a. 5
  - b. 2
  - c. 3
  - d. 7
2. The second major point discussed was:
  - a. advantages of night river crossing.
  - b. lighting under blackout conditions.
  - c. disadvantages of night river crossing.
  - d. weighing advantages and disadvantages.
3. The best natural lighting condition for a night river crossing is:
  - a. a quarter moon behind you.
  - b. a half moon behind you.
  - c. a quarter moon in front of you.
  - d. a full moon in front of you.

Unit III, Lesson 1  
Checkpoint 1, Form A/B

1

4. Look at each of the statements below.

1. Keep an attack going
2. Enemy air superiority over crossing area
3. Assembling of rafts requires more time
4. Surprise the enemy

Which of the above were mentioned as advantages of crossing a river at night?

- a. 1, 2, and 3
- b. 2, 3, and 4
- c. 1, 2, and 4
- d. All of the above

5. Look at each of the statements below.

1. Open land by the river
2. More confusion
3. Extra measures needed to prevent vehicle accidents
4. Need for artificial lighting

Which of the above were mentioned as disadvantages of crossing a river at night?

- a. 1, 2, 3
- b. 3 and 4
- c. 1 and 4
- d. 2 and 3

6. Look at each of the items below.

1. Infrared binoculars
2. Flashlights
3. Vehicle lights
4. Starlight scopes

Which of the above were mentioned as night vision devices?

- a. 2 and 3
- b. 1 and 4
- c. 1 and 3
- d. All of the above

Directions:

NOTE: Do not look at the questions until after you hear the tape.

1. Listen to the second short lecture on the audiotape.
2. Stop the tape when you are directed to do so.
3. Do not take notes.
4. After you stop the tape, answer questions 7 through 10.
5. After finishing the checkpoint, rewind the tape.

START THE TAPE NOW.

7. The purpose of the procedure described was:
- a. presetting the PQT-37 Telephone Terminal.
  - b. adjusting the Transmitter Amplifier Gain.
  - c. aligning the Modem 2.
  - d. checking the Receiver Amplifier.

8. Three panels were mentioned in the lecture. They were:
- a. Measure Select Panel, Test Panel, Adjust Gain Panel.
  - b. Adjust Gain Panel, Subgroup Panel, Test Panel.
  - c. Transmitter Panel, Amplifier Panel, Modem 2.
  - d. Test Panel, Subgroup Panel, Modem 2.
9. The Fine Tune control and Measure Select switch are located on the:
- a. Power Supply.
  - b. Receiver.
  - c. Test Panel.
  - d. Modem 2.
10. The Transmitter Amplifier Gain control is located on the:
- a. Subgroup Panel.
  - b. Adjust Gain Panel.
  - c. Transmitter Panel.
  - d. Test Panel.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

REWIND THE AUDIOTAPE TO THE BEGINNING  
SO IT WILL BE READY FOR THE NEXT STUDENT.

Name \_\_\_\_\_

Date \_\_\_\_\_

**UNIT III - LESSON 2**

**Checkpoint 1, Form A/B**

**Directions:**

**NOTE:** Do not look at the questions until after you are done viewing the tape.

1. Watch the tape all the way through to the end.
2. Do not take notes.
3. You may replay the tape but do not look at the questions beforehand.
4. After you stop the tape, answer the questions below.
5. When you have finished the checkpoint, rewind the tape.

1. What was the demonstration about?
  - a. Presetting parts of the AN/TCC-7 Telephone Terminal
  - b. Adjusting the Orderwire of the AN/TCC-7 Telephone Terminal
  - c. Tuning the Transmitter of the AN/TRC-24 Radio
  - d. Presetting the PP-827 power supply
  
2. These two switches are located next to each other: 68 KC Alarm Cutoff, 120 KC Alarm Cutoff. Which statement below describes how they should be adjusted?
  - a. Both should be switched to ON.
  - b. The first one should be OFF, the second one ON.
  - c. Both should be switched to OFF.
  - d. The first one should be ON, the second one OFF.

Unit III, Lesson 2  
Checkpoint 1, Form A/B

1

3. Here is a statement from the demonstration: "Set this control three quarters of a turn from the full counterclockwise position." Which of the following says the same thing?
- a. Turn it fully clockwise, then stop.
  - b. Turn it three quarters counterclockwise, then stop.
  - c. Turn it three quarters clockwise, then one quarter counterclockwise.
  - d. Turn it fully counterclockwise, then three quarters back to clockwise.
4. Which of the following statements gives the correct order for doing the preset on the Test Panel?
- a. Adjust the 65 KC control, the High Frequency control, the 1 KC control.
  - b. Adjust the High Frequency control, the 65 KC control, the 1 KC control.
  - c. Adjust the 1 KC control, the High Frequency control, the 65 KC control.
  - d. Adjust the High Frequency control, the 1 KC control, the 65 KC control.
5. Where is the 65 kilocycle (or KC) Transmit Control located?
- a. Upper right front of the Carrier Supply panel
  - b. Middle of the Test Panel front
  - c. Lower right front of the Power Supply
  - d. Inside the Test Panel
6. Some of the controls must be adjusted with a screwdriver. How should they be turned?
- a. Three quarters from counterclockwise.
  - b. Fully clockwise
  - c. Fully counterclockwise
  - d. Half-way from clockwise.

7. Two units or pieces of equipment were used in the demonstration. They were:
- a. Transmitter and Test Panel.
  - b. Test Panel and Power Supply.
  - c. Test Panel and Carrier Supply Panel.
  - d. Carrier Supply Panel and Transmitter.
8. One step was to plug a cord into a jack. What was the name of the jack?
- a. Channel In
  - b. Channel Out
  - c. 68 kilocycle
  - d. Measure Out
9. Which of the following needs to be adjusted with a screwdriver?
- a. 68 KC Alarm Cutoff switch
  - b. Carrier Sync switch
  - c. 12 and 28 Send switch
  - d. 65 kilocycle Transmit Control
10. Some of the controls are adjusted with a screwdriver. Which of the statements below correctly describes how those controls are adjusted?
- a. Each is adjusted in its own different way.
  - b. All are adjusted in the same way.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT III - LESSON 3

Checkpoint 1, Form A/B

- Directions:
1. Watch the first short demonstration on the videotape that goes with this checkpoint.
  2. Stop the tape when you are directed to do so.
  3. Do not take notes.
  4. You may replay the tape but do not look at the questions beforehand.
  5. After you stop the tape, answer questions 1 and 2.
  6. After you have finished the whole checkpoint, rewind the tape.

NOTE: Do not look at the questions until after you are done viewing the taped demonstration.

1. Which of the following pieces of information was not included in Demonstration 1?
  - a. Where to set the Measure Switch
  - b. When to stop adjusting the Mod Adjust control.
  - c. Which direction to turn the Mod Trim control.
  - d. All of the above were included in the demonstration.
  
2. Which of the following statements was not made in Demonstration 1?
  - a. You need a screwdriver to adjust the Mod Adjust control.
  - b. Put the Meter Sensitivity switch in the Increase position.
  - c. Turn the Mod Trim control till you get a maximum reading on the Measure Meter.
  - d. All of the above were included in the demonstration.

Now start the tape and watch Demonstration 2. You will be told when to turn off the tape. Afterwards, answer the next two questions.

3. Which of the following pieces of information was not included in Demonstration 2?
  - a. What this demonstration is about.
  - b. What to do with the 150 Volt control.
  - c. What position to set the 750 Volt DC switch.
  - d. All of the above statements were included in the demonstration.
  
4. Which of the following statements was not included in Demonstration 2?
  - a. The 750 Volt Adjust switch should be set at Position 1.
  - b. The 150 Volt DC switch should be in the OFF position.
  - c. You need a screwdriver for the 150 Volt Adjust control.
  - d. All of the above statements were included in the demonstration.

Now start the tape and watch Demonstration 3. You will be told when to turn off the tape. Afterwards, answer the next two questions.

5. Which of the following pieces of information was not included in Demonstration 3?
  - a. What you should do with the RF Channel Tune control.
  - b. What the decade channel is in this case.
  - c. Usually the index pointer will not point exactly to the decade channel.
  - d. All of the above were included in the demonstration.
  
6. Which of the following pieces of information was not included in Demonstration 3?
  - a. What the reading should be on the Measure Meter.
  - b. What you should do with the Indicator control.
  - c. What to do if the Frequency Drift meter has drifted from zero.
  - d. All of the above were included in the demonstration.

Now start the tape and watch Demonstration 4. You will be told when to turn off the tape. Afterwards, answer the next two questions.

7. Which of the following pieces of information was not included in Demonstration 4?
- a. What the reading should be on the DC Volt meter.
  - b. What position to put the 750 Volt DC switch in.
  - c. The purpose of the demonstration.
  - d. All of the above were included in the demonstration.
8. Which of the following statements was not included in Demonstration 4?
- a. Set the 750 Volt Adjust switch to Position 1.
  - b. Set the DC Test switch to 750 Volt Lower Scale position.
  - c. Turn the 750 Volt DC switch to the ON position.
  - d. All of the above were included in the demonstration.

Now watch Demonstration 5. You will be told when to turn off the tape. Afterward answer the next two questions.

9. Which of the following pieces of information was not included in Demonstration 5?
- a. The name of the control you must adjust.
  - b. The name of the meter you must look at.
  - c. The name of the piece of equipment you are working on.
  - d. All of the above were included in the demonstration.
10. Which of the following statements was not included in Demonstration 5?
- a. Turn the AFC switch to ON.
  - b. Turn the AFC control to the +4 mark.
  - c. When you release the AFC control, it automatically returns to zero.
  - d. All of the above were included in the demonstration.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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**INSTRUCTIONS FOR STUDENT - TO BE HANDED WITH VIDEOTAPE**

Name \_\_\_\_\_

Date \_\_\_\_\_

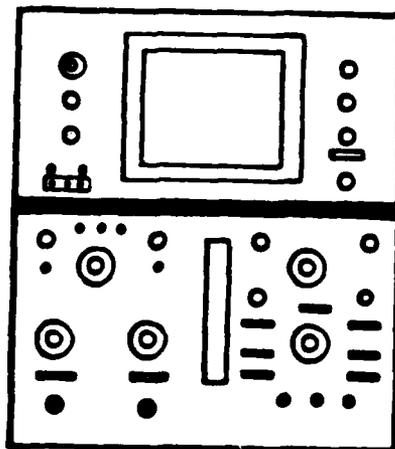
**UNIT IV - LESSON 1**

**Checkpoint 1, Form A/B**

To complete this checkpoint,

- Insert the videotape on the machine and watch the demonstration on the presets for the AN/USM-281A Oscilloscope. Take notes on a separate sheet of paper. Use the drawing below to label the controls.
- If necessary, rewind the tape and watch the demonstration again.
- When you are satisfied that your notes are complete, return the tape to the instructor. He will assign you to some other activity for half an hour. Then he will give you a set of questions to answer.

**DO NOT LOSE YOUR NOTES.**



**Unit IV, Lesson 1  
Checkpoint 1, Form A/B**

**INSTRUCTIONS**

TO BE HANDED OUT AFTER VIDEOTAPE HAS BEEN RETURNED.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 1

Checkpoint 1, Form A

Use your notes to answer the questions below. Check the one correct answer for each question.

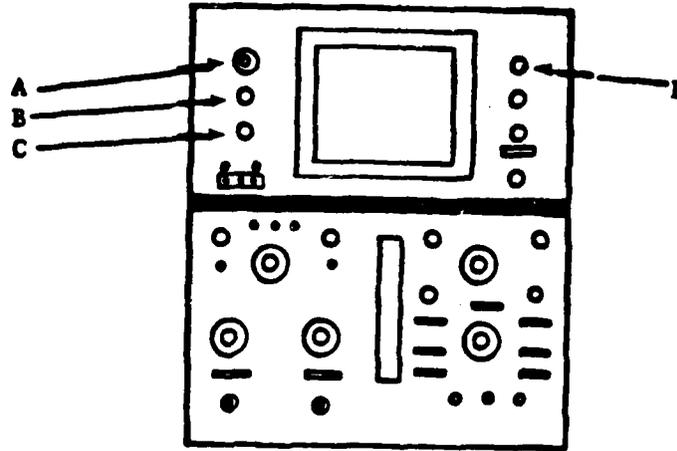
1. The tables in the front of TM 9-6625-2362-12 will tell you:  
 a. the steps in using the AN/USM-281A oscilloscope for troubleshooting.  
 b. where to find additional reference materials on the AN/USM-281A.  
 c. the description and function of each control on the control panel.  
 d. how to locate each procedure in the manual.
  
2. The vertical function controls are located in the \_\_\_\_\_ quarter of the oscilloscope.  
 a. upper left  
 b. lower left  
 c. upper right  
 d. lower right
  
3. The AN/USM-281A cannot be used as:  
 a. an AC voltmeter.  
 b. a DC voltmeter  
 c. a peak-to-peak voltmeter.  
 d. a frequency meter.

Unit IV, Lesson 1  
Checkpoint 1, Form A

1

4. The BEAM FINDER button is located in the middle of:
- a. the SCALE ILLUMINATION control.
  - b. the HORIZONTAL POSITIONING control.
  - c. the INTENSITY control.
  - d. the FOCUS control.
5. If the controls are set properly but there is no display on the CRT you would:
- a. adjust the SCALE ILLUMINATION control.
  - b. turn the HORIZONTAL POSITIONING control.
  - c. turn the FOCUS control counterclockwise.
  - d. press the BEAM FINDER button.
6. When the POWER OFF/ON switch is turned to ON, what indication do you get?
- a. A buzzer sounds
  - b. A pilot light comes on
  - c. The CRT lights up
  - d. No indication
7. Suppose the trace shows up near the bottom of the CRT. What control would you use to move it to where it should be?
- a. The HORIZONTAL POSITIONING control
  - b. The VERTICAL POSITIONING control
  - c. The BEAM FINDER button
  - d. The SCALE ILLUMINATION control

For the next three questions, refer to the drawing below.



8. If you wanted to move the trace to the left or right, you would use the control marked:

- a. A
- b. B
- c. C
- d. D

9. To light up the up and down lines on the face of the CRT, you would use the control marked:

- a. A
- b. B
- c. C
- d. D

10. To make the CRT beam brighter, you would turn the outer rim of the control marked:

- a. A
- b. B
- c. C
- d. D

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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TO BE HANDED OUT AFTER VIDEOTAPE HAS BEEN RETURNED.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 1

Checkpoint 1, Form B

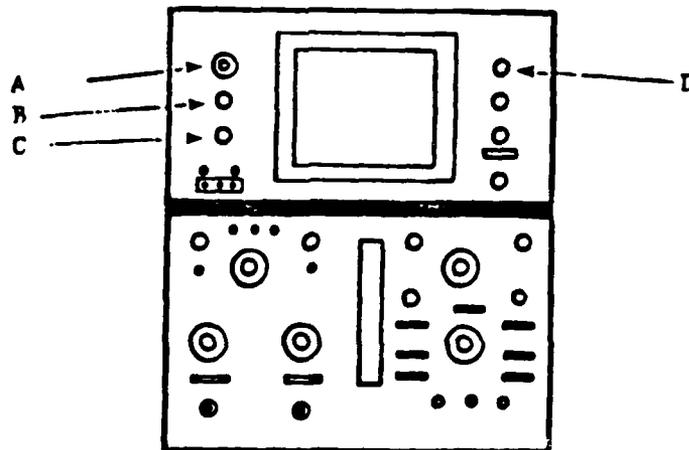
1. The horizontal function controls are located in the \_\_\_\_\_ quarter of the oscilloscope.
  - a. upper right
  - b. lower left
  - c. upper right
  - d. lower right
  
2. The AN/USM-281A is used for troubleshooting using the \_\_\_\_\_ method.
  - a. peak-to-peak
  - b. signal tracing
  - c. horizontal positioning
  - d. trial and error
  
3. To find the description and function of each control on the AN/USM-281A, you would look:
  - a. on the back panel of the oscilloscope.
  - b. in the Soldier's Manual (FM 11-31M 1/2)
  - c. in the front of TM 9-6625-2362-12.
  - d. in the Appendix to TM 9-6625-2362-12.
  
4. The up-and-down lines on the CRT are used for:
  - a. locating the beam.
  - b. horizontal positioning.
  - c. measuring peak-to-peak voltage.
  - d. measuring DC voltage.

Unit IV, Lesson 1  
Checkpoint 1, Form B

1

5. The BEAM FINDER button is used to:
- a. locate the trace when there is no display.
  - b. move the trace up and down.
  - c. move the trace to left or right.
  - d. control the intensity of the CRT beam.
6. The outer rim of the BEAM FINDER button is called the:
- a. HORIZONTAL POSITIONING control.
  - b. INTENSITY control.
  - c. FOCUS control.
  - d. SCALE illumination control.
7. Suppose the trace shows up near the top of the CRT. What control would you use to move it to where it should be?
- a. The SCALE ILLUMINATION control
  - b. The BEAM FINDER control
  - c. The HORIZONTAL POSITIONING control
  - d. The VERTICAL POSITIONING control

For the next three questions, refer to the drawing below.



Unit IV, Lesson 1  
Checkpoint 1, Form B

2

8. The control labeled "D" is used to:
- a. move the trace to the left or right.
  - b. move the trace up and down.
  - c. make the CRT beam brighter.
  - d. light up the up-and-down lines on the CRT.
9. The control labeled "B" is used to:
- a. bring the display into focus.
  - b. locate the beam when there is no display
  - c. turn the power on and off.
  - d. move the trace to the left or right.
10. The control labeled "C" is used to:
- a. turn the power on and off.
  - b. move the trace up and down.
  - c. light up the up-and-down lines on the CRT.
  - d. make the CRT beam brighter.

**INSTRUCTIONS FOR STUDENT - TO BE HANDED OUT WITH VIDEOTAPE**

Name \_\_\_\_\_

Date \_\_\_\_\_

**UNIT IV - LESSON 2**

**Checkpoint 1, Form A/B**

To complete this checkpoint,

- . Insert the videotape in the machine and watch the demonstration of how to count a frequency on the AN/TSM 16 Frequency Meter. Take notes on a separate sheet of paper.
- . If necessary, rewind the tape and watch the demonstration again.
- . When you are satisfied that your notes are complete, return the tape to the instructor. He will assign you to some other activity for half an hour. Then he will give you a set of questions to answer.

**DO NOT LOSE YOUR NOTES.**

Unit IV, Lesson 2  
Checkpoint 1, Form A/B

**INSTRUCTIONS**

TO BE HANDED OUT AFTER VIDEOTAPE HAS BEEN RETURNED

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 2

Checkpoint 1, Form A

Use your notes to answer the questions below. Check the one correct answer for each question.

1. Before coupling the frequency to be measured to the COUNTER INPUT receptacle, you should:
  - a. set the FUNCTION switch to FREQ COUNT position.
  - b. rotate the SENSITIVITY control clockwise.
  - c. adjust the DISPLAY TIME control.
  - d. translate the reading into cycles per second.
  
2. After you rotate the TIME SECONDS switch to the desired time sampling period, the next step is to:
  - a. translate the reading into cycles per second.
  - b. rotate the SENSITIVITY control clockwise.
  - c. adjust the DISPLAY TIME control.
  - d. set the FUNCTION switch to the FREQ COUNT position.
  
3. How should the INPUT LEVEL meter look after you adjust the SENSITIVITY control?
  - a. There should be a maximum right-hand deflection.
  - b. There should be a maximum left-hand deflection.
  - c. The indicator needle should be at zero.
  - d. The indicator needle should be within the green area.

4. Several of the steps in counting a frequency involve operating controls and switches. Which of the following shows the correct sequence for operating three of the controls?

- a. FUNCTION  
TIME-SECONDS  
SENSITIVITY
- b. FUNCTION  
SENSITIVITY  
TIME-SECONDS
- c. SENSITIVITY  
FUNCTION  
TIME-SECONDS
- d. TIME-SECONDS  
DISPLAY TIME  
SENSITIVITY

5. Of these four steps, which one would you do first?

- a. Adjust the DISPLAY TIME control.
- b. Adjust the SENSITIVITY control.
- c. Rotate the TIME-SECONDS switch to the desired time sampling period.
- d. Couple frequency to be measured to the COUNTER INPUT receptacle.

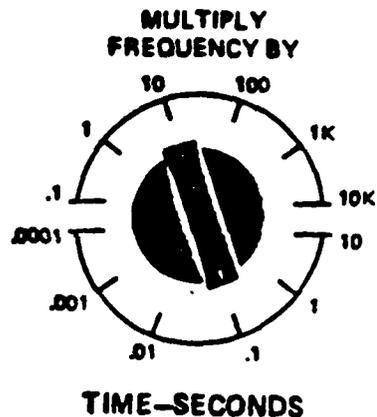
6. Of these four steps, which one do you do last?

- a. Translate reading on frequency counter into cycles per second.
- b. Set FUNCTION switch to FREQ COUNT position.
- c. Adjust SENSITIVITY control.
- d. Adjust DISPLAY TIME control.

7. After adjusting the DISPLAY TIME control, you should:

- a. set the FUNCTION switch to the FREQ COUNT position.
- b. adjust the SENSITIVITY control.
- c. translate the reading on the frequency counter into cycles per second.
- d. rotate the TIME-SECONDS switch to the desired time sampling period.

8. The drawing below shows the display on the counter and the setting of the TIME-SECOND switch. How would you translate the count into cycles per second?



- a. Multiply 8000 times .1  
 b. Multiply 8000 times 10  
 c. Divide 8000 by .1  
 d. Divide 8000 by 10
9. How do you adjust the sensitivity control?
- a. Slide it up  
 b. Rotate it counterclockwise  
 c. Slide it down  
 d. Rotate it clockwise
10. Of these four steps, which one do you do first?
- a. Adjust the DISPLAY TIME control.  
 b. Set the FUNCTION switch to the FREQ COUNT position.  
 c. Adjust the SENSITIVITY control.  
 d. Couple the frequency to be measured to the COUNTER INPUT receptacle.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Unit IV, Lesson 2  
Checkpoint 1, Form A

TO BE HANDED OUT AFTER VIDEOTAPE HAS BEEN RETURNED

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 2

Checkpoint 1, Form B

Use your notes to answer the questions below. Check the one correct answer for each question.

1. After coupling the frequency to be measured to the COUNTER INPUT receptacle, you should:
  - a. set the FUNCTION switch to FREQ COUNT position.
  - b. rotate the SENSITIVITY control clockwise.
  - c. adjust the DISPLAY TIME control.
  - d. translate the reading into cycles per second.
  
2. Before you rotate the TIME SECONDS switch, you should:
  - a. translate the reading into cycles per second.
  - b. rotate the SENSITIVITY control clockwise.
  - c. adjust the DISPLAY TIME control.
  - d. set the FUNCTION switch to the FREQ COUNT position.
  
3. What control do you use to change the indication on the INPUT LEVEL meter?
  - a. FUNCTION switch
  - b. DISPLAY TIME switch
  - c. TIME-SECONDS switch
  - d. SENSITIVITY control

4. Several of the steps in counting a frequency involve operating controls and switches. Which of the following shows the correct sequence for operating three of the controls?

\_\_\_\_\_ a. SENSITIVITY  
TIME-SECONDS  
DISPLAY TIME

\_\_\_\_\_ b. FUNCTION  
TIME-SECONDS  
SENSITIVITY

\_\_\_\_\_ c. DISPLAY TIME  
TIME-SECONDS  
FUNCTION

\_\_\_\_\_ d. TIME-SECONDS  
DISPLAY TIME  
FUNCTION

5. Of these four steps, which one would you do last?

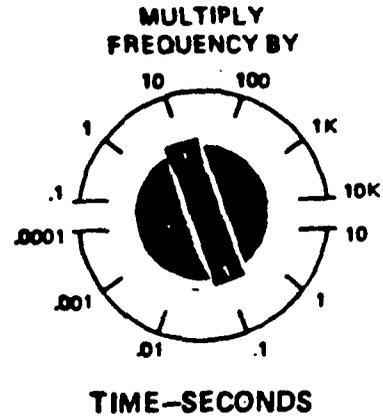
\_\_\_\_\_ a. Adjust the DISPLAY TIME control.

\_\_\_\_\_ b. Adjust the SENSITIVITY control.

\_\_\_\_\_ c. Rotate the TIME-SECONDS switch to the desired time sampling period.

\_\_\_\_\_ d. Couple frequency to be measured to the COUNTER INPUT receptacle.

6. The drawing below shows the display on the counter and the setting of the TIME-SECOND switch. How would you translate the count into cycles per second?



- a. .01  
 b. .1  
 c. 1  
 d. 10
7. After these four steps, which one do you do first?
- a. Rotate TIME-SECONDS switch to desired time sampling period  
 b. Translate reading into cycles per second  
 c. Couple frequency to be measured to COUNTER INPUT receptacle  
 d. Adjust DISPLAY TIME control
8. After these four steps, which would you do last?
- a. Rotate TIME-SECONDS switch to desired time sampling period  
 b. Translate reading into cycles per second  
 c. Couple frequency to be measured to COUNTER INPUT receptacle  
 d. Adjust DISPLAY TIME control

9. After rotating the SENSITIVITY control, you should:

- a. Couple frequency to be measured to COUNTER INPUT receptacle.
- b. Set FUNCTION switch to FREQ COUNT position.
- c. Rotate TIME-SECONDS switch to desired time sampling period.
- d. Adjust DISPLAY TIME control.

10. What indication should you get on the INPUT LEVEL meter?

- a. Needle within the green area
- b. Needle at zero
- c. Needle all the way to the left
- d. Needle all the way to the right

INSTRUCTIONS FOR STUDENT - TO BE HANDED OUT WITH VIDEOTAPE

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 3

Checkpoint 1, Form A/B

To complete this checkpoint,

- . Insert the videotape on the machine and watch the demonstration on the presets for the AN/TRC-24 radio set. Take notes on a separate sheet of paper.
- . If necessary, rewind the tape and watch the demonstration again.
- . When you are satisfied that your notes are complete, return the tape to the instructor. He will assign you to some other activity for half an hour. Then he will give you a set of questions to answer.

DO NOT LOSE YOUR NOTES.

Unit IV, Lesson 3  
Checkpoint 1, Form A/B

INSTRUCTIONS

TO BE HANDED OUT AFTER VIDEOTAPE HAS BEEN RETURNED

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 3

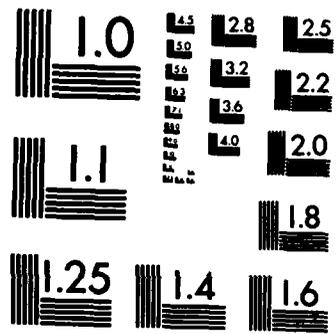
Checkpoint 1, Form A

Use your notes to answer the questions below. Check the one correct answer for each question.

1. What are the three major parts of this demonstration?
  - a. COARSE TUNE adjustment, FINE TUNE adjustment, and RF AMP adjustment
  - b. Receiver presets, transmitter presets, and power supply presets
  - c. Receiver presets, RF CHANNEL TUNE adjustment, and 150 V adjustment
  - d. COARSE TUNE adjustment, DRIVER TUNE adjustment, and power supply presets
  
2. Which of these steps are part of the transmitter presets?
  - a. Adjust COARSE TUNE control and adjust FINE TUNE control
  - b. Adjust RF AMP control and turn INDEX knob
  - c. Set AFC control at zero and adjust DRIVER TUNE control
  - d. Preset 750 ADJ control and 150 V ADJ control
  
3. How many steps are there in the receiver presets?
  - a. Two
  - b. Three
  - c. Four
  - d. Five

Unit IV, Lesson 3  
Checkpoint 1, Form A





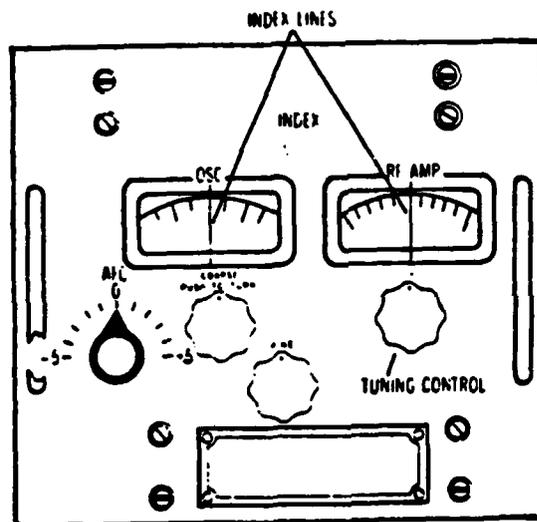
MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

4. Setting the PULSED OSCILLATOR control for ODD or EVEN channels is the first step in:

- \_\_\_\_\_ a. Receiver presets.
- \_\_\_\_\_ b. Transmitter presets.
- \_\_\_\_\_ c. Power supply presets.
- \_\_\_\_\_ d. Connecting the power supply.

5. Look at the controls shown in the drawing below, and compare the terms with your notes. This is a drawing of the:

- \_\_\_\_\_ a. Power supply.
- \_\_\_\_\_ b. Transmitter - upper panel.
- \_\_\_\_\_ c. Receiver.
- \_\_\_\_\_ d. Transmitter - lower panel.



6. The last step in the receiver presets is:

- \_\_\_\_\_ a. adjust the RF CHANNEL TUNE control.
- \_\_\_\_\_ b. adjust the DRIVER TUNE control.
- \_\_\_\_\_ c. adjust the RF AMP TUNE control.
- \_\_\_\_\_ d. adjust the FINE TUNE control.

7. The assigned channel number should appear at the center of a window:

- a. on both the transmitter and receiver.
- b. on the receiver only.
- c. on both the transmitter and the power supply.
- d. on the transmitter only.

8. The last step in the transmitter presets is:

- a. adjust the RF AMP tune control.
- b. adjust the AFC control.
- c. connect the ground wires to the ground binding post.
- d. adjust the DRIVER TUNE control.

9. The first step in the power supply presets is:

- a. adjust the COARSE TUNE control.
- b. set the ODD/EVEN CHANNEL control.
- c. set the 750 V ADJ control.
- d. set the DC test switch.

10. A screwdriver is used to perform one of the steps in the:

- a. Receiver presets.
- b. Transmitter presets.
- c. Power supply presets.
- d. COARSE TUNE adjustment.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

TO BE HANDED OUT AFTER VIDEOTAPE HAS BEEN RETURNED

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 3

Checkpoint 1, Form B

Use your notes to answer the questions below. Check the one correct answer for each question.

1. Which major part of the procedure has steps performed on more than one panel?

- a. Receiver Presets
- b. Transmitter Presets
- c. Power Supply Presets

2. Which of these steps are part of the transmitter presets?

- a. Adjust COARSE TUNE control and adjust FINE TUNE control
- b. Adjust RF AMP control and turn INDEX knob
- c. Set AFC control at zero and adjust DRIVER TUNE control
- d. Preset 750 ADJ control and 150 V ADJ control

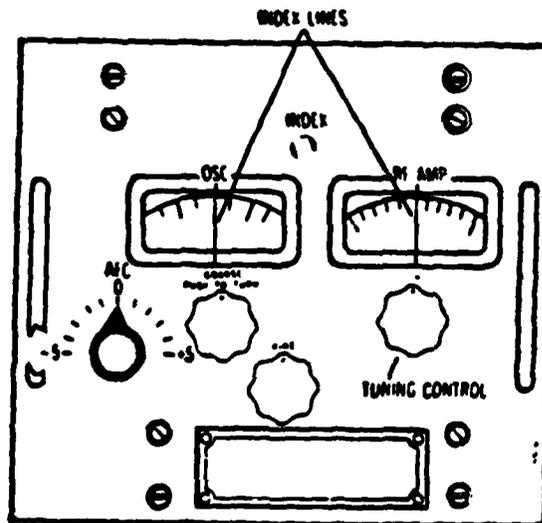
3. How many steps are there in the receiver presets?

- a. Two
- b. Three
- c. Four
- d. Five

Unit IV, Lesson 3  
Checkpoint 1, Form B

1

4. Adapting the DRIVER TUNE control is the last step in:
- a. Receiver presets.
  - b. Transmitter presets.
  - c. Power supply presets.
  - d. Connecting the power supply.
5. Look at the controls shown in the drawing below. Which of these controls do you use in the receiver preset procedures?
- a. AFC control, RF AMP tune control, and COARSE TUNE control
  - b. AFC control, COARSE TUNE control, and FINE TUNE control
  - c. COARSE TUNE control, FINE TUNE control, and RF AMP tune control
  - d. FINE TUNE control, RF AMP tune control, and AFC control



6. After you preset the 750 V ADJ control, what do you do next?
- a. Adjust the DRIVER TUNE control.
  - b. Connect the ground wires to the binding post.
  - c. Preset the 150 V ADJ control.
  - d. Set the DC TEST switch.

7. You need to know the assigned channel in order to do the:

- a. Receiver and power supply presets.
- b. Receiver presets only.
- c. Receiver and transmitter presets
- d. Transmitter presets only.

8. The last step in the receiver presets is:

- a. adjust the RF AMP tune control.
- b. adjust the AFC control.
- c. connect the ground wires to the ground binding post.
- d. adjust the DRIVER TUNE control.

9. The first step in the transmitter presets is:

- a. set the PULSED OSCILLATOR control.
- b. preset the 750 V ADJ control.
- c. adjust the COARSE TUNE control.
- d. adjust the INDEX control.

10. The PULSED OSCILLATOR control is located on the:

- a. receiver.
- b. upper pannel of the transmitter.
- c. lower panel of the transmitter
- d. power supply.

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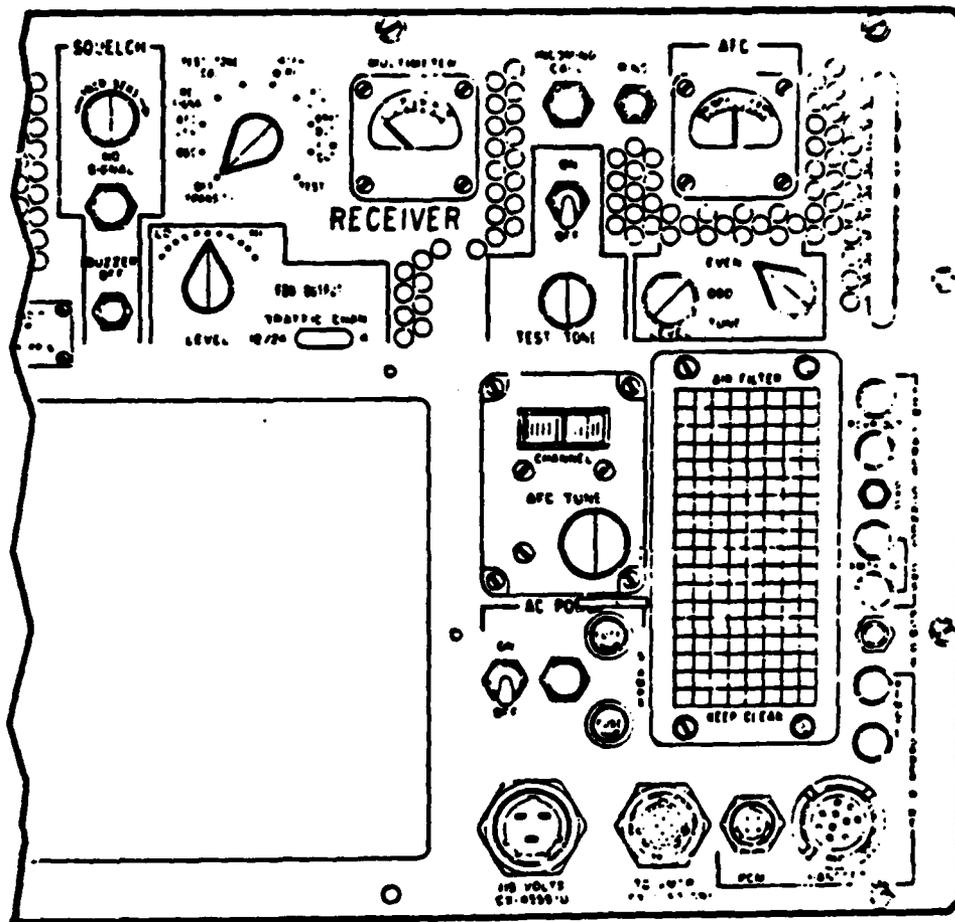
Name \_\_\_\_\_

Date \_\_\_\_\_

### UNIT V - LESSON 1

#### Checkpoint 1, Form A

Below is a drawing of part of the front panel of a radio receiver. Look over the parts on this panel. Then answer the questions on the next page.

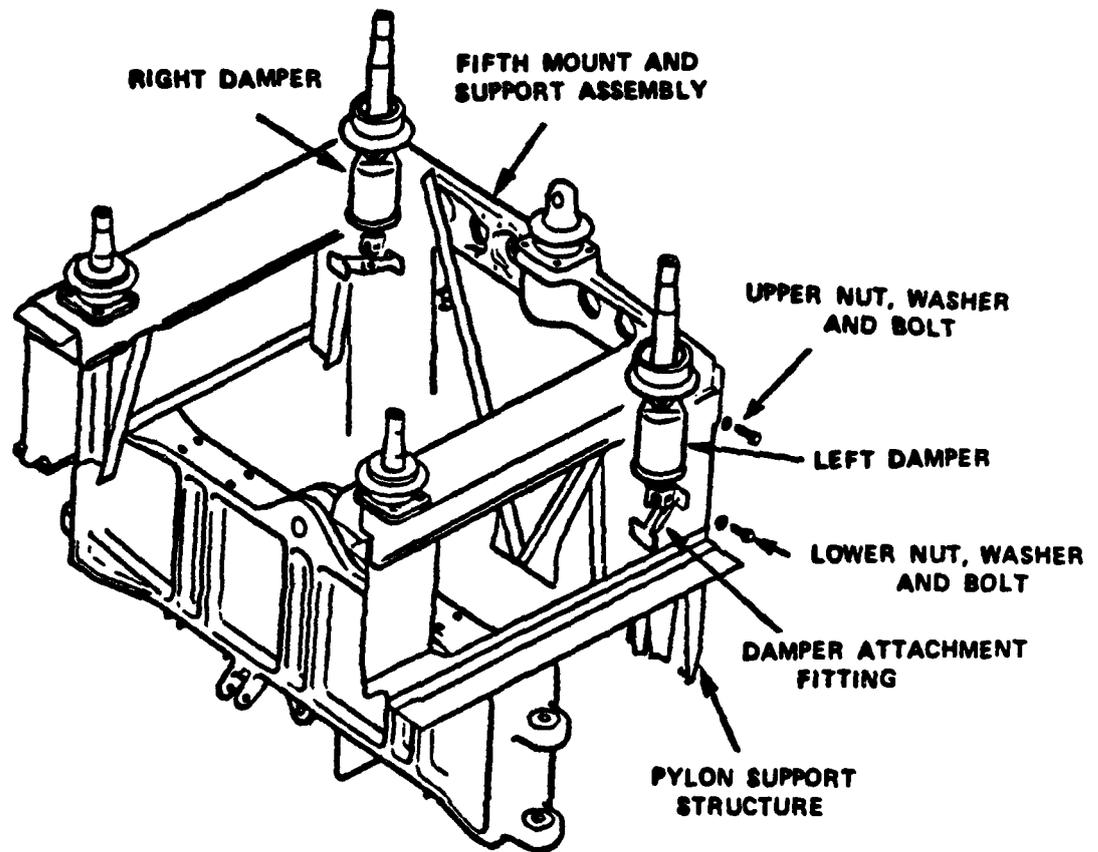


Unit V, Lesson 1  
Checkpoint 1, Form A

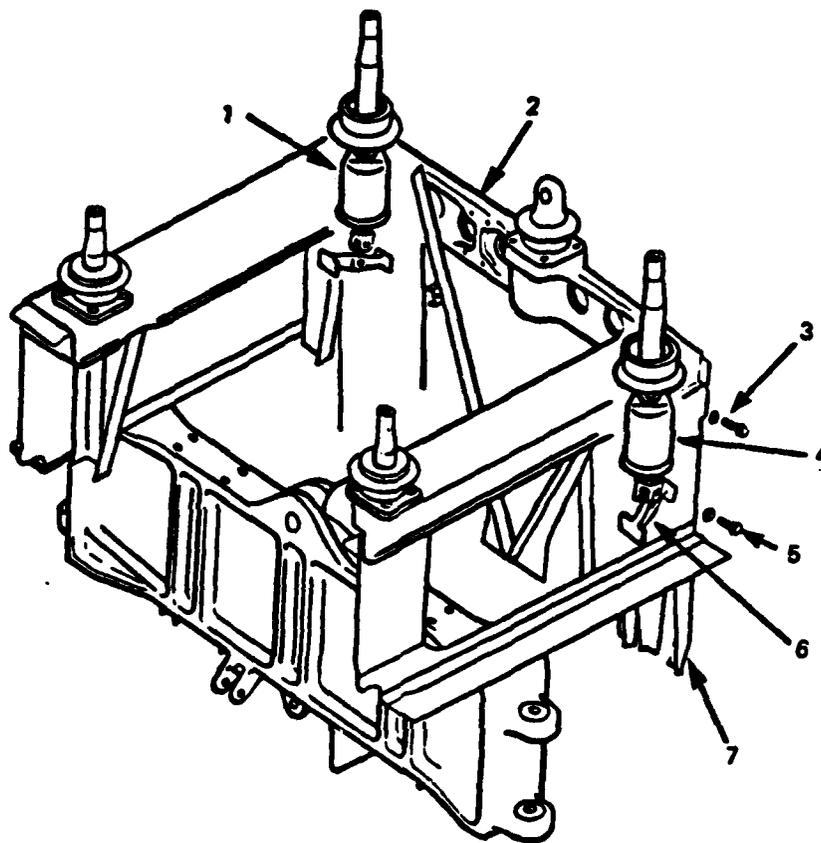
1

1. The RING label is located:
  - a. Below the part.
  - b. Above the part.
  - c. On the left side of the part.
  - d. On the right side of the part.
  
2. On the panel shown on the previous page, the best way to locate the TEST TONE control is by:
  - a. the shape.
  - b. the color.
  - c. the label.
  - d. the size.

Below is a diagram of a section of a helicopter. Look over the labeled parts. Then turn to the next page and answer the question about the diagram.



Unit V, Lesson 1  
Checkpoint 1, Form A



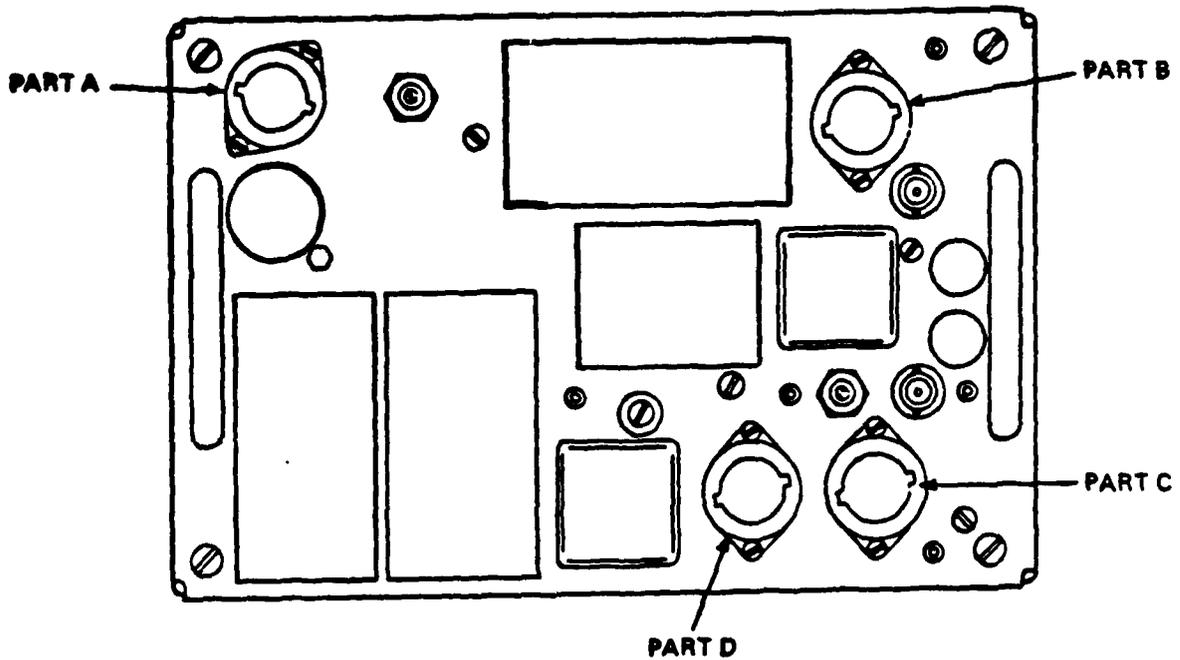
The following question refers to the above diagram. This diagram is identical to the one on the page before, except that the parts have numbers instead of labels. When answering the question, you may refer back to the diagram with the labeled parts.

3. The damper attachment fitting is part number:
- a. 1
  - b. 3
  - c. 5
  - d. 6

Unit V, Lesson 1  
Checkpoint 1, Form A

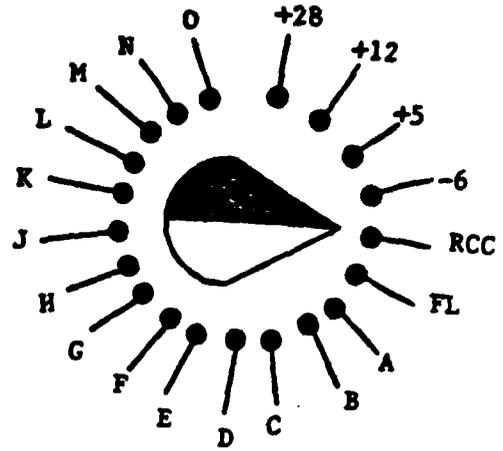
4

Below is a drawing of a baseband assembly. Pay attention to how the various parts are arranged. Then answer the question that follows the drawing.



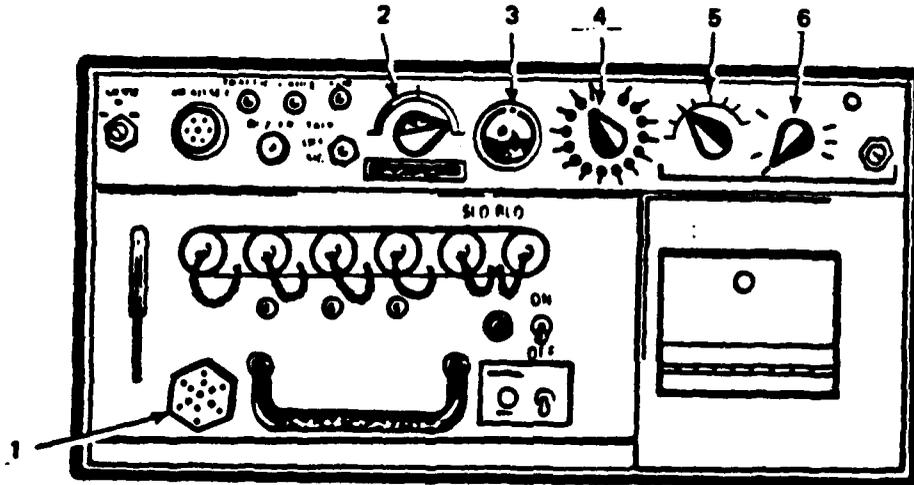
4. Which feature of Part B makes it different from Part D?
- a. The shape.
  - b. The size.
  - c. The location.
  - d. The color.

On the right is a drawing of a SERV SEL switch.

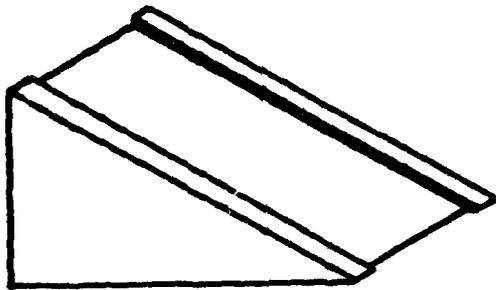


5. On the piece of equipment shown below, which of the numbered parts is the SERV SEL switch?

- a. 2
- b. 3
- c. 4
- d. 5



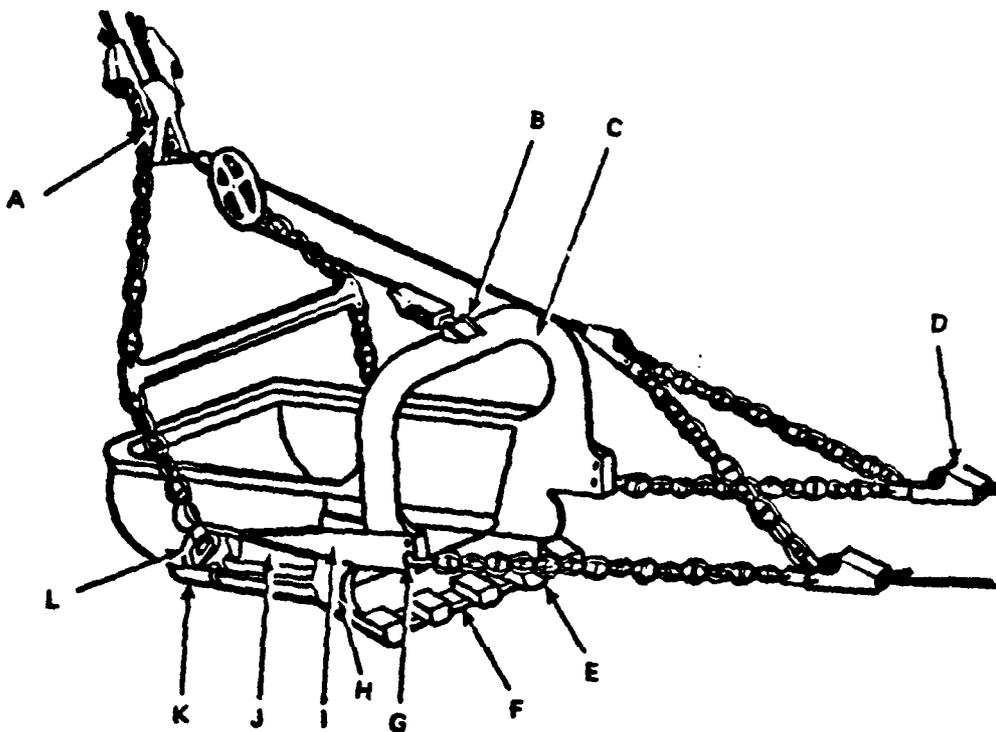
Unit V, Lesson 1  
 Checkpoint 1, Form A



On the left is part of a dragline bucket system called an anchor.

6. Below is a drawing of a dragline bucket system. Which of the lettered parts is the anchor?

- a. A
- b. B
- c. C
- d. D



Unit V, Lesson 1  
Checkpoint 1, Form A



**PART A**



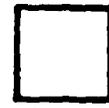
**PART B**



**PART C**



**PART D**



**PART E**

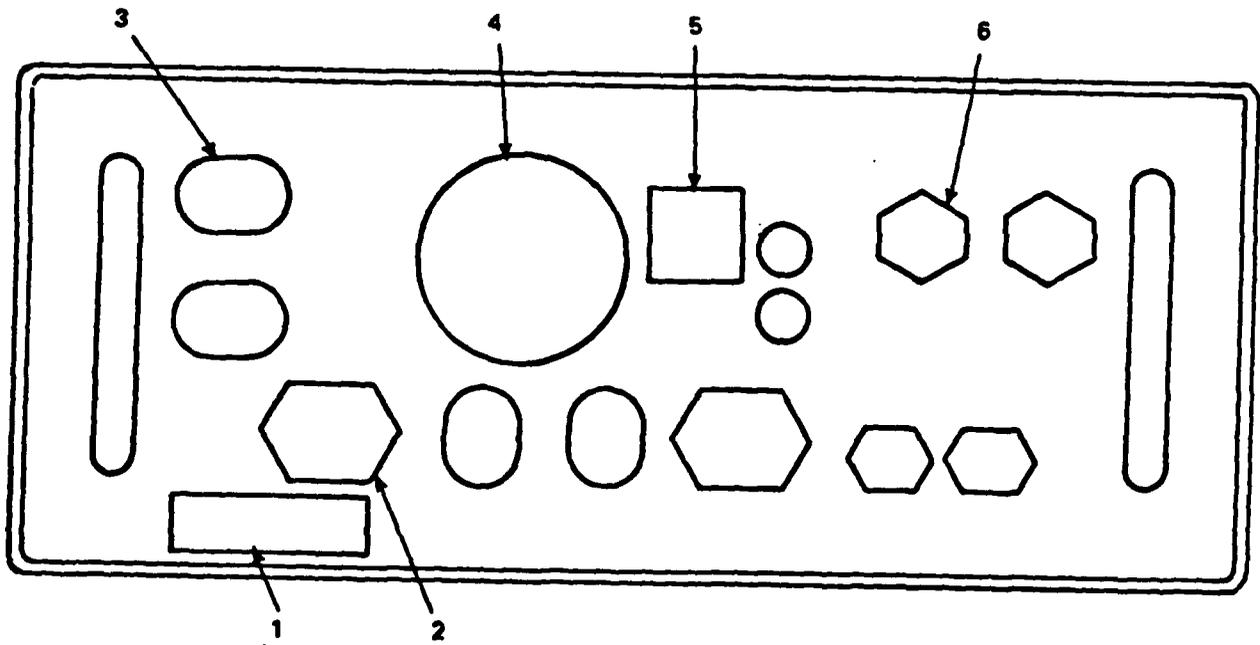
Above are five parts of a whole piece of equipment. Look over each of the parts, then answer the following two questions.

7. On the piece of equipment shown below, Part C is number:

- a. 1
- b. 3
- c. 4
- d. 5

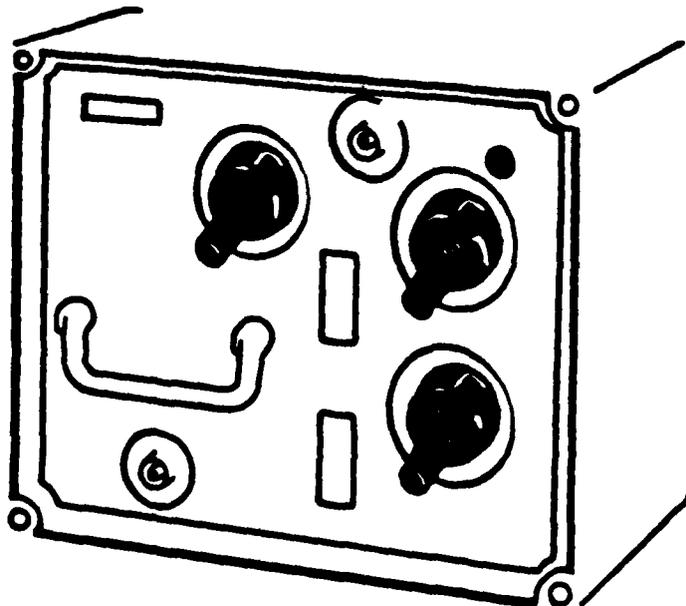
8. Which of the numbered parts matches Part A above?

- a. 1
- b. 3
- c. 4
- d. 6

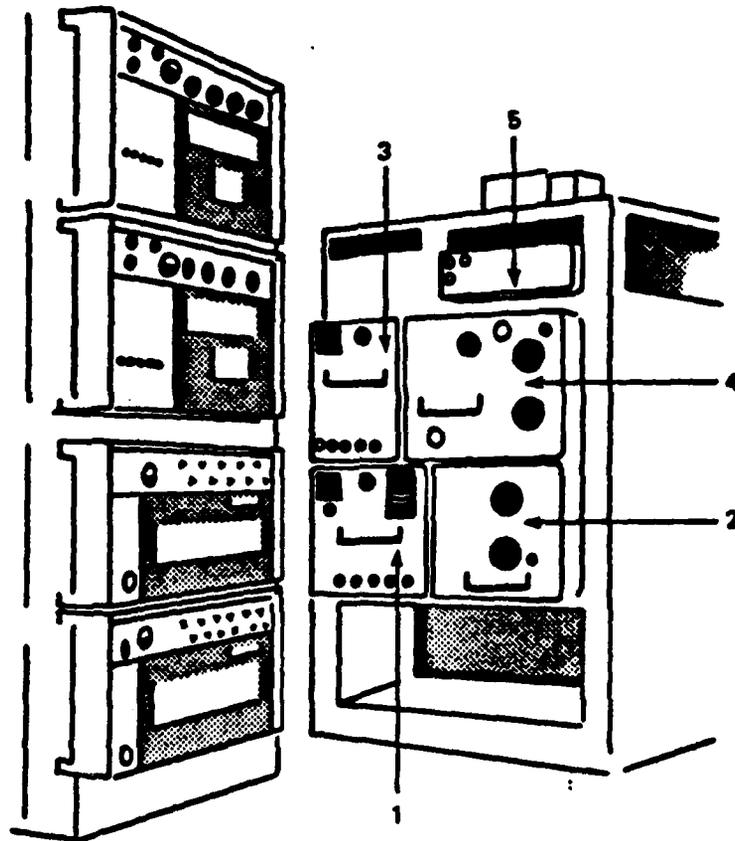


Unit V, Lesson 1  
Checkpoint 1, Form A

Below is a diagram of an amplifier-converter.



9. In the drawing on the next page, which of the numbered parts is the amplifier-converter?
- a. 3
  - b. 5
  - c. 6
  - d. 7
10. The amplifier-converter can best be recognized by:
- a. the shape of the controls and indicators.
  - b. the presence of air vents and handles.
  - c. the size and color of the equipment.
  - d. the number of large controls.



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Unit V, Lesson 1  
Checkpoint 1, Form A

10

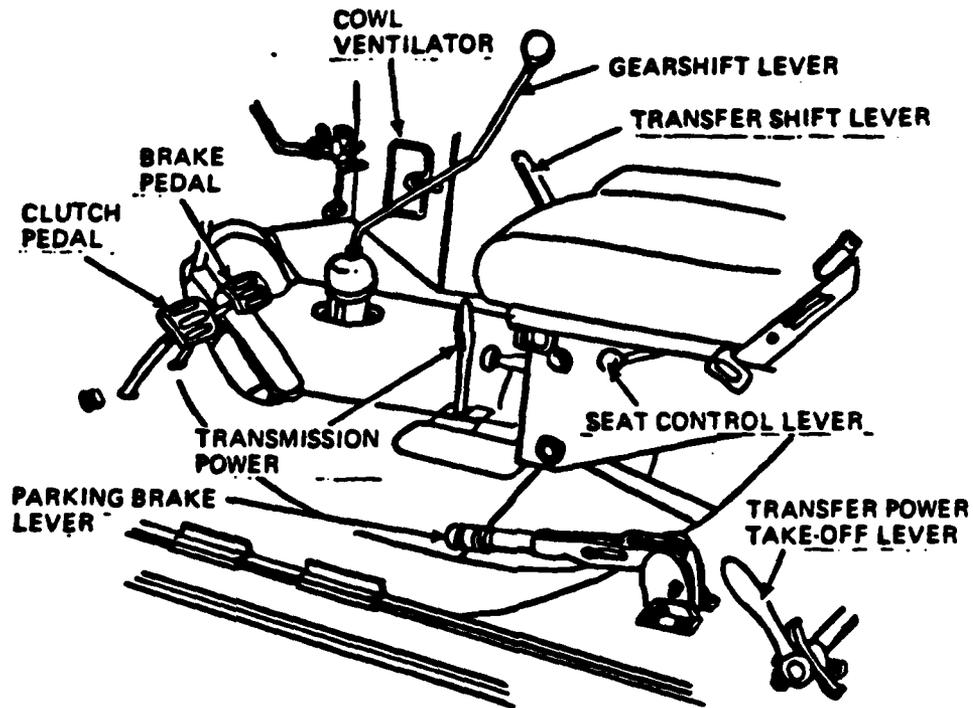
Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT V - LESSON 1

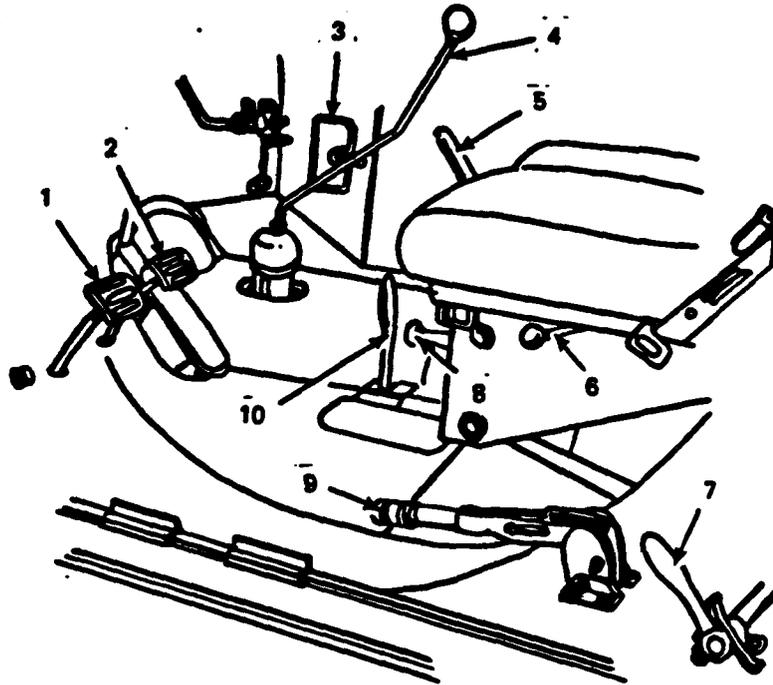
Checkpoint 1, Form B

Below is a drawing of the interior of an Army truck. Many of the parts are chassis controls. Look over all the labeled parts, then turn to the next page and answer the question concerning the diagram.



Unit V, Lesson 1  
Checkpoint 1, Form B

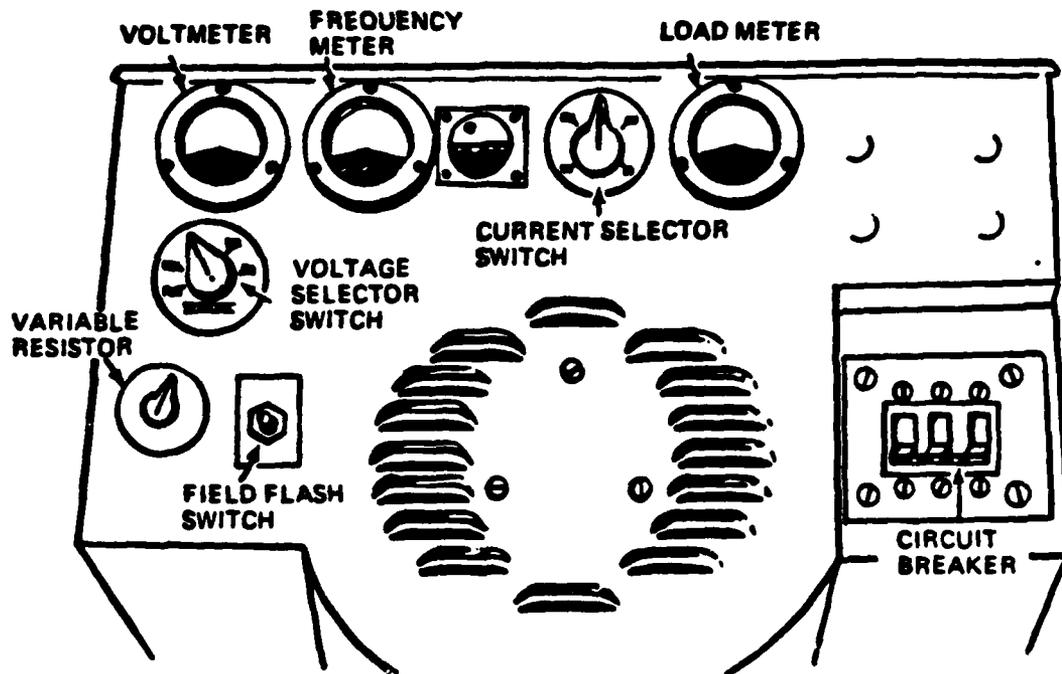
1



The following question refers to the above diagram. The diagram is identical to the one on the page before, except that the parts have numbers instead of labels. When answering the question, you may refer back to the diagram with the labeled parts.

1. Which of the numbered parts is the transmission power?
  - a. 4
  - b. 5
  - c. 8
  - d. 10

Below is a drawing of a generator panel. Pay attention to how the meters and switches are arranged. Then answer the questions that follow.

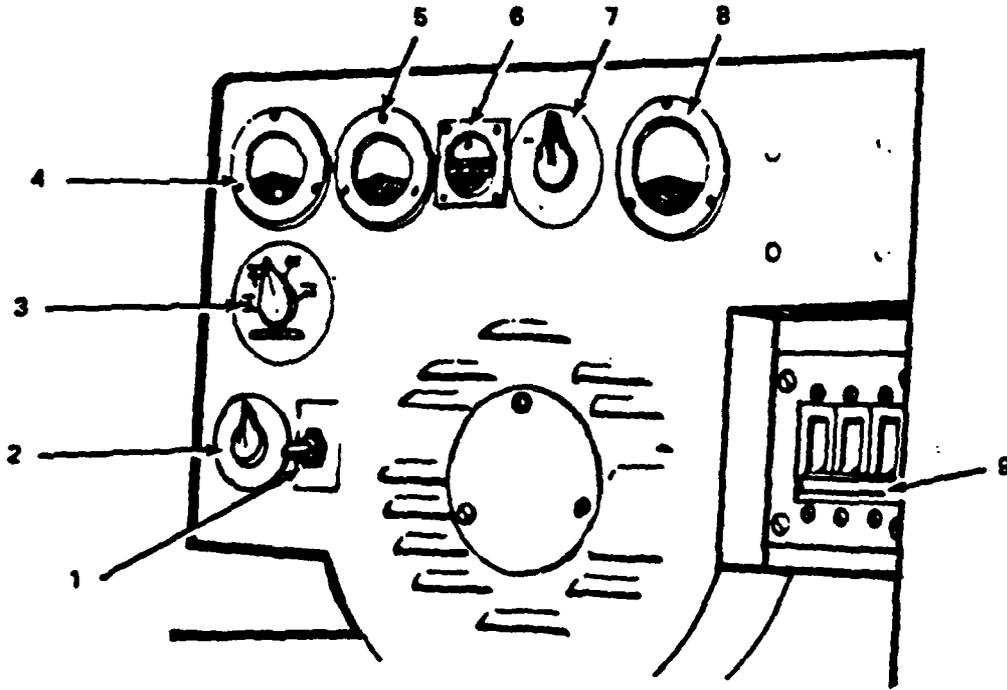


On the following page is a drawing of the same generator panel shown above. Use the drawing to answer the next two questions. You may refer back to the drawing above to help you answer the questions.

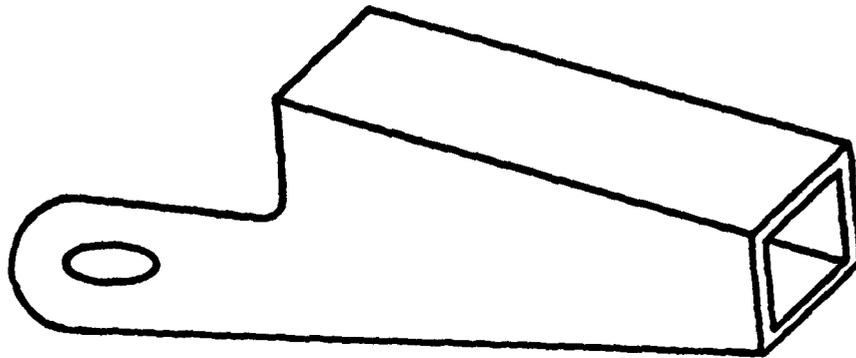
2. On the drawing on the next page, which numbered part is the LOAD METER?
  - a. 4
  - b. 5
  - c. 7
  - d. 8
  
3. The LOAD METER can best be recognized by its:
  - a. shape.
  - b. size.
  - c. location.
  - d. color.

Unit V, Lesson 1  
Checkpoint 1, Form B

3



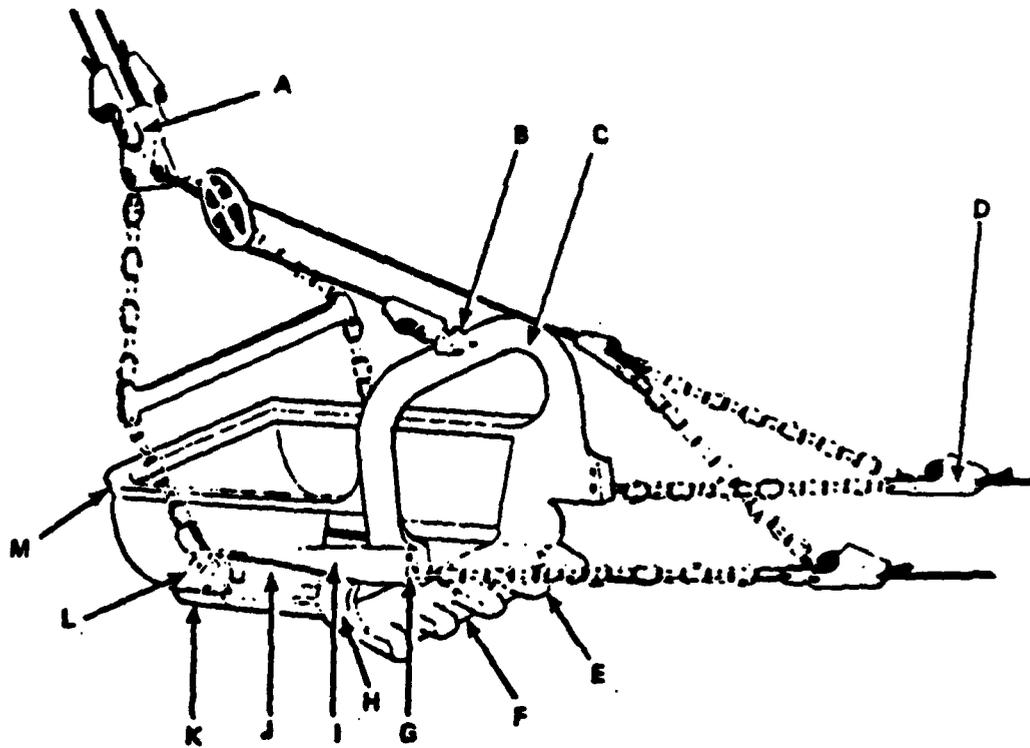
Unit V, Lesson 1  
Checkpoint 1, Form B



Above is a drawing of one part of a bucket rigging system. It is called a drag socket.

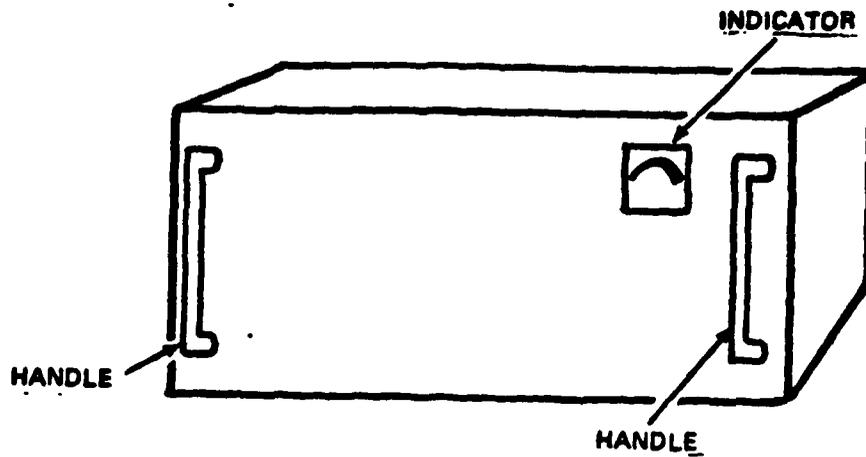
4. Below is a drawing of the entire bucket rigging system. Which of the parts is the drag socket?

- a. A
- b. B
- c. C
- d. D



Unit V, Lesson 1  
Checkpoint 1, Form B

5

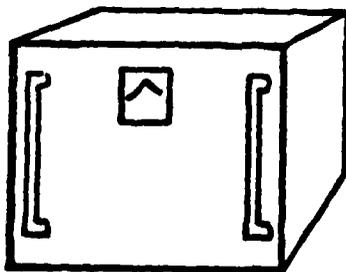


5. Below are drawings of three different multiplexes. Which one matches the drawing above?

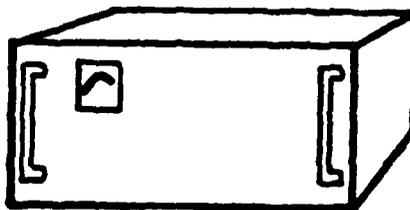
- a. A
- b. B
- c. C
- d. None of the above.

6. In what way are all three multiplexes shown below different?

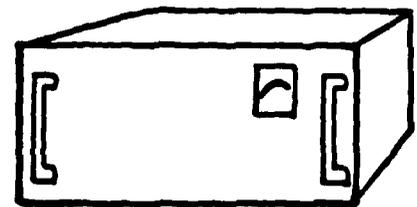
- a. Size
- b. Location of indicator
- c. Presence of handles
- d. Location of handles



A



B

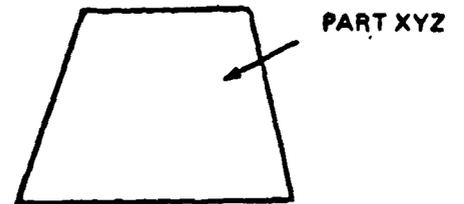
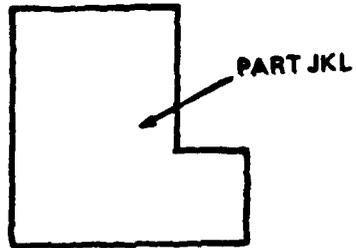
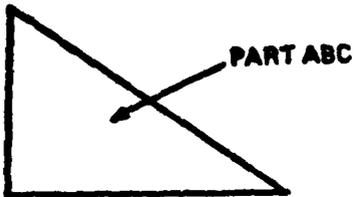


C

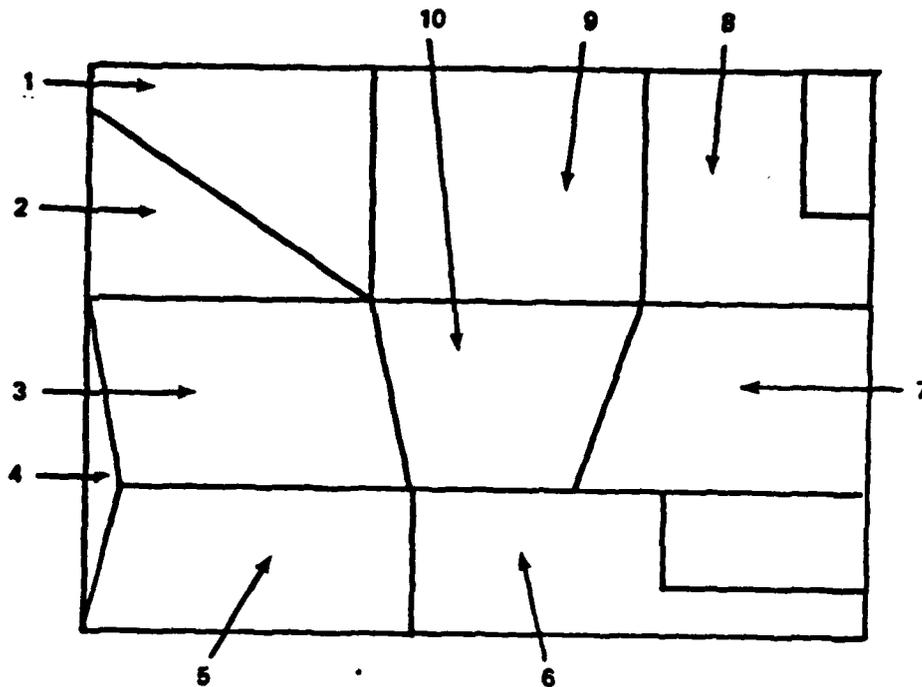
Unit V, Lesson 1  
Checkpoint 1, Form B

6

**Directions:** Below are drawings of three parts of a whole: Part ABC, Part JKL, and Part XYZ. Look over each part, then answer the question that follows. Then turn to the next page and answer some questions.



7. What feature makes the three parts different?
- a. The Size
  - b. The Shape
  - c. The Color
  - d. The Design



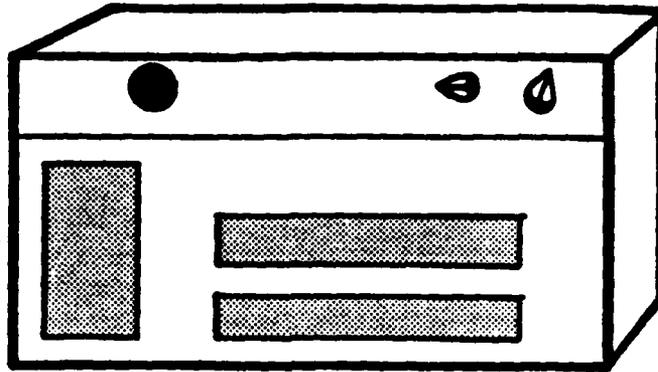
8. Where is Part JKL located in the drawing above?

- a. 1
- b. 6
- c. 8
- d. 10

9. In the drawing above, number 10 is:

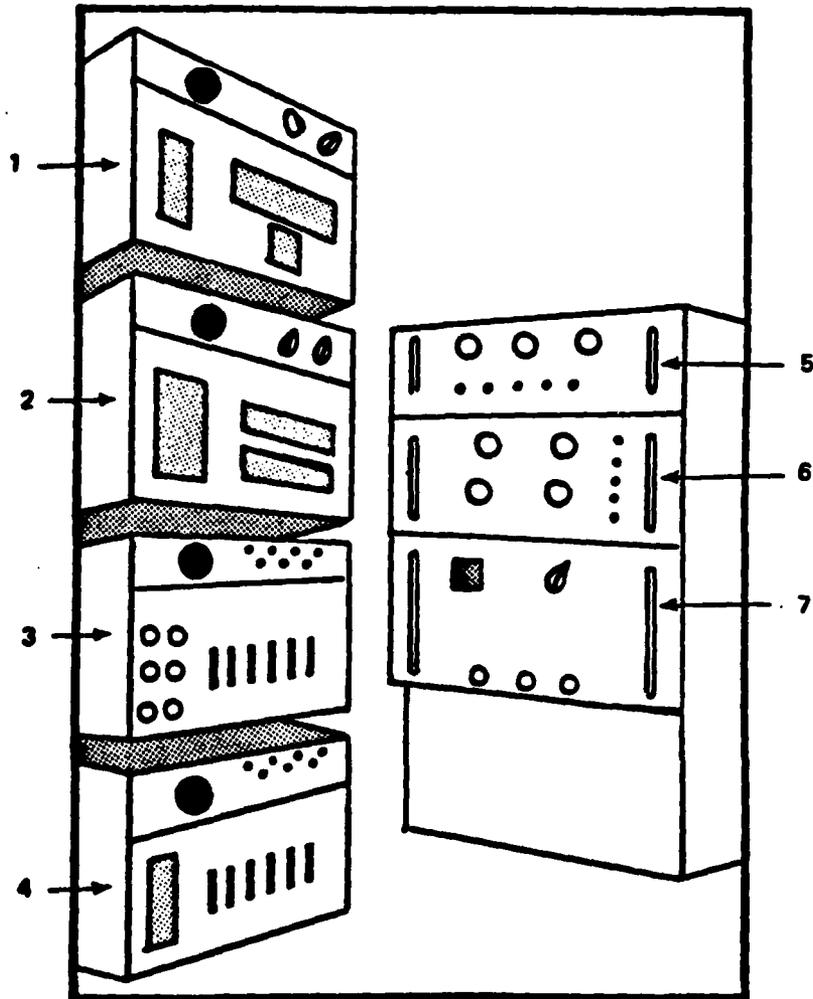
- a. Part ABC
- b. Part JKL
- c. Part XYZ
- d. None of the above parts.

On the right is a drawing of a particular piece of equipment.



10. In the drawing below, which of the numbered parts is the piece of equipment shown above?

- a. 1
- b. 2
- c. 3
- d. 4



Unit V, Lesson 1  
Checkpoint 1, Form B

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Unit V, Lesson 1  
Checkpoint 1, Form B

10

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VI - LESSON 1  
UNIT VII - LESSON 1

Checkpoint 1, Form A

Use the diagram below to answer questions 1 to 5.

	SYSTEM 1		SYSTEM 2	
	ABC	XYZ	ABC	XYZ
EAST	D	E	F	G
WEST	H	I	J	K
NORTH	L	M	N	O
SOUTH	P	Q	R	S

1. The letter in SYSTEM 2, ABC, NORTH is \_\_\_\_\_.
2. The letters F, J, N, and R (but not any others) are all in \_\_\_\_\_.
3. The letter in SYSTEM 1, XYZ, EAST is \_\_\_\_\_.
4. List all the letters in SYSTEM 1: \_\_\_\_\_.
5. The letters E, M, and K are all in \_\_\_\_\_.

Use the table below to answer questions 6 to 10.

Item No.	Unit	Procedure	Expected Result
1	Dial	a. Clean b. Check needle	a. No dirt. b. Needle moves.
2	Plug	a. Check cord	a. Tight
3	Case	a. Check lock b. Count items c. Check cover	a. Lock works. b. Nothing missing. c. Cover is tight.
4	Lens	a. Examine b. Turn	a. No cracks. b. Lens turns freely.

6. The procedure in Item No 3b is \_\_\_\_\_.
7. In Item No. 4, the procedure is \_\_\_\_\_.
8. In the table, "Cover is tight" is the \_\_\_\_\_  
in Item No. \_\_\_\_\_.
9. The expected result in Item No. 1b is \_\_\_\_\_.
10. The unit in Item No. 2 is \_\_\_\_\_.

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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VI - LESSON 1  
UNIT VII - LESSON 1

Checkpoint 1, Form B

Use the table below to answer questions 1 to 5.

Item No.	Procedure	Malfunction
1	U	D
2	a. V	a. E
	b. W	b. F
3	a. X	a. G
	b. Y	b. H
	c. Z	c. I

1. How many procedures are there in Item No. 3? \_\_\_\_\_
2. E and F are both \_\_\_\_\_ in Item No. \_\_\_\_\_.
3. The malfunction in Item No. 1 is \_\_\_\_\_.
4. The procedure in Item No. 2a is \_\_\_\_\_.
5. The malfunction in Item No. 3b is \_\_\_\_\_.

Use the diagram below to answer questions 6 to 10.

	SYSTEM 1		SYSTEM 2		SYSTEM 3	
	JKL	MNO	JKL	MNO	JKL	MNO
RED	A	B				
GREEN		C	D	E		F
BLUE		G			H	
YELLOW		I				

6. The letters in MNO, GREEN are \_\_\_\_\_.
7. The letters in SYSTEM 1, MNO are \_\_\_\_\_.
8. The letters in SYSTEM 2, GREEN are \_\_\_\_\_.
9. The letter in SYSTEM 1, JKL, RED is \_\_\_\_\_.
10. The letter H is in \_\_\_\_\_.

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Name \_\_\_\_\_

Date \_\_\_\_\_

**UNIT VI - LESSON 2**

**Checkpoint 1, Form A**

1. Here are the titles of four troubleshooting tables in a TM:

4-7b. TD-202/U and TD-203/U Troubleshooting Chart

4-7c. TD-204/U Troubleshooting Chart

4-7d. TD-352/U or TD-353/U Troubleshooting Chart

4-7e. CV-2548/G Troubleshooting Chart

Which table should you use for troubleshooting a TD-204/U?

\_\_\_\_\_

Below are the column headings of an equipment performance checklist.  
Use them to answer questions 2 to 4.

<u>Step</u>	<u>Unit</u>	<u>Action</u>	<u>Normal indication</u>	<u>Fault symptom</u>	<u>Corrective measure</u>
-------------	-------------	---------------	--------------------------	----------------------	---------------------------

2. If something goes wrong, which column tells you how to fix it?

\_\_\_\_\_

3. Which column tells you what should not happen if the equipment is operating properly?

\_\_\_\_\_

4. The Action column tells the operator \_\_\_\_\_

\_\_\_\_\_

Below are the column headings of a troubleshooting chart. Use them to answer questions 5 to 7.

Item No.	Malfunction	Probable cause	Suggested remedy
----------	-------------	----------------	------------------

5. Which column lists symptoms that may happen while you are operating equipment? \_\_\_\_\_
6. Something goes wrong while you are operating equipment. You want to know why. Which column will tell you? \_\_\_\_\_
7. Which column heading means the same thing as Corrective measures? \_\_\_\_\_

Below are the column headings of a maintenance table. Use them to answer questions 8 to 10.

M - Monthly    Q - Quarterly

Item No.	Interval		Item To Be Inspected	Procedure	Reference
	M	Q			

8. The column heading Q stands for \_\_\_\_\_.
9. If you need more information about a maintenance operation, which column should you look in? \_\_\_\_\_
10. Which column lists the equipment components that are being checked? \_\_\_\_\_

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Name \_\_\_\_\_

Date \_\_\_\_\_

**UNIT VI - LESSON 2**

**Checkpoint 1, Form B**

1. Here are the titles of four tables for performing PMCS:

Table 4-2. Operator's Daily Preventive Maintenance Checks and Services

Table 4-3. Operator's Weekly Preventive Maintenance Checks and Services

Table 4-4. Organizational Monthly Preventive Maintenance Checks and Services

Table 4-5. Organizational Quarterly Preventive Maintenance Checks and Services

You are doing weekly maintenance. Which table should you use?

\_\_\_\_\_

Below are the column headings of an equipment performance checklist. Use them to answer questions 2 to 4.

Step	Unit	Action	Normal result	Corrective measures
------	------	--------	---------------	---------------------

2. Which column tells the operator what to do at each step?

\_\_\_\_\_

3. Which column describes the piece of equipment being checked?

\_\_\_\_\_

4. Which column tells what should happen if the equipment is working properly? \_\_\_\_\_

Below are the column headings of a table used for troubleshooting. Use them to answer questions 5 to 7.

Item No.	Symptom	Possible trouble	Suggested remedy
----------	---------	------------------	------------------

5. Which column heading means the same thing as Probable cause?  
\_\_\_\_\_

6. Which column heading means the same thing as Malfunction?  
\_\_\_\_\_

7. Which column lists defects that can cause trouble?  
\_\_\_\_\_

Below are the column headings of a maintenance table. Use them to answer questions 8 to 10.

B-Before Operation    D-During Operation    A-After Operation    W-Weekly

Sequence No.	Interval				Item To Be Inspected	Procedure	Equipment is not ready/available if:
	B	D	A	W			

8. Which column lists symptoms? \_\_\_\_\_

9. Which column should you look in to find out what must be done after operation? \_\_\_\_\_

10. Which column heading means the same thing as Action?  
\_\_\_\_\_

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Unit VI, Lesson 2  
Checkpoint 1, Form B

2

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VI - LESSON 3

Checkpoint 1, Form A

Part of an equipment performance checklist is on the next page. Use it to answer questions 1 to 3 below.

1. If the equipment is operating properly at Step 33, what should happen?

\_\_\_\_\_

2. In Step 36, if the HV indicator does not light, what is the Corrective measure?

\_\_\_\_\_

3. What should the operator do in Step 33?

\_\_\_\_\_

EQUIPMENT PERFORMANCE

Step	Unit	Action	Normal indication	Corrective measure
31	CN-514/GRC	Set POWER circuit breaker to ON.	POWER ON indicator light.	Check power source output and power cable connections. Check fuse F2 (20 amp) (fig. 5-11). Check POWER ON indicator lamp.
32	CN-514/GRC	Set MANUAL RAISE-LOWER switch to RAISE then to LOWER.	MANUAL indicator lights. Meter indicates raise in voltage then decrease in voltage.	Check MANUAL indicator lamp. Check MOTOR 1 AMP fuse
33	CN-514/GRC	Set MANUAL-AUTOMATIC switch to AUTOMATIC.	Meter indicates 115 volts. MANUAL indicator goes out.	
34	CN-514/GRC	Set MANUAL-AUTOMATIC switch to MANUAL and MANUAL RAISE-LOWER switch to LOWER until meter indicates approximately 105 volts. Then set MANUAL-AUTOMATIC switch to AUTOMATIC. Repeat above except operate switch to RAISE until meter indicates approximately 120 volts.	Voltage indication on meter changes back to 115 volts in both operations.	Check V1 and V2. Replace plug-in regulator assembly.
35	PP-2054(*)/GRC	Set AC POWER circuit breaker to ON. Allow equipment to warm up for 5 minutes.	Blower motor operates. FIL indicator lights.	Check 5 AMP FIL fuse. Check FIL indicator lamp. Check silicon rectifiers in PP-2054 (*)/GRC. If they are blistered or discolored, higher maintenance services are required.
36	PP-2054 (*)/GRC	Set OPERATE-STANDBY switch to OPERATE.	Blower motor in T-893(P)/GRC operates.  The LV and HV indicators light. Target bolt (interlock switch (fig. 1-4)) is tight; also all bolts holding amplifier-oscillator are tight.	Check cable connection between TO XMTR on PP-2054 (*)/GRC and TO PWR SUP on T-893(P)/GRC. If LV indicator does not light, check 3 AMP LV fuse. Check LV lamp. If HV indicator does not light, check HV fuse. (This fuse, whether equipment is marked with 5 AMP or 3 AMP should be replaced with 3 amp, time-delay fuse in all equipments (para

Unit VI, Lesson 3  
Checkpoint 1, Form A

Use the Radio Terminal Troubleshooting Chart on the next page to answer questions 4 to 6.

4. The second Probable cause in Item No. 3 is \_\_\_\_\_

---

5. You get the symptom: Order wire very noisy or no reception, but all other indications on TD-660A/G and AN/GRC-103(V) are normal. What is the first Probable cause?

---

6. In Item No. 7, what is the Corrective action for Probable cause e?

---

Item No.	Malfunction	Probable cause	Corrective action
1	FRAME ALARM indicator of TD-660A/G lights, buzzer sounds and TEST ALIGN meter indicates in green area with selector switch I at PCM IN or TIM IN.	Defective TD-660A/G.	Troubleshoot TD-660A/G (para 5-5).
2	FRAME ALARM indicator of TD-660AG lights, buzzer sounds, and TEST ALIGN meter does not indicate in green area with selector switch I at PCM IN or TIM IN. AN/GRC-103(V) operates normally. Order wire normal.	a. Defective cable between VIDEO patch panel PCM IN connector and TD-660A/G PCM IN connector, or between VIDEO patch panel PCM RCVR connector and R-1329(P)/GRC-103(V) PCM connector. b. Defective VIDEO patch panel cable between PCM IN and PCM RCVR connectors.	a. Check and replace if necessary. b. Check and replace if necessary.
3	FRAME ALARM indicator on TD-660A/G lights, buzzer sounds, R-1329(P)/GRC-103(V) ALARMS LOW SIGNAL indicator lights	a. Defective antenna cable or defective cable between VIDEO AND ANTENNA ENTRANCE BOX and ANT connector on R-1329(P)/GRC-103(V). b. Defective or misoriented antenna. c. Defective R-1329(P)/GRC-103(V). d. Defective T-983(P)/GRC-103(V) at distant terminal or repeater.	a. Check and replace if necessary. b. Check and replace or reorient if necessary. c. Troubleshoot R-1329(P)/GRC-103(V) (para 5-5). d. Keep R-1329(P)/GRC-103(V) operating on assigned frequency. Periodically try order wire and await response. Send person to distant terminal or repeater.
4	FRAME ALARM indicator of TD-660A/G lights and buzzer sounds. No indication on R-1329(P)/GRC-103(V) meter with selector switch at 12 CH PCM. Order wire is normal.	Defective pcm component at distant terminal.	Request distant terminal troubleshooting.
5	Order wire very noisy or no reception, but all other indications on TD-660A/G and AN/GRC-103(V) are normal.	a. Defective order wire cable between RT-773/GRC-103(V) and R-1329(P)/GRC-103(V). b. Defective RT-773/GRC-103(V). c. Defective power supply in R-1329(P)/GRC-103(V).	a. Check and replace if necessary. b. Troubleshoot RT-773/GRC-103(V) (para 5-5). c. Troubleshoot R-1329(P)/GRC-103(V) (para 5-5).
6	Switchboard operator reports high noise level or hum on all channels. All local indications are normal.	a. Defective AN/GRC-103(V). b. Defective TD-660A/G.	a. Troubleshoot AN/GRC-103(V) (para 5-5). b. Troubleshoot TD-660A/G (para 5-5).
7	Switchboard operator reports loss of a specific channel or only one way communication on a specific channel. All local indications are normal.	a. Defective TD-660A/G. b. Defective CV-1548(*)/G. c. Defective CX-7870/TCC between CV-1548(*)/G and TD-660A/G. d. Defective field wire or 26-pair cable. e. Defective TD-660A/G or CV-1548(*)/G at distant terminal.	a. Troubleshoot TD-660A/G (para 5-5). b. Troubleshoot CV-1548(*)/G (para 5-5). c. Check and replace if necessary. d. Check and repair if required. e. Request distant terminal troubleshooting.
8	Switchboard operator reports that no signaling is available on any 2-wire channel.	Defective CV-1548(*)/G.	Troubleshoot CV-1548(*)/G (para 5-5).
9	Switchboard operator reports loss of one group of four channels. All local indications are normal.	a. Defective CX-7870/TCC cable between TD-660A/G and CV-1548(*)/G. b. Defective interconnecting cable between CV-1548(*)/G and SIGNAL ENTRANCE panel. c. Defective associated cable at distant terminal.	a. Check and replace if necessary. b. Check and replace if necessary. c. Request distant terminal troubleshooting.

Unit VI, Lesson 3  
Checkpoint 1, Form A

Use the maintenance table on the next two pages to answer questions 7-10.

7. When should the METER SELECT switch (Item No. 14) be inspected?

\_\_\_\_\_

8. List the items which should be inspected weekly: \_\_\_\_\_

\_\_\_\_\_

9. What is the fourth procedure to be carried out on the radio set AN/GRC-103(V)?

\_\_\_\_\_

10. In Item No. 14, the order wire circuit is not ready/available for use if \_\_\_\_\_

\_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

B—Before operation    D—During operation    A—After operation    W—Weekly

Item No.	Interval				Item to be Inspected	Procedures Check and have repaired or adjusted as necessary	For readiness reporting equipment is not ready/available if
	B	D	A	W			
13	.	.	.	.	Radio Set AN/GRC-103(V)	<p>Set the transmitter of system 1 and receiver of system 2 to the same channel.</p> <p>Set the transmitter of system 2 and the receiver of system 1 to the same channel, but maintain a minimum of a 50-channel separation from that in 3 above.</p> <p><b>SYSTEM 1</b></p> <p>a. Adjust receiver RCVR CHANNEL, RCVR SIG, and XMTR DUPL controls for correct channel numbers on both RCVR CHANNEL and XMTR CHANNEL indicators.</p> <p>b. Adjust transmitter XMTR CHANNEL and XMTR TUNE controls for correct transmitting frequency.</p> <p>c. Operate transmitter AC POWER switch to ON/RESET.</p> <p>d. Operate receiver AC POWER switch to ON.</p> <p>e. Press BUZZER OFF switch to silence buzzer.</p> <p>f. Operate transmitter selector switch sequentially through 12 VDC, 28 VDC, and 600 VDC.</p> <p>g. Operate transmitter selector switch sequentially through OSC, DOUBLER, and MULT.</p> <p>h. Operate transmitter selector switch to DRIVER (no adjustment for bands II and III); push in PWR OUT PEAK knob and tune for maximum indication on meter.</p> <p>i. Operate transmitter selector switch to PWR OUT (no adjustment for band III); pull out PWR OUT PEAK knob and tune for maximum indication on meter. (Silence buzzer with BUZZER OFF switch upon completion of adjustment.)</p> <p>j. Operate transmitter selector switch to REFL PWR and tune receiver XMTR DUPL control for minimum indication on transmitter meter.</p> <p>k. Operate receiver selector switch to XMTR DUPL.</p> <p>l. Operate receiver selector switch to REFL PWR.</p> <p>m. Operate transmitter selector switch to 12 CH PCM and adjust INPUT control for green band indication on meter.</p>	<p>a. All controls do not adjust to correct channel.</p> <p>b. Both controls do not adjust to correct frequency.</p> <p>c. AC POWER and ALARMS LOW POWER indicator does not light, ALARMS SYNC indicator does not light momentarily, buzzer does not sound, and blower does not operate.</p> <p>d. AC POWER and ALARMS LOW SIGNAL indicator do not light, ALARMS SYNC indicator does not light momentarily and buzzer does not sound.</p> <p>e. POWER indicator on order wire unit does not light, and loud rushing noise is not heard in order wire handset.</p> <p>f. Meter does not indicate in green band for each switch position.</p> <p>g. Meter does not indicate between 25 and 90 percent of full scale.</p> <p>h. Meter does not indicate between 25 and 90 percent of full scale.</p> <p>i. Meter does not indicate between 25 and 90 percent of full scale, and LOW POWER indicator does not extinguish.</p> <p>j. XMTR CHANNEL indicator is not within 10 channels of correct frequency, and meter indicates greater than 20 percent of full scale.</p> <p>k. Meter does not indicate within 25 to 90 percent of full scale.</p> <p>l. Meter does not indicate less than 20 percent of full scale.</p> <p>m. No meter indication.</p>

Unit VI, Lesson 3  
Checkpoint 1, Form A

Item No.	Interval				Item to be Inspected	Procedures Check and have repaired or adjusted as necessary	For readiness reporting equipment is not ready/available if:												
	B	D	A	W															
14	.				Multiplexer TD-204/U  Order wire circuit  METER SELECT switch	a. Operate receiver selector switch sequentially through +12 VDC and -12 VDC. a. Operate receiver selector switch sequentially through OSC and DOUBLER. p. Operate receiver selector switch to MULT and adjust MULT PEAK control for maximum indication on meter. q. Check for loud rushing noise in order wire handset when ALARM LOW SIGNAL indicator extinguishes, indicating a signal is being received. r. Operate receiver selector switch to RCVR SIG.	n. Meter does not indicate in green band in either switch position. a. Meter does not indicate between 25 and 90 percent of full scale in either switch position. p. Meter does not indicate between 25 and 90 percent of full scale. q. Loud rushing noise is not heard. r. Meter does not indicate between 25 and 90 percent of full scale.												
	.					<p style="text-align: center;"><b>SYSTEM 2</b></p> s. Repeat procedures a through r above for SYSTEM 2. a. Operate CABLE POWER switch to ON. ALARMS NO CABLE CURRENT indicator goes out. b. Operate TALK-OFF-SIG switch to SIG for 2 seconds or between SIG and OFF for called terminal identification. c. Operate TALK-OFF-SIG switch to TALK and talk with the called station. d. Request distant terminal to signal by order wire and operate TALK-OFF-SIG switch to OFF. e. When buzzer sounds and CALL indicator lights, operate TALK-OFF-SIG switch to TALK and answer the call. f. When the check is completed, set the TALK-OFF-SIG switch to OFF. g. Operate switch to the following positions and check for proper indication on TEST ALIGN meter.	s. Results are the same as a through r above. a. ALARMS NO CABLE CURRENT indicator fails to go out. b. Order wire fails to operate.												
	.					<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;">Position</th> <th style="text-align: left; border-bottom: 1px solid black;">Indication</th> </tr> </thead> <tbody> <tr> <td>TIMING IN</td> <td>Green area</td> </tr> <tr> <td>PCM IN-1</td> <td>Green area</td> </tr> <tr> <td>PCM IN-2</td> <td>Green area</td> </tr> <tr> <td>CABLE I</td> <td>Yellow area</td> </tr> <tr> <td>CABLE V</td> <td>10.8 times number of TD-206/G's plus 13.</td> </tr> </tbody> </table> <p style="text-align: center;"><b>NOTE</b></p> If CABLE V position is checked with loss of timing in signal, use 14.8 times number of TD-206/G's plus 13.	Position	Indication	TIMING IN	Green area	PCM IN-1	Green area	PCM IN-2	Green area	CABLE I	Yellow area	CABLE V	10.8 times number of TD-206/G's plus 13.	
	Position	Indication																	
	TIMING IN	Green area																	
	PCM IN-1	Green area																	
	PCM IN-2	Green area																	
	CABLE I	Yellow area																	
	CABLE V	10.8 times number of TD-206/G's plus 13.																	
	.					<p style="text-align: center;"><b>NOTE</b></p> Perform a and b below only when there is no traffic. a. Operate PWR switch to ON and observe that power and CABLE CUR indicators light. Operate CABLE CURRENT switch to ON and observe that the CABLE CUR indicator goes out. b. Notify operator at opposite end of cable link to momentarily operate POWER switch on TD-660/G to OFF. Observe that TRAFFIC													
	.																		
	.																		
	.																		
	.																		
.																			
.																			
.																			
.																			
.																			
15					Multiplexer TD-754/G  PWR and CABLE CURRENT switches and cable current alarm circuit.  Traffic (pcm) alarm circuit	A. Operate switch to SERV FAC.													

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VI - LESSON 3

Checkpoint 1, Form B

Use the equipment performance checklist on the next page to answer questions 1-3.

1. If the equipment is operating properly in Step 54, what should happen?

\_\_\_\_\_

2. What equipment component is being checked in Step 56?

\_\_\_\_\_

3. What should the operator do in Step 58?

\_\_\_\_\_

## EQUIPMENT PERFORMANCE

Step	Unit	Action	Normal Indication	Corrective measures
53	R-1148(P)/GRC or R-1331(+) (P)/G.C.	ation on DA-189/ GRC. Depress BUZZ OFF pushbutton to silence buzzer. Set AC POWER switch to ON. Allow 5-min- ute warmup.	AC POWER indicator lights. INCOMING CALL lamp lights mo- mentarily. RING buz- zer sounds momentar- ily. Blower motor oper- ates.	Check silicon rectifiers on bottom of receiver for blistering or discolora- tion. If rectifiers are blistered or discolored, or show any signs of malfunction, higher cat- egory of maintenance is required.
54	R-1148(P)/GRC or R-1331(+) (P)/GRC.	Set multimeter selector switch to TEST TONE CAL. Set TEST TONE switch to ON and ad- just TEST TONE con- trol for indication in green area of receiver multimeter.	Multimeter indicates in green area of meter scale.	Check V2 in signaling unit 3A6.
55	T-893(P)/GRC	Set multimeter selector switch to 1 KC MOD.	Multimeter indicates in green area of meter scale.	Check V1, V2, and V4 on 2A3. Check V5 on afc assembly 2A4. Check all tubes in modu- lator 2A5.
56	AM-1955(*)/ GRC or AM- 1956(*)/GRC.	Set multimeter selector switch on R-1148(P)/ GRC or R-1331(+) (P) GRC to OSC and ad- just OSCILLATOR control for peak indi- cation on multimeter.	Peak indication is ob- tained on multimeter.	Check WAVEMETER control for correct setting. Check diode CR2 in wave- meter.
57	R-1148(P)/GRC. (Omit this step when using AM-1955A/ GRC or AM- 1956A GRC.)	Set multimeter selector switch to AFC LEV. Tune AFC LEVEL control for peak indi- cation on multimeter.	Multimeter indicates 10 or more.	Check V1 through V7 on afc assembly 3A4.
58	R-1148(P)/GRC. (Omit this step when using AM-1955A/ GRC or AM- 1956A GRC.)	Adjust AFC TUNE control for peak indi- cation on multimeter.	Peak is indicated on mul- timeter.	
59	R-1148(P)/GRC. (Omit this step when using AM-1955A/ GRC or AM- 1956A/GRC.)	Set AFC TUNE-ODD- EVEN switch to ODD if receiver channel is odd-numbered, or to EVEN if receiver channel is even-num- bered. Rotate AFC cor- rection control on AM- 1955/GRC or AM- 1956/GRC until AFC meter indicates $\pm 40$ . After normal indica-	AFC meter needle moves back toward center and stops near center. AFC correction control on AM-1955/GRC or AM- 1956/GRC moves away from center position and then returns to original setting.	Adjust R42 on afc assem- bly 3A4 to center AFC meter needle. Check V8 and V9 on afc assembly 3A4. If V8 is replaced, adjust R42 as required.

Unit VI, Lesson 3  
Checkpoint 1, Form B

Use the troubleshooting chart on the next page to answer questions 4 to 6.

4. If you get Malfunction No. 53, what does the chart tell you to do to fix it?

---

5. What is the second probable cause of the malfunction in Item No. 61?

---

6. If the cause of the malfunction in Item No. 57 is a defective receiver head, what should the operator do to fix it?

---

Item No.	Malfunction	Probable cause	Corrective action
30	Indicator lights and all other indications are normal. T-983(P)/GRC-103(V) meter has no indication for any position of meter selector switch. All other indications are normal.	a. Defective centrifugal fan SA2B1. Defective meter STRA1M1 or meter switch STRA1S1.	any airflow obstructions. b. Replace T-983(P)/GRC-103(V). Replace T-983(P)/GRC-103(V)
51	R-1329(P)/GRC-103(V) AC POWER and LOW SIGNAL indicators do not light, and buzzer is silent when AC POWER switch is operated to ON.	a. Defective power cable to R-1329(P)/GRC-103(V). b. Defective power supply 1RE1PS1. c. Defective switch 1RE1A1CBI.	a. Repair assigned to higher category of maintenance. b. Replace power supply (app A). c. Replace R-1329(P)/GRC-103(V). Replace lamp.
52	R-1329(P)/GRC-103(V) LOW SIGNAL indicator lights and buzzer sounds but AC POWER indicator does not light when AC POWER switch is operated to ON.	Defective AC POWER lamp.	Replace lamp.
53	R-1329(P)/GRC-103(V) AC POWER indicator lights and buzzer sounds but LOW SIGNAL indicator does not light when AC POWER switch is operated to ON.	Defective LOW SIGNAL lamp.	Replace lamp.
54	R-1329(P)/GRC-103(V) AC POWER and LOW SIGNAL indicators light but buzzer does not sound when AC POWER switch is operated to ON.	a. BUZ OFF/ALM NOR switch at incorrect setting. b. Defective BUZZER OFF switch or defective buzzer.	a. Check switch (inside of case at left-hand side, front upper corner of receiver head) and reset it if necessary. b. Replace R-1329(P)/GRC-103(V)
55	R-1329(P)/GRC-103(V) SYNC indicator does not extinguish within 10 seconds after AC POWER switch is operated to ON.	a. Defective power supply 1RE1A2. b. Defective electrical frequency synthesizer 1RE1A2.	a. Replace power supply (app A). b. Replace R-1329(P)/GRC-103(V).
56	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at +12 VDC.	a. Defective CX-10763/GRC-103(V) cable. b. Defective receiver head. c. Defective RT-773/GRC-103(V). d. Defective power supply 1RE1PS1.	a. Check and replace if necessary. b. Replace receiver head. c. Replace RT-773/GRC-103(V). d. Replace power supply (app A).
57	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at -12 VDC.	a. Defective power supply 1RE1PS1. b. Defective module in R-1329(P)/GRC-103(V). c. Defective receiver head.	a. Replace power supply (app A). b. Replace R-1329(P)/GRC-103(V). c. Replace receiver head.
58	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at XMTR DUPL. Meter indication normal with T-983(P)/GRC-103(V) meter selector switch at PWR OUT.	a. Incorrect XMTR DUPL control setting. b. Defective CG-3444/U cable c. Defective duplexer 2A1A1 or power monitor 2A1A5.	a. Reset control. b. Check and replace if necessary c. Replace R-1329(P)/GRC-103(V).
59	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at OSC.	a. Defective control-indicator 2A2. b. Defective electrical frequency synthesizer 1RE1A2.	a. Replace control-indicator (app A). b. Replace R-1329(P)/GRC-103(V).
60	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at DOUBLER. Normal indication in OSC position.	Defective amplifier-frequency multiplier 1RE1A5.	Replace amplifier-frequency multiplier (app A).
61	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at MULT. Normal indication in DOUBLER position.	a. Incorrect setting of RCVR SIG control. b. Incorrect tuning of MULT PEAK control. c. Defective control-indicator 2A2. d. Defective frequency multiplier 2A1A2A1 or electrical frequency synthesizer 1RE1A2.	a. Reset control. b. Retune control. c. Replace control-indicator (app A). d. Replace R-1329(P)/GRC-103(V).
62	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at RCVR SIG. Normal indication in MULT position but LOW SIGNAL indicator does not extinguish.	a. RCVR SIG or RCVR CHANNEL control incorrectly adjusted. b. Antenna facing wrong direction. c. Defective frequency mixer stage 2A1A2, radiofrequency amplifier 2A1A1 or low pass filter 2A1A1FL1. d. Defective T-983(P)/GRC-103(V) at distant terminal or repeater.	a. Adjust control. b. Check azimuth. c. Replace R-1329(P)/GRC-103(V). d. Request distant terminal or repeater troubleshooting.
63	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch Unit VI, Lesson 3 Checkpoint 1, Form B	a. Defective intermediate frequency amplifier 1RE1AP2.	a. Replace intermediate frequency amplifier (app A).

Use the maintenance table on the next page to answer questions 7 to 10.

7. The interior walls, ceilings, and floors (Item No. 5) are not ready/available for use if \_\_\_\_\_

8. How often should the interior walls, ceilings, and floors be inspected? \_\_\_\_\_

9. What is the first procedure you should carry out on the POWER DISTRIBUTION PANEL (Item No. 7)?

10. Which items should be inspected before operation?

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Item No.	Interval				Item to be Inspected	Procedures Check and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if:
	B	D	A	W			
5					<b>INTERIOR</b> Walls, ceilings, and floors	Check for holes, open seams, or signs of water seepage or leaks that may present a shock hazard.	A shock hazard exists.
6	•	•			POWER INDICATOR neon lamp and AC VOLTS METER on POWER DISTRIBUTION PANEL	Apply power to the assemblage by starting generator set or turning on central power source. POWER INDICATOR neon lamp lights and AC VOLTS meter on POWER DISTRIBUTION PANEL indicates 115 vac. No less than 109 volts nor more than 121 volts.	Voltage is less than 109 volts or more than 121 volts.
7	•				POWER DISTRIBUTION PANEL	<p>a. Operate MAIN circuit breaker to ON; AMPERES AC meter indicates zero.</p> <p>b. Sequentially operate each circuit breaker to ON; the associated indicator should light.</p> <p><b>CAUTION</b></p> <p>Under blackout conditions this check may be made only if the curtains are closed. After testing, operate the BYPASS BLACKOUT switch to the BLACKOUT position.</p>	a. High current reading is noted.
8				•	Door microswitch	Operate the BYPASS BLACKOUT switch to BLACKOUT and open the door. Ceiling lights should go out.	Lights do not go out when the door is open.
9		•		•	BYPASS BLACKOUT switch	Operate the switch to the BYPASS position with the door open. Ceiling lights should light.	
10		•		•	Exhaust blowers	Operate BLOWER switch associated with each exhaust blower to ON. Exhaust blower should operate.	
11		•		•	Heater	<p>a. Operate HEAT-OFF-FAN switch to HEAT, operate TEMPERATURE control and note that warm air blows from the front of the heater.</p> <p>b. Operate HEAT-OFF-FAN switch to FAN; fan blows air and heating element ceases to glow.</p> <p>c. Operate HEAT-OFF-FAN switch to OFF; fan should stop.</p> <p><b>NOTE</b></p> <p>Perform the following items on each system. If the AN/TRC-145 is in continuous use, perform only those items that do not interfere with the operation of the equipment.</p>	a. Heater fails to heat, fan does not blow, or excessive current causes circuit breaker to trip (If heater is mission essential.)
12		•		•	Equipment ac power switches	Operate to ON; associated ac power indicators on each unit should light. Blowers should operate. TD-204/U ALARMS NO CABLE CURRENT indicator, or TD-754/G CABLE CUR should light.	One or more blowers fail to operate.

**RADIO TUNING CHECKS  
NOTES**

Position each antenna assembly on the ground at least 30 feet apart facing in opposite directions. (This will allow transmission and reception from the weak back lobe radiation pattern on each antenna.)

Connect each antenna to the SYSTEM antenna connector of the SIGNAL ENTRANCE BOX associated with the system to be checked.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VII - LESSON 2

Checkpoint 1, Form A

VIDEO PATCH				
	System 1		System 2	
	A	B	A	B
Red	o	o	o	o
Blue	o	o	o	o
Green	o	o	o	o

1. For System 1, A-Blue is connected to:
- a. B-Blue
  - b. A-Red
  - c. B-Red
  - d. B-Green

VIDEO PATCH				
	System 1		System 2	
	M	N	M	N
R1	o	o	o	o
R2	o	o	o	o
R3	o	o	o	o

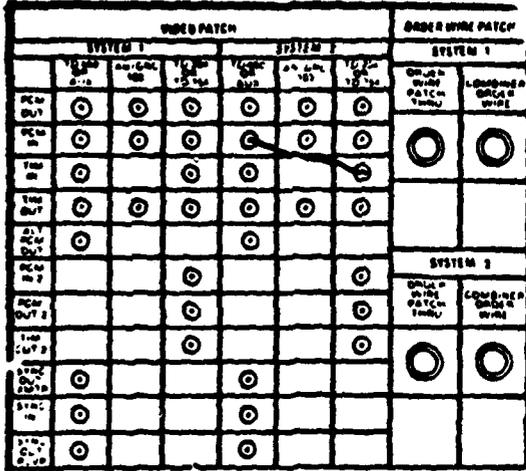
2. Using the above video patch diagram, locate the cable connecting M-R3 to N-R1. In which system is it located?
- a. System 1
  - b. System 2
  - c. Both System 1 and System 2
  - d. Neither System 1 nor System 2

3. Suppose you have been given the following instructions:

For System 2, connect TD-660-PCM IN to TD-204-TIM IN.

Which of the following four diagrams shows the result of your assigned task?

- a. Diagram 1
- b. Diagram 2
- c. Diagram 3
- d. Diagram 4



4. Which of the following diagrams show Systems 1 and 2 interconnected?

- a. Diagrams 1 and 2
- b. Diagrams 1 and 3
- c. Diagrams 2 and 3
- d. Diagrams 2 and 4

VIDEO PATCH						
	System 1			System 2		
	X	Y	Z	X	Y	Z
Blue	o	o	o	o	o	o
White	o	o	o	o	o	o
Green	o	o	o	o	o	o

Diagram 1

VIDEO PATCH						
	System 1			System 2		
	X	Y	Z	X	Y	Z
Blue	o	o	o	o	o	o
White	o	o	o	o	o	o
Green	o	o	o	o	o	o

Diagram 2

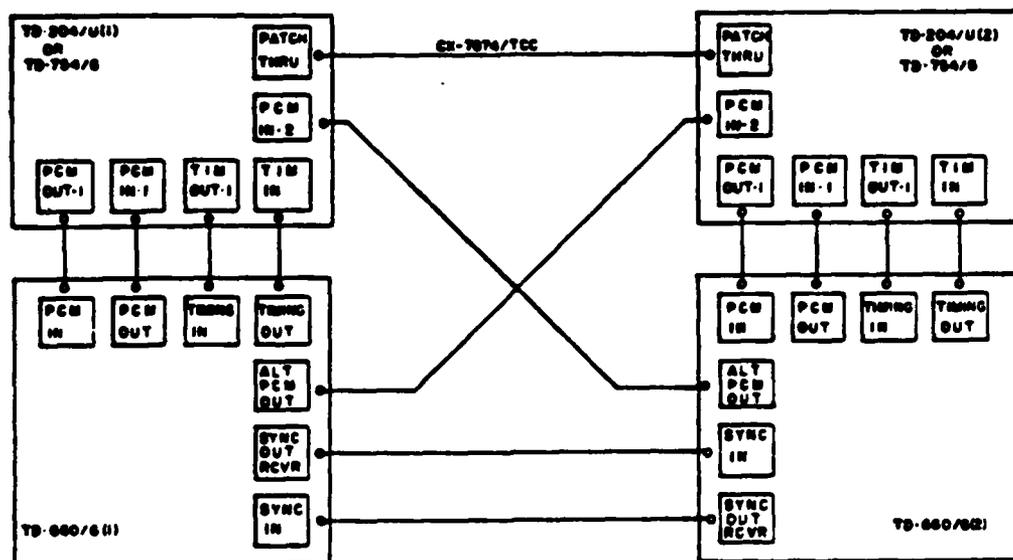
VIDEO PATCH						
	System 1			System 2		
	X	Y	Z	X	Y	Z
Blue	o	o	o	o	o	o
White	o	o	o	o	o	o
Green	o	o	o	o	o	o

Diagram 3

VIDEO PATCH						
	System 1			System 2		
	X	Y	Z	X	Y	Z
Blue	o	o	o	o	o	o
White	o	o	o	o	o	o
Green	o	o	o	o	o	o

Diagram 4

Below is a different kind of cabling diagram. It is called a block diagram. The larger boxes are the components, and the smaller boxes are the connectors. The cables are represented by the solid dark lines.



5. In the block diagram above, TD-204/U(1)-PCM IN-2 is connected to:
- TD-204/U(2)-PCM IN-2.
  - TD-660/G(1)-ALT PCM OUT.
  - TD-660/G(2)-ALT PCM OUT.
  - TD-204/U(2)-PCM OUT-1.

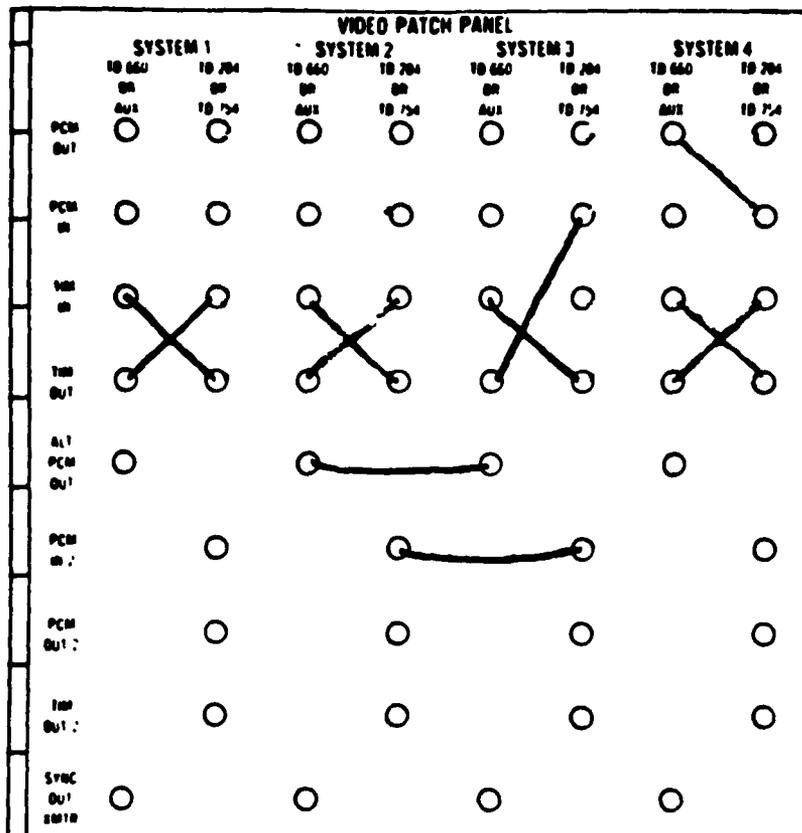
Look over the video patch diagram below. Then answer the two questions that follow the diagram.

VIDEO PATCH								
	System 1		System 2		System 3		System 4	
	M	N	M	N	M	N	M	N
I	o	o	o	o	o	o	o	o
II	o	o	o	o	o	o	o	o
III	o	o	o	o	o	o	o	o
IV	o	o	o	o	o	o	o	o

6. In the above diagram, which systems are being used?
- Systems 1, 2, and 4
  - Systems 1, 2, and 3
  - Systems 1, 3, and 4
  - Systems 2, 3, and 4
7. In System 2:
- M-III is connected to N-I and M-I is connected to M-III.
  - M-II is connected to N-III and M-III is connected to N-I.
  - M-II is connected to N-I and M-IV is connected to N-IV.
  - M-I is connected to N-II and M-IV is connected to N-III.

VIDEO PATCH								
	System 1		System 2		System 3		System 4	
	A	B	A	B	A	B	A	B
I	o	o	o	o	o	o	o	o
II	o	o	o	o	o	o	o	o
III	o	o	o	o	o	o	o	o
IV	o	o	o	o	o	o	o	o

8. In the video patch above, which statement is true concerning System 3?
- a. B-II is connected to B-III; A-II is connected to B-I.
  - b. B-I is connected to B-III; A-II is connected to A-IV.
  - c. A-II is connected to B-IV; A-III is connected to B-IV.
  - d. B-II is connected to B-IV; A-III is connected to B-I.



On the left is a diagram of a video patch panel. Look closely over the diagram, then answer the following two questions.

9. Which of the following connections is shown in the diagram above?
- For System 1, TD-660 TIM IN is connected to TD-204 PCM IN.
  - For System 3, TD-660 TIM IN is connected to TD-204 PCM IN.
  - For System 4, TD-660 PCM OUT is connected to TD-204 PCM IN.
  - For System 2, TD-660 TIM OUT is connected to TD-204 PCM IN.
10. Which systems are interconnected in the above video patch?
- Systems 1 and 2
  - Systems 2 and 3
  - Systems 2 and 4
  - Systems 3 and 4

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Unit VII, Lesson 2  
Checkpoint 1, Form A

7

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VII - LESSON 2

Checkpoint 1, Form B

VIDEO PATCH				
	System 1		System 2	
	X	Y	X	Y
IN	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
OUT	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

1. In the video patch diagram above, which of the following statements accurately describes the cable connection for System 2.
- a. X-IN is connected to Y-IN.
  - b. X-IN is connected to Y-OUT.
  - c. X-OUT is connected to Y-IN.
  - d. X-OUT is connected to Y-OUT.

VIDEO PATCH				
	System 1		System 2	
	M	N	M	N
IN	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
OUT	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IN-1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
OUT-1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. In which system is the cable connection between N-IN and N-OUT-1 located?
- a. System 1
  - b. System 2
  - c. Both System 1 and System 2
  - d. Neither System 1 nor System 2

VIDEO PATCH				
	System 1		System 2	
	A	B	A	B
Blue	o	o	o	o
Brown	o	o	o	o
Black	o	o	o	o

3. In the cabling diagram above, which statement accurately describes the cable connection for System 2?
- A-Black is connected to B-Brown.
  - A-Black is connected to B-Black.
  - A-Brown is connected to B-Black.
  - A-Blue is connected to B-Black.

VIDEO PATCH						
	System 1			System 2		
	A	B	C	A	B	C
P OUT	o	o	o	o	o	o
P IN	o	o	o	o	o	o
T OUT	o	o	o	o	o	o

4. The diagram above shows the correct way for connecting cables for Systems 1 and 2 on the video patch. Which of the diagrams on the next page shows the correct way to connect the cables for System 1 only?
- Diagram 1
  - Diagram 2
  - Diagram 3
  - Diagram 4

VIDEO PATCH						
	System 1			System 2		
	A	B	C	A	B	C
P OUT	o	o	o	o	o	o
P IN	o	o	o	o	o	o
T OUT	o	o	o	o	o	o

Diagram 1

VIDEO PATCH						
	System 1			System 2		
	A	B	C	A	B	C
P OUT	o	o	o	o	o	o
P IN	o	o	o	o	o	o
T OUT	o	o	o	o	o	o

Diagram 2

VIDEO PATCH						
	System 1			System 2		
	A	B	C	A	B	C
P OUT	o	o	o	o	o	o
P IN	o	o	o	o	o	o
T OUT	o	o	o	o	o	o

Diagram 3

VIDEO PATCH						
	System 1			System 2		
	A	B	C	A	B	C
P OUT	o	o	o	o	o	o
P IN	o	o	o	o	o	o
T OUT	o	o	o	o	o	o

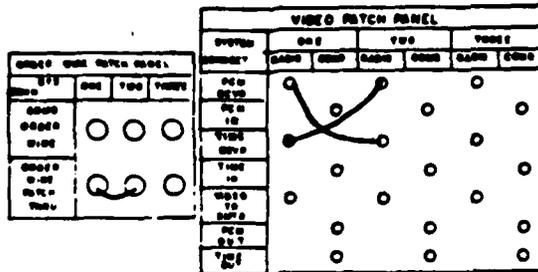
Diagram 4

VIDEO PATCH						
	System 1			System 2		
	X	Y	Z	X	Y	Z
I	o	o	o	o	o	o
II	o	o	o	o	o	o
III	o	o	o	o	o	o
IV	o	o	o	o	o	o
V	o	o	o	o	o	o

5. Which of the following statements is not true about the above video patch diagram?
- For System 1, Y-III is connected to Z-IV.
  - System 1 is connected to System 2.
  - For System 2, Y-I is connected to Z-II.
  - For System 2, Y-II is connected to Z-I.

Unit VII, Lesson 2  
Checkpoint 1, Form B

Below is a diagram which shows typical cable connections for a radio. System 1 and 2 cable connections are shown as examples. This diagram does not show all possible system cable connections.



6. Which of the following diagrams shows the correct cable connections if you were to connect System 1 and System 3? Use the above diagram as a guide.

- a. Diagram 1
- b. Diagram 2
- c. Diagram 3
- d. Diagram 4

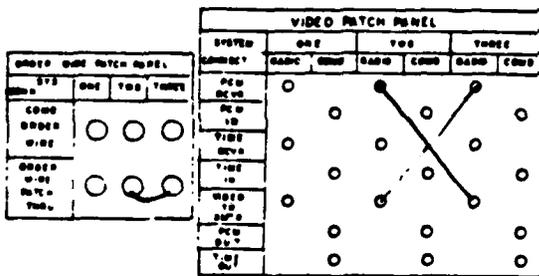


Diagram 1

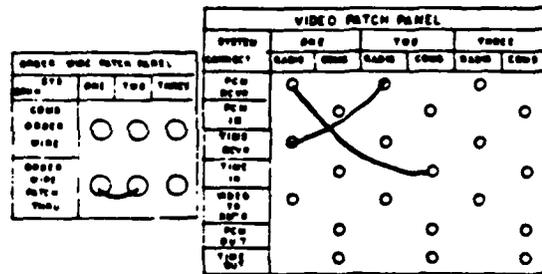


Diagram 2

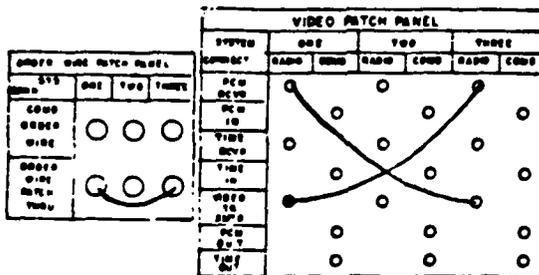


Diagram 3

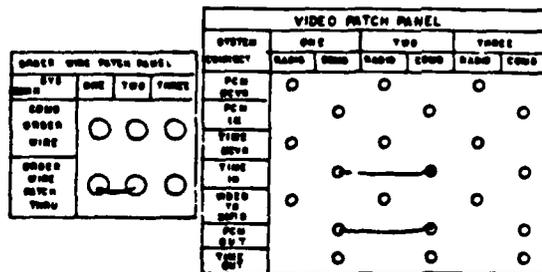
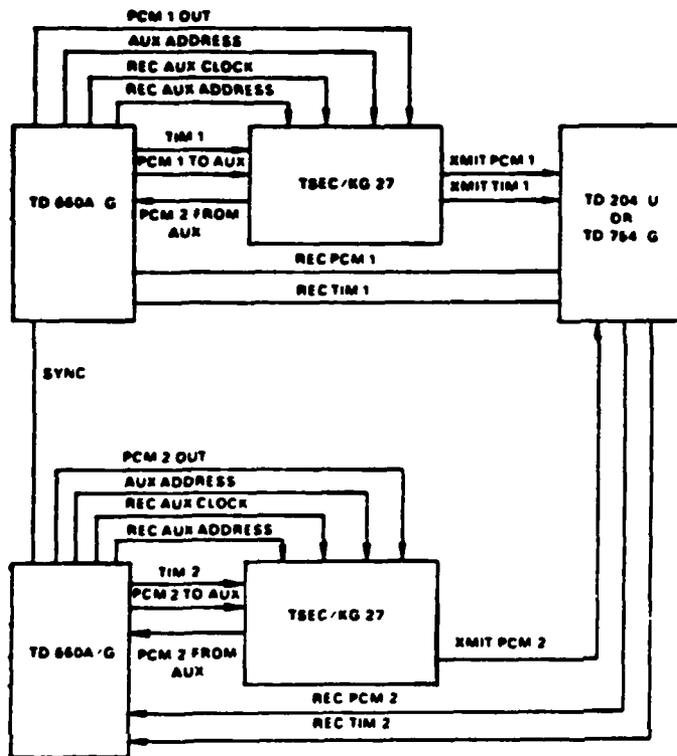


Diagram 4

VIDEO PATCH						
	System 1		System 2		System 3	
	A	B	A	B	A	B
I	o	o	o	o	o	o
II	o	o	o	o	o	o
III	o	o	o	o	o	o
IV	o	o	o	o	o	o

7. In the above video patch diagram, which system(s) is not being used?
- System 1
  - System 2
  - System 3
  - Systems 1 and 2



On the left is a different kind of cabling diagram. It is called a block diagram. The labels in the boxes identify the components. The solid dark lines are the cables. The labels directly above or below the lines identify the connectors.

8. In the block diagram above, TD-204/U - REC PCM 2 is connected to:
- TD-660A/G
  - TD-754/G
  - XMIT PCM 1
  - TSEC/KG-27

VIDEO PATCH									
	System 1			System 2			System 3		
	X	Y	Z	X	Y	Z	X	Y	Z
P OUT	o	o	o	o	o	o	o	o	o
P IN	o	o	o	o	o	o	o	o	o
T IN	o	o	o	o	o	o	o	o	o
T OUT	o	o	o	o	o	o	o	o	o

9. Which statement is true concerning the video patch above?

- For System 1, X - P IN is connected to Z - T IN.
- For System 2, X - T OUT is connected to Z - P IN.
- For System 2, X - P IN is connected to Z - T IN.
- For System 3, X - T IN is connected to Z - P OUT.

VIDEO PATCH									
	System 1		System 2		System 3		System 4		
	A	B	A	B	A	B	A	B	
P OUT	o	o	o	o	o	o	o	o	
P IN	o	o	o	o	o	o	o	o	
T IN	o	o	o	o	o	o	o	o	
T OUT	o	o	o	o	o	o	o	o	
S IN	o	o	o	o	o	o	o	o	

10. Which of the following statements is true concerning the above video patch diagram?

- A - P OUT for System 1 is connected to A - T IN for System 3.
- B - P OUT for System 2 is connected to A - P IN for System 4.
- A - P IN for System 3 is connected to B - P IN for System 4.
- B - P OUT for System 2 is connected to B - P IN for System 4.

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Unit VII, Lesson 2  
Checkpoint 1, Form B

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VIII - LESSON 1

Checkpoint 1, Form A

Here is part of a troubleshooting checklist. Use it to answer the questions on the next page.

<u>Step</u>	<u>Action</u>	<u>Normal Indication</u>
1	Tune AFC LEVEL control for peak indication on multimeter.	Multimeter indicates 10 or more.
2	Rotate AFC correction control.	AFC meter needle moves back toward center and stops near center.
3	Press push-to-talk button on Handset H-156/U.	Side tone is heard in H-156/U receiver.
4	Adjust REC SIG-1 for maximum indication on receiver multimeter.	Multimeter indicates peak or off scale.
5	Detune REC SIG-1 control for minimum indication on multimeter.	Multimeter indicates minimum level.
6	Operate RING switch and listen on handset.	1,600-cps ringing tone should be heard.
7	Set AC POWER circuit breaker to ON.	Blower motor operates.
8	Adjust AFC CORRECTION through its range.	AFC CORRECTION control is not over 10° from midrange.
9	Readjust AMP control and rotate COUPLING control.	DA-189/U meter indicates more than 12 watts.
10	Set multimeter selector switch to PWR OUT.	Multimeter indication is 20 or more.

Unit VIII, Lesson 1  
Checkpoint 1, Form A

1

Questions:

1. You do Action No. 1. The multimeter reading on your equipment is 9. Does this mean that there is something wrong?

\_\_\_\_\_

2. You do Action No. 2 The AFC meter needle moves from  to  and stays there. Is something wrong?

\_\_\_\_\_

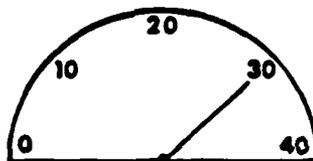
3. You do Action No. 3. You hear a side tone in the H/156/U receiver. Is something wrong?

\_\_\_\_\_

4. You do Action No. 4. The multimeter needle goes off the scale. Is something wrong?

\_\_\_\_\_

5. You do Action No. 5. Here is what the multimeter looks like:



Is something wrong?

\_\_\_\_\_

6. You do Action No. 6. You hear a faint buzz, but it is not a ringing tone. Is something wrong?

\_\_\_\_\_

7. You do Action No. 7. You hear the blower motor go on. Is something wrong?

\_\_\_\_\_

8. You do Action No. 8. The AFC CORRECTION control is about 30° from midrange. Is something wrong?

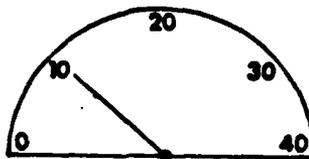
\_\_\_\_\_

Unit VIII, Lesson 1  
Checkpoint 1, Form A

2

9. You do Action No. 9. The DA-189/GRC meter reads 15 watts. Is something wrong? \_\_\_\_\_

10. You do Action No. 10. The multimeter looks like this:



Is something wrong? \_\_\_\_\_

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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VIII - LESSON 1

Checkpoint 1, Form B

Here is part of a troubleshooting checklist. Use it to answer the questions on the next page.

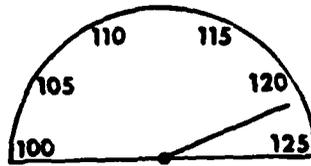
<u>Step</u>	<u>Action</u>	<u>Normal Indication</u>
1	Set POWER circuit breaker to ON.	POWER ON indicator lights.
2	Set MANUAL RAISE-LOWER switch to RAISE then LOWER.	Meter indicates raise in voltage, then decrease in voltage.
3	Set MANUAL-AUTOMATIC switch to AUTOMATIC.	Meter indicates 115 volts.
4	Rotate coupling control to obtain higher DA-189/GRC meter indication.	DA-189/GRC meter indicates more than 8 watts.
5	Set multimeter selector switch to 1 KC MOD.	Multimeter indicates in green area of meter scale.
6	Operate RING switch and listen on handset.	1,600-cps ringing tone should be heard.
7	Set AC POWER circuit breaker to ON.	blower motor operates.
8	Adjust AFC CORRECTION through its range.	AFC CORRECTION control is not over 10° from midrange.
9	Readjust AMP control and rotate COUPLING control.	DA-189/U meter indicates more than 12 watts.
10	Set multimeter selector switch to PWR OUT.	Multimeter indication is 20 or more.

Unit VIII, Lesson 1  
Checkpoint 1, Form B

1

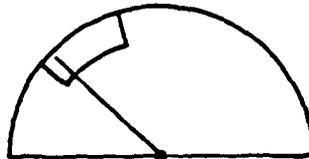
Questions:

1. You do Action No. 1. The POWER ON indicator stays unlit. Is something wrong? \_\_\_\_\_
2. You do Action No. 2. The meter goes from 30 to 50, then back to 30. Is something wrong? \_\_\_\_\_
3. You Do Action No. 3. Here is how the meter looks. \_\_\_\_\_



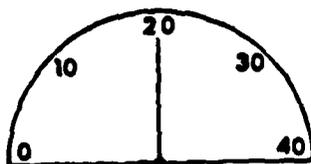
Is something wrong? \_\_\_\_\_

4. You do Action No. 4. The DA-189/GRC meter reads 5 watts. Is something wrong? \_\_\_\_\_
5. You do Action No. 5. Here is how the multimeter looks. \_\_\_\_\_



Is something wrong? \_\_\_\_\_

6. You do Action No. 6. There is no sound on the handset. Is something wrong? \_\_\_\_\_
7. You do Action No. 7. The blower motor does not go on. Is something wrong? \_\_\_\_\_
8. You do Action No. 8. The AFC CORRECTION control is about 5° from midrange. Is something wrong? \_\_\_\_\_
9. You do Action No. 9. The DA-189/GRC meter indicates 15 watts Is something wrong? \_\_\_\_\_
10. You do Action No. 10. Here is how the multimeter looks. \_\_\_\_\_



Is something wrong? \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VIII - LESSON 2

Checkpoint 1, Form A

Here is part of a troubleshooting checklist. Use it to answer the questions below.

<u>Step</u>	<u>Action</u>	<u>Normal Indication</u>
1	Set AC POWER circuit breaker to ON. Allow equipment to warm up for 5 minutes.	Blower motor operates. FIL indicator lights.
2	Set multimeter switch to AMP. Adjust AFC CORRECTION through its range for peak indication.	Indication on multimeter is more than 10. AFC CORRECTION control is not over 10° from midrange.
3	Set multimeter selector switch to PWR OUT.	Multimeter indication should be no less than 20. LOW POWER indicator should be extinguished.
4	Rotate AFC CORRECTION control 30° to the right from its original setting.	AFC meter indication moves off center then slowly returns to center. AFC CORRECTION control returns to original setting.

Use the checklist above to answer the following questions.

1. You do Action No. 1. The blower motor goes on, and the FIL indicator lights. Is something wrong? \_\_\_\_\_
2. You do Action No. 1. The blower motor goes on. The FIL indicator does not light. Is something wrong? \_\_\_\_\_

Unit VIII, Lesson 2  
Checkpoint 1, Form A

1

3. You do Action No. 2. The multimeter shows a reading of 20. The AFC CORRECTION control is about 15° from midrange. Is something wrong? \_\_\_\_\_
4. You do Action No. 2. The multimeter reading is 5. The AFC CORRECTION control is far to the left of midrange. Is something wrong? \_\_\_\_\_
5. You do Action No. 2. The multimeter reading is 9. The AFC CORRECTION control is at midrange. Is something wrong? \_\_\_\_\_
6. You do Action No. 3. The multimeter indication is 25. The LOW POWER indicator goes out. Is something wrong? \_\_\_\_\_
7. You do Action No. 3. The multimeter indication is 15. The LOW POWER indicator goes out. Is something wrong? \_\_\_\_\_
8. You do Action No. 3. The multimeter indication is 15. The LOW POWER indicator is lit. Is something wrong? \_\_\_\_\_
9. Before you do Action No. 4, the AFC CORRECTION control is at midrange. Now you do Action No. 4. The AFC meter needle moves to the right then back to the center. The AFC CORRECTION control returns to midrange. Is something wrong? \_\_\_\_\_
10. Before you do Action No. 4, The AFC CORRECTION control is at midrange. Now you do Action No. 4. The AFC meter needle moves to the right and stays there. The AFC CORRECTION control returns to midrange. Is something wrong? \_\_\_\_\_

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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VIII - LESSON 2

Checkpoint 1, Form B

Here is part of a checklist for troubleshooting radio equipment. Do not try to read it now, but use it to answer the questions on the next page.

<u>Step</u>	<u>Action</u>	<u>Normal Indication</u>
1	Press BUZZER OFF switch.	POWER INDICATOR lights. Loud rushing noise is heard on handset.
2	Set AC POWER circuit breaker to ON.	Blower motor operates. Overhead fan starts. FIL indicator lights.
3	Set multimeter selector switch to PWR OUT. Set multimeter switch to AMP.	Multimeter indicates no more than 20. LOW POWER indicator goes out.
4	Adjust AFC CORRECTION through its range for peak indication.	Indication on multimeter is more than 10. AFC CORRECTION control is not over 10° from midrange.
5	Rotate AFC CORRECTION control 30° to the right from its midrange setting.	AFC meter indication moves off center then slowly returns to center. AFC CORRECTION control returns to midrange.

USE THE TABLE ON THE PREVIOUS PAGE TO ANSWER THE FOLLOWING QUESTIONS:

1. You do Action No. 1. The POWER INDICATOR lights. You hear a crackling sound on the handset. Is something wrong? \_\_\_\_\_
2. You do Action No. 1. The POWER INDICATOR remains off. There is no sound on the handset. Is something wrong? \_\_\_\_\_
3. You do Action No. 2. The blower motor operates. The overhead fan does not move. The FIL indicator lights. Is something wrong? \_\_\_\_\_
4. You do Action No. 2. The blower motor and the overhead fan start running. The FIL indicator lights. Is something wrong? \_\_\_\_\_
5. You do Action No. 3. The multimeter registers 18. The LOW POWER indicator stays on. Is something wrong? \_\_\_\_\_
6. You do Action No. 3. The multimeter registers 25. The LOW POWER indicator goes out. Is something wrong? \_\_\_\_\_
7. You do Action No. 4. There is no indication on the multimeter. The AFC CORRECTION control is about 40° from midrange. Is something wrong? \_\_\_\_\_
8. You do Action No. 4. The multimeter indicates 20. The AFC CORRECTION control is about 5° from midrange. Is something wrong? \_\_\_\_\_
9. You do Action No. 5. The AFC meter needle moves to the right then returns to the center. The AFC CORRECTION control goes back to midrange. Is something wrong? \_\_\_\_\_
10. You do Action No. 5. The AFC meter needle moves to the right then returns to the center. The AFC CORRECTION control remains in a setting 30° to the right of midrange. Is something wrong? \_\_\_\_\_

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Unit VIII, Lesson 2  
Checkpoint 1, Form B

2

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VIII - LESSON 3

Checkpoint 1, Form A

Each question below tells you something that happened while operating equipment. Look in the table on the following pages for the symptom description that matches what happened on the equipment, and write its Item No. in the space provided.

- |  | <u>Item No.</u> |
|--|-----------------|
| 1. You are operating a TD-660(*)/G. You set selector switch III at OSC. The TEST ALIGN meter indicates outside the green area.                           | _____           |
| 2. You are operating a T-983(P)/GRC-103(V). You set the meter selector switch at 12 VDC. The meter reads below normal.                                   | _____           |
| 3. You are operating a TD-660(*)/G. You set selector switch I at SW II and selector switch II at A. The TEST ALIGN meter registers zero.                 | _____           |
| 4. You are operating an R-1329(P)/GRC-103(V). You set the meter selector switch at DOUBLER. The meter reading is below normal.                           | _____           |
| 5. You are operating a TD-660(*)/G. You set the POWER switch at ON, but the indicator lamp does not go on.   | _____           |
| 6. You are operating a TD-204/U. You set the METER SELECT switch at SERV FAC and the SERV SEL switch at D. The TEST ALIGN meter indication is incorrect. | _____           |
| 7. You are operating a TD-660(*)/G. You set selector switch I at NOISE GEN. The TEST ALIGN meter needle is not in the yellow.                            | _____           |
| 8. You are operating an R-1329(P)/GRC-103(V). You set the meter selector switch at MULT. The meter reading is below normal.                              | _____           |

Item No.

9. You are operating a TD-204/U. You set the METER SELECT switch at SERV FAC and the SERV SEL switch at -10. The TEST ALIGN meter gives an incorrect indication. \_\_\_\_\_
10. You are operating an R-1329(P)/GRC-103(V). You set the meter selector switch to OSC. The meter reading is below normal. \_\_\_\_\_

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Unit VIII, Lesson 3  
Checkpoint 1, Form A

2

List of Symptoms from a Troubleshooting Table.

<u>Item No.</u>	<u>Malfunction (Symptom)</u>
1	Incorrect indication on TD-204/U TEST ALIGN meter with METER SELECT switch at SERV FAC and SERV SEL switch at: a. -10. b. +10 c. SUM + 3. d. BAL. <u>-</u>
2	Incorrect indication on TD-204/U TEST ALIGN meter with METER SELECT switch at SERV FAC and SERV SEL switch at: a. A b. B c. C d. D e. E
3	T-983(P)/GRC-103(V) OVERHEAT in- dicator lights when AC POWER switch is operated to ON/RESET.
4	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at 12 VDC or 28 VDC.
5	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at PWR OUT.
6	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at OSC.
7	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at DOUBLER.

(continued on the next page)

<u>Item No.</u>	<u>Malfunction (Symptom)</u>
8	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at MULT.
9	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at RCVR SIG.
10	TD-660(*)/G indicator lamp does not light when POWER switch is operated to ON.
11	Incorrect indication on TD-660(*)/G TEST ALIGN meter with selector switch I at; <ul style="list-style-type: none"> <li>a. +12</li> <li>b. +4</li> <li>c. -12</li> <li>d. -6</li> <li>e. -4</li> </ul>
12	TEST ALIGN meter fails to indicate yellow when selector switch I is at +7 on TD-660(*)/G.
13	TEST ALIGN meter fails to indicate yellow when selector switch I of TD-660(*)/G is at NOISE GEN.
14	TEST ALIGN meter of TD-660(*)/G fails to indicate green with selector switch I at SW II and selector switch II at: <ul style="list-style-type: none"> <li>a. A</li> <li>b. B</li> <li>c. C</li> <li>d. D</li> </ul>
15	TEST ALIGN meter of TD-660(*)/G does not indicate in green area with selector switch III at OSC.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VIII - LESSON 3

Checkpoint 1, Form B

Each question below tells about a symptom that occurred while operating equipment. Find the symptom description that matches the symptom, using the table on the two pages following the questions. Then write its Item No. in the space provided.

- |  | <u>Item No.</u> |
|--|-----------------|
| 1. You are operating a TD-660(*)/G. You set selector switch I at -6. The TEST ALIGN meter indicates incorrectly.   | _____           |
| 2. You are operating a TD-204/U. You set the METER SELECT switch at SERV FAC and the SERV SEL switch at +10. The TEST ALIGN meter shows an incorrect indication. | _____           |
| 3. You are operating a TD-660(*). You set selector switch I at SW II and selector switch II at D. The needle on the TEST ALIGN meter is out of the green area.   | _____           |
| 4. You are operating a T-983(P)/GRC-103(V). You set the meter selector switch at PWR OUT. The meter reading is below normal.                                     | _____           |
| 5. You are operating a TD-660(*)/G. You set selector switch I to NOISE GEN. The TEST ALIGN meter indication is not in the yellow.                                | _____           |
| 6. You are operating an R-1329(P)/GRC-103(V). You set the meter selector switch to RCVR SIG. The meter indicates below normal.                                   | _____           |
| 7. You are operating a T-983(P)/GRC-103(V). You set the AC POWER switch to ON/RESET. The OVERHEAT indicator lights.  | _____           |
| 8. You are operating a TD-660(*)/G. You set selector switch I at +4. The TEST ALIGN meter shows an incorrect indication.   | _____           |

9. You are operating a T-983(P)/GRC-103(V). You set the meter selector switch at 28 VDC. The meter reading is below normal. \_\_\_\_\_
10. You are operating a TD-660(\*)/G. You set selector switch I to +7. the TEST ALIGN meter needle is not in the yellow area. \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

List of Symptoms from a Troubleshooting Table.

<u>Item</u> <u>No.</u>	<u>Malfuction</u> (Symptom)
1	Incorrect indication on TD-204/U TEST ALIGN meter with METER SELECT switch at SERV FAC and SERV SEL switch at: a. -10. b. +10 c. SUM + 3. d. BAL.
2	Incorrect indication on TD-204/U TEST ALIGN meter with METER SELECT switch at SERV FAC and SERV SEL switch at: a. A b. B c. C d. D e. E
3	T-983(P)/GRC-103(V) OVERHEAT indicator lights when AC POWER switch is operated to ON/RESET.
4	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at 12 VDC or 28 VDC.
5	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at PWR OUT.
6	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at OSC.
7	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at DOUBLER.

(continued on the next page)

<u>Item No.</u>	<u>Malfunction (Symptom)</u>
8	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at MULT.
9	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at RCVR SIG.
10	TD-660(*)/G indicator lamp does not light when POWER switch is operated to ON.
11	Incorrect indication on TD-660(*)/G TEST ALIGN meter with selector switch I at: <ul style="list-style-type: none"> <li>a. +12</li> <li>b. +4</li> <li>c. -12</li> <li>d. -6</li> <li>e. -4</li> </ul>
12	TEST ALIGN meter fails to indicate yellow when selector switch I is at +7 on TD-660(*)/G.
13	TEST ALIGN meter fails to indicate yellow when selector switch I of TD-660(*)/G is at NOISE GEN.
14	TEST ALIGN meter of TD-660(*)/G fails to indicate green with selector switch I at SW II and selector switch II at: <ul style="list-style-type: none"> <li>a. A</li> <li>b. B</li> <li>c. C</li> <li>d. D</li> </ul>
15	TEST ALIGN meter of TD-660(*)/G does not indicate in green area with selector switch III at OSC.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VIII - LESSON 4

Checkpoint 1, Form A

Each of the ten questions below describes an equipment symptom. On the following two pages, you will find a list of symptoms from a trouble-shooting table. Read each question. Then find the matching symptom description in the table, and write its Item No. in the space provided.

- |  | <u>Item No.</u> |
|--|-----------------|
| 1. You are operating a T-983(P)/GRC-103(V). You set the AC POWER switch to ON/RESET. The AC POWER indicator lights. The LOW POWER indicator lights. The buzzer sounds. The blower does not go on.  | _____           |
| 2. You are checking out an RT-773/GRC-103(V). An order wire signal is coming in. The buzzer sounds, but the CALL indicator does not light.   | _____           |
| 3. You are working with a medium capacity system including a TD-352/U, TD-202/U, and AN/GRC-50A(V). You set the METER SELECT switch of the TD-202/U at FROM RADIO RCVR. The TD-202/U TEST ALIGN meter does not indicate in the green area, and the ALARMS TRAFFIC indicator lights. The TD-352/U ALARMS FRAME indicator also lights, and the buzzer sounds. The AN/GRC-50A(V) and order wire are operating normally. | _____           |
| 4. You are operating a T-983(P)/GRC-103(V). You set the AC POWER switch to ON/RESET. The AC POWER indicator does not light, but the LOW POWER indicator lights, the buzzer sounds, and the blower goes on.   | _____           |
| 5. You are operating an R-1329(P)/GRC-103(V). You set the AC POWER switch to ON. The AC POWER indicator does not light. The LOW SIGNAL indicator does not light. The buzzer does not sound.  | _____           |

Unit VIII, Lesson 4  
Checkpoint 1, Form A

Item No.

6. You are operating an R-1329(P)/GRC-103(V). You set the AC POWER switch to ON. The LOW SIGNAL indicator does not light, but the AC POWER indicator lights and the buzzer sounds. \_\_\_\_\_
  
7. You are operating an R-1329(P)/GRC-103(V). You set the AC POWER switch to ON. The POWER indicator on the RT-773/GRC-103(V) does not light, but all other indications are normal. \_\_\_\_\_
  
8. You are operating a T-983(P)/GRC-103(V). You set the AC POWER switch to ON/RESET and the meter selector switch to 600 VDC. The LOW POWER indicator stays on, and the meter indicates below normal. \_\_\_\_\_
  
9. You are operating an R-1329(P)/GRC-103(V). You set the AC POWER switch to ON. The AC POWER indicator does not light, but the LOW SIGNAL indicator lights and the buzzer sounds. \_\_\_\_\_
  
10. You are operating an R-1329(P)/GRC-103(V). You set the AC POWER switch to ON. The buzzer does not sound, but both the AC POWER and the LOW SIGNAL indicators light. \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

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AND TELL YOU WHAT TO DO NEXT.

List of Symptom Descriptions from a Troubleshooting Table

<u>Item No.</u>	<u>Symptom</u>
1	T-983(P)/GRC-103(V) LOW POWER indicator does not extinguish within 60 seconds after AC POWER switch is operated to ON/RESET and meter indication is below normal with meter selector switch at 600 VDC.
2	T-983(P)/GRC-103(V) AC POWER and LOW POWER indicators do not light, buzzer is silent, and blower does not operate when AC POWER switch is operated to ON/RESET.
3	T-983(P)/GRC-103(V) AC POWER and LOW POWER indicators light, buzzer sounds, but blower does not operate when AC POWER switch is operated to ON/RESET.
4	T-983(P)/GRC-103(V) LOW POWER indicator lights, buzzer sounds, and blower operates, but AC POWER indicator does not light when AC POWER switch is operated to ON/RESET.
5	R-1329(P)/GRC-103(V) AC POWER and LOW SIGNAL indicators do not light, and buzzer is silent when AC POWER switch is operated to ON.
6	R-1329(P)/GRC-103(V) LOW SIGNAL indicator lights and buzzer sounds but AC POWER indicator does not light when AC POWER switch is operated to ON.
7	R-1329(P)/GRC-103(V) AC POWER indicator lights and buzzer sounds but LOW SIGNAL indicator does not light when AC POWER switch is operated to ON.
8	R-1329(P)/GRC-103(V) AC POWER and LOW SIGNAL indicators light but buzzer does not sound when AC POWER switch is operated to ON.
9	RT-773/GRC-103(V) POWER indicator does not light when R-1329(P)/GRC-103(V) AC POWER switch is operated to ON and there is no order wire communications.

(continue on the next page)

<u>Item No.</u>	<u>Symptom</u>
10	RT-773/GRC-103(V) POWER indicator does not light when R-1329(P)/GRC-103(V) AC POWER switch is operated to ON. All other indications are normal.
11	RT-773/GRC-103(V) CALL indicator does not light when order wire signal is received, but buzzer sounds.
12	RT-773/GRC-103(V) CALL indicator lights, but buzzer does not sound when order wire signal is received.
13	ALARMS FRAME indicator of TD-352/U lights, buzzer sounds, and TEST ALIGN meter indicates in green area with METER SELECT switch at PCM IN and TIMING IN.
14	ALARMS FRAME indicator of TD-352/U lights, buzzer sounds, and TEST ALIGN meter does not indicate in green area with METER SELECT switch at PCM IN and/or TIMING IN. TD-202/U and AN/GRC-50A(V) indicate normally.
15	ALARMS FRAME indicator of TD-352/U and ALARMS TRAFFIC indicator of TD-202/U light, buzzer sounds, TEST ALIGN meter of TD-202/U does not indicate in green area with METER SELECT switch at FROM RADIO RCVR. AN/GRC-50A(V) operates normally, order wire normal.
16	ALARMS FRAME indicator of TD-352/U and ALARMS TRAFFIC indicator of TD-202/U light and TEST METER does not indicate in green area with METER SELECT switch at FROM RADIO RCVR, all indications on AN/GRC-50A(V) are normal except for noisy or no order wire.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VIII - LESSON 4

Checkpoint 1, Form B

Each of the ten questions below describes an equipment symptom. Read each question. Then go to the table following the questions and find the symptom description which matches the equipment symptom. Write its Item No. in the space provided.

- |  | <u>Item No.</u> |
|--|-----------------|
| 1. You are operating a T-983(P)/GRC-103(V). You set the AC POWER switch to ON/RESET. The AC POWER indicator lights. The LOW POWER indicator lights. The buzzer sounds. The blower does not go on.  | _____           |
| 2. You are operating an R-1329(P)/GRC-103(V). You set the AC POWER switch to ON. The indicators on the R-1329 are normal, but the RT-773/GRC-103(V) POWER indicator does not light.  | _____           |
| 3. You are operating an R-1329(P)/GRC-103(V). You set the AC POWER switch to ON. The AC POWER indicator lights and the buzzer sounds, but the LOW SIGNAL indicator does not light.   | _____           |
| 4. You are operating a T-983(P)/GRC-103(V). You set the meter selector switch at DRIVER. The meter reading is normal. Next, you set the meter selector switch at PWR OUT. The meter indicates below normal. You set the meter selector switch of the R-1329(P)/GRC-103(V) at XMTR DUPL. The R-1329 meter indicates below normal. | _____           |
| 5. You receive an order wire signal. The buzzer sounds, but the CALL indicator on the RT-773/GRC-103(V) does not light.  | _____           |

Item No.

6. You are operating a T-983(P)/GRC-103(V). You set the meter selector switch at REFL PWR. The meter reading is above normal. You set the meter selector switch of the R-1329(P)/GRC-103(V) at REFL PWR. The R-1329 meter also indicates above normal. \_\_\_\_\_
7. You are operating an R-1329(P)/GRC-103(V). You set the AC POWER switch to ON. The AC POWER indicator does not light. The LOW SIGNAL indicator does not light. The buzzer does not sound. \_\_\_\_\_
8. You are operating a T-983(P)/GRC-103(V). You set the AC POWER switch to ON/RESET and the meter selector switch to 600 VDC. The LOW POWER indicator goes on and stays on. The meter indication is below normal. \_\_\_\_\_
9. You are operating a T-983(P)/GRC-103(V). You set the meter selector switch at DRIVER. The meter indication is normal. You set the meter selector switch at PWR OUT. The meter reads below normal. You set the meter selector switch of the R-1329(P)/GRC-103(V) at XMTR DUPL. The R-1329 meter indication is normal. \_\_\_\_\_
10. You are operating a T-983(P)/GRC-103(V). You set the AC POWER switch to ON/RESET. The AC POWER indicator does not light. The LOW POWER indicator does not light. The buzzer does not sound. \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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AND TELL YOU WHAT TO DO NEXT.

List of Symptom Descriptions from a Troubleshooting Table

<u>Item No.</u>	<u>Symptom</u>
1	T-983(P)/GRC-103(V) LOW POWER indicator does not extinguish within 60 seconds after AC POWER switch is operated to ON/RESET and meter indication is below normal with meter selector switch at 600 VDC.
2	T-983(P)/GRC-103(V) AC POWER and LOW POWER indicators do not light, buzzer is silent, and blower does not operate when AC POWER switch is operated to ON/RESET.
3	T-983(P)/GRC-103(V) AC POWER and LOW POWER indicators light, buzzer sounds, but blower does not operate when AC POWER switch is operated to ON/RESET.
4	T-983(P)/GRC-103(V) LOW POWER indicator lights, buzzer sounds, and blower operates, but AC POWER indicator does not light when AC POWER switch is operated to ON/RESET.
5	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at PWR OUT. Normal indication in DRIVER position, but R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at XMTR DUPL.
6	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at PWR OUT. Normal indication in DRIVER position, and R-1329(P)/GRC-103(V) meter indicates normal with meter selector switch at XMTR DUPL.
7	T-983(P)/GRC-103(V) LOW POWER indicator does not extinguish, but meter indication is normal with meter selector switch at PWR OUT.
8	T-983(P)/GRC-103(V) meter indicates above normal with meter selector switch at REFL PWR. R-1329(P)/GRC-103(V) meter indicates above normal with meter selector switch at REFL PWR.

(continued on the next page)

<u>Item No.</u>	<u>Symptom</u>
9	R-1329(P)/GRC-103(V) AC POWER and LOW SIGNAL indicators do not light, and buzzer is silent when AC POWER switch is operated to ON.
10	R-1329(P)/GRC-103(V) LOW SIGNAL indicator lights and buzzer sounds but AC POWER indicator does not light when AC POWER switch is operated to ON.
11	R-1329(P)/GRC-103(V) AC POWER indicator lights and buzzer sounds but LOW SIGNAL indicator does not light when AC POWER switch is operated to ON.
12	R-1329(P)/GRC-103(V) AC POWER and LOW SIGNAL indicators light but buzzer does not sound when AC POWER switch is operated to ON.
13	RT-773/GRC-103(V) POWER indicator does not light when R-1329(P)/GRC-103(V) AC POWER switch is operated to ON and there is no order wire communications.
14	RT-773/GRC-103(V) POWER indicator does not light when R-1329(P)/GRC-103(V) AC POWER switch is operated to ON. All other indications are normal.
15	RT-773/GRC-103(V) CALL indicator does not light when order wire signal is received, but buzzer sounds.
16	RT-773/GRC-103(V) CALL indicator lights, but buzzer does not sound when order wire signal is received.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IX - LESSON 1

Checkpoint 1, Form A

1. Write the number having:
- a. 1 in the tenths place
  - b. 2 in the ones place
  - c. 3 in the tens place
  - d. 3 in the hundreds place

ANSWER: \_\_\_\_\_

2. Write the number having:
- a. 6 in the hundreds place
  - b. 3 in the tens place
  - c. 1 in the ones place
  - d. 7 in the tenths place

ANSWER: \_\_\_\_\_

3. Write the number having:
- a. 2 in the ones place
  - b. 7 in the hundreds place
  - c. 5 in the tenths place
  - d. 5 in the tens place

ANSWER: \_\_\_\_\_

4. Write the number having:
- a. 9 in the hundreds place
  - b. 3 in the ones place
  - c. 0 in the tens place
  - d. 6 in the tenths place

ANSWER: \_\_\_\_\_

5. Write the number having:
- a. 8 in the ones place
  - b. 7 in the hundreds place
  - c. 3 in the tens place
  - d. 9 in the tenths place

ANSWER: \_\_\_\_\_

6. Write the number having:
- a. 5 in the tenths place
  - b. 6 in the ones place
  - c. 2 in the tens place
  - d. 8 in the hundreds place

ANSWER: \_\_\_\_\_

7. Write the number having:
- a. 2 in the tenths place
  - b. 2 in the ones place
  - c. 2 in the tens place
  - d. 2 in the hundreds place

ANSWER: \_\_\_\_\_

8. Write the number having:
- a. 7 in the tens place
  - b. 0 in the ones place
  - c. 1 in the hundreds place
  - d. 6 in the tenths place

ANSWER: \_\_\_\_\_

Put the place value in the blank for the number below.

9. 3 0 3 . 0

|

ANSWER: \_\_\_\_\_

10. 2 1 6 . 7

|

ANSWER: \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKLIST,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IX - LESSON 1

Checkpoint 1, Form B

1. Write the number having:
- a. 6 in the hundreds place
  - b. 8 in the tens place
  - c. 9 in the ones place
  - d. 2 in the tenths place

ANSWER: \_\_\_\_\_

2. Write the number having:
- a. 7 in the tenths place
  - b. 2 in the ones place
  - c. 1 in the tens place
  - d. 9 in the hundreds place

ANSWER: \_\_\_\_\_

3. Write the number having:
- a. 3 in the ones place
  - b. 7 in the hundreds place
  - c. 5 in the tenths place
  - d. 6 in the tens place

ANSWER: \_\_\_\_\_

4. Write the number having:
- a. 0 in the ones place
  - b. 1 in the tens place
  - c. 2 in the tenths place
  - d. 3 in the hundreds place

ANSWER: \_\_\_\_\_

5. Write the number having:

- a. 5 in the hundreds place
- b. 2 in the tens place
- c. 1 in the ones place
- d. 3 in the tenths place

ANSWER: \_\_\_\_\_

6. Write the number having:

- a. 6 in the tenths place
- b. 8 in the ones place
- c. 9 in the tens place
- d. 5 in the hundreds place

ANSWER: \_\_\_\_\_

7. Write the number having:

- a. 4 in the tens place
- b. 7 in the ones place
- c. 4 in the tenths place
- d. 2 in the hundreds place

ANSWER: \_\_\_\_\_

8. Write the number having:

- a. 3 in the hundreds place
- b. 8 in the ones place
- c. 7 in the tenths place
- d. 1 in the tens place

ANSWER: \_\_\_\_\_

Put the place value in the blanks for the numbers below.

9. 4 9 0 . 3

|

ANSWER: \_\_\_\_\_

10. 1 2 0 . 3

|

ANSWER: \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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AND TELL YOU WHAT TO DO NEXT.

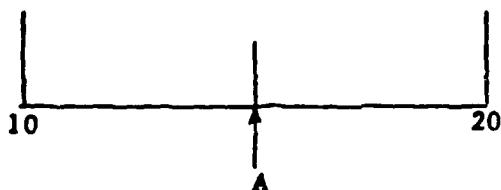
Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IX - LESSON 2

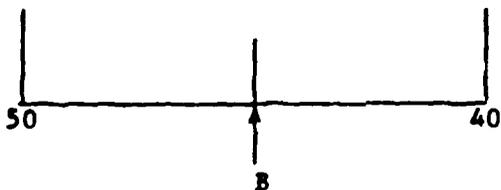
Checkpoint 1, Form A

1. What number does A stand for?



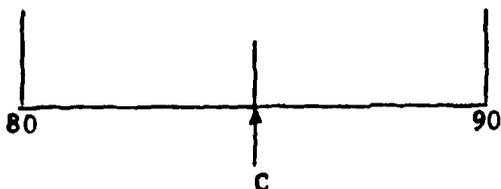
ANSWER: \_\_\_\_\_

2. What number does B stand for?



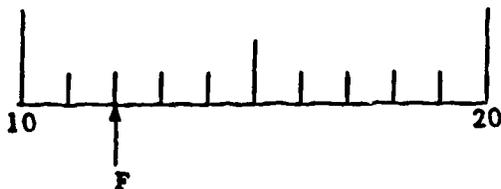
ANSWER: \_\_\_\_\_

3. What number does C stand for?



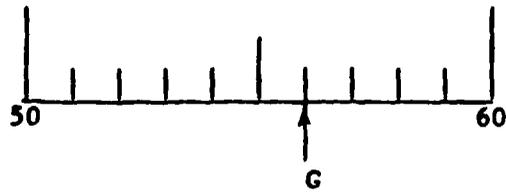
ANSWER: \_\_\_\_\_

4. What number does F stand for?



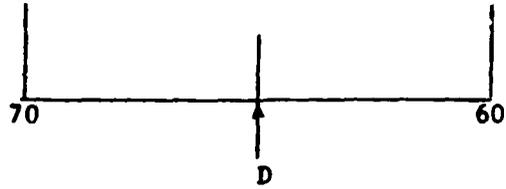
ANSWER: \_\_\_\_\_

5. What number does G stand for?



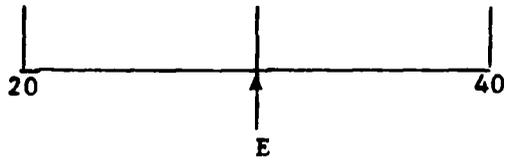
ANSWER: \_\_\_\_\_

6. What number does D stand for?



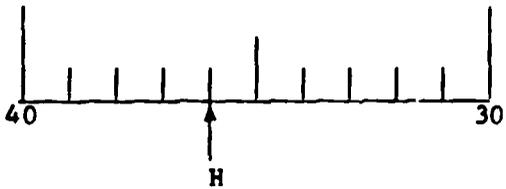
ANSWER: \_\_\_\_\_

7. What number does E stand for?



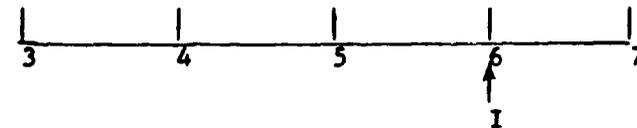
ANSWER: \_\_\_\_\_

8. What number does H stand for?



ANSWER: \_\_\_\_\_

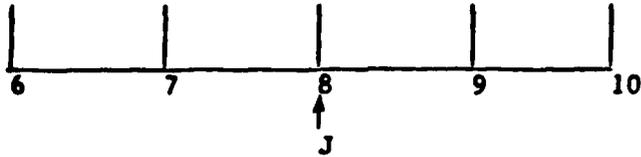
9. The scale below is a hundreds scale.  
What number does the letter I stand for?



ANSWER: \_\_\_\_\_

Unit IX, Lesson 2  
Checkpoint 1, Form A

10. The scale below is a hundreds scale.  
What number does the letter J stand for?



ANSWER: \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING  
YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE,  
AND TELL YOU WHAT TO DO NEXT.

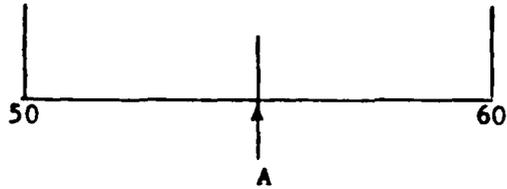
Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IX - LESSON 2

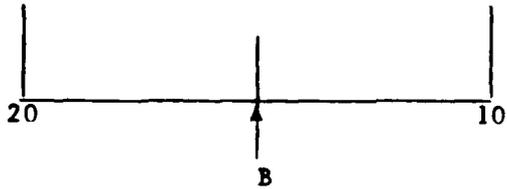
Checkpoint 1, Form B

1. What number does A stand for?



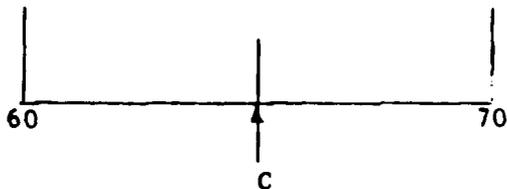
ANSWER: \_\_\_\_\_

2. What number does B stand for?



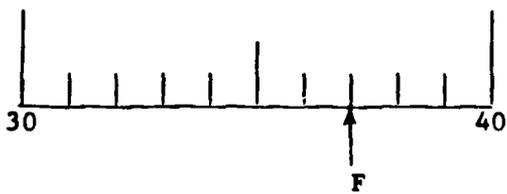
ANSWER: \_\_\_\_\_

3. What number does C stand for?



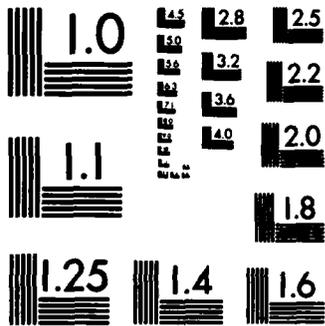
ANSWER: \_\_\_\_\_

4. What number does F stand for?



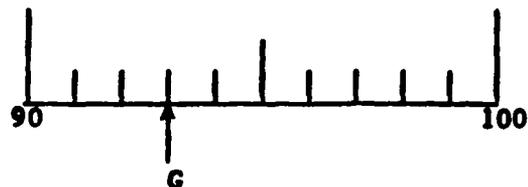
ANSWER: \_\_\_\_\_





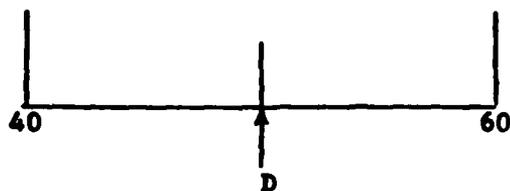
MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

5. What number does G stand for?



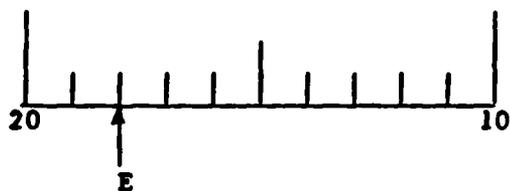
ANSWER: \_\_\_\_\_

6. What number does D stand for?



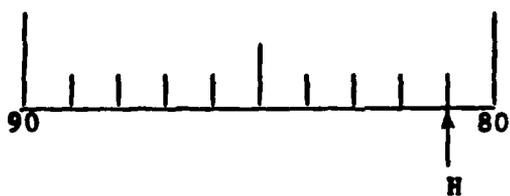
ANSWER: \_\_\_\_\_

7. What number does E stand for?



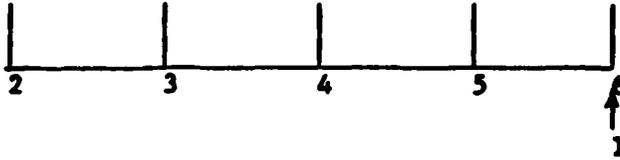
ANSWER: \_\_\_\_\_

8. What number does H stand for?



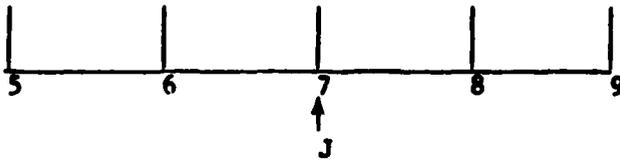
ANSWER: \_\_\_\_\_

9. The scale below is a hundreds scale? What does the letter I stand for?



ANSWER: \_\_\_\_\_

10. The scale below is a hundreds scale. What does the letter J stand for?



ANSWER: \_\_\_\_\_

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AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

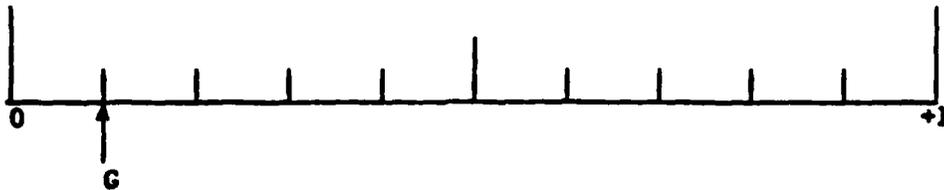
UNIT IX - LESSON 3

Checkpoint 1, Form A

Read the directions and answer the questions.

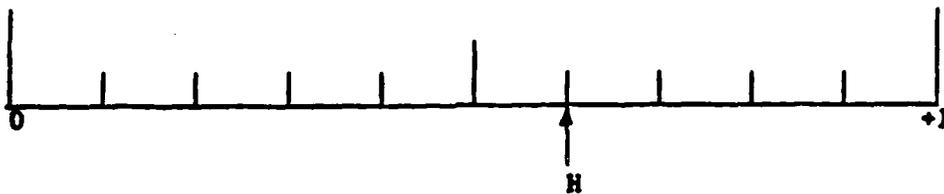
Put an "X" beside the best answer for the following questions:

1. What number does the letter G stand for?



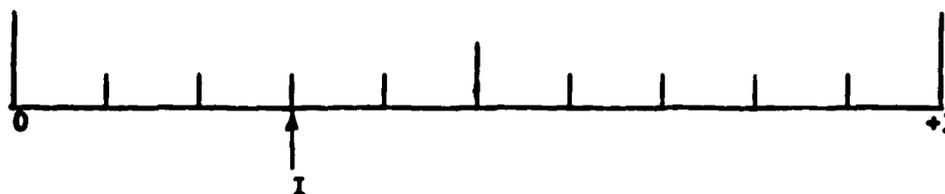
- \_\_\_\_\_ a. .01  
\_\_\_\_\_ b. 0.1  
\_\_\_\_\_ c. 0.9  
\_\_\_\_\_ d. one-ninth

2. What number does the letter H stand for?



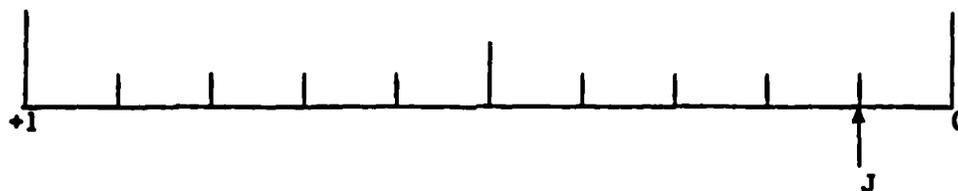
- \_\_\_\_\_ a. 0.6  
\_\_\_\_\_ b. 6.0  
\_\_\_\_\_ c. one-sixth  
\_\_\_\_\_ d. one-tenth

3. What number does the letter I stand for?



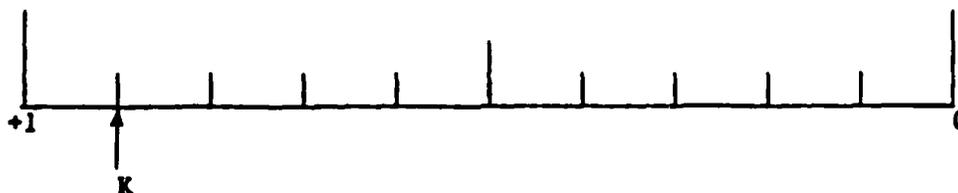
- a. 0.7
- b. 0.4
- c. .04
- d. 0.3

4. What number does the letter J stand for?



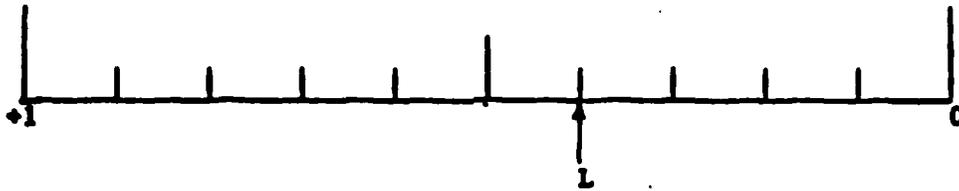
- a. 0.9
- b. .01
- c. one-tenth
- d. one-ninth

5. What number does the letter K stand for?



- a. 0.9
- b. .01
- c. one-tenth
- d. one-ninth

6. What number does the letter L stand for?



- \_\_\_\_\_ a. four-tenths
- \_\_\_\_\_ b. one-tenth
- \_\_\_\_\_ c. one-sixth
- \_\_\_\_\_ d. 0.6

Supply the answers for the following questions.

7. Nine-tenths means what number? ANSWER: \_\_\_\_\_
8. Five-tenths means what number? ANSWER: \_\_\_\_\_
9. Write the name for the number 0.3. ANSWER: \_\_\_\_\_
10. Write the name for the number 0.8. ANSWER: \_\_\_\_\_

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Name \_\_\_\_\_

Date \_\_\_\_\_

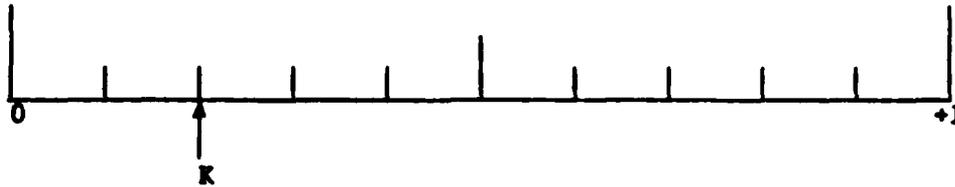
UNIT IX - LESSON 3

Checkpoint 1, Form B

Read the directions and answer the questions.

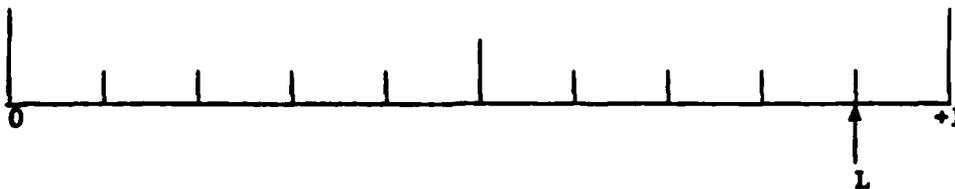
Put an "X" beside the best answer for the following questions:

1. What number does the letter K stand for?



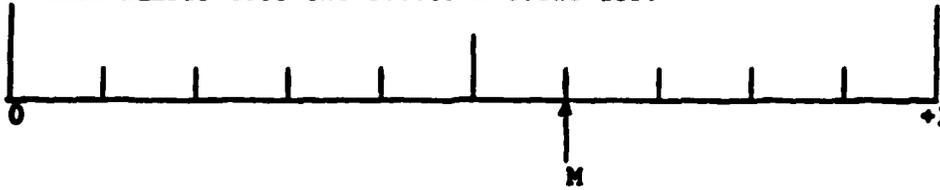
- \_\_\_\_\_ a. .02
- \_\_\_\_\_ b. 0.2
- \_\_\_\_\_ c. 0.8
- \_\_\_\_\_ d. .08

2. What number does the letter L stand for?



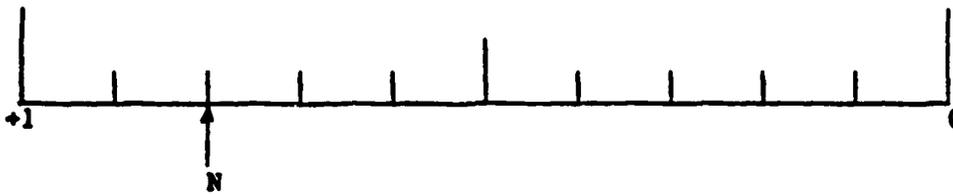
- \_\_\_\_\_ a. one-ninth
- \_\_\_\_\_ b. nine-tenths
- \_\_\_\_\_ c. one-tenth
- \_\_\_\_\_ d. .09

3. What number does the letter M stand for?



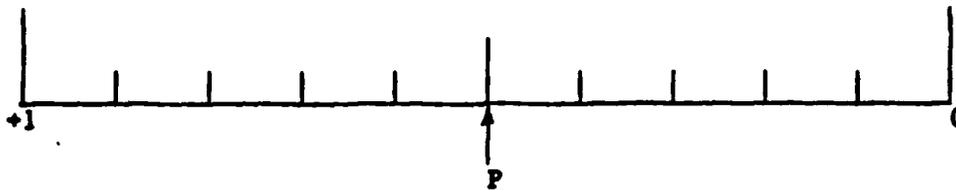
- a. one-tenth
- b. 0.4
- c. one-sixth
- d. 0.6

4. What number does the letter J stand for?



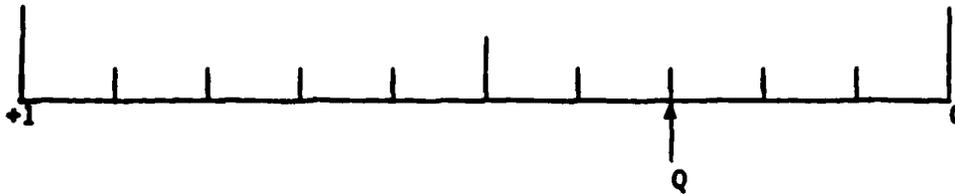
- a. 0.8
- b. 0.2
- c. 0.8
- d. 0.2

5. What number does the letter P stand for?



- a. one-fifth
- b. 5.0
- c. five-tenths
- d. .05

6. What number does the letter Q stand for?



- \_\_\_\_\_ a. 0.7
- \_\_\_\_\_ b. 0.4
- \_\_\_\_\_ c. one-third
- \_\_\_\_\_ d. 0.3

Supply the answers for the following questions.

- 7. Six-tenths means what number? ANSWER: \_\_\_\_\_
- 8. Seven-tenths means what number? ANSWER: \_\_\_\_\_
- 9. Write the name for the number 0.4. ANSWER: \_\_\_\_\_
- 10. Write the name for the number 0.2. ANSWER: \_\_\_\_\_

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Name \_\_\_\_\_

Date \_\_\_\_\_

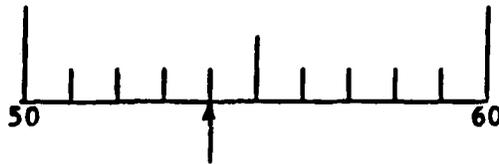
**UNIT IX - LESSON 4**

**Checkpoint 1, Form A**

Read the directions and answer the questions.

Look at the straight line scale. Note the reading on the scale.

Scale A.



1. On Scale A above, is the reading within two marks from the value of 59?

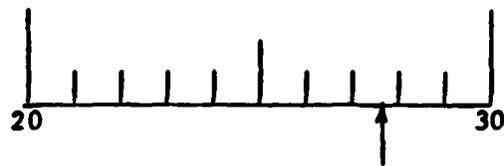
ANSWER: \_\_\_\_\_

2. On Scale A above, is the reading within three marks from the value of 52?

ANSWER: \_\_\_\_\_

Look at the straight line scale below. Note the reading on the scale.

Scale B.



3. On Scale B above, is the reading within two marks from the value of 29?

ANSWER: \_\_\_\_\_

4. On Scale B above, is the reading within two marks from the value of 24?

ANSWER: \_\_\_\_\_

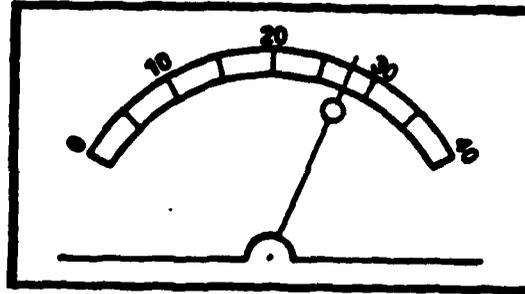
5. On Scale B above, is the reading within three marks from the value of 25?

ANSWER: \_\_\_\_\_

6. On Scale B above, is the reading within three marks from the value of 30?

ANSWER: \_\_\_\_\_

Look at the meter below. Note the reading on the scale.



Meter A

7. On Meter A above, is the reading within two marks from the value of 10?

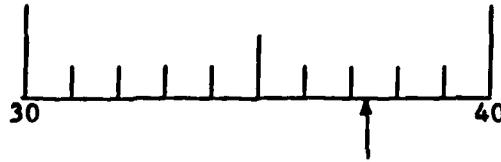
ANSWER: \_\_\_\_\_

8. On Meter A above, is the reading within two marks from the value of 40?

ANSWER: \_\_\_\_\_

Look at the straight line scale below. Note the reading on the scale.

Scale C

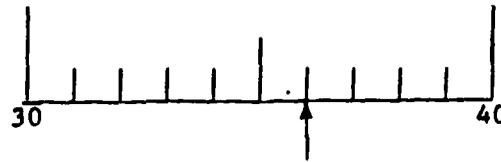


9. Is the reading on this scale within two marks from the reading on Scale C?



ANSWER: \_\_\_\_\_

10. Is the reading on this scale within two marks from the reading on Scale C?



ANSWER: \_\_\_\_\_

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AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

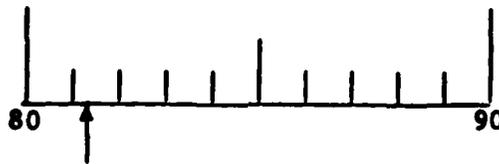
UNIT IX - LESSON 4

Checkpoint 1, Form B

Read the directions and answer the questions. Mark your answers on the answer sheet.

Look at the straight line scale. Note the reading on the scale.

Scale 0

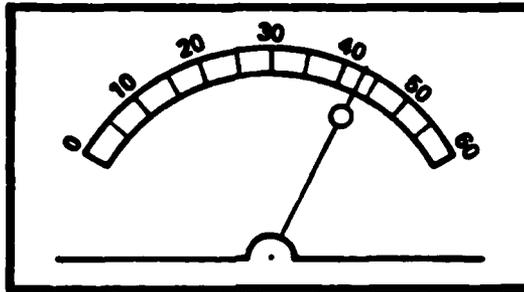


1. On Scale 0 above, is the reading within two marks from the value of 85?
  - a. Yes
  - b. No
  
2. On Scale 0 above, is the reading within two marks from the value of 80?
  - a. Yes
  - b. No
  
3. On Scale 0 above, is the reading within three marks from the value of 90?
  - a. Yes
  - b. No
  
4. On Scale 0 above, is the reading within three marks from the value of 80?
  - a. Yes
  - b. No

Unit IX, Lesson 4  
Checkpoint 1, Form B

1

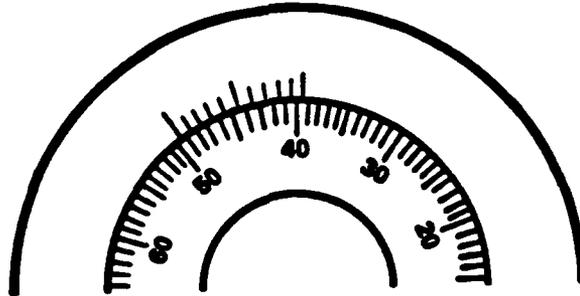
Look at Meter D shown below. Note the reading on the scale of the meter.



Meter D

5. On Meter D above, is the reading within two marks from the value of 50?
  - a. Yes
  - b. No
  
6. On Meter D above, is the reading within two marks from the value of 30?
  - a. Yes
  - b. No

Look at part of a Dial Z shown below. Note the reading on the scale of the dial.



Dial Z

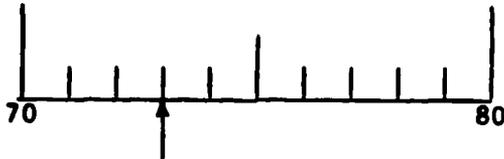
7. On Dial Z above, is the reading within two marks from the value of 38?
- a. Yes
  - b. No
8. On Dial Z above, is the reading within two marks from the value of 45?
- a. Yes
  - b. No

Look at the scale below. Note the reading on the scale.

Scale X

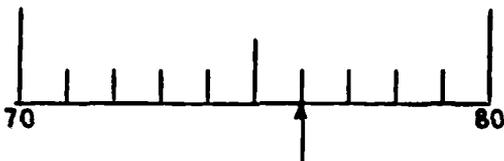


9. Is the reading on this scale within two marks from the reading on Scale X?



- a. Yes  
b. No

10. Is the reading on the scale below within two marks from the reading on Scale X?



- a. Yes  
b. No

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Unit IX, Lesson 4  
Checkpoint 1, Form B

**FINAL REPORT  
CRITICAL INCIDENT STUDY**

**31M10 Functional Basic  
Skills Education Package**

**Contract No. DABT60-81-C-0006**

**Prepared by:**

**Paul Gordiejew  
Zita Glasgow**

**Applied Science Associates, Inc.  
4616 Henry Street  
Pittsburgh, Pennsylvania 15213**

**September 1982**

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## INTRODUCTION AND SUMMARY

### The Problem

The Functional Basic Skills Education Program (FBSEP) concept is based on the assumption that a significant cause of AIT failures can be accounted for by a lack of basic skills in the target population, and that this problem can be corrected by job relevant basic skills training that is tailored to the specific needs of students. While the lack of basic skills is a significant cause of AIT failure, it is recognized that it may not be the only significant factor contributing to failure. Other causes may include difficulty adapting to the Army, the requirements of "soldiering" which interfere with the requirements of learning, poor instruction either by the instructor or the materials, administrative events which interrupt and/or interfere with learning, the soldier's personal problems, and the motivations and attitudes of both students and instructors. In sum, even if basic skill deficiencies are removed, the student may fail for other reasons.

This report describes an exploratory study to document and categorize these "other" non-basic skills factors. The study resulted in a list of the critical factors which are indicative of success and failure in the AIT course. From the total picture of the students' military life as illustrated by these critical factors, the Government can formulate hypotheses about cause and effect relationships and derive practical procedures for improving performance.

### The Approach

The list of critical factors was derived from first hand narrative reports from 124 randomly selected 31M students and other significant "actors" in the soldier's life at Fort Gordon. These others included AIT instructors (n=79) and Platoon Sergeants (n=18), who supervise the duties of soldiers in the barracks.

The reports were gathered and analyzed using the critical incident technique<sup>1</sup>. It involves the gathering of data through interviews. Respondents are asked to provide detailed descriptions of incidents of the behavior which is the object of study. According to Flanagan:

An incident is any observable human activity that is sufficiently complete in itself to permit inferences and predictions to be made about the person performing the act. To be critical, an incident must occur in a situation where purpose or intent of the act seems fairly clear to the observer and where its consequences are sufficiently definite to leave little doubt concerning its effects.

<sup>1</sup>Flanagan, John C. The Critical Incident Technique. Psychological Bulletin, July 1959, 51 (4).

Personal interviews were conducted with each student. During the interview, the researcher posed a series of highly structured questions asking the respondent to recall an example of successful and unsuccessful performance in the AIT course. The respondent was asked to describe the incidents in detail and the specific auxiliary circumstances such as what led up to the incidents, who was involved, and what happened afterward. The interviewer recorded the students' responses on specifically developed forms. In addition to the critical incidents, sociodemographic and attitudinal data were gathered from each student.

Interviews of instructors and platoon sergeants were conducted in groups. During the group sessions, respondents were asked to put on paper specific behavioral situations and other circumstances as the data collection forms required. AIT instructors were asked to report incidents during which they were successful and unsuccessful in helping a student overcome a learning problem. Platoon sergeants were asked to report on instances in which they were successful and unsuccessful in helping soldiers overcome adjustment problems.

### Data Analysis and Results

Both qualitative and quantitative analyses were carried out.

#### Qualitative Analysis

The incident data were analyzed separately for each data source group. The aim of this analysis was to summarize and describe the data using an inductive and iterative process. The process involved the establishment of several major categories which were further subdivided to an appropriate level of specificity.

Incidents gathered from students resulted in the establishment of nine major areas:

- I. Task Concentration included 151 incidents relating to students' concentration and alertness during instruction.
- II. Instructional Style/Techniques included 98 incidents concerning the quality and quantity of instruction.
- III. Interpersonal/Unit Cooperation included 72 incidents relating to the effects of peers on a soldier's performance.
- IV. Stress in Training, as its name implies, included 43 incidents on stresses in the AIT course.
- V. Basic Skills included 54 incidents relating to reading, listening, note taking and other basic skills associated with learning in the AIT course.

- VI. Equipment Related Factors included 46 incidents associated with quality and quantity of resources.
- VII. Work Environment included 26 incidents related to weather, space, location (i.e., classroom vs. field), and performance.
- VIII. Non-AIT Distractors (i.e., soldiering tasks and other activities) included 58 incidents relating to the effect of activities/events outside the classroom and its effect on performance.
- IX. Quality of Army Life/Adjustment included 56 incidents relating to the soldier's ability to adjust to a military environment.

Incidents from AIT instructors included 11 major categories with many similar to student categories, but with differing emphasis. Following are the areas and the number of incidents reported for each.

- I. Task Concentration: 107
- II. Instructional Style/Techniques: 18
- III. Interpersonal/Unit Cooperation: 6
- IV. Stress: 6
- V. Basic Skills: 52
- VI. Equipment Related Factors: 17
- VII. Work Environment: 2
- VIII. Non-AIT Activities and Distractors: 58
- IX. Quality of Army Life/Adjustment: 18
- X. Expectations/Satisfaction with MOS: 11
- XI. Comprehension/Learning Speed: 19

Only 48 incidents were reported by platoon sergeants. This is not a sufficient number for conclusive analysis, however, in general, the incidents take the form of: (1) internal effects, and (2) external effects. Internal effects include such components as depression and withdrawal into self, anomie - loss of interest in everything, loss of concentration, desire for release from the Army (TDP), dissatisfaction, lethargy - no desire to go to AIT, desire for reclassification, and preoccupation with people and situations outside of the Army. These are all internalized, introspective components. External effects encompass many of the visible manifestations of the internal, emotional states, e.g., refusal to get out of bed, tardiness, interpersonal conflicts, court martial, and getting in trouble with the NCOs.

## Quantitative Analysis

Once categories were formed, a quantitative analysis of the student incidents was conducted to determine whether certain subgroups reported certain types of incidents more than others. The chi-square statistic was used to test the relationship between the observed and expected frequency of major areas/categories and the sex, age, education, and performance level of student responses. In addition, the chi-square statistic was used to test significant differences in AIT performance and selected background variables. The criterion measure for AIT performance, called TESTSUM, was the sum of five performance tests given during the duration of the 11 week AIT course.

Except for incidents relating to basic skills, the performance level of the student made no significant difference in the types of critical incidents reported. However, there were differences in the types of incidents reported on the basis of the soldier's sex, age, and educational level.

Of all the background variables examined in relationship to AIT performance, only age was significant, with older students (21 or older) out performing younger ones. However, most of the other relationships were in the expected direction, suggesting that these variables are indeed important and merit further investigation.

Finally, the chi-square test was used to compare the distribution of incident components across the major comparable areas for students and instructors. Significant differences were found for Task Concentration, Instructor Style/Technique, Stress, Work Environment, and Basic Skills.

## Significance of the Study

While a number of factors were identified as contributing to poor performance, the findings with respect to basic skills are particularly important for two reasons: (1) The results, in general, provided verification for the need for basic skills instruction. That is, low performance students reported significantly more incidents relating basic skill deficiencies with poor performance than did high performance students. This implies that students who do poorly in the AIT perceive a need for basic skill instruction. (2) The results provided confirming evidence for the need for the types of skills and knowledges included in the 31M10 FBSEP. For example, the low performance student reported more problems in relation to note-taking and listening than did high performance students.

Finally, the study resulted in the identification of several areas where further research may produce significant results.

## RESEARCH PLAN

### Respondents

Incidents were gathered from three groups. First, since student performance in 31M MOS is the criterion variable of this exploratory study, 31M students are the target population and the primary data source. Initially, the plan was to interview 100 students with a provision for additional interviews if needed. After collecting incidents from the first 100 students, it was decided that more incidents were necessary to obtain a more comprehensive and representative sample of critical factors that influence performance. When employing the critical incident technique, it is advisable to obtain a large number of incidents, so we proceeded to interview an additional 24 students. The three companies constituting the 5th Battalion - Alpha, Bravo, and Charlie - each contribute approximately an equal number of students to the 31M MOS. Each week approximately 50 new students entered the course. At that time, there were about 550 students distributed over the 11 weeks of the course. The student sample was drawn from the first 10 weeks of this estimated population since the students were not available for interviews during the eleventh week.

At Fort Gordon, the social environment network is complex. In recognition of this complexity, behaviors or attitudes that develop in one setting should not be assessed in isolation from behaviors and attitudes formed in other settings in which the 31M student/soldier operates. How an individual adjusts to housing conditions on the post, for instance, may affect his/her performance in the 31M course.

Therefore, in addition to selecting and interviewing 31M students, 31M instructor and platoon sergeant populations were interviewed because they are most actively involved with the students. The instructors represent the AIT setting, in which students spend an average of 6 hours per day. The instructor interviews were directed toward collecting incidents on students experiencing difficulty in the 31M course. Platoon sergeants, on the other hand, represent the setting of "barracks life." "Barracks life" was defined as all settings outside of the 31M MOS in which the soldier is considered on-duty. Platoon sergeants were asked to report incidents of successful and unsuccessful adjustment, and whether they felt the incident had an effect on performance in the 31M course.

In sum, the plan was to interview a sample of the student population and the total population of instructors and platoon sergeants.

## Student Sampling Procedure

To select the initial sample of 100 students, a disproportionate stratified sampling procedure was used. Disproportionate stratified sampling provided us with a greater number of students from those weeks in which greater representation was desired. The stratification phase involved segmenting the 10 weeks in which we sampled from four strata on the basis of: (1) the location of the training site, and (2) the nature of the course material being taught. (See Table 1 for a complete description of each stratum.) Students were not selected from the 11th week of the course because it pertains only to end-of-course testing; there is no new material introduced. From each stratum, a disproportionate number of students was randomly selected. (See Table 2.) The number of students selected in this initial sampling phase was greater from those strata containing the latter weeks/half of training, namely, Stratum C and Stratum D. (See Figure 1.) By the sixth/seventh week of training, the student has been exposed to a substantial amount of the course material, and to many of the instructors in the course. This provides them with a broader experiential base on which to report their critical incidents of better than usual and worse than usual performance.

Table 1  
Description of Strata

Stratum	Description
A	Weeks 1, 2. Located in classroom at Burkhardt Hall. Week 1 consists of conferences used to present basic material concerning the MOS. The major objective of Week 2 is for students to install and operate a low capacity PCM system terminal to terminal.
B	Weeks 3, 4, 5. Located on field at Willard Training Area. In Week 3 students install and operate low capacity PCM cable and radio systems housed in assemblages. Week 4 involves installing and operating secure low capacity systems, installing the AN/GRC-103 antenna, and installing and operating the 3KW generator set. The primary objective for Week 5 is troubleshooting low capacity systems.
C	Weeks 6, 7. Located in classroom in Moran Hall. Operating a medium capacity PCM radio terminal is the major objective of the 6th week. In Week 7 students learn to troubleshoot the medium capacity equipment they learned to operate in Week 6.
D	Weeks 8, 9, 10. Located in field at Mobile Unit. Students in Week 8 operate the 5KW generator, raise the AN/GRC-50 antenna, and interpret and use the information in an operation order. In Weeks 9 and 10 students, as members of a team, install, operate, and troubleshoot 12 and 24 channel medium capacity systems housed in assemblages.

Table 2  
Breakdown of Student Sample

Stratum	Number of Students in Stratum N Population	Percent of Population Represented by Stratum N	Sample from Stratum N	Percent of Stratum N	Percent of Total N
D	150	30%	48*	32% of D	10%
C	100	20%	30	30% of C	6%
B	150	30%	36**	24% of D	7%
A	100	20%	10	10% of A	2%
Total	500	100%	124		25%

\*13 students added after initial random sampling.

\*\*11 students added after initial random sampling.

Estimated Population (500 Students)

Sample (100 Students)

35%

Stratum D (Weeks 8, 9, 10)  
150 students

35 students  
.35 X 100  
randomly selected

30%

Stratum C (Weeks 6, 7)  
100 students

30 students  
.30 X 100  
randomly selected

25%

Stratum B (Weeks 3, 4, 5,)  
150 students

25 students  
.25 X 100  
randomly selected

10%

Stratum A (Weeks 1, 2)

10 students  
.10 X 100  
randomly selected

Figure 1. Illustration of Disproportionate Stratified Random Sampling

Rosters of student names were obtained from the school at Fort Gordon for each week of the course. These rosters were collapsed within each stratum to form one roster per stratum. In the case of Stratum B, for example, names of students from Weeks 3, 4, and 5 were pooled to form one list of names. Each name was assigned a number. A random sample was then selected from each stratum using a table of random numbers. When necessary, replacements for any unavailable student on a particular day was carried out by selecting the next name from the randomly selected sample. Names were selected in a second round of random sampling to replace original sample members if none were available.

## METHODS AND PROCEDURES

### Instruments

The critical incident questionnaire, administered in individual and group sessions, was the primary data collection instrument. In addition, sociodemographic data were gathered from 31M students participating in the study. Used as supplemental data, it allowed for correlational analysis with variables of interest.

Respondents were asked to report from memory recent personal experiences (students) or observations (NCOs). Recency is important because the facts of the incidents tend to become distorted over time, particularly with long intervals between the actual incidents and the moments of recall. Such distortion were controlled by limiting the recall of incidents to those observed within a month of the report. To insure that we got detailed and precise reports, we pretested our critical incident questionnaires on samples of the three respondent groups that were interviewed in the full-scale study. On the basis of this tryout, revisions and modifications were made.

### Instrument Development

The most crucial aspect in the development of the critical incident questionnaires was to write stimulus questions that would elicit factual information concerning (1) performance in the course and (2) adjustment to Army life. For each respondent group, the frame of reference was actual student behaviors that are judged to have had, or potentially have, a significant effect on performance. The questions in the critical incident questionnaires were worded to assist the respondent in making such a judgment, by asking for extreme examples of behaviors that resulted in positive and negative outcomes. In the student forms, for instance, students were asked to provide reports of "better than usual performance" and "worse than usual performance." In asking for both, one extreme provides a contextual frame for the other. We can more fully understand what constitutes poor performance and failure if we know and understand its counterpart - success. Asking for both extremes not only provided the respondent with a context in which to make a judgment, but it also becomes important in developing a functional description of what constitutes success and what constitutes failure.

The critical incident and sociodemographic questionnaires were developed to meet the specific demands of the general aim. The preliminary forms were subsequently pretested on small samples of the three data source populations during the week of 9 November to 13 November 1981. Revisions and modifications to the data collection instruments were made on the basis of these tryouts. The student sample, interviewed individually, yielded encouraging responses. A majority of the incidents reported by students were sufficiently detailed, most

likely because the data was gathered by only on one interviews and the interviewer, by careful probing, could obtain more detail. As a result, except for minor revisions, the student critical incident forms remained intact. The incidents reported by the NCOs, particularly platoon sergeants, were less encouraging because responses tended to be vague generalities and opinions. Consequently, a model critical incident report was developed to illustrate the characteristics of a good report. The questionnaire was also revised and it, with the model, was tested on a sample of platoon sergeants. The reports did improve with the model. They were more detailed and descriptive than the vague and inferential earlier reports. Copies of the data collection instruments are presented in Appendix A.

### Data Collection Procedures

#### Data Gatherers

Two graduate students in psychology conducted the one-on-one and group interview sessions. The interviewers had experience in interviewing and counseling, but were given specific training to insure proper conduct of the data collection

Training consisted of three stages. First, the interviewers were briefed on the background and purpose of the study and instructed in the procedures for random selection of students. This procedure familiarized them with the interview questions and the manner in which they were to be asked. In the second stage of the training session, each of the interviewers conducted two actual interviews with 31M students. The results obtained in these practice interviews were reviewed and critiqued by ASA staff. The final stage of training consisted of administering the interview in group sessions. Specific written instructions for the group interviews were prepared and used by the interviewers.

After training, during the first two days of data collection, the ASA staff monitored the process to insure proper conduct of interviews.

#### Student Interview Schedule and Response Rates

The originally proposed student interview schedule is presented in Table 3. This schedule assumed the use of two full-time interviewers. As shown in the schedule, an attempt was made to interview the entire sample of 100 31M students during the period of 1 February to 12 February 1982. Absenteeism was anticipated, and thus we subsequently modified the plan to allow for 140 interviews over a three-week period.

Time with each student was limited to one hour and thus students were requested to report only two critical incidents, one describing a "worse than usual" performance and the other a "better than usual" performance in addition to answering the questions designed to obtain sociodemographic data. From the 124 student interviews that were conducted, 122 poor performance and 125 good performance incidents were reported.

Table 3  
Proposed Student Interviewing Schedule<sup>a</sup>

	7:15-8:15 n <sup>b</sup>	8:30-9:30 n	9:45-10:45 n	12:30-13:30 n	13:35-14:35 n	Total (ct) <sup>c</sup>
Feb. 1 Monday	2	2	2	2	2	10 (10)
2 Tuesday	2	2	2	2	2	10 (20)
3 Wednesday	2	2	2	2	2	10 (30)
4 Thursday	2	2	2	2	2	10 (40)
5 Friday	2	2	2	2	2	10 (50)
8 Monday	2	2	2	2	2	10 (60)
9 Tuesday	2	2	2	2	2	10 (70)
10 Wednesday	2	2	2	2	2	10 (80)
11 Thursday	2	2	2	2	2	10 (90)
12 Friday	2	2	2	2	2	10 (100) <sup>d</sup>
15 Monday	H O L I D A Y					
16 Tuesday						
17 Wednesday						
18 Thursday						
19 Friday						10 (140) <sup>e</sup>

<sup>a</sup> This schedule assumes two full-time interviewers.

<sup>b</sup> n = number of students interviewed.

<sup>c</sup> ct = cumulative total

<sup>d</sup> The sample n = 100.

<sup>e</sup> this schedule allows for 140 potential interviews.

### Student Interview Procedures

All student interviews were conducted one-on-one and lasted approximately one hour. An attempt was made to physically ensure privacy and the respondents were told that their responses would be confidential. After a brief introduction, indicating the sponsor of the study, the purpose of the study, and why and how the respondent had been selected to participate in the study, the interviewer asked questions from the sociodemographic questionnaire pertaining to: (1) basic training, (2) AIT/MOS training, and (3) barracks life. Then, the critical incident questions were asked and the responses recorded on tape so that all vital information was retained. The interviewer concluded the interview by asking questions pertaining to the social life and personal history of the respondent. They were placed at the end of the interview since at that point rapport was more likely to be at its maximum and frank responses more likely to be given than if they were asked at the onset of the interview.

### Interview Schedule and Procedures for Group Sessions

An introduction similar to the one given to students was given in the group interview. Confidentiality and anonymity were assured. The interviewer read aloud the instructions for completing the forms, with the respondents reading silently. Model critical incident reports were subsequently distributed and also read aloud by the interviewer. Questions were answered about the procedures. The models were collected and the instructions were reiterated. The group sessions were approximately one hour in duration.

Because we proposed to interview the instructors and platoon sergeants in groups of 25, the time constraints were less rigid than with student interviewing, and people were allowed more time, if needed, to complete the forms. As shown in Table 4, we attempted to interview all instructors and platoon sergeants over five weeks. In this schedule, several alternate sessions could be arranged if absenteeism was a problem.

Table 4  
Proposed Schedule for Group Interviews

	February	March					Total
	22-27	1-5	8-12	15-19	22-26	29-31	
INSTRUCTORS	25	25	25	25	20	a	120
PLATOON SERGEANTS	25	25	a	a	a	a	50
TOTAL	50	50	25	25	20		170

\* The open cells were available to accommodate rescheduled interviews. Also, if additional student interviewing was required, it could be accommodated in this plan.

### Incident Responses for Group Interviews

Unlike the student response rates, we were unable to achieve a high return rate with the group-administered instructor and platoon sergeant interviews. Table 5 shows the number of reports of successful and unsuccessful performance for all groups interviewed. Table 6 shows the response rates from each group. Although both of the Platoon Sergeants and the instructors were requested to provide four incidents, most persons returned only two. The overall mean response rate was 2.72; the modal response rate was two incidents. Only a small percentage of the instructors and platoon sergeants cooperated in completing and returning the four incidents requested of them. There are several possible reasons. The main reason might be attributed to the group method of data gathering vs. the individualized approach used for collecting student responses. The students were interviewed individually, which allowed for probing on the part of the interviewer if the response was too vague. Such interactions were not possible in the instructor and platoon sergeant group-administered interviews, as the large numbers made individualized attention for any considerable length of time impossible. Secondly, the mechanism of expression seemed to make a difference. The students were given the opportunity to talk freely about their experiences of poor and good performance, while instructors were asked to write about incidents. Probably, the instructors and platoon sergeants would have been more at ease and proficient talking about rather than writing about incidents. While the model critical incident forms provided encouraging results in the tryouts, in the actual data collection phase, they may have been largely ignored.

Another problem encountered with the group interviews was the apparent unwillingness on the part of some instructors to contribute to the study. The several reasons given for this lack of cooperation were illness/hospitalization, insufficient experience to draw on for reporting incidents, and fluctuation of personnel at the time of interviews. Attempts to reschedule interviews were not successful.

In sum, although we had anticipated collecting some 388 incidents from the two NCO groups, for many reasons a much smaller number was obtained.

Table 5

Types of Incidents Reported, By Data Source

Data Source	Type of Incident		Total
	Contributing to Successful Performance	Contributing to Unsuccessful Performance	
Students	125	122	247
Instructors	110	90	200
Platoon Sergeants	<u>22</u>	<u>27</u>	<u>49</u>
TOTALS	335	239	496

Table 6

Total Number of Incidents Obtained From Data Sources

Data Source	Number of Respondents	Number of Incidents Requested	Number of Incidents Reported	Number of Incidents Requested per Individ. Respondent	Average Number of Incidents Reported	Total Number of Incidents Reported
Students	124	248	247	2	2	247
Instructors	79	316	200	4	2.53	200
Platoon Sergeants	<u>18</u>	<u>72</u>	<u>49</u>	4	2.72	<u>49</u>
TOTALS	221	636	516			516

## DATA ANALYSIS

### Incident Classification

#### Initial Treatment of Interview Data

Before incident analysis, several data preparation steps were necessary. For the student responses, a check of the accuracy and completeness of the interviewers' hand-written reports was conducted. To accomplish this, the tape-recorded incidents were reviewed and changes made to keep the reports verbatim. Then, the incidents were typed to facilitate visual inspection of the data. At this stage, the incidents were read and edited for any technical errors and for excessive redundancy or impertinent information. The incidents were transcribed onto 5" x 8" index cards to simplify handling. The following information was contained on these cards:

1. The student incident card included the following information: (a) Respondent Number; (b) Location of Incident - classroom or field; (c) Type of Incident - good or poor performance; (d) Assigned task and type of equipment worked on; (e) Number of Times the Task Had Been Previously Performed; (f) Incident Number; (g) Incident(s) Reports; and (h) Classification.
2. The instructor incident card included the following information: (a) Respondent Number; (b) Type of Incident - could not help or helped performance; (c) Assigned Task and Type of Equipment Worked on by the Student; (d) Number of Times the Task Had Been Previously Performed by the Student; (e) Incident Number; (f) Incident(s) Reports; (g) Classification. And on the reverse side: (h) With Whom the Instructor Consulted; (i) Whether the Student Meets Army Expectations in the Areas of Appearance, Work Habits, and Interpersonal Interactions; (j) Persistence of the Problem; and (k) Absenteeism of the Student.
3. The platoon sergeant incident card included the following information: (a) Respondent Number; (b) Type of Incident - successful adjustment or unsuccessful adjustment; (c) Problem Incident and How the Sergeant Learned of the Problem; (d) Cause of the Problem; (e) Effect Problem was Having on Student; (f) Effect Problem was Having on Others; (g) Actions the Sergeant Took to Alleviate Problem; (h) With Whom the Sergeant Consulted; (i) Result of These Actions; (j) Areas of Performance that were Effected by Problem; (k) Persistence of the Problem; (l) Whether the Student Meets Army Expectations in the Areas of Appearance, Work Habits, and Interpersonal Interactions; and (m) Absenteeism.

## The Development of Categories

With the data preparation phase still in progress, a preliminary incident classification was undertaken to derive a list of tentative categories which served to provide a working framework for subsequent, more comprehensive and intensive analyses. This preliminary analysis, based on a sample of about 50 incidents, yielded several categories which in one form or another were carried through to the finalized student classification structures.

## Organization and Classification

In the majority of cases, more than one critical segment or component was indicated by a single incident. Because of this multiplicity of components found in individual incidents, it was decided not to duplicate the incident cards for each component found. Instead, classification forms were developed to accommodate each component individually and designed to show the entire set of components that were part of the same incident report. Similar forms were used in the incident classification process for all data source groups.

The incident data were analyzed separately for each data source group. The responses, as noted above, were categorized and classified according to the types of critical components (e.g., behaviors, behavior situations) portrayed in the incidents. The following steps were taken in the inductive and iterative process of incident classification:

1. The entire student incident sample was divided randomly into three incident subsamples, or sorting samples. This three-way division allowed us to check on the adequacy of the incident sample. Because a single incident, or merely a few incidents, describes only isolated events, large numbers of incidents are required for comprehensiveness.

There are no set rules to determine how many critical incidents are required. The objective was to obtain the entire spectrum of behaviors that are critical to performance, be it success or failure, in the 31M course. Flanagan<sup>2</sup> suggests this can be accomplished by keeping "a running account on the number of new critical behaviors added to the classification system with each additional 100 incidents. For most purposes, it can be considered that adequate coverage has been achieved when the addition of 100 critical incidents to the sample adds only two or three critical behaviors." We adapted the general structure of this suggestion to our research plan. First, we randomly selected a third of the collected incidents and classified the critical "segments" that are found in each. An additional third of the incidents were then selected and classified according to Flanagan's suggestion. As the incidents were being classified, a running count on the number of new critical behaviors added to the tentatively established classification system were kept. Virtually no new components were introduced with the addition of the second and third subsamples of incidents, suggesting that adequate coverage was attained for the student incident sample.

<sup>2</sup>Ibid., p. 343.

2. As individual critical incidents were read, all critical components were first isolated and then were abstracted and separately classified according to their judged outcome, i.e., whether they contributed to good or poor performance or to successful or unsuccessful adjustment.
3. The abstracted incident components were arranged into groups on the basis of similarity. Each group of similar incident components constituted a category.
4. The initial randomly sampled incident subsample was submitted to a second analyst who likewise identified and then classified the incident components into the tentative categories. (The categories were considered tentative throughout the incident classification. As the classification process progressed through the incident sample, the classification structure evolved.)
5. The two analysts met to note and discuss discrepancies between their classifications. An agreement index in the form of a percentage was computed to measure interclassifier reliability. On the basis of the discussion, revisions and modifications to the existing classification structure were made.

The following example illustrates how an incident was treated in the classification of data.

INCIDENT: I was chosen team chief and no one was listening to what I was saying. And it was windy and my voice wouldn't carry. NCOs were being a pain. They were jumping all over everybody for nothing; for stupid things they shouldn't have been jumped on for. It made me nervous.

The above incident was judged by the respondent to have contributed to poor performance. Just by a single reading of the incident we can see that several things are going on. There are multiple behaviors and thus we must classify each one. The first step was to elicit the primary behavior, or component, of the entire incident. Sometimes, if there was no single overriding component, this was not possible. In the above example, we could have classified the entire incident in situational terms as a stressful situation created by several other components. The second step was to identify each individual component, be it situational or behavioral. We thus proceeded to segment the above incident into the following components:

1. I was chosen team chief and no one was listening to what I was saying.
2. It was windy and my voice wouldn't carry.
3. NCOs were being a pain. They were jumping all over everybody for nothing, for stupid things they shouldn't have been jumped on for.
4. It made me nervous.

Each of these four components was treated as a single unit. In this particular example, taken from the student data, the four components were classified into the following four different categories:

1. Interpersonal/Interunit Cooperation - Team Chief's Leadership
2. Work Environment: Hot/Cold/Wind
3. Instructional Quality
4. Stress in Training: General

### Reliability Checks

Three reliability checks were conducted by two analysts. Two of the three checks were performed on randomly selected incident samples of good and poor performance. The third check was performed on a random sample of instructor incidents. No reliability check was performed on the platoon sergeant incident sample because the relatively few incidents collected represented broad areas and were clearly interpretable.

The checks involved submitting the random samples to the second analyst who proceeded to identify the critical components found in each incident and then to classify these components onto a classification form. In order to allow the second analyst to identify the incident components, a tentative list of areas and categories was provided. The independent analyses were then compared to determine the level of agreement between the two classifications. As shown in Table 7, substantial agreement was reached between the two analysts for all three reliability checks.

Table 7

### Reliability Checks

	Number of Incidents Classified	Number of Agreements		Percentage of Agreements	
		Partial (Area & Category)	Complete (Area Only)	Partial	Complete
Instructor Incidents	26	21	23	80.8%	88.5%
Students (Good Perf.)				78%	90%
Students (Poor Perf.)	40	34	36	85%	90%

## Statistical Analysis of Student Critical Incidents

Once categories were formed, a quantitative analysis was conducted to explore whether certain subgroups reported certain types of incidents more than others. The chi-square test was used to test the relationship between the observed and expected frequency of major areas/categories and the sex, age, education, and performance level of student respondents. Specifically, the following questions were explored:

1. Does the distribution of critical components reported by two groups of students - a high performance and a low performance group - depart significantly from a chance distribution?
2. Does the distribution of critical components represented by male students and female students depart significantly from a chance distribution?
3. Does the distribution of critical incident components represented by younger students (ages 17-20) and older students (21+) depart significantly from a chance distribution?
4. Does the distribution of critical incident components represented by students who are not high school graduates and students who have graduated from high school and college depart significantly from a chance distribution?

The following overall course performance measure, which we have called TESTSUM, was adopted as the criterion measure for the student sample:

**TESTSUM (PERFORMANCE) = Sum of Original Scores on 5 Weekly Performance Tests (i.e., scores before remediation)**

It was decided to use TESTSUM as the criterion measure because it was found to be the most stable performance measure in the validation of the Diagnostic Test Model.<sup>3</sup>

Based on the above measure of performance, students were divided into the following two groups:

1. Students who scored above the TESTSUM median (Md=467.5) were placed into the successful, or High Performance, group.
2. Students who scored below the TESTSUM median (Md=467.5) were placed into the less successful/unsuccessful, or Low Performance, group.

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<sup>3</sup>Functional BSEP Analysis Report: Stage II Verification, 31M10 Functional Basic Skills Education Package, Contract number DABT60-81-C-0006, Applied Science Associates, Inc., December 1981, pp. 2-16.

## Analysis of Sociodemographic-Attitudinal Data

The chi-square statistic was used to test for significant median differences in TESTSUM performance for the following background variables.

1. Sex of respondent.
2. Age of respondent: a. Younger students (17-20)  
b. Older students (21+)
3. Education: a. Non-high school graduates  
b. High school graduates
4. Ethnic Group: a. Black students  
b. White students
5. Choice of MOS: a. Students selecting 31M10 as one of top 3 choices  
b. Students not selecting 31M10 as one of top 3 choices
6. Expectations Concerning MOS:  
a. Informed students with accurate expectations  
b. Misinformed students with inaccurate expectations
7. MOS Satisfaction: a. Satisfied students  
b. Dissatisfied students
8. Bed Time: a. Go to bed late at least 2-3 times a week  
b. Go to bed early

## STUDENT RESULTS

One hundred twenty-two (122) poor performance incidents were sorted into major areas and each of the areas were subsequently classified into categories. An exhaustive list of both poor and good performance areas and categories is shown in Table 8.

### Classification of Student Incidents Contributing to Poor Performance

For purposes of our analysis, an area was considered to be a major contributor to poor performance if it had an incident frequency of ten or more. Given this operational definition, nine of the seventeen areas were major contributors to poor performance in the 31M10 course. Appendix C contains representative samples of each type of incident. (Area X, Expectations, and Area XI, Comprehension, had just one and six incidents respectively. The remaining categories contained good performance incidents only and are discussed later.) The nine major areas in order of frequency are: I. Task Concentration (79 incidents); II. Instructional Style/Techniques (65); VIII. Non-AIT Activities and Distractors (44); IV. Stress in Training (37); IX. Quality of Army Life: Barracks Related (34); VIII. Work Environment (21); V. Basic Skills (19); III. Interpersonal/Unit Cooperation (17). Table 9 shows the relative numbers and percentages contributing to poor performance and compares the relative frequency and percentages of good performance incidents reported for the nine areas. Figure 2 graphically displays the relative percentages contributing to good and poor performance for each of the nine major areas.

Forty-two percent of the poor critical incidents associated with the nine major areas relate to Task Concentration (Area I) and Instructional Style/Techniques (Area II). The importance of these two areas is supported by an examination of the categories emphasized in good performance incidents. Here also, the same two areas are reported more frequently than the other areas. Five major categories comprise the area of Task Concentration. Of these five categories, the students emphasized "Attention to Detail (I.A.)" and "Alertness (I.E.)." Critical negative aspects or components of the Attention to Detail category include such behaviors as "rushing through a procedure and inadvertently skipping steps" or "overlooking minor details". In such instances, the student usually is familiar with the procedure and suffers a brief lapse of concentration while working on it. Also emphasized was the category, "Alertness." Note that the alertness factors (i.e., staying awake in class) also is reported in Area VIII (Non-AIT Distractors) under the category "Fatigue and Result of Work Detail." This would imply students' abilities to concentrate on tasks are affected by their state of fatigue as a function of external work loads.

The second largest area emphasized by the students was "Instructional Style/Techniques" (Area II), which is further subdivided into two major categories, "Instructional Quality" (II.A.) and "Instructional Quantity (II.B.). Of these two categories, 31M10 students tended to emphasize the former. Instructional Quality encompasses components associated with: (1) the manner in

Table 8

Student Classification Structure of Areas and Categories

- I. Task Concentration
  - A. Attention to Detail
  - B. Retention/Memory
  - C. Following Instructions
  - D. Attention to Task: Attentiveness/Preoccupied Mind
  - E. Alertness
  
- II. Instructional Style/Techniques
  - A. Instructional Quality
    - 1. Instructional Manner
      - a. Formal Instruction (group level)
      - b. Informal Instruction (individual level)
      - c. Disciplinary Threat/Action
    - 2. Attitude of Instructor as Perceived by the Student
    - 3. Organization/Scheduling
      - a. Course Scheduling
      - b. Site/Instructor Changes
      - c. Discrepancies in Instruction
  - B. Instructional Quantity
    - 1. Amount of Explanation/Demonstration
    - 2. Amount of Practice/Hands-on
    - 3. Time to Learn/Practice
  
- III. Interpersonal/Unit Cooperation
  - A. Team Chief Leadership
  - B. Teamwork/Peer Support
  - C. Technical Competence of Peers
  - D. Creation of Safe vs. Hazardous Conditions
  
- IV. Stress in Training
  - A. General
  - B. Time Pressure
  
- V. Basic Skills
  - A. Notes
  - B. Reading and Using Manuals

Table 8 (Continued)

Student Classification Structure of Areas and Categories

- VI. Equipment Related Factors
  - A. Malfunction
  - B. Limited Resources
  - C. Equipment Familiarity
  - D. Nature of Equipment
  - E. Task Familiarity
  
- VII. Work Environment
  - A. Spacial Conditions
  - B. Hot/Cold (indoors/outdoors)/Wind
  - C. Task Location
  
- VIII. Non-AIT Activities and Distractions
  - A. Fatigue as a Result of Work Details
  - B. Lack of Time as a Result of Company Activities
  - C. Fatigue/Lethargy as a Result of Non-Company Activities
  - D. Absenteeism
    - 1. Sick Call
    - 2. Administrative
  
- IX. Quality of Army Life/Adjustment
  - A. Stress
  - B. Interpersonal Relations with NCOs and Peers
  - C. NCO Treatment: Merits vs. Demerits
  - D. Living Conditions
  - E. Personal/Family Problems
  
- X. Expectations ( , , )
  
- XI. Comprehension: General Understanding and Learning Speed ( , , - )
  
- XII. Physical Condition
  - A. Injury/Illness
  - B. Individual Physiological Structure

Table 8 (Continued)

Student Classification Structure of Areas and Categories

XIII. Internal/Motivational Factors

- A. Self-Confidence
- B. Frame of Mind
- C. Motivation to Learn
- D. Satisfaction/Interest
- E. Perseverance
- F. Anticipation of Course Completion

XIV. Task Participation/Active Involvement

XV. Competition

XVI. Practice Procedure

XVII. Novelty

Table 9

**Student Classification Structure of Areas and Categories  
Containing Critical Components Judged to  
Contribute to Good and Poor Performance**

Area and Category of Classification	Poor Performance		Good Performance	
	n	%	n	%
<b>I. Task Concentration</b>				
A. Attention to Detail	29		18	
B. Retention/Memory	6		11	
C. Following Instructions	5		19	
D. Attention to Task	13		19	
E. Alertness	26		5	
<b>TOTAL - AREA I</b>	<u>79</u>	23	<u>72</u>	21
<b>II. Instructional Style/Techniques</b>				
A. Instructional Quality	43		66	
B. Instructional Quantity	22		44	
<b>TOTAL - AREA II</b>	<u>65</u>	19	<u>110</u>	33
<b>III. Interpersonal/Unit Cooperation</b>				
A. Team Chief Leadership	2		10	
B. Teamwork/Peer Support	5		40	
C. Technical Competence of Peers	5		5	
D. Creation of Safe vs. Hazardous Conditions	5		0	
<b>TOTAL - AREA III</b>	<u>17</u>	5	<u>55</u>	16
<b>IV. Stress in Training</b>				
A. General	25		1	
B. Time Pressure	12		5	
<b>TOTAL - AREA IV</b>	<u>37</u>	11	<u>6</u>	2
<b>V. Basic Skills</b>				
A. Notes	15		24	
B. Reading and Using Manuals	4		11	
<b>TOTAL - AREA V</b>	<u>19</u>	5	<u>35</u>	10

Table 9 (Continued)

Student Classification Structure of Areas and Categories  
Containing Critical Components Judged to  
Contribute to Good and Poor Performance

Area and Category of Classification	Poor Performance		Good Performance	
	n	%	n	%
<b>VI. Equipment Related Factors</b>				
A. Malfunction	6		0	
B. Limited Resources	1		0	
C. Equipment Familiarity	12		6	
D. Nature of Equipment	4		0	
E. Task Familiarity	7		10	
<b>TOTAL - AREA VI</b>	<u>30</u>	9	<u>16</u>	5
<b>VII. Work Environment</b>				
A. Space	3		0	
B. Hot/Cold/Wind	13		1	
C. Location	5		4	
<b>TOTAL - AREA VII</b>	<u>21</u>	6	<u>5</u>	1
<b>VIII. Non-AIT Distractions</b>				
A. Fatigue as a Result of Work Detail	26		12	
B. Lack of Time as a Result of Company Activities	5		2	
C. Fatigue/Lethargy as a Result of Non-Company Activities	1		1	
D. Absenteeism	12		0	
<b>TOTAL - AREA VIII</b>	<u>44</u>	13	<u>14</u>	4
<b>IX. Quality of Army Life/Adjustment</b>				
A. Stress	9		1	
B. Interpersonal Relations	5		5	
C. NCO Treatments: Merits & Demerits	7		4	
D. Living Conditions	3		0	
E. Personal Problems	10		12	
<b>TOTAL - AREA IX</b>	<u>34</u>	9	<u>22</u>	7
<b>TOTAL - ALL AREAS</b>				
	346		335	

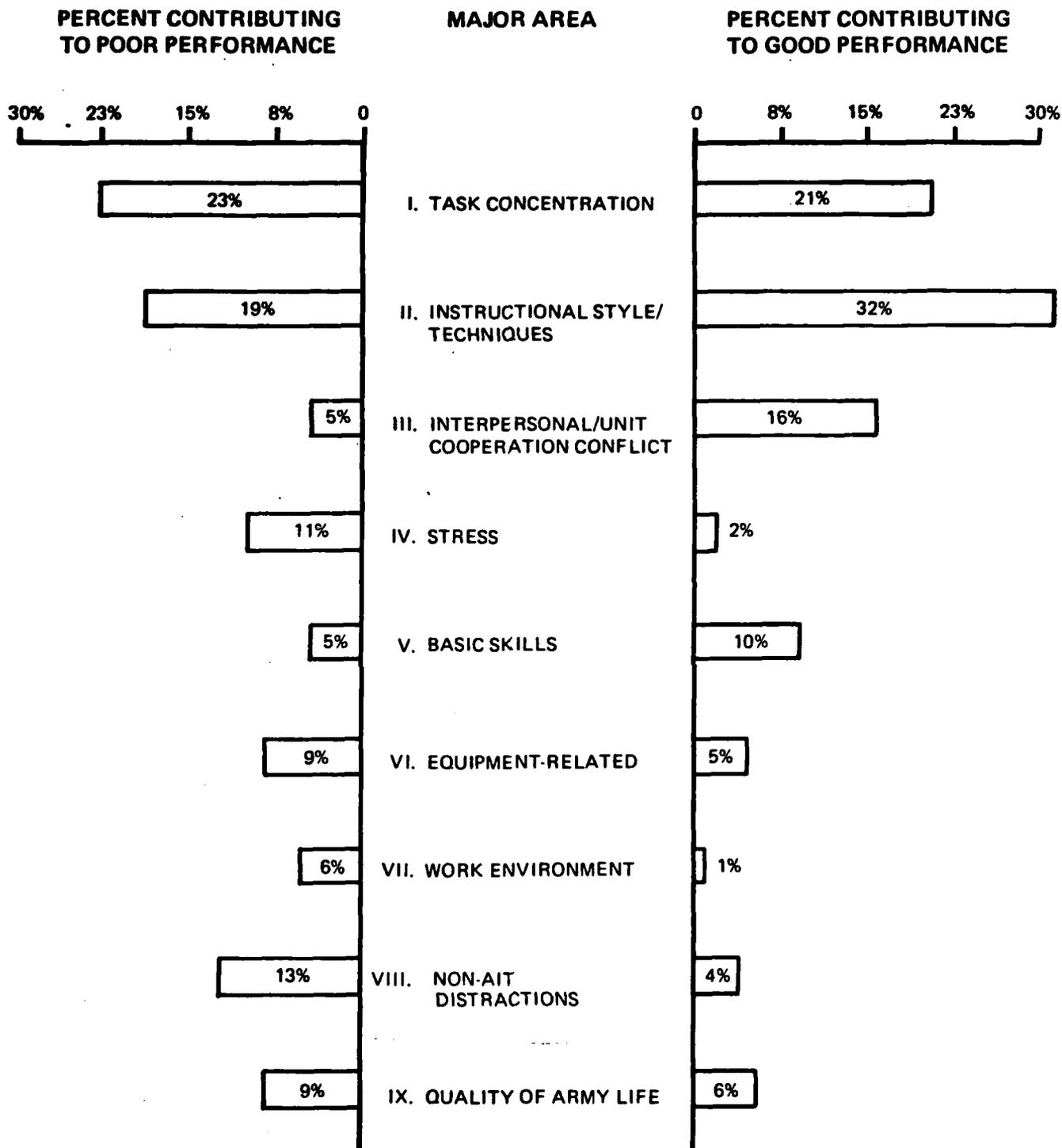


Figure 2. Comparison of Percentages Contributing to Good and Poor AIT Performance

which instruction is presented at both the group level (formal) and individual (informal) level; (2) the student's perception of the instructor's attitude; and (3) the organization of the course and the classes. This latter category was primarily concerned with site and instructor changes and discrepancies in instruction (e.g., being taught the same task differently by two instructors).

Area VIII, Non-AIT Distractions, contains the third highest percentage of reported incident components (13%). The majority of these components were concerned with Category VIII.A. "Fatigue as a Result of Work Detail." In fact 60% of these components contained in Area VIII refer to this category. Category VIII has already been discussed in relation to the "Alertness" category subsumed by the area of Task Concentration. The next highest percentage of report in this area referred to "Absenteeism" (VIII.D.). Absenteeism can be subdivided into (1) sick call and (2) administrative absenteeism.

Ranked fourth according to degree of criticality was "Stress in Training" (Area IV). This area refers to stress strictly within the confines of the AIT training sites. Critical aspects of this area concern both stressful situations and feelings of stress. The 3M10 course is relatively short in duration. It is divided into 11 weeks of training. During the first 10 weeks of the course, the student is expected to pass five performance tests, with the constant threat that failure on any one of these may result in being set back one week in the course. Thus, there is constant pressure to learn all that is being taught in one week before moving on to learn about new equipment and new procedures in the next week. In addition, time specifications for completing certain tasks must be met in order to receive a "GO," or a pass, on each test. Such situations are covered by the "Time Pressure" category listed under Stress.

Area VI, Equipment-Related Factors (9%), encompasses the following five major categories: VI.A, Malfunction; VI.B, Limited Resources; VI.C, Equipment Familiarity; VI.D, Nature of equipment; and VI.E, Task Familiarity. Three of these categories - Malfunction, Limited Resources, and Nature of Equipment - are all non-behavioral components that are outside the control of the student.

Ranked equal with Equipment-Related Factors is IX, Quality of Army Life/Adjustment (9%), which includes incidents related to the soldier's ability to adapt to Army life including the ability to related to peers and superiors according to the expectations of the Army.

VII, Work Environment, like Equipment-related Factors, is pretty much beyond the control of the students and includes incidents related to poor classroom conditions, weather, and location of equipment.

Jointly ranked last as accounting for poor performance are III, Interpersonal/Unit Cooperation/Conflict, and V, Basic Skills. Area III related to the amount of conflict or cooperation among work crews. It should be noted that while conflict in the group has a detrimental effect on performance, when the group is working well together, it has a stronger significant impact on performance. There were 40 incidents on the impact of teamwork/peer support on

good performance. Area V, Basic Skills, related to the ability of students to use the Technical Manuals and note taking. The ability to take notes was found to be the greatest predictor of success in the AIT course (see Validation Report). The critical incident reports of its effect on both good and poor performance provide additional verification of its importance and the need for its inclusion in Functional BSEP.

Chi-Square Analysis of the Critical Incident Data

For the chi-square analysis of the critical incident data, the major areas and combinations of major categories shown in Table 10 were used. In general, analysis at the area level was performed in order to obtain frequency levels sufficiently high for statistical analysis.

Table 10

Categories Used in Chi-Square Analyses of  
Student Poor Performance Incidents

Area/Category of Classification	n	%
I.A,B,C. Attention to Detail	40	23
I.D,E. Attention to Task	39	23
II.A. Instructional Quality	43	25
II.B. Instructional Quantity	22	13
III. Interpersonal/Unit Cooperation	17	10
IV. Stress	37	21
V. Basic Skills	19	11
VI. Equipment-Related	30	17
VII. Work Environment	21	12
VIII. Non-AIT Distractions	44	25
IX. Quality of Army Life/Adjustment	32	18

## TESTSUM Performance and Category Selection

Students were divided into high and low performance groups on the basis of TESTSUM scores. Students whose TESTSUM scores were above the median were placed into the High Performance group. Students whose TESTSUM scores were below the median were placed into the low performance group.

Chi-Square values were calculated to explore whether the differences between the observed and expected frequencies were significantly large enough to be attributed to the different groups or to just chance variations. An examination of Table 11 chi-square values suggests that the distribution of incident components reported by high performance and low performance students is statistically different for the Basic Skills (V) factor ( $\chi^2=6.153$ ,  $p<.02$ ). The low performance group tend to report this type of factor with greater frequency, suggesting that they may be experiencing difficulty with taking good notes and reading and using manuals.

Two additional areas, although not significant statistically, are worth noting for their differences. These areas are Interpersonal/Unit Conflict (III) and Work Environment (VII). The High Performance group tended to emphasize both of these areas more than did the Low Performance group ( $p<.20$ ).

Table 11

Chi-Square Values of Differences According to  
Level of TESTSUM Performance

Area/Category of Classification	Students Above Median		Students Below Median		$\chi^2$	df=1 p
	O	E	O	E		
I.A,B,C. Attention to Detail	18	19.76	20	18.24	.326	
I.D,E. Attention to Task	20	21.32	21	19.68	.170	
II.A. Instructional Quality	23	20.28	16	18.72	.453	
II.B. Instructional Quantity	9	9.36	9	8.64	.029	
III. Interpersonal/Unit Cooperation	11	8.32	5	7.68	1.798	$p<.20$
IV. Stress	17	17.68	17	16.32	.054	
V. Basic Skills	3	7.8	12	7.2	6.153*	$p<.05$
VI. Equipment-Related	14	13.0	11	12.0	.160	
VII. Work Environment	14	10.92	7	10.08	1.809	$p<.20$
VIII. Non-AIT Distractions	15	18.2	20	16.8	1.172	
IX. Quality of Army Life/ Adjustment	9	7.8	6	7.2	.385	

### Sex and Category Selections

Eleven critical factors (areas and categories) were examined in their relationship to sex (see Table 12). Two of these eleven factors were found significant at the .05 level. Female students as a group tended to report a greater number of incident components containing some reference to Instructional Quality than would be expected by a chance distribution ( $X^2=3.940$ ,  $p<.05$ ). The male students tended to place significantly greater emphasis on the area of Basic Skills than did female students.

Other interesting differences found between observed and expected frequencies that were not significant but still worthy of mention are: (1) Attention to Detail (I.A,B,C,), (2) Non-AIT Distractions (VIII), and (3) Quality of Army Life (IX). The first two of these categories tended to be emphasized by males, while the female students tended to emphasize the latter. (Table 12 shows that all three differences were significant at the 0.10 level of significance.)

Table 12  
Chi-Square Values of Differences According to Sex  
Poor Performance

Area/Category of Classification	Male Students		Female Students		$X^2$	df=1 P
	O	E	O	E		
I.A,B,C. Attention to Detail	32	27.30	3	7.70	3.678	$p<.10$
I.D,E. Attention to Task	35	31.20	5	8.80	2.504	$p<.20$
II.A. Instructional Quality	26	31.20	14	8.80	3.940	$p<.05$
II.B. Instructional Quantity	11	13.26	6	3.74	1.751	$p<.20$
III. Interpersonal/Unit Cooperation	11	11.70	4	3.30	.190	
IV. Stress	25	26.52	9	7.48	.396	
V. Basic Skills	15	11.70	0	3.30	4.231	$p<.05$
VI. Equipment-Related	17	20.28	9	5.72	2.411	$p<.20$
VII. Work Environment	14	14.82	5	4.18	.206	
VIII. Non-AIT Distractions	34	29.64	4	8.26	2.915	$p<.10$
IX. Quality of Army Life/ Adjustment						

### Age and Category Selection

Chi-square values were calculated for the 11 critical factors (areas and categories) appearing in Table 13. Of these 11 factors, statistically significant differences were found for only two of them. It should be noted, however, that the expected frequencies are too low to make any accurate or conclusive statements regarding them. Therefore, the reported statistical values should be considered only as suggestive. Even given this limitation, a visual inspection of the data clearly shows a striking difference between younger (17-20) and older (21+) students with respect to the Basic Skills (V) factor. Critical components describing this factor were reported exclusively by the younger students. Data presented later in this report shows that a greater percentage of younger students tended to score below the TESTSUM median than did older students. Here, the data suggests that younger students may be lacking in basic skills. Whether there is a relationship between their lower TESTSUM score and basic skills deficiencies is a question that needs further exploration.

Table 13

#### Chi-Square Values of Differences According to Age Level

Area/Category of Classification	Younger Students (17 - 20)		Older Students (21 and over)		X <sup>2</sup>	df=1 p
	n	χ <sup>2</sup>	n	χ <sup>2</sup>		
I.A,B,C. Attention to Detail	29	27.72	7	8.28	.26	NS
I.D,E. Attention to Task	32	31.57	9	9.43		NS
II.A. Instructional Quality	28	30.03	11	8.97	.60	NS
II.B. Instructional Quantity	15	13.86	3	4.14		NS
III. Interpersonal/Unit Cooperation	4	11.55	11	3.45	21.45**	p<.001
IV. Stress	28	26.18	6	7.82		NS
V. Basic Skills	15	11.55	0	3.45	4.48*	p<.05
VI. Equipment-Related	17	18.48	7	5.52		NS
VII. Work Environment	16	15.40	4	4.60		NS
VIII. Non-AIT Distractions	31	28.49	6	8.51		NS
IX. Quality of Army Life/Adjustment	16	16.19	5	4.83		NS

### Education and Category Selection

Of the 11 areas and categories examined in Table 14, only one chi-square value was found statistically significant at the .05 level of significance. This value ( $X^2=4.5$ ,  $p<.05$ ) suggests that high school graduates tended to place greater emphasis on interpersonal and interunit conflict (III) as contributing to poor performance than did the non-high school graduates. That is, the difference between the number of reports actually received on this factor and the number of reports expected was significantly greater than would be expected on the basis of chance differences alone. However, because of the low expected frequency computed for non-high school graduates, this interpretation is at best suggestive. However, an examination of the observed frequencies for this factor indicates support for the statistical difference. Of the 14 reports on this factor, all were contributed by high school graduates.

One other chi-square value warrants mention. Non-high school graduates tended to report more incident components concerned with inattention to detail ( $X^2=3.574$ ,  $p<.10$ ).

Table 14

Chi-Square Values of Differences According to Education

	Area/Category of Classification	Non-High School Graduates		High School Graduates		$X^2$	$\frac{df=1}{p}$
		O	E	O	E		
I.A,B,C.	Attention to Detail	12	7.4	25	29.6	3.574	$p<.10$
I.D,E.	Attention to Task	10	7.4	27	29.6	1.142	
II.A.	Instructional Quality	4	5.2	22	20.8	0.346	
II.B.	Instructional Quantity	4	3.2	12	12.8	0.25	
III.	Interpersonal/Unit Cooperation	0	3.8	14	11.2	4.500*	$p<.05$
IV.	Stress	5	5.4	22	21.6	0.015	
V.	Basic Skills	2	2.4	10	9.6	0.08	
VI.	Equipment-Related	2	3.6	16	14.4	0.278	
VII.	Work Environment	3	2.8	11	11.2	0.018	
VIII.	Non-AIT Distractions	6	7.2	30	28.8	0.25	
IX.	Quality of Army Life/ Adjustment	3	3.6	15	14.4	0.125	

\*Expected frequency should be higher. The discrepancy in observed scores, however, does suggest a difference.

### Exclusively Good Performance Categories (Areas XIII-XVII)

Five areas contained incidents related solely to good performance. These areas and the number of incidents are:

- XIII. Internal/Motivational Factors: 44
- XIV. Task Participation/Active Involvement: 8
- XV. Competition: 5
- XVI. Practice Procedure: 4
- XVII. Novelty: 3

The most striking result is the large number of incidents in Area XIII, Internal/Motivational Factors. This area covers a broad range of factors that the students perceived as making a significant contribution to good performance. In order of frequency, these categories are as follows: A. Self Confidence (n=14); B. Frame of Mind (n=10); C. Motivation to Learn (n=7); D. Satisfaction/Interest (n=6); E. Perseverance (n=4); and F. Anticipation of Course Completion (n=3). As each of these headings imply, these factors involve some kind of internalized state that is not directly observable in behavioral terms. Indeed, these categories were formulated primarily on the self-perceptions of the student participants and not on behavioral descriptions. Although the critical incident technique was developed and primarily used to tap observable behaviors, the large number of incidents that contained explicit reference to some kind of internal factor made mention of them necessary. The students, it seems, perceived these internalized states as being critical motivational factors contributing to good performance.

The second largest area was Task Participation/Active Involvement (Area XIV). This area was defined by incidents that reported active participation in a class situation, primarily when the student takes the initiative by asking questions.

Area XV, Competition, emerged primarily from the context of the team situation. For instance, striving towards being the first team to erect an antenna seems to have been an important motivational factor for a few students, perhaps in order to be singled out and complimented by the instructors. Numerous times the students report on being complimented or receiving praise from instructors. This suggests the importance the students place on receiving attention. In this manner, the student's behavior, that is her/his good performance, is rewarded and thus reinforced.

Area XVI, Practice Procedure, could have perhaps been placed in the Area of Task Concentration under "Memory." Here, however, it was categorized specifically as a particular manner of practicing on the equipment. Four cases reported being helped by practicing on the equipment by using memory.

Novelty, Area XVII, included reports of exposure to new equipment and/or tasks. Perhaps, for these students, the opportunity to work on equipment they had not previously worked on stimulated their desire to learn.

## Relationship Between Background Variables and AIT Performance

A summary of the responses to the sociodemographic questions is presented in Appendix C. The effect of selected background variables (e.g., age, sex, MOS satisfaction) on AIT performance was determined by examining the relationship between category membership on the background variable and TESTSUM performance (above vs. below median), using the  $X^2$  test for significant at the .05 level. The results are discussed below.

### Sex and Performance

Table 15 shows the relationship between sex and performance, as measured by TESTSUM. Visual inspection reveals a tendency for women to score above the median TESTSUM more often than men. However,  $X^2=.569$  ( $p=.451$ ) was not significant.

Table 15

#### Sex and TESTSUM

	<u>Males</u>	<u>Females</u>
Above Median	46	15
Below Median	52	11

### Age and Performance

Table 16 shows that older students (21 years or older) performed higher in the AIT course, on the average, than younger students. The difference ( $X^2=4.036$ ) was significant ( $p=.045$ ).

Table 16

#### Age and TESTSUM

	<u>Younger</u> <u>(17-20 Years)</u>	<u>Older</u> <u>(21 years or Older)</u>
Above Median	42	19
Below Median	53	10

### Education and Performance

Table 17 shows the relationship between education and TESTSUM. Not surprisingly, high school graduates tended to perform better than non-graduates. However, the difference was not significant ( $X^2=.476$ ,  $p=.788$ ).

Table 17

#### Education and TESTSUM

	<u>Non-graduate</u>	<u>High School Graduate</u>	<u>College Graduate</u>
Above Median	8	38	15
Below Median	11	38	14

### Ethnicity and Performance

Table 18 shows the relationship between ethnic group membership (White, Black, Hispanic) and TESTSUM. Because of the small number of Hispanic students, only white and black students were compared. Though blacks had a slight tendency to score lower, the difference was not significant ( $X^2=2.825$ ,  $p=.244$ ). If sex is taken into account, it is the black males, but not females, who tend to score below median.

Table 18

#### Ethnicity and TESTSUM

	<u>White</u>	<u>Black</u>	<u>Hispanic</u>
Above Median	36	18	6
Below Median	36	24	2

### Choice of MOS and Performance

TESTSUM was compared between students whose first three choices of MOS included the 31M and students whose first three choices did not. Table 19 shows the results. The table shows a tendency for students who did not select the 31M MOS to score higher on TESTSUM than students who did. However, the difference was not significant. ( $X^2=.390$ ,  $p=.532$ )

Table 19

#### Choice of MOS and TESTSUM

	<u>31M Among First Three Choices</u>	<u>31M Not Among First Three Choices</u>
Above Median	33	28
Below Median	38	24

### Expectations Concerning MOS and Performance

Some students reported that they had been well-informed concerning the nature of 31M MOS, while others reported that they had been misinformed. Table 20 shows the relationship between MOS expectation and TESTSUM. The results show that students performed equally well in the AIT course, regardless of whether they had realistic or unrealistic expectations of the MOS. ( $X^2=.010$ ,  $p=.919$ )

Table 20

#### MOS Expectation and TESTSUM

	<u>Well Informed</u>	<u>Misinformed</u>
Above Median	32	28
Below Median	32	31

### MOS Satisfaction and Performance

Table 21 shows the relationship between satisfaction with the 31M MOS and TESTSUM. There is a very slight tendency - not significant - for satisfied students to perform higher than dissatisfied students. It would be interesting to explore this relationship using an index of degree of satisfaction, perhaps based on a series of items, rather than just one item measuring satisfaction vs. dissatisfaction. ( $X^2=.793$ ,  $p=.693$ )

Table 21

#### 31M MOS Satisfaction and TESTSUM

	<u>Dissatisfied</u>	<u>Neutral</u>	<u>Satisfied</u>
Above Median	11	22	28
Below Median	8	26	29

### Late Nights and Performance

The critical incident data indicated that staying up late at night due to work details, parties, etc. may cause students to be tired and sleepy the next day, thus contributing to poor performance. Table 22 shows the relationship between the degree to which students reported staying up late at night and their AIT performance. Though  $X^2=1.140$  was not significant, ( $p=.296$ ) there is a tendency for "late nighters" to do worse in the course, thus supporting the critical incident data.

Table 22

#### Staying Up Late and TESTSUM

	<u>Go to Bed Late at Least 2 or 3 Times a Week</u>	<u>Go to Bed Late Less than Twice a Week</u>
Above Median	35	26
Below Median	42	19

Relationships Among Background Variables

The background variable of MOS satisfaction was examined in relation to other background variables. The results are discussed below.

Satisfaction with MOS and Satisfaction with the Army

Table 23 shows the relationship between MOS satisfaction (Pleased vs Displeased) and satisfaction with the Army (positive, neutral, negative). Chi-Square was significant at the .001 level. Thus, student satisfaction with the Army in general and the 31M MOS in particular tend to go hand in hand. Few students are pleased with one while being displeased with the other ( $X^2=14.14$ ,  $p<.001$ ).

Table 23

MOS Satisfaction and Army Satisfaction

		MOS Satisfaction	
		<u>Pleased</u>	<u>Displeased</u>
Army Satisfaction	Positive	34	3
	Neutral	9	1
	Negative	13	13

Satisfaction with MOS and Future Work Expectations

Students' reported future work expectations fell into three categories: working with equipment, civilian job, nothing or unknown. Table 24 shows the relationship between satisfaction with 31M MOS and future work expectations. If the neutral category is dropped, the relationship is significant at the .05 level. Thus, students who are pleased with the MOS are more likely to anticipate working with equipment or a civilian job, while dissatisfied students are more likely to be uncertain concerning their future career. If the "neutral" category is dropped,  $X^2=6.82$  ( $p<.05$ ).

Table 24

MOS Satisfaction and Future Work Expectation

		MOS Satisfaction		
		<u>Pleased</u>	<u>Neutral</u>	<u>Displeased</u>
Work Expectation	Working with Equipment	21	13	5
	Civilian Job	21	10	3
	Nothing/Unknown	12	19	9

### Expectations Concerning MOS and MOS Satisfaction

One might expect that students who have more realistic expectations of the 31M MOS prior to the start of AIT would tend to be more satisfied with the MOS. Table 25 shows the relationship between MOS expectation (informed vs. misinformed) and MOS satisfaction. Though there was a slight tendency for better informed students to be more pleased, the relationship was not significant.

Similarly, the relationship between MOS expectation and Army satisfaction was not significant ( $X^2=4.46$ ;  $p<.20$ ).

Table 25

#### MOS Expectation and MOS Satisfaction

		MOS Expectation	
		<u>Informed</u>	<u>Misinformed</u>
MOS Satisfaction	Positive	35	22
	Neutral	20	28
	Negative	8	10

### Choice of MOS and MOS Satisfaction

Table 26 shows the relationship between first choice of MOS (31M vs. other) and satisfaction with the 31M MOS. The relationship is not significant. Students were equally likely to be satisfied with the 31M MOS, regardless of whether it was their first choice or not ( $X^2=.96$ ).

Table 26

#### MOS Choice and MOS Satisfaction

		First Choice of MOS	
		<u>31M</u>	<u>Other</u>
MOS Satisfaction	Pleased	15	38
	Neutral	14	32
	Displeased	4	16

## INSTRUCTOR RESULTS

### Instructor Incident Clarification

The classification of instructor incidents resulted in eight major areas (Table 27). An area was considered major if it included a frequency of ten or more incident components. As with the student classification, Task Concentration emerged as the most reported area. Also in agreement with the student structure was the emphasis placed on the following two categories: (1) Attention to Detail (I.A.), and (2) Alertness (I.E.). Unlike the students, instructors did not emphasize Instructional Style/Techniques.

Area VIII, Non-AIT Activities and Distractions, emerged as the second largest area in the instructor classifications structure. Within this major area, instructors tended to emphasize the first category, "Details/Late Hours Resulting in Fatigue" (VIII.A.).

The area containing the third highest number of incident components was "Basic Skills" (V). That this factor was so strongly emphasized by the instructors is indicative of the overall strong emphasis placed on strictly "academic factors" such as listening skills (i.e., Attention to Task), following instructions, comprehension/learning speed, note-taking, and reading and using manuals.

### Comparison of Student and Instructor Classification Structures

A comparison of the distributions of incident components across the major comparable areas for students and instructors has suggested several noteworthy agreements and disagreements (see Table 28). These are as follows:

1. Task Concentration emerged as the most emphasized major area for both student and instructor groups. Both students and instructors agreed that: (1) not paying attention to detail, (2) not staying awake or being overly fatigued in class, and (3) not following instructions were all critical factors contributing to poor performance.
2. Instructors did not share the emphasis students placed on Area II, Instructional Style/Techniques. Students reported it as their second most critical area; 19% of the total incident components reported by students contained some reference to either Instructional Quality (II.A.) or Instructional Quantity (II.B.). In comparison, only 6% of the instructor incident components made reference to this area. The reason for this significant difference in emphasis is uncertain. We do know that this area concerns the instructors themselves. Perhaps they were simply unwilling to portray themselves as contributors to poor performance.

Table 27

## Instructor Classification Structure

Areas/Categories	Could Not Help (n)	Could Help (n)	Total (n)
<b>I. Task Concentration</b>			
A. Attention to Detail	17	19	36
B. Retention/Memory	1	6	7
C. Following Instructions	11	9	20
D. Attention to Task: Attentiveness/ Listening	9	6	15
E. Alertness	15	14	29
<b>TOTAL I</b>	<b>53</b>	<b>54</b>	<b>107</b>
<b>II. Instructional Style/Techniques</b>			
A. Instructional Quality	7	4	11
B. Instructional Quantity	3	4	7
<b>TOTAL II</b>	<b>10</b>	<b>8</b>	<b>18</b>
<b>III. Interpersonal/Interunit Cooperation</b>	<b>4</b>	<b>2</b>	<b>6</b>
<b>TOTAL III</b>	<b>4</b>	<b>2</b>	<b>6</b>
<b>IV. Stress/Pressure</b>	<b>0</b>	<b>6</b>	<b>6</b>
<b>TOTAL IV</b>	<b>0</b>	<b>6</b>	<b>6</b>
<b>V. Basic Skills</b>			
A. Notes	8	8	16
B. Reading: Comprehension, Use of TMs	17	19	36
<b>TOTAL V</b>	<b>25</b>	<b>27</b>	<b>52</b>
<b>VI. Equipment Related: Task/Equipment     Familiarity</b>	<b>4</b>	<b>13</b>	<b>17</b>
<b>TOTAL VI</b>	<b>4</b>	<b>13</b>	<b>17</b>
<b>VII. Work Environment</b>	<b>2</b>	<b>0</b>	<b>2</b>
<b>TOTAL VII</b>	<b>2</b>	<b>0</b>	<b>2</b>
<b>VIII. Non-AIT Activities and Distractions</b>			
A. Details/Late Hours Resulting in Fatigue	9	17	26
B. Lack of Time Due to Company Activities	8	9	17
C. Absenteeism: Sick Call/Administrative	8	2	10
D. General	2	3	5
<b>TOTAL VIII</b>	<b>27</b>	<b>31</b>	<b>58</b>

Table 27 (Continued)

## Instructor Classification Structure

Areas/Categories	Could Not Help (n)	Could Help (n)	Total (n)
IX. Quality of Army Life/Adjustment			
A. NCO Treatment	1	2	3
B. Satisfaction with Army	4	5	9
C. Personal/Family Problems	5	1	6
TOTAL IX	<u>10</u>	<u>8</u>	<u>18</u>
X. Expectations/Satisfaction with MOS	7	4	11
TOTAL X	<u>7</u>	<u>4</u>	<u>11</u>
XI. Comprehension/Learning Speed	10	9	19
TOTAL XI	<u>10</u>	<u>9</u>	<u>19</u>

Table 28

Distributions of Comparable Areas and Categories  
for Students and Instructors

Area and Category of Classification	Students		Instructors	
	n	%	n	%
<b>I. Task Concentration</b>				
A. Attention to Detail	29		36	
B. Retention/Memory	6		7	
C. Following Instructions	5		20	
D. Attention to Task	13		15	
E. Alertness	26		29	
<b>TOTAL - AREA I</b>	<u>79</u>	23	<u>107</u>	38
<b>II. Instructional Style/Techniques</b>				
A. Instructional Quality	43		11	
B. Instructional Quantity	22		7	
<b>TOTAL - AREA II</b>	<u>65</u>	19	<u>18</u>	6
<b>III. Interpersonal/Unit Cooperation</b>	17		6	
<b>TOTAL - AREA III</b>	<u>17</u>	5	<u>6</u>	2
<b>IV. Stress in Training</b>	37		6	
<b>TOTAL - AREA IV</b>	<u>37</u>	11	<u>6</u>	2
<b>V. Basic Skills</b>	19		52	
<b>TOTAL - AREA V</b>	<u>19</u>	5	<u>52</u>	18
<b>VI. Equipment Related Factors</b>	30		17	
<b>TOTAL - AREA VI</b>	<u>30</u>	9	<u>17</u>	6
<b>VII. Work Environment</b>	21		2	
<b>TOTAL - AREA VII</b>	<u>21</u>	6	<u>2</u>	1
<b>VIII. Non-AIT Distractions</b>				
A. Fatigue as a Result of Work Detail	26		26	
B. Lack of Time as a Result of Company Activities	5		17	
C. Fatigue/Lethargy as a Result of Non-Company Activities	1		10	
D. Absenteeism	12		5	
<b>TOTAL - AREA VIII</b>	<u>44</u>	13	<u>58</u>	20

Table 28 (Continued)

Distributions of Comparable Areas and Categories  
for Students and Instructors

Area and Category of Classification	Students		Instructors	
	n	%	n	%
IX. Quality of Army Life/Adjustment				
A. Stress	9		0	
B. Interpersonal Relations	5		0	
C. NCO Treatments: Merits/Demerits	7		3	
D. Living Conditions	3		9	
E. Personal Problems	10		6	
TOTAL - AREA IX	34	9	18	6
TOTAL - ALL AREAS	346		284	

NOTE: Student frequencies are based on incidents contributing to poor performance. Instructor frequencies are based on both "Helped" and "Could Not Help" incidents. The "Helped" incidents were included because they also describe incidents of poor performance.

3. It is interesting to note that instructors placed greater emphasis on Basic Skill deficiencies than the students (10% to the students 5%). Thus, coupled with item 2 above, it appears that students attribute poor instruction for their poor performance, and instructors assign deficiencies within the student as an important source of difficulty. The student incidents related to basic skills were contributed largely by students who were placed in the low performance group (i.e., below the media based on TESTSUM scores).
4. A substantial difference between the student and instructor groups was found for Area IV, Stress in Training. Perhaps, this discrepancy can be attributed to the nature of stress. For the most part, stress is internalized and, thus, it may best be indicated by a self-report. Since the students were the target population and the ones having the stress, they were in the best position to report it.

Chi-square values were calculated to statistically test for a difference between the student and instructor distributions discussed above. Table 29 shows that the percentage differences that resulted between the two groups were supported by the chi-square analyses. The chi-square results suggest that, in general, the student and instructor groups, though recognizing the importance of the same factors, tended to emphasize them differently.

One chi-square value in Table 29 is potentially deceiving. The significant chi-square value for Task Concentration suggests that instructors placed greater emphasis on this area than did the students. This is only partially accurate. The statistical difference between the two groups does not show that the students, like the instructors, emphasized Task Concentration within their own group more than they did any other factor. Although this information was lost in the chi-square analysis, it is made clear by examining the percentage differences of the two groups shown in Table 28.

Table 29

## Chi-Square Values of Differences According to Data Source

Area/Category *	Students		Instructors		$\chi^2$	$\frac{df=1}{p}$
	Observed	Expected	Observed	Expected		
I. A, B, C	40	56.65	63	46.35	10.87	p<.001
I. D, E	39	45.65	44	37.35	2.15	NS
II. A, B	65	45.65	18	37.35	18.22	p<.001
III.	17	12.65	6	10.35	3.33	NS
IV.	37	23.65	6	19.35	16.75	p<.001
V.	19	39.6	52	31.95	23.30	p<.001
VI.	30	25.85	17	21.15	1.47	NS
VII.	21	12.65	2	10.35	12.25	p<.001
VIII.	44	56.1	58	45.9	5.8	p<.02
IX.	32	27.5	18	22.5	1.64	NS

\*Corresponding Area/Category readings are shown in Table 28

## PLATOON SERGEANT RESULTS

### Classification Structure

The eighteen platoon sergeants, in reporting incidents of adjustment to Army life, provided a different perspective of the 31M10 students. Although both students and instructors were also given the opportunity to describe such incidents, they tended to emphasize AIT-related incidents. By interviewing the platoon sergeants we were able to obtain a more comprehensive look at some of the adjustment difficulties faced by 31M10 students.

Of the total of 48 incidents reported by platoon sergeants, 22 incidents were judged to eventually result in successful adjustment and 26 to result in unsuccessful adjustment. Because problems related to adjustment were reported in both types, and given the small number of incidents, successful and unsuccessful incidents were combined in deriving the classification structure presented in Table 30. Actual incidents illustrating each of the 12 areas are presented in Appendix D.

A dual classification structure can also be derived (from the platoon sergeant incidents). This dual classification takes the form of: (1) internal effects, and (2) external effects. Internal effects include such components as depression and withdrawal into self, anomie - loss of interest in everything, loss of concentration, desire for release from the Army (TDP), dissatisfaction, lethargy - no desire to go to AIT training, desire for reclassification, and preoccupation with people and situations outside of the Army. These are all internalized, introspective components. External effects encompass many of the visible manifestations of the internal, emotional states, e.g., refusal to get out of bed, tardiness, interpersonal conflicts, court martial, and getting in trouble with the NCOs.

In short, it seems these emotional states cause the individual to withdraw into him/herself, consequently affecting his/her school (AIT), work, company activities, and interpersonal relationships.

Table 30

Platoon Sergeant Classification Structure  
And Number of Incidents in Each Area

- I. Emotional States: Stress, Lethargy, Depression, Anomie, Alienation: 18
- II. Family/Personal Problems: 15
  - A. Family Members
  - B. Financial Concerns
  - C. Personal Problems
- III. Interpersonal Relations with Peers: 12
- IV. Military Bearing: 11
- V. Regimen: 10
- VI. Expectations and MOS Satisfaction: 8
- VII. Expectations and Satisfaction with the Army: 8
- VIII. AIT-Related Factors: 8
- IX. Physical Condition: 4
  - A. Sick Call
  - B. Injury
  - C. Pregnancy
- X. Authoritarianism: 4
- XI. Non-AIT Distractions: 2
  - A. Fatigue
  - B. Time
- XII. Alcohol Abuse: 1

## CONCLUSIONS AND DISCUSSION

### Conclusions

The findings are:

1. The performance level of the student made no significant difference in the types of critical factors reported except in the area relating to Basic Skills. In this case, the students below the median - the low performance group - reported more Basic Skills components, and students above the median reported fewer Basic Skills components than would be expected by chance alone.
2. The status of the respondent (student or instructor) makes a significant difference in the types of incident components emphasized in the following areas:
  - a. Task Concentration was emphasized by instructors. Although statistically different, Task Concentration was also reported by students more than any other area.
  - b. Instructor Style/Technique was emphasized by students.
  - c. Stress was emphasized by students.
  - d. Work Environment was emphasized by students.
  - e. Basic Skills was emphasized by instructors.
3. Unlike instructors, incidents reported by Platoon Sergeants emphasized emotional states and personal factors as contributing to adjustment.
4. The sex of the student reporting incident components does make a significant difference in the areas of Instructional Quality and Basic Skills. Females tend to emphasize components associated with some aspect of Instructional Quality as contributing to poor performance. The reverse is true with respect to the Basic Skills factor. Males tend to use this factor as contributing more to poor performance. In fact, incident components describing some aspect of Basic Skills were reported exclusively by males in the low performance group (whose TESTSUM score was below the median). Other sex differences that show interesting differences significant at only the .10 level of significance are:
  - a. Males tend to emphasize Attention to Task as a contributing factor to poor performance. Attention to Task involves alertness, which seems especially critical to male students.
  - b. Males emphasized Non-AIT Distractions, which contains yet another component reported as especially critical: Fatigue due to Work Details. A relationship between Non-AIT Distractions and ability to stay alert in class is suggested. The specifics of this suggested relationship need to be expanded further.

5. The age of the students reporting the incidents does make a significant difference in the areas of Interpersonal/Unit Cooperation and Conflict and Basic Skills. The former area was emphasized by older students and the latter by younger students. Given our analyses of the relationship between age and TESTSUM performance (in which below median students emphasized basic skills), this difference is not unexpected. As reported, age seems to be the single most important variable explaining TESTSUM performance difference between above and below median students.
6. The educational level of the students reporting the incidents may make a significant difference in the area of Interpersonal/Unit Conflict. High school graduates tended to place greater emphasis on Interpersonal/Unit Conflict as contributing to poor performance than did the non-high school graduates.
7. Of all the background variables examined in relation to AIT performance, only age was significant, with older students (21 or older) outperforming younger ones. However, most of the other relationships were in the expected direction, suggesting that these variables are indeed important and merit further investigation.
8. With respect to the relationships among background variables, MOS satisfaction was significantly related to both Army satisfaction and future work expectation. However, neither MOS expectation nor first choice of MOS was significantly related to MOS satisfaction.

### Discussion

#### Significance of the Study to Functional Basic Skills Education Program (FBSEP)

During verification of skills prerequisites to success in the 31M10 course, the following areas were identified and associated lessons developed:

- Reading Comprehension (Unit I)
- Using Tables of Contents (Unit II)
- Listening Skills (Unit III)
- Note-Taking Skills (Unit IV)
- Recognizing Part of a Whole (Unit V)
- Locating Information in Tables (Unit VI)
- Reading Cabling Diagrams (Unit VII)
- Diagramming Equipment Malfunctions (Unit VIII)
- Scale Reading (Unit IX)

Critical incidents related to poor performance as reported by low performance students add confirming evidence that the skills taught in the FBSEP lessons are necessary for success in the 31M10 course.

In the validation of the Diagnostic Test Model, test scores for FBSEP Units III and IV, representing listening and note-taking skills respectively, were found to make significant contributions to the formulas used to predict success in the 31M10 course<sup>4</sup>. As in this study's measure of performance, success/failure was defined as the sum of the performance tests, five weekly tests given throughout the duration of the 11-week course. The regression analysis outcome supports the critical incident results which show that the most "variance" in the incidents was explained by the Area Task Concentration (i.e., includes listening).

Additionally, the result of the quantitative analyses of incidents showed that the low performance group (group scoring below the median) reported more problems in relation to note-taking than the high/above median performance group.

In sum, low performance students indicated problems with listening, notes, reading and using manuals, skills in Units I, II, III, IV, V, VI, VII, and VIII of the FBSEP. Thus, 31M10 trainees identified some of the problem areas that the verification of prerequisite skills revealed. Consequently, the FBSEP training in these areas should help to eliminate associated problems and contribute to successful AIT performance.

#### Recommendations for Further Research

This study resulted in the identification of several broad areas that are contributors to success or failure in AIT performance. Both the qualitative and quantitative outcomes of this study can contribute to laying the ground work for a predictive model of student performance. Such a model could be used to predict within a certain degree of accuracy how an individual student or a class of students is likely to perform. However, while several broad areas were identified, they must be further defined to achieve the level of specificity necessary for predictive purposes. For example, the critical incident results indicate that "Quantity of Instruction" is an important factor in performance, particularly in hands-on experience. In order to do well, the student requires a substantial amount of time working with the equipment him/herself. In fact, 64% of the student sample told us that is how they learn the most. Thus, the question does not concern the importance of getting hands-on work. The critical incident results make this clear. What the critical incident results do not explain is the relationship between the nature and amount of hands-on practice in some measurable form and actual performance. Secondly, we cannot ascertain from the critical incident findings what effect different combinations of critical factors have on performance. However, the critical incident data does suggest a multicausal effect on performance and also the interactive effect of certain critical factors in contributing to performance (e.g., working late night details and sleeping in class, or missing a class and not getting a chance to work on the equipment, etc.) from which a number of hypotheses about their effect on performance could be generated and tested empirically.

<sup>4</sup>Validation Report, Functional Basic Skills Package, 31M10 Course, Contract DABT60-81-C-0006, Applied Science Associates, Inc., September 1982, p. I-12.

APPENDIX A  
DATA COLLECTION INSTRUMENTS

## STUDENT QUESTIONNAIRE

### Introductory Statement

The Army is interested in improving Army life while you are in AIT. You, as a current AIT student, are in a good position to help the Army to do this.

For the next hour we are going to talk about your life in the Army. I am going to ask you questions about basic training, life at Fort Gordon, and the 31M course. I am also going to ask you about what you did before you joined the Army and for some general background information. I will record your answers on these forms.

In addition to these questions, I will ask you to describe two specific examples of your performance in the 31M course. At that time, I will record your examples on the tape recorder.

The reports you give will be confidential. Army personnel will not have access to them. Completed forms will be analyzed and kept in our company office in Pittsburgh, Pennsylvania. Only combined results will be reported back to the Army. You need not use real names of other soldiers or NCO's in your reports.

Do you have any questions before we begin?

Interviewer's ID: \_\_\_\_\_

Date: \_\_\_\_\_

STUDENT BACKGROUND INFORMATION REPORT

1. Where did you receive your basic training?

\_\_\_\_\_ (Name of Post) \_\_\_\_\_ (State)

2. Your first 3 choices of MOSs were: Record comments about choices here:

1. \_\_\_\_\_  
2. \_\_\_\_\_  
3. \_\_\_\_\_

3. Which MOSs did you want least?

1. \_\_\_\_\_  
2. \_\_\_\_\_  
3. \_\_\_\_\_

4. What is the main reason why you joined the Army? (Rank 3 reasons in order of importance.)

\_\_\_\_\_ Personal problems  
\_\_\_\_\_ Learn job skills  
\_\_\_\_\_ Money and benefits  
\_\_\_\_\_ Job security  
\_\_\_\_\_ Escape  
\_\_\_\_\_ Patriotism

\_\_\_\_\_ Unemployment  
\_\_\_\_\_ Travel  
\_\_\_\_\_ Nothing else to do  
\_\_\_\_\_ Felt I had no other choice  
\_\_\_\_\_ Build my self-confidence  
\_\_\_\_\_ Other (specify) \_\_\_\_\_

5. Complete this sentence:

Compared to AIT, basic training was \_\_\_\_\_

6. Which week of 31M training are you presently in? \_\_\_\_\_

Complete the following sentences:

7. For the week of training I am now in, I like \_\_\_\_\_  
most and \_\_\_\_\_ least.

8. To date, which week of the 31M course did or do you like best? \_\_\_\_\_  
Why? \_\_\_\_\_  
\_\_\_\_\_

9. In the 31M course, I get the most out of: (Rank 2 or more choices)

- \_\_\_\_\_ Lecture
- \_\_\_\_\_ Demonstration
- \_\_\_\_\_ Talking to NCO instructors
- \_\_\_\_\_ Talking to civilian instructors
- \_\_\_\_\_ Working with the equipment myself
- \_\_\_\_\_ Reading on my own
- \_\_\_\_\_ Visits to the Learning Center
- \_\_\_\_\_ Talking to other students in class
- \_\_\_\_\_ Other (specify) \_\_\_\_\_

10. Compared to other teachers I've had, the 31M civilian instructors are:  
(Circle one)

Very poor      1      2      3      4      5      Very good

Complete the following sentences:

11. Before coming to Fort Gordon, I really thought the 31M course would teach  
me how to work with \_\_\_\_\_

What made you think that? \_\_\_\_\_  
\_\_\_\_\_

12. Now that I am going to be a 31M, I am: (Circle one)

Very disappointed      1      2      3      4      5      Very pleased

13. In the 31M course I get the most help from \_\_\_\_\_  
\_\_\_\_\_

14. When I leave the Army, the work skill taught in the 31M course that will  
help me the most is \_\_\_\_\_

15. If I were to miss a day in class, I would get help from: (Circle one)

Instructors      Other students      Learning Center      Myself

16. In the barracks I get the most help from \_\_\_\_\_
17. I think it is hardest to get along with: (Check and rank in order as many as apply)
- \_\_\_\_\_ NCOs in basic training
  - \_\_\_\_\_ Civilian instructors
  - \_\_\_\_\_ NCO instructors
  - \_\_\_\_\_ NCOs in the barracks
  - \_\_\_\_\_ Other Army personnel (specify) \_\_\_\_\_

18. Think of the NCO you most admire and tell me why. \_\_\_\_\_

\_\_\_\_\_

19. Compared to other teachers I've had, the 31M NCO instructors are:  
(Circle one)

Very poor      1      2      3      4      5      Very good

Complete the following sentences:

20. In the barracks, I turn to \_\_\_\_\_ when I have a problem.

21. One barracks rule which is not strictly enforced is \_\_\_\_\_

22. The most satisfying thing about barracks life is \_\_\_\_\_

\_\_\_\_\_

23. The least satisfying thing about barracks life is \_\_\_\_\_

\_\_\_\_\_

24. Of the NCOs and civilians in charge, I think it is easiest to get along with: (Check and rank in order as many as apply)

- \_\_\_\_\_ NCOs in basic training
- \_\_\_\_\_ Civilian instructors
- \_\_\_\_\_ NCO instructors
- \_\_\_\_\_ NCOs in the barracks
- \_\_\_\_\_ Other Army personnel (specify) \_\_\_\_\_

25. Some NCOs in the barracks look the other way when \_\_\_\_\_

26. Compared to basic training, Army life at Fort Gordon is \_\_\_\_\_

\_\_\_\_\_

27. I prefer to participate in individual rather than team activities:  
(Circle one)

Like Me

Unlike Me

28. How often do you personally do these things? (Check one)

	Once a Day	2-3 Times per Week	Once a Week	2-3 Times per Month	Never
Go into Augusta					
Go to a party					
Go to the Enlisted Men's Club					
Go to a recreational center (e.g., movies, bowling, etc.)					
Go to the day room					
Go out for food					
Have a beer/mixed drink					
Study course material					
Read something for pleasure					
Listen to the radio					
Watch television					
Stay up real late					
Go to a shopping center					
Go to a bar off post					
Go out on a date					
Get "high"					
Go to bed at 10 p.m.					
Other (specify)					

29. How many of your friends from home are now in the Armed Services?  
(Circle one)

None            1            2            3            4 or more

30. Was your father ever in the Armed Services?            Yes            No

If yes, which branch \_\_\_\_\_

31. When you go somewhere, are you most likely to go: (Circle one)

By yourself            With one other person            With a group of people

Complete the following sentences:

32. Most of my mail comes from \_\_\_\_\_

33. The mail I get is usually about \_\_\_\_\_

34. My letters to home are usually about \_\_\_\_\_

35. If you got a letter from home saying that there is a problem, what would you do? \_\_\_\_\_

Possible answer categories:

\_\_\_\_\_ Ask for leave immediately

\_\_\_\_\_ Call home to find out more about it.

\_\_\_\_\_ Rely on the people at home to handle the problem.

\_\_\_\_\_ Ask a friend at home to handle the problem.

\_\_\_\_\_ Other \_\_\_\_\_

36. In the evenings during the week, the most exciting thing to do is \_\_\_\_\_

37. On weekends, the best thing to do is \_\_\_\_\_

38. Age \_\_\_\_\_

39. What type of school did you last attend? (Circle one)

Grade	Middle	High	Technical	2 Year	4 Year
School	School	School	School	College	College

40. Last grade completed \_\_\_\_\_

41. Degrees/diplomas/certificates received: \_\_\_\_\_

42. In the Army, I make friends: (Circle one)

With difficulty	1	2	3	4	5	Very easily
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Why do you say that? \_\_\_\_\_

43. I'm finding that the Army is \_\_\_\_\_

44. What were the last two jobs you held before joining the Army? (Include part-time work.)

1. \_\_\_\_\_

2. \_\_\_\_\_

45. I left my last job because \_\_\_\_\_

46. At my last job, the other workers were \_\_\_\_\_

47. The supervisor at my last job was \_\_\_\_\_

48. Marital status: (Check one)

\_\_\_\_\_ Single\*  
\_\_\_\_\_ Married

\_\_\_\_\_ Separated  
\_\_\_\_\_ Divorced

\_\_\_\_\_ Remarried  
\_\_\_\_\_ Spouse deceased

\* If single, skip to questions #52.

49. Number and ages of children: \_\_\_\_\_

50. Location of spouse (husband or wife): \_\_\_\_\_  
(City) (State)

51. Occupation of spouse: \_\_\_\_\_

52. Marital status of parents: (Check one)

\_\_\_\_\_ Single  
\_\_\_\_\_ Married

\_\_\_\_\_ Divorced  
\_\_\_\_\_ Separated

\_\_\_\_\_ One parent deceased  
\_\_\_\_\_ Both parents deceased

\_\_\_\_\_ Father remarried  
\_\_\_\_\_ Mother remarried

53. I feel my family was: (Circle one)

Very close      1      2      3      4      5      Not at all close

54. Number of brothers and sisters: \_\_\_\_\_

55. Did you live with your parent(s)?            Yes            No
56. If only one, which parent (if applicable)? \_\_\_\_\_
57. Did you ever have a place of your own?    Yes            No
58. When I told my parents I was joining the Army, they said \_\_\_\_\_  
\_\_\_\_\_
59. Learning to work as a team is: (Circle one)  
Important                      Sometimes Important                      Not Important
60. Since I have joined the Army, dating is \_\_\_\_\_
61. How many times have you been on sick call since you started AIT? \_\_\_\_\_
62. Nature of illness: \_\_\_\_\_
63. Have you had this problem before? \_\_\_\_\_

Interviewer's ID: \_\_\_\_\_ Date: \_\_\_\_\_

CRITICAL INCIDENT INTERVIEW FOR STUDENTS  
(Good Performance)

Introductory Statement: The Army is interested in improving Army life while you're in AIT. You, as a current AIT student, are in a good position to help the Army to do this.

Incident Inducer: Within the past week or two, think of a time when you were assigned a task in the 3IM course and the assignment worked out especially well.

1. Where were you located? \_\_\_\_\_ Field \_\_\_\_\_ Classroom

2. What was the task you were assigned? (Check one)

<u>Radio</u>	<u>Generator</u>	<u>Antenna</u>
_____ Installing	_____ Pre-start	_____ Erecting
_____ Operating	_____ Starting	_____ Taking down
_____ Troubleshooting	_____ Operating	
	_____ Stopping	
	_____ Pre-operation	

3. If task other than equipment related, specify here \_\_\_\_\_

4. Had you performed this task before? \_\_\_\_\_ Yes \_\_\_\_\_ No

If yes, how many times before? \_\_\_\_\_

5. Tell me the events that led up to your better than usual performance.

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6. Exactly what did you do this time to make your performance especially good?

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7. What made you feel good about your performance? \_\_\_\_\_

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8. What else happened that day or the day before in class that you feel helped you to do better than usual work in class? \_\_\_\_\_

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9. What else happened that day or the day before outside class that you feel helped you to do better than usual work in class? \_\_\_\_\_

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Interviewer's ID: \_\_\_\_\_

Date: \_\_\_\_\_

CRITICAL INCIDENT INTERVIEW FOR STUDENTS  
(Poor Performance)

Introductory Statement: The Army is interested in improving Army life while you're in AIT. You, as a current AIT student, are in a good position to help the Army to do this.

Incident Inducer: Within the past week or two, think of a time when you were assigned a task in the 31M course and the assignment turned out worse than usual.

1. Where were you located? \_\_\_\_\_ Field \_\_\_\_\_ Classroom

2. What was the task you were assigned? (Check one)

<u>Radio</u>	<u>Generator</u>	<u>Antenna</u>
_____ Installing	_____ Pre-start	_____ Erecting
_____ Operating	_____ Starting	_____ Taking down
_____ Troubleshooting	_____ Operating	
	_____ Stopping	
	_____ Pre-operation	

3. If task other than equipment related, specify here. \_\_\_\_\_  
\_\_\_\_\_

4. Had you performed this task before? \_\_\_\_\_ Yes \_\_\_\_\_ No

If yes, how many times before? \_\_\_\_\_

5. Tell me the events that led up to your worse than usual performance.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6. Exactly what happened this time to cause your performance to be worse than usual? \_\_\_\_\_

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7. What would you do next time to improve your performance? \_\_\_\_\_

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8. How did you feel about your performance that day? \_\_\_\_\_

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9. What else happened that day or the day before in class that you feel prevented you from doing your usual good work in class? \_\_\_\_\_

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10. What else happened that day or the day before outside of class that you feel prevented you from doing your usual good work in class?

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Date: \_\_\_\_\_

### NCO REPORT FORM

The Army wants to increase the number of soldiers who successfully complete the 31M AIT course. One way to do this is to teach students how to understand what they read, how to take notes, and how to study. The Army is doing this by changing the existing basic skills course.

Another way to increase successful course completion is to improve Army life outside the AIT classroom. To do this, the Army needs first-hand facts about the types of problems soldiers have in trying to adjust to Army life while in AIT. This is where you, the Company NCO, can help. You work with the soldiers daily. You know about the many kinds of problems soldiers have. You can assist the Army in identifying these problem areas.

Directions for completing the form: On this form, we would like you to report the facts about problems you have been directly involved with. Notice that this report form has blue and yellow pages. The blue pages are for examples of soldiers who were having a problem at first, but now no longer have one. The yellow pages are for examples of soldiers who had a problem that could not be corrected. You have two (2) copies of each colored form. If you can, please complete both versions so that we may get four (4) reports from each of you.

When completing the forms, avoid general statements of common problems, such as this: "The soldier had an attitude problem." Instead, give specific examples of problems you have seen, dealt with, or talked about with a soldier. Models of both types of problems will be provided to help you see the kinds of information we need from you. The administrator will distribute the models to you and will go over them with you before you complete your forms. The models are based on actual reports we got from a platoon NCO at Fort Gordon.

The reports you give will be anonymous and confidential. Army personnel will not have access to them. Completed forms will be analyzed and kept in our company office in Pittsburgh, Pennsylvania. Only combined results will be reported back to the Army. You need not use soldiers' real names in your reports.

NCO - Unsuccessful Adjustment

Think of a recent time (in the last month), when a 31M soldier had a problem that could not be corrected. This should be a problem you observed or discussed with the soldier.

1. What behaviors on the part of the soldier told you that there was a problem? \_\_\_\_\_

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2. What caused the soldier to behave as he or she did? \_\_\_\_\_

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3. Exactly how did this problem affect the soldier? \_\_\_\_\_

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4. Exactly how did this problem affect the other soldiers in the company?

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5. How did you first find out about the problem? (Check one)

- From the soldier
- From an instructor
- I noticed it myself
- From a Company NCO
- From another soldier

6. Did you talk to the soldier about the problem? (Circle one)

Yes

No

7. Discuss what help, if any, you gave the soldier concerning this problem.

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8. In trying to help the soldier, did you talk with anyone else about the problem? (Circle one)

Yes

No

If yes, with whom did you talk? \_\_\_\_\_

Describe the discussion and its outcome. \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

9. Exactly what has the soldier done to demonstrate improvement in the problem area? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

10. This problem did affect: (Check as many as apply)

- Course performance
- Soldiering duties
- Company duties
- Social life
- Other (specify) \_\_\_\_\_
- No serious effect

11. Does this problem still continue? (Circle one)

Yes

No

12. Does the student meet Army expectations concerning the following: (Circle answer for each.)

a. Personal appearance:        Yes            No

If no, give specific examples of how the student falls short of the expectations.

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b. Work habits:                    Yes            No

If no, give specific examples of how the student falls short of the expectations.

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c. Interactions with:

Other soldiers	Yes	No
Civilian instructors	Yes	No
NCO instructors	Yes	No
Other Army personnel	Yes	No (specify) _____

If no, give specific examples of how the student falls short of the expectations for each NO above.

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13. How many times has this student reported to sick call within the last week? (Check one)

- \_\_\_\_\_ Don't know
- \_\_\_\_\_ None
- \_\_\_\_\_ Once
- \_\_\_\_\_ Twice
- \_\_\_\_\_ Three or more times

NCO - Successful Adjustment

Think of a recent time (in the last month), when a 31M soldier was having a problem, and now no longer has one. This should be a problem you observed or discussed with the soldier.

1. What behaviors on the part of the soldier told you that there was a problem? \_\_\_\_\_

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2. What caused the soldier to behave as he or she did? \_\_\_\_\_

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3. Exactly how did this problem affect the soldier? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. Exactly how did this problem affect the other soldiers in the company?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. How did you first find out about the problem? (Check one)

- From the soldier
- From an instructor
- I noticed it myself
- From a Company NCO
- From another soldier

6. Did you talk to the soldier about the problem? (Circle one)

Yes

No

7. Discuss what help, if any, you gave the soldier concerning this problem.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

8. In trying to help the soldier, did you talk with anyone else about the problem? (Circle one)

Yes

No

If yes, with whom did you talk? \_\_\_\_\_

Describe the discussion and its outcome. \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

9. Exactly what has the soldier done to demonstrate improvement in the problem area? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

10. This problem did affect: (Check as many as apply)

- Course performance
- Soldiering duties
- Company duties
- Social life
- Other (specify) \_\_\_\_\_
- No serious effect

11. Does this problem still continue? (Circle one)

Yes

No

12. Does the student meet Army expectations concerning the following: (Circle answer for each.)

a. Personal appearance:            Yes            No

If no, give specific examples of how the student falls short of the expectations.

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b. Work habits:                    Yes            No

If no, give specific examples of how the student falls short of the expectations.

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c. Interactions with:

Other soldiers	Yes	No
Civilian instructors	Yes	No
NCO instructors	Yes	No
Other Army personnel	Yes	No (specify) _____

If no, give specific examples of how the student falls short of the expectations for each NO above.

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13. How many times has this student reported to sick call within the last week? (Check one)

- \_\_\_\_\_ Don't know
- \_\_\_\_\_ None
- \_\_\_\_\_ Once
- \_\_\_\_\_ Twice
- \_\_\_\_\_ Three or more times

Date: \_\_\_\_\_

### INSTRUCTOR REPORT FORM

The Army wants to increase the number of soldiers who successfully complete the 31M AIT course. One way to do this is to teach students how to understand what they read, how to take notes, and how to study. The Army is doing this by changing the existing basic skills course.

Another way is to do something about other problems students have which affect course performance. To do this, the Army needs to identify the problems students have. This is where you, the 31M instructor, can help. You work with the students daily. You see the things which affect how a student performs in class. You can assist the Army in identifying these problem areas.

Directions for completing the form: On this form, we would like you to report the facts about class performance problems you have been directly involved with. Notice that this report form has blue and yellow pages. The blue pages are for examples of students whose performance you were able to improve. The yellow pages are for examples of students whose poor performance you were not able to improve. You have two (2) copies of each colored form. If you can, please complete both versions so that we may get four (4) reports from each of you.

When completing the forms, avoid general statements of common problems, such as this: "The student was lost in class." Instead, give specific examples of problems you have seen, dealt with, or talked about with a student. Models of both types of poor performance will be provided to help you see the kinds of information we need from you. The administrator will distribute the models to you and will go over them with you before you complete your forms. The models are based on actual reports we got from a 31M instructor at Fort Gordon.

The reports you give will be anonymous and confidential. Army personnel will not have access to them. Completed forms will be analyzed and kept in our company office in Pittsburgh, Pennsylvania. Only combined results will be reported back to the Army. You need not use soldiers' real names in your reports.

INSTRUCTOR  
HELPED POOR PERFORMANCE

Think of a time, within the past month, when a student's performance was poor, and you were able to improve his/her performance.

1. What was the assigned task? \_\_\_\_\_  
\_\_\_\_\_

2. Had the student performed this task before? (Circle one)

Yes

No

If yes, how many times? (Circle one)

1

2

3

4

5 or more times

3. Exactly what did the student do that led up to the poor performance?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. How long did this go on? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. Was a reason given by the student for the poor performance? (Circle one)

Yes

No

If yes, what reason was given?

- \_\_\_\_\_ Omit step on purpose/took a shortcut
- \_\_\_\_\_ Forgot to do step
- \_\_\_\_\_ Performed step out of sequence
- \_\_\_\_\_ Performed step incorrectly
- \_\_\_\_\_ Could not recognize control
- \_\_\_\_\_ Did not know what to do
- \_\_\_\_\_ Other (specify) \_\_\_\_\_

6. What did you do to help the student improve his/her performance on the task?

Reteach (one-on-one instruction)

Counseling

Suggest additional assignment (reading, learning center, etc.)

Other (specify) \_\_\_\_\_

Describe in detail what you said and did. \_\_\_\_\_

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7. What else do you know that might have affected the student's performance on the task?

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8. In trying to help the student, did you talk with anyone else about the student's performance? (Circle one)

Yes

No

If yes, with whom did you talk? \_\_\_\_\_

Describe the discussion and its outcome. \_\_\_\_\_

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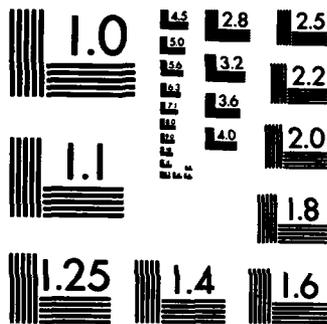
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MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

9. Exactly what has the student done as a result of your action?

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10. Does this problem still continue? (Circle one)

Yes                  No

11. Does the student meet Army expectations concerning the following: (Circle answer for each.)

a. Personal appearance:      Yes                  No

If no, give specific examples of how the student falls short of the expectations.

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b. Work habits:                      Yes                  No

If no, give specific examples of how the student falls short of the expectations.

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c. Interactions with:

Other students:                      Yes                  No

Civilian instructors:              Yes                  No

NCO instructors                    Yes                  No

Other Army personnel              Yes                  No (specify) \_\_\_\_\_

If no, give specific examples of how the student falls short of the expectations for each NO above.

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12. How many times has this student been absent during this week of training? (Check one)

- \_\_\_\_\_ Don't know  
\_\_\_\_\_ None  
\_\_\_\_\_ Once  
\_\_\_\_\_ Twice  
\_\_\_\_\_ Three or more times

INSTRUCTOR

COULD NOT HELP POOR PERFORMANCE

Think of a time, within the past month, when a student's performance was poor, and you were not able to improve his/her performance.

1. What was the assigned task? \_\_\_\_\_  
\_\_\_\_\_

2. Had the student performed this task before? (Circle one)

Yes

No

If yes, how many times? (Circle one)

1

2

3

4

5 or more times

3. Exactly what did the student do that led up to the poor performance?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. How long did this go on? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. Was a reason given by the student for the poor performance? (Circle one)

Yes

No

If yes, what reason was given?

- \_\_\_\_\_ Omit step on purpose/took a shortcut
- \_\_\_\_\_ Forgot to do step
- \_\_\_\_\_ Performed step out of sequence
- \_\_\_\_\_ Performed step incorrectly
- \_\_\_\_\_ Could not recognize control
- \_\_\_\_\_ Did not know what to do
- \_\_\_\_\_ Other (specify) \_\_\_\_\_

6. What did you do to help the student improve his/her performance on the task?

- Reteach (one-on-one instruction)
- Counseling
- Suggest additional assignment (reading, learning center, etc.)
- Other (specify) \_\_\_\_\_

Describe in detail what you said and did. \_\_\_\_\_

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7. What else do you know that might have affected the student's performance on the task?

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8. In trying to help the student, did you talk with anyone else about the student's performance? (Circle one)

Yes

No

If yes, with whom did you talk? \_\_\_\_\_

Describe the discussion and its outcome. \_\_\_\_\_

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9. Exactly what has the student done as a result of your action?

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10. Does this problem still continue? (Circle one)

Yes                      No

11. Does the student meet Army expectations concerning the following: (Circle answer for each.)

a. Personal appearance:              Yes                      No

If no, give specific examples of how the student falls short of the expectations.

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b. Work habits:                              Yes                      No

If no, give specific examples of how the student falls short of the expectations.

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c. Interactions with:

Other students:	Yes	No
Civilian instructors:	Yes	No
NCO instructors	Yes	No
Other Army personnel	Yes	No (specify) _____

If no, give specific examples of how the student falls short of the expectations for each NO above.

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12. How many times has this student been absent during this week of training? (Check one)

- Don't know
- None
- Once
- Twice
- Three or more times

**APPENDIX B**  
**STUDENT INCIDENT EXAMPLES**

I. TASK CONCENTRATION

A. ATTENTION TO DETAIL

Poor Performance

"There had to be short write-ups. They were kind of hard to come up with. I had a little problem with it. I ended up getting a 72 on the test. I knew what I was doing. It's just when I wrote them up I didn't put in the right things, where they're supposed to be at."

"We were getting tested out. Got a 74. Should have made a 100. Forgot to line up part of the equipment. A stupid error. I was hurried myself. I put in my mind I knew what I was doing, without concentrating."

"Not paying attention to very small detail. Inadvertently skipping a procedure. Going from steps A, B, and C and missing the B section and throwing the whole system out of whack."

"You have to write it down a certain way and I didn't write it a certain way that they wanted. They wanted the Army's sort of thing, to keep it simple, stupid and I like to use bigger words and they want it broken down and it can be something so simple, like an alpha - doesn't show up green. And if you don't watch it, you'll mess it up. You'll think it's something complicated, yet it's something very small. Probably because I wasn't paying as much attention to what I was doing as I should've. Worrying too much about something big when it was something small. Small detail, looking for something - a problem I'm thinking about, some major malfunction and here it is, just a tiny alphameter."

Good Performance

"I checked and rechecked all my pre-sets before I turned the equipment on. I turned it on and was sure I got it right."

"I took my time; made sure had everything was in the correct position."

"Doublechecked everything to make sure it was right."

B. RETENTION/MEMORY

Poor Performance

"Just forgot. Wasn't reading out of the book. Thought I remembered how to do it. Forgot about one step."

"Rushed into everything. Then I noticed that everything was all screwed up. Sergeant chewed me out for it. Told me to go read a book in the corner by myself. I panicked. Took it for granted it I knew it by heart."

### Good Performance

"I already knew what I was doing, over at Rees make you do same thing over & over, until memorize it better. Works good like that too, to do something so many times. In fact that's what we're doing in class right now. Same thing over & over. Trying to get us to memorize it, because we won't be doing things like this when we test out."

"Just concentrated, took my time, had already worked on it couple times before. But not really for speed. In process of working on it before, I remembered some things that I had to do, instead of having to look in the book for it again to refind it & do. Already knew I had to do it, so instead of having to go through the book, just went on & did it."

"We'd practiced installing & operating about a day before that & I wasn't getting hang of it very well. So we did a few practices & I started understand & the instructor would come & check us out. Finally, I did it on my own without reading out of the book. Did it right and it made me feel good. Tried to picture in my head what we were supposed to do, each step by step. Tried to remember how it was written out in the book."

"Concisely, read the book (training manual) instead of trying to go by what was in my head."

### C. FOLLOWING INSTRUCTIONS

#### Poor Performance

"Never really bothered me until this, until this week because right now have 100 average all through course. They keep telling you to take off your watch when you work on equipment. I was the second week and I didn't take off my watch, and they gave me a 90. They took 10 points away. I just forgot all about my watch."

"They told us if the meter read a certain thing it would be incorrect - I thought they was wrong cause if it's a little higher than incorrect - so I put down a different word, a different definite answer. They said it would be no 'indication' but I put down the 'incorrect indication'."

#### Good Performance

"Everything worked out great, when step-by-step like we were taught, everything turned out perfect, hadn't had any trouble since then."

"Earlier in week I was having problems with it and I talked to this civilian instructor and he just kept telling me if you go straight by the manual, follow just step by step, it's going to go allright and if you don't believe it just try it. So, I started trying a lot harder and it was getting better and better and then I came to the test and I was really motivated. So I gave it my best shot and I got 100 on the test. But I was having a lot of problems before that. This was in our second week of training. I went by the manual, step by step, and made sure I did each step. I went back over material to see if missed anything. Just followed it real carefully."

D. ATTENTION TO TASK

Poor Performance

"That day I didn't ask too many questions and hadn't paid attention a lot. But my mind drift off because my fiance came down this past weekend and that's the way it was. Snapped out of that with no problem at all. Grades came up. What I was thinking of I just couldn't focus attention on what I was doing and reading."

"I think one of my main problems is listening. Sometimes, unconsciously, I won't really be listening. So, by doing that you miss those little details."

"Didn't pay attention. Didn't listen to the instructor. Just goofing off in class."

Good Performance

"I paid attention in class when instructor giving us final checkouts, giving us a rundown on what test was going to be like, paid attention, listened, sucked in all that. When had chance between working on the equipment, sit down & study my manual, got it in my head, remembered it."

"I was paying close attention to instructor, tried not to get lost."

"Through listening in class & paying attention I was pretty much interested in having the radio to work and to communicate back and forth with my buddy. Knew everything I had to do, had job done in pretty good time - timewise."

## E. ALERTNESS

### Poor Performance

"We GI'd for about 3 hours and then went to latrine for 45 mins., got to bed a little after 11 p.m. Slept in class, fell asleep a few times. [Sleeping cause you to get in trouble?] I did get in trouble. They just told me don't fall asleep again. I dozed off 3 times and had to keep waking up. They made me stand up in back. If you got to go to bed little earlier you wouldn't sleep in class. That's one thing they teach you around here, you do learn what they teach you. Make you stand for like 10-15 mins. and tell you to go sit down again. Plus as soon as you wake up, they get right on you. Start moving, clean this, clean that. But that's all part of it. It's really not that bad, it's as hard as you make it."

"Tired; fatigued; not really concentrating that week in class."

"We get up about 4:00, or 4:30 in the morning - you come to class & you be pretty tired. In the morning it's pretty cold & you're out there trying to erect this metal antenna which you have to take off your gloves for. Weather condition, night before not getting enough sleep is all added to it. [How was weather?] Cold. [What was the reference with the not enough sleep on the night before?] We'd go to bed 10, 11, 11:30 - maybe we had an inspection & had to get up half hour earlier to get prepared. Get up at 4 in the morning. Then after running to school, you'd forget to put on your socks, or something like that."

### Good Performance

"I listened in class, didn't fall asleep; being interested."

"I was in good spirits, had read over the assignment, wasn't tired. I got caught sleeping the day before so that made me react the next day, make sure I didn't go to sleep."

"We got a class full of sleepers. I don't know what was wrong with me that day but I seemed to be able to stay awake. I guess I retained more than anybody else."

## II. INSTRUCTIONAL STYLE/TECHNIQUES

### A. INSTRUCTIONAL QUALITY

#### 1. INSTRUCTIONAL MANNER

##### Poor Performance

"Some of these weeks the classes you take - it has a lot to do with instructors. You get an instructor that will explain really good. Precise, repeat it over and over & over. Sounds sarcastic. Sometimes it gets to you. He just repeats the same thing over & he's yelling at you. But it gets it through your head & there some instructors that just talk slow for you & go to sleep. They start so fast at once & they won't repeat it for you. You just can't get anything out of it. Then you go try & do it & you screw up. He tells you real fast what you did wrong, but you don't get nothing out of it, as far as somebody that will stop & explain why that did that, what you do to correct it."

"NCO's were being a pain; they were tripping on everything. They were just jumping all over everybody for nothing, for stupid things they shouldn't have been jumped on for. It made me nervous."

"Civilian instructor was getting on people's cases for making mistakes - he didn't help them when they made the mistakes - he just yelled at them and sent them back out instead of showing them where they made their mistake."

##### Good Performance

"(1) It wasn't all that hard, but it was just started flowed off like it was supposed to. It was like one of those good weeks.  
(2) My first week here was kind of nervous, but the instructor got to see everybody was nervous, took the time right and everything starting flowing right in night course, too (during first week). Instructor see that I was kind of nervous and everybody else was, took it - not easy, but at good pace. We could all keep up. Everything starting flowing right that week too."

"It's easy; when they show you how to do it, they diagram it. They tell you how to do it while you're doing it. Then you do it on your own, and they go by and check it. [Diagram it when show you how to do it?] Yes, they read it out. There's a mike in class and they tell you what step to do first. Tell you to wait, don't go ahead of them. Then after they show you how to do it, you do it on your own. And you do it 2-3 times a day, so you know how to do it, in case you have to leave that classroom and go to another one you know how to do it, what you learned in there."

"When we'd work on the things - go through the system, then the instructor would come up & check it & find something a little wrong with it, & then they'd fix it for us. We'd remember it the next day for the test. That helped a lot."

"One day I took a ride with a Sgt. to refuel one of vans. He took an interest in me, telling me things students don't normally get to see or get to learn or learn later on. He showed me little things, hands-on."

"Had been practicing during the day - I was getting kind of nervous about it. NCO instructor gave me a lot of support - he told me I could do it. I said, Hey, I can do it - got in there and I just set that system right up - beat the clock."

## 2. ATTITUDE OF INSTRUCTOR AS PERCEIVED BY THE STUL

### Poor Performance

"First, had miserable cold; not feeling great. Then I think instructors attitude at that partic. site wasn't very helpful, in the sense he was very antagonistic in a subtle way. I got impression that because of person I am & being PFC, I was expected to make 100s all way through week; but nobody functions like that. So as result of those attitudes around me, I could have done worse. I was expected to perform at higher level than anybody else in the class, which I felt was unreasonable. PFC is my rank - a lot of responsibility but not to an extreme. And I feel a person shouldn't put those extreme demands on my shoulders."

"NCO that we had was - she gave off impression she didn't like being there; didn't want to be there and we were a 'bother'."

### Good Performance

"I think I concentrated more this week than I did in the past weeks, instructor dep. on teachers, they made it a better atmosphere for training and said 'we train hard, we work hard, & we play hard.' Was that kind of attitude & think that makes you go all out."

"I knew he was a mean instructor, so that made me pay attention more."

## 3. COURSE ORGANIZATION/SCHEDULING

### Poor Performance

"We were assigned to vans. There were 2 - me and this other guy. They mixed us up. He was supposed to be in one van and I was supposed to be in another, but they mixed it up and we were in each other's vans. This was only our second day, beginning our third week. Somebody else's making the error that I had to correct."

"During the test they changed sites for testing; they changed steps; I don't believe it was my fault; I thought the system was the same at both sites. For some reason you were supposed to check one thing at one site, but not at this other site, so I didn't check & I got it wrong. We have a list of checks. You turn a knob & check. For some reason the checks turned out different at the other site."

## B. INSTRUCTIONAL QUANTITY

### 1. AMOUNT OF EXPLANATION/DEMONSTRATION

#### Poor Performance

"We were allowed 45 mins. Think we put it up in 60-65 min. I don't think enough class time was spent on it at all. There could have been more. That would have helped me. Just fact that it came down on us in class that, well, here's the antenna. We're going to go outside & put it up all in one shot. He just showed it to us & we had to do it & we didn't even know anything about it. Usually on radios you get full instruction & lecture. He said, 'Here's a picture of it. This is the way you have to put it up. Let's go.' I thought, there's got to be some way we can learn a little more about it before we just go out there & throw it up in the air & take it down."

"Wasn't enough classroom instruction on the operation of the radio, before they expected us to start doing it."

"8th week was split up into 3 different places - had generators, antennas and the vans working with assemblages. I had 1 day on assemblages and wasn't really familiar with it. I got to do it one time the day before I had taken the test and I got in there to take the test and just everything went blank; I couldn't think of nothing, nothing. Didn't have enough practice - not enough hands-on, there just wasn't enough time in that week to learn what we had to even though it did sink in after test. I did alright on the test but I took too long for what was considered average or good."

#### Good Performance

"Always the same all the time. They show you the same thing over and over. Each day learn one part and work that whole part the whole day and the next day learn another part, until you learn all 4 pieces of equipment. Then they give you - like, tomorrow we have a hands-on test. When you learn that part you learn the whole part, how it operates, functions."

"When the instructor took that second time to explain it again."

"Instructor went back over steps again. I found a couple little things I missed out of my notes."

## 2. AMOUNT OF PRACTICE/HANDS-ON

### Poor Performance

"8th week was split up into 3 different places - had generators, antennas and the vans working with assemblages. I had 1 day on assemblages and wasn't really familiar with it. I got to do it one time the day before I had taken the test and I got in there to take the test and just everything went blank; I couldn't think of nothing, nothing. Didn't have enough practice - not enough hands-on, there just wasn't enough time in that week to learn what we had to even though it did sink in after test. I did alright on the test but I took too long for what was considered average or good."

"The fact I only went out once to do it. Only worked that day on the antenna and that was it."

### Good Performance

"Practiced a lot in vans, got out as much as I could bec. more hands on, the better you get. I got to where if someone else was slow out in the vans, the teachers were assigning me out there to help them bec. I was getting mine done so fast that I could go out there & help somebody catch up. Instructor assigned me the day before to help those people bec. it was near the end of the week & they were still slow & needed somebody out there to help them. [So you got in a lot more practice? You could see it all develop?] Right. I got the hang of it. I'd go out there & help them & I'd be out there doing it too. I'd be doing it twice as much."

"More practice you get, faster you can do things. Mainly this whole course, more practice you get, easier time I have with it. Depends, some people pick up stuff faster than others. Some doesn't take but a couple times, some takes longer. What helped us - every time you do it, you learn to do things faster, just comes by experience."

"2 days before we tested out, we got to go and practice so many times - the repetition."

"We went over & over equipment. They let us have lot of hands-on experience instead of sitting there & giving us a lot of lectures. They tried to get everybody out there to do a system as many times as they could, as many diff. systems as they could."

## 3. TIME TO LEARN/PRACTICE

### Poor Performance

"Didn't have enough practice - not enough hands-on, there just wasn't enough time in that week to learn what we had to even though it did sink in after test. I did alright on the test but I took too long for what was considered average or good. This is going to sound crazy, but I think I'd demand more time to learn it because it's hard to demand things from Army but I would try my best. Just needed more time."

"Went in the van; one thing was wrong with the equipment in there; the whole system was messed up. I didn't have time to study my notes; I just jotted down all my notes, about 6-7 pp. I just tried to figure it out from my notes, see what I was supposed to do next. Couldn't do nothing with it."

"We operated the radio - went inside & told us we had a test. No chance to study or anything, we did know the nomenclature. No studying, no time for studying at all. They just came in & pop a quiz, we had 2 quizzes - 3, 3 at one time. No time to study."

#### Good Performance

"A little bit more relaxed - I had more time to work with it. It wasn't like I only had been working on it maybe 2 days. I was working on it all week, more hands-on rather than sitting in classroom and listening to someone talk to you and having it go in one ear and out the other while you're falling asleep. It's a little different when get hands-on."

"They gave us time to study the day before the test. They went over it with us before we took the test, a kind of briefing."

### III. INTERPERSONAL/INTERUNIT COOPERATION

#### A. TEAM CHIEF LEADERSHIP

##### Poor Performance

"It's the team chief. Team chief is there to put you to work and make sure he's on top of a job - whether it's done right or wrong. If he's not giving each individual a specific order, just stand around there, time will fly by and the job doesn't get done. Team chief is the main key to every team. I was disgusted because seeing that the team chief had a lack of motivation; you can make your whole team feel that way. Rank has a lot to do with a team chief. Even though it's a person, but rank does make a difference."

"I was chosen as team chief, and no one was listening to what I was saying. And it was windy, and my voice wouldn't carry. NCO's were being a pain; they were tripping on everything. They were just jumping all over everybody for nothing, for stupid things they shouldn't have been jumped on for. It made me nervous."

##### Good Performance

"Team chief mainly basically the team chief. I was working under someone who knew what he was doing. That's what I was just working under someone who gave me the orders. I had confidence. You really can't work along with someone if they don't know what they're doing."

"We were assigned different teams (5). Our team chief was easy to get along with and he knew what he was doing. Everybody seemed to work together well. Antenna erected in excellent time."

## B. TEAMWORK/PEER SUPPORT

### Poor Performance

"I was trying to keep my mind on what I was doing. I was in there (van). I don't like being a repeater anyway. I don't like being a cable to radio conversion. The 2 people I was trying to get them communicated - one of them was a real smart ass. They were being timed for their task. They had a certain amount of time to hurry and get their systems going. So I had to hurry & get mine in first so I could get them communicating & if I messed up it caused them to be late; he was jumping all over me over the head set. My instructor was real nice to me though. He tell me not to let it worry me."

"We were doing good at first - all of a sudden everybody wanted to be in charge - I would tell them to do one thing and they would say Nah! We can do it this way better - thing wound up looking like leaning tower of Pisa. I was the team chief, they would cooperate but they wanted to do it their way. First I let them do it to prove to them they were wrong."

### Good Performance

"We had to get all equip out, set up antenna, get everything out as usual. Erect it in 45 min., have everything good. We couldn't get a certain amount of NO GOs. Take it down in 45 min. Couldn't get a certain amount of NO GO's on that also, or we wouldn't pass for that week and we'd have to come back next week to same place. 4-5 people with me all worked as a team; didn't argue, knew what our job was; knew what we had to do and we did it; did it under a certain amount of time."

"I was really confident of myself & others were confident of themselves that we could do it. We set our goal. We said we could erect it before he came back. So we did. We tried to work as fast as we could. We did a good job. [Demonstration worthwhile?] Yes it was. He taught us another way of doing it, besides book said something & he taught us another way which was a lot easier & he gave a chance for our performance to be better."

## C. TECHNICAL COMPETENCE OF PEERS

### Poor Performance

"Working with bad people (didn't know what they were doing). [How many in team?] 5 [Did you know what you were doing and they just didn't?] Yes. [Don't have control over who you get?] No. They pick them out. If one person messes up big enough, everybody else has to come back next day and re-do it."

"We had to put radio system in, antenna and generator. Everything was just going wrong. We were short one person and equipment was messed up. One guy got hand cut. He couldn't help much. Everything just went wrong. Didn't finish on time. Some personnel we had, they were some of the slower personnel, so we had to tell them what to do. If you didn't they'd stand around."

### Good Performance

"I ended up with good partners, instead of somebody who was slow. Somebody ran the same pace as mine. We both finished everything on time. We worked like clockwork. Both knew what we were doing. Just look right in. Both knew what we were doing - what to do, when to do it, what knobs to turn here. We knew exactly what we were doing & did it, got it done. We got extra long break."

"Our team setting up the equip.; instructor showed us just one time how to set it up; we had trouble all over the place trying to set it up. Then the 2nd time this guy who did know how to set it up - we just let him instruct us & we got it up in no time - about 15 mins."

## D. CREATION OF SAFE VS. HAZARDOUS CONDITIONS

### Poor Performance

"It was all going good. We were just getting ready to put another mask section on antenna & something got stuck, so I reached down to unstick it & guy that was working on the crank hoisting the antenna, he let go of the brake and I pulled myself out just in time before that thing came crashing down on my head & nearly killed me. Needless to say, I wasn't too happy about that. That thing almost fell on me. That weight coming down that fast would have ---; it gave me a tremendous headache."

"We were sort of in a hurry, they more or less specify speed, have it up in a certain amount of time - the fact that we were speed conscious & we were trying to get it up as fast as we could. In fact, we were more or less racing against the females. We were erecting antenna. We wasn't looking at the way the antenna was going up - it almost came down on us."

### Good Performance

"Put antenna up; hook up ground and generator and made contact with other terminal. We worked well as a team because we were serious about our job and my friend got his finger messed up in generator. He liked to play around. Was joking around and got his finger smashed up. That summer we weren't fooling around, because he messed up his finger. It really got to me. Serious about getting it together."

#### IV. STRESS/PRESSURE IN TRAINING

##### A. GENERAL

###### Poor Performance

"We went into exodus - had 2 days of class before went home for exodus and I got back late because I got snowed in and when I got back, they were trying to get me caught up right away so they just kept driving this information into me. Then 2 days later we had to test out. [You missed how many days of class?] 3. They made me do more training than usual, than what the other people were doing to try to get me to catch up and it was demanding on me. [You just behind?] Being behind and I was very nervous about it. I thought was going to be set back in training and I was going to fail that part of the class."

"It was test day and I was nervous. I just wasn't thinking. I'm always nervous on a test. I was always like that."

###### Good Performance

"Relaxed atmosphere. You weren't under pressure. More or less training instead of being quizzed or anything else."

"When we'd work on the things - go through the system, then the instructor would come up and check it and find something a little wrong with it, and then they'd fix it for us. We'd remember it the next day for the test. That helped a lot."

##### B. TIME PRESSURE

###### Poor Performance

"Time factors. I messed up, had to back track, then ran out of time."

"I didn't remember which wire to put on; didn't hook up all my wires; time got short and I panicked; got nervous and started doing anything. Started guessing; hooked up my wires wrong. Time limit was drawing close and I panicked and started doing anything to get it in."

"We were sort of in a hurry, they more or less specify speed, have it up in a certain amount of time - the fact that we were speed conscious & we were trying to get it up as fast as we could. In fact, we were more or less racing against the females."

###### Good Performance

"Not better than usual, the best thing I have done so far, putting the antenna up very quickly and accurately. The best thing I had done in that amount of time. It really went well. I don't know, I was relaxed and went over my notes for about half hour. Read everything."

"A little more relaxed - had more time to work with it. It wasn't like I only had been working on it maybe 2 days. I was working on it all week, more hands-on rather than sitting in classroom and listening to someone talk to you and having it go in one ear and out the other while you're falling asleep. It's a little different when get hands-on."

## V. BASIC SKILLS

### A. NOTES

#### Poor Performance

"Well finally trying to get down notes real quick and not being able to pay attention to what instructor said."

"Sgt. put some notes on the board and I didn't copy them down."

"I didn't have time to study my notes; I just jotted down all my notes, about 6-7 pp. I just tried to figure it out from my notes, see what I was supposed to do next. Couldn't do nothing with it."

"Took bad notes & did not re-write them."

#### Good Performance

"[Praise, beat time limit, good score, complements?] Took notes & rearranged the notes completely to where I could read them - my way. Then it did everything & doublechecked it & I got it done fast & I knew I had it right. They came up & check it & couldn't find nothing wrong with it. Said good job. Then I knew I'd done it right."

"Notes we took were excellent - instructor put them in order, all the steps and deleted a lot of the unnecessary steps. There's about 150 steps, but only go through about 20-25 steps. The equipment itself was easy to work with."

"I had tried hard and tried to read the notes to make sure I did it good. The notes. I had taken pretty good notes for a change."

### B. READING AND USING MANUALS

#### Poor Performance

"Something I hadn't done before. Worse problem I had is I didn't understand how to write it down & just didn't understand what they (the instr.) were explaining to me. [Hadn't you studied?] Not for this, cause I couldn't find this in my Soldier's Manual."

"Did everything book said to do, can't always go by my book. Half time I just found the wrong bug; then half the time when I find bug, I write down the defects. I had the defects wrong and everything else right."

"Not reading the book, misplaced some wires."

### Good Performance

"I wasn't doing too good the first day, so I took the TM manual. Just looked it over at the barracks. When I came into class in morning, I looked it over again. And when they sent me to van, there was nothing to it. I drove myself to study that manual, otherwise I think I would have never made it. Once I looked over the TM and after I did that system, I found the other system easy. I had no problems at all. Because I have seen guys the week before that would just mess around and did not study. I used to do the same thing. They had all kinds of problems on systems, including next day and couple of days after that. Of course they wouldn't pick up TM and read it."

"I'd messed up because I didn't pay attention to manual. Tried to do it on my own. Then did it by manual & turned out right."

"Earlier in week I was having problems with it and I talked to this civilian instructor and he just kept telling me if you go straight by the manual, follow just step by step, it's going to go alright and if you don't believe it just try it. So, I started trying a lot harder and it was getting better and better and then I came to the test and I was really motivated. So I gave it my best shot and I got 100 on the test. But I was having a lot of problems before that. This was in our second week of training. I went by the manual, step by step, and made sure I did each step. I went back over material to see if missed anything. Just followed it real carefully."

## VI. EQUIPMENT RELATED

### A. MALFUNCTION

#### Poor Performance

"They tell us to troubleshoot equip. You have certain steps to follow. The equip doesn't always work the way it's supposed to. Something will malfunction. When you find something, you have to stop & write it down, but that might not be what they want; but at the time that's what is wrong, it doesn't work the way it's supposed to. You tell the instructor what you found & he says 'you're crazy & you're nuts.' Something else may go wrong, the machine isn't warmed up or something, & it will discourage you a lot."

"Kept getting interrupted. Had to start over all the time. Gets on your nerves when you think you're doing real good & some computer tells you you're not & you know yourself that you are. You're being told you're wrong when you know you're right. Then when it's all over with you find that it was just the computer not picking it up, that you weren't doing it wrong. [You're being told wrong by the computer?] The computer & the instructors at first, until they realized what happened."

B. LIMITED RESOURCES/WAITING TIME

Poor Performance

"We all had to wait around for our turn to use the equipment."

C. EQUIPMENT FAMILIARITY

Poor Performance

"I had never felt so lost on equip. before in my life. Maybe it was because we were going into something new. I felt lost, like my 1st day walking in there; read notes, said turn on all equip. Instead of turning on equip., I would be using, only I turned on everything. I mean, I felt lost today."

"I didn't know what everything was on it. I didn't understand the equipment."

Good Performance

"Getting up; looking at all equip., then sitting down and talking about it."

"As you learn equip. more, you feel as if you can really get into it that day. You had last weeks training & next week is going to be little bit different. You feel you've learned somewhat about equipment week before & just feel like you could do better next week & that helps a lot. You got to think you can do it. If you think you're going to have a lot problems, you sure as heck have a lot of problems with it."

D. NATURE OF EQUIPMENT

Poor Performance

"It was cold, rainy. We'd been standing in rain all morning. Wet, was getting cold, we'd already started generator once with electric start. Then we had to start it pull rope. You'd pull and pull and they would not start. You'd get cold. You just didn't feel like being out there that day. The generator was hard to pull-start, the more you pulled, the less it wanted to start; and you have to start it to pass."

"We were testing out and I was doing pre-sets on Angry 50 (1 on 1); I was nervous, did not like the equipment; not in as good shape as it could have been. When I set my AFC Disable, I did not lock in; put my frequency off; cost me 4 points. She gave me a 96; got my grade down. Had perfect 100 average until that week, which is what I worked for."

## E. TASK FAMILIARITY

### Poor Performance

"People were in the vans and were confused that did not know what to do. There's a few who did have problems in the van - going from the classroom to the van. Going to the van they told us to put equip. into systems, but we didn't really know what we were supposed to do. It's OK, here's the equip., go to it. In the class they tell you step-by-step what to do. And sometimes they do it real different because they know more about it. And they expect you to know."

"Got in the van, lights were buzzing. I was working with equip. I sat there for 3-1/2 hours - never could get it to work. Finally Sgt. came in the van & said it's time to go to lunch. Not knowing exactly how to do it. Not knowing the sequence of the troubleshooting method."

### Good Performance

"Assigned my task (AN-GRC/103). The radios were to be made functional. I could see what was wrong. Just had to turn 2 or 3 knobs and it turned out pretty good. I did it in about 3 mins (the troubleshooting). Aware of what I was doing."

"Both knew what we were doing - what to do, when to do it, what knobs to turn here. We knew exactly what we were doing & did it, got it done. We got extra long break."

## VII. WORK ENVIRONMENT

### A. SPACIAL

#### Poor Performance

"We had no heat in classroom so one day was spent in another classroom crammed with another class and there wasn't that much room to take notes. [I think we should also bring out GI party the night before.] Yes."

"Was hard to see and hear and we were all crowded together. The instructor was on top of the generator and we were down. And people were all crowded close to it so you could get close."

B. HOT/COLD/WIND

Poor Performance

"That week it was snowing real bad, ice on the ground. Was hard to hear & see, & we were crowded all together. Hard to see what was going on, how things were being done, plus it was so cold. The instructor was on top of the generator and we were down. And people were all crowded close to it so you couldn't get close. It was so cold that most of the time you were paying more attention to keeping warm than to the instructions. When I went up there to start it, I didn't know what I was doing. Took me 20 min. to start. Most everyone was worrying about getting back to barracks. Even the instructors were worried about the snow and ice, whether we'd have class the next day or what. So the main thing that was on everybody's mind was getting out of the snow. I know it's going to be an outside MOS, but I think they should keep that kind of instruction inside. Worry about outside to the mobile unit."

"Just the cold weather & having to erect antenna outside made for just a lousy day. [Performance?] Performance, yea. See, because you have to be out there for better part of an hour. You get half hour to put them up & about 20 mins. to take them down. Weather conditions. [Bundle up more, would that make it awkward to work with?] You have to take your gloves off anyway to do a lot of the work, so there's no way to prevent your hands from getting cold. But I really don't think so. It's something that's got to be done outdoors. Really can't do it inside of a shelter. It's just something you got to put up with."

"That week was when we had all that snow and we'd been missing a lot of class. I hadn't had any experience out there at all in the vans. Wasn't sure what was going on. And I was still getting used to the equipment."

C. LOCATION

Poor Performance

"Everything was going right until test day, then nothing went right. Everytime I wrote up the trouble for it & it was trouble, but I didn't follow through with it & I got that wrong. Went back outside, got all of the right then I went back wrote down the wrong symptom. I had it something, I just wrote it down wrong. Good days - just turn out to be bad days. Plus one of them changed positions. I prob. got confident in that one position, in that one site. They changed sites just last week, changed it around."

Good Performance

"It had been a miserable week as far as weather was concerned. Just the fact we were able to get inside a van after 2 days of being wet and freezing, really gave us a lot of incentive."

## VIII. NON-AIT ACTIVITIES AND DISTRACTIONS

### A. FATIGUE AS A RESULT OF DETAILS AND DUTIES

#### Poor Performance

"We GI'd for about 3 hours and then went to latrine for 45 mins., got to bed a little after 11 p.m. Slept in class, fell asleep a few times. [Sleeping cause you to get in trouble?] I did get in trouble. They just told me don't fall asleep again. I dozed off 3 times and had to keep waking up. They made me stand up in back. If you got to go to bed little earlier you wouldn't sleep in class. That's one thing they teach you around here, you do learn what they teach you. Make you stand for like 10-15 mins. and tell you to go sit down again. Plus as soon as you wake up, they get right on you. Start moving, clean this, clean that. But that's all part of it. It's really not that bad, it's as hard as you make it."

"GI parties, up all night long, you fall asleep, miss half info., have to go back, ask the instructors, can't help fall asleep; stay up late cleaning up, fall asleep if they let you, most throw erasers, hit rulers on desk. Nothing really, being overly tired, sleeping for 4 hours."

#### Good Performance

"Good night's sleep, that helps (the morning after), erect an antenna - 3 man effort. Paid attention and stayed awake. We didn't have to pull no detail, so I just went straight to bed."

### B. LACK OF TIME AS A RESULT OF COMPANY ACTIVITIES.

#### Poor Performance

"Some days got stuck on detail. Not over & study my notes."

"What I think happens to all of us which interferes with doing good work is we don't look forward to getting out of school. We get back and begin a long hard day. Before you know, we go to PT, then here to clean up barracks - assigned duties/details. That's everyday, not particularly one day or 1 week. There is something that has to be done. If I had to be here any longer, probably end up a TDP. Keep saying we are men, time to grow up, but treat us and punish us like children, giving us restrictions and details. Sounds like 1940's mother; doesn't help. Breaks a person's spirit, outcome of that will chuck it! I don't need this shit!"

#### Good Performance

"Studying notes in the barracks."

"Re-read Soldier's Manual in barracks."

C. FATIGUE/LETHARGY AS A RESULT OF NON-COMPANY ACTIVITIES

Poor Performance

"I stayed up late last night, went out. The same thing, out last night, drinking, was kind of tired, had a headache this morning."

Good Performance

"We didn't go out the night before. Weekend before that we went out every night."

D. ABSENTEEISM

1. SICK CALL

Poor Performance

"I missed a half day of class when they showed everybody how to hook up the system. It was on a Monday, nothing the week before, just that I had to go on sick call and I never did get to learn how to hook up that system. So when I got to 9th week, I was completely lost."

"There were thing or the things we had to go through - symptom, itme no. and the defect. There had to be little write-ups, short write-ups. They were kind of hard to come up with. I had a little problem with it. I ended up getting about 72 on the test. I knew what I was doing. It's just when I wrote them up I didn't put in the right things, where they're supposed to be at. Then, I had missed the 1st 2 mornings of the week and that kind of messed me up. I didn't get all the inforamtion I was supposed to get. Missed first two mornings because of sick call. Miss first day and it's hard to catch up. That's probably why I missed the problems. Instructors don't really have time. They gave me what I really needed, but probably gave more when gave notes to everybody that Monday morning. I probably would've been better off if I'd been listening in class Monday morning and got all he had to say. All I got was notes from beginning of week and I had to learn them myself. Got a little help from a friend."

2. ADMINISTRATIVE

Poor Performance

"Not really too much. 1st day worked on assemblages, 2nd on antennas, 3rd on generators. Thursday I had appointment somewhere & on Friday I tested. Thursday I would have done was go back to generators & tested out on generators, but when had gotten back on on Thursday p.m., changed it to test out on Thursday & I tested out on everything on Thursday & Friday was maintenance day, so week was really kind of split up & spread around."

"Went through all week. You take notes and I wasn't there that Monday morning when handed notes out. So came in Monday afternoon and they gave me notes. I had to go to clothing sales - somebody didn't issue me at basic - part of my uniform. [From what I can gather, that's when most goes on, in the morning sessions.] Especially Monday mornings. That's when they give all notes for what you'll be doing that week."

## IX. QUALITY OF ARMY LIFE/ADJUSTMENT

### A. STRESS

#### Poor Performance

"I have been depressed 24 hours a day for the past few days."

"Pressures at barracks. Inspections, daily inspections. If don't pass inspection, you get extra duty."

#### Good Performance

"Relaxed atmosphere. You weren't under pressure. More or less training instead of being quizzed or anything else."

### B. INTERPERSONAL RELATIONS

"I starting dating a guy. Guess that could be it. [Was that upsetting?] No, it's just that me and him were just good friends before. We started to get closer and it was on my mind."

"That was day I had a big argument with squad leader. [Day you also went to sick call?] Yes."

#### Good Performance

"I am getting along very well with this guy I have met here. [So you think that influenced?] Oh yeah."

"When I came here I got along with everyone and I thought I wouldn't because I'd be new and it would take me a long time, but it only took me a day or 2. [Why'd you think you wouldn't get along with anybody?] Because when I was back home on the streets I always stayed to myself, and a lot of people would get on to me. A lot of people would make fun of me because I was little and then I just didn't want to."

### C. NCO TREATMENTS: MERITS AND DEMERITS

#### Poor Performance

"If I had to be here any longer, probably end up a TDP. Keep saying we are men, time to grow up, but treat us and punish us like children, giving us restrictions and details. Sounds like 1940's mother; doesn't help. Breaks a person's spirit, outcome of that will chuck it!"

"We had a new team Sergeant and he was trying to let us know he meant business. We had GI parties all week. Talk from people ahead of us about what to expect in the course; having your 'individual space' in the barracks inspected while you were in class causes us all some worry."

Good Performance

"I'm room commander and my room had won inspection. We got "room of the day" and that made me feel proud of my room."

"Passing PT test. I felt good about that. [Day before?] Yes."

D. LIVING CONDITIONS

Poor Performance

"Noise in the barracks; can't get to sleep at night."

Good Performance

"Went to bed earlier. [Got a good night's sleep?] Good night's sleep. Nobody making noise or raising hell."

E. PERSONAL/FAMILY PROBLEMS

Poor Performance

"At time, I was looking for a place to live off post for my family; most concerned about the family at the time."

"Probably because I couldn't get hold of my boyfriend or something on the telephone. He's not always there & that gets irritating. I guess I expect him to always be there when I want to talk to him and that's too much to expect of anybody."

Good Performance

"I called home the night before; usually when I call home I'll be depressed, but after I talked to my girl friend and parents I usually feel a lot better, at least for a day or so."

"Are you serious? My husband told me if I messed up I was in a lot of trouble. Seriously, he sat down and told me, outside of class, what I was going on. Explained to me everything as well as he could."

"Day before I got mail from back home and it was good news."

APPENDIX C  
SUMMARY OF SOCIODEMOGRAPHIC  
QUESTIONNAIRE RESPONSES

BACKGROUND VARIABLES

	Absolute Frequency (n)	Relative Frequency (%)
<b>SEX</b>		
Male	98	79.0
Female	26	21.0
<b>ETHNIC GROUP</b>		
Black	42	58.1
White	72	33.9
Hispanic	8	6.5
Other	1	0.8
<b>MARITAL STATUS</b>		
Single	101	81.5
Married	18	14.5
Separated	2	1.6
Divorced	2	1.6
Remarried	1	0.8
<b>AGE</b>		
17	2	1.6
18	48	38.7
19	28	22.6
20	17	13.7
21-25	22	17.6
26-34	7	5.6
<b>EDUCATION</b>		
Less than High School	19	15.3
High School Graduate	76	61.3
Some College	25	20.2
College Graduate	4	3.2
<b>NUMBER OF SIBLINGS</b>		
None	6	4.8
One	47	37.9
Two-Four	46	37.1
Five or More	24	19.4

**FAMILY VARIABLES**

	Absolute Frequency (n)	Relative Frequency (%)
<b>IF MARRIED - LOCATION OF SPOUSE</b>		
Local	6	4.8
Non-Local	15	12.1
<b>IF MARRIED - OCCUPATION OF SPOUSE</b>		
Army	4	3.2
Housewife/None	9	7.3
Student	2	1.6
Working	6	4.8
Don't Know/Unemployed	1	0.8
<b>PARENTS' MARITAL STATUS</b>		
Married	59	47.6
Separated/Divorced	54	43.5
One Parent Deceased	8	6.5
Both Parents Deceased	2	1.6
<b>NUMBER OF SIBLINGS</b>		
None	6	4.8
One	47	37.9
Two-Four	46	37.1
Five or More	24	19.4
<b>PARENTS' REACTION TO ENLISTMENT</b>		
Both Parents Supported	63	50.8
One Parent Supported	23	18.5
Neither Parent Supported	25	20.2
Did Not Care	12	9.7

### 31M/MOS RELATED VARIABLES

	Absolute Frequency (n)	Relative Frequency (%)
<b>STRATUM</b>		
A (Weeks 1-2)	10	8.1
B (Weeks 3-5)	36	29.0
C (Weeks 6-7)	30	24.2
D (Weeks 8-10)	48	38.7
 <b><u>MOS SELECTION:</u></b>		
<b>FIRST CHOICE OF MOS</b>		
31M	35	28.2
Other	88	71.0
 <b>WAS 31M ONE OF TOP THREE CHOICES OF MOS?</b>		
Yes	71	57.3
No	52	41.9
 <b>COMPARED TO OTHER TEACHERS I'VE HAD, CIVILIAN INSTRUCTORS ARE</b>		
Very Poor	0	0.0
Poor	3	2.4
About the Same	20	16.1
Good	52	41.9
Very Good	48	38.7
 <b>COMPARED TO OTHER TEACHERS I'VE HAD, NCO INSTRUCTORS ARE</b>		
Very Poor	3	2.4
Poor	7	5.6
About the Same	29	23.4
Good	44	35.5
Very Good	41	33.1
 <b>IN THE 31M COURSE, I GET THE MOST HELP OUT OF</b>		
Lecture	2	1.6
Demonstration	15	12.1
Talking w/NCO Instructors	24	19.4
Talking w/Civ. Instructors	2	1.6
Working with Equipment		
Myself	79	63.7
Reading on My Own	0	0.0
Visits to Learning Center	1	0.8
Talking w/Other Students	1	0.8

31M/MOS RELATED VARIABLES (Continued)

	Absolute Frequency (n)	Relative Frequency (%)
<b>IN THE 31M COURSE, I GET THE MOST HELP FROM</b>		
Instructors	81	65.3
Other Students	21	16.9
Myself/No One	6	4.8
Hands-On	16	12.9
<b>IF I WERE TO MISS A DAY IN CLASS, I WOULD GET HELP FROM</b>		
Instructors	45	36.3
Other Students	55	44.4
Learning Center	10	8.1
Myself	14	11.3
<b>WHAT DO YOU LIKE <u>MOST</u> ABOUT CURRENT WEEK OF TRAINING?</b>		
Working with particular equipment/specific task/equipment-task integration.	60	48.4
Working with equipment in general hands-on.	31	25.0
Location	11	8.9
Instruction-related	3	2.4
Everything	6	4.8
Nothing I Like	4	2.4
Other	8	6.5
<b>WHAT DO YOU LIKE <u>LEAST</u> ABOUT CURRENT WEEK OF TRAINING?</b>		
Working with particular equipment/specific task/equipment-task integration.	27	21.8
Working with equipment in general hands-on.		
Location	13	10.5
Instruction-Related	32	25.8
Everything	19	15.3
Like Everything		
Other		

31M/MOS RELATED VARIABLES (Continued)

	Absolute Frequency (n)	Relative Frequency (%)
<b>WHAT DO YOU LIKE MOST ABOUT TRAINING?</b>		
Working with particular equipment/specific task/equipment-task integration.	49	39.5
Working with equipment in general hands-on.	22	17.7
Location	22	17.7
Instruction-related	20	16.1
Everything	5	4.0
Nothing	1	0.8
Other	5	4.0
<b>EXPECTATIONS CONCERNING 31M COURSE</b>		
Computerized/modern equipment.	19	15.3
Electronics	14	11.3
Radio Repair	10	8.1
Radios/Communication equipment I knew	64	51.6
Other	4	3.2
Didn't Know	12	9.7
<b>SOURCE OF EXPECTATION</b>		
Recruiter	76	61.3
Title of Course	13	10.5
Literature	13	10.5
Others in Service	4	3.2
Other	10	8.1
Did Not Know	8	6.5
<b>SATISFACTION WITH MOS</b>		
Very Disappointed	10	8.1
Disappointed	9	7.3
Neither	48	38.7
Pleased	30	24.2
Very Pleased	27	21.8

## BARRACKS VARIABLES

	Absolute Frequency (n)	Relative Frequency (%)
<b>COMPARED TO BASIC, ARMY LIFE AT FORT GORDON IS</b>		
Tougher	37	29.8
Easier	73	58.9
About the Same	14	11.3
<b>IT IS EASIEST TO GET ALONG WITH</b>		
NCOs in Basic	14	11.3
Civilian Instructors	31	25.0
NCO Instructors	32	25.8
NCOs in Barracks	34	27.4
Other Army Personnel	8	6.5
Get Along With All	5	4.0
<b>IT IS HARDEST TO GET ALONG WITH</b>		
NCOs in Basic	36	29.0
Civilian Instructors	5	4.0
NCO Instructors	7	5.6
NCOs in Barracks	24	19.4
Other Army Personnel	36	29.0
Get Along With All	16	12.9
<b>WHEN I HAVE A PROBLEM, I TURN TO</b>		
Platoon NCOs	48	38.7
Other Soldiers	51	41.1
Squad Leaders	4	3.2
No One/Myself	17	13.7
Others	3	2.4
<b>MOST SATISFYING THING ABOUT BARRACKS LIFE</b>		
Social Aspects (Compan- ionship, Interaction)	54	43.5
Getting Off - Free Time	24	19.4
Sleeping	4	3.2
Stays Clean & Orderly	3	2.4
No Payments	5	4.0
Other	12	9.7
Nothing is Satisfying	19	15.3

BARRACKS VARIABLES

	Absolute Frequency (n)	Relative Frequency (%)
<b>LEAST SATISFYING THING ABOUT BARRACKS LIFE</b>		
Housing Conditions (No Privacy, Open Quarters, Overcrowding)	37	29.8
Noise, Rowdiness	6	4.8
GI Parties/Other Details	44	35.5
Regimen (Early Rising, Restrictions)	14	11.3
Interpersonal Conflicts ("Troublemakers")	11	8.9
Other	6	4.8
Nothing is Satisfying	4	3.2
Everything is Satisfying	1	0.8

**SOCIAL VARIABLES**

	Absolute Frequency (n)	Relative Frequency (%)
<b>GO INTO AUGUSTA</b>		
Once a Day	2	1.6
2-3 Times per Week	9	7.3
Once a Week	29	23.4
2-3 Times per Month	63	50.8
Never	21	16.9
<b>GO TO A PARTY</b>		
Once a Day	2	1.6
2-3 Times per Week	10	8.1
Once a Week	22	17.7
2-3 Times per Month	24	19.4
Never	65	52.4
<b>GO TO A BAR OFF POST</b>		
Once a Day	0	0.0
2-3 Times per Week	2	1.6
Once a Week	21	16.9
2-3 Times per Month	28	22.6
Never	73	58.9
<b>GO OUT ON A DATE</b>		
Once a Day	6	4.8
2-3 Times per Week	32	25.8
Once a Week	21	16.9
2-3 Times per Month	25	20.2
Never	40	32.3
<b>GO TO THE EM CLUB</b>		
Once a Day	2	1.6
2-3 Times per Week	18	14.5
Once a Week	19	15.3
2-3 Times per Month	36	29.0
Never	49	39.5
<b>GO TO A RECREATIONAL CENTER</b>		
Once a Day	12	9.7
2-3 Times per Week	72	58.1
Once a Week	23	18.5
2-3 Times per Month	9	7.3
Never	8	6.5

SOCIAL VARIABLES (Continued)

	Absolute Frequency (n)	Relative Frequency (%)
GO TO THE DAY ROOM		
Once a Day	56	45.2
2-3 Times per Week	27	21.8
Once a Week	21	16.9
2-3 Times per Month	4	3.2
Never	16	12.9

APPENDIX D  
PLATOON SERGEANT INCIDENT EXAMPLES

## I. EMOTIONAL STATES

"SM wouldn't get up when I woke everyone up. When he did get up, SM would just sit on his bunk as though he didn't have any place to go or things to do. SM just really didn't care. SM always seems to believe that someone else would do his job for him or it just wouldn't get done."

"Lack of motivation, always crying. Homesick. SM has never been away from home."

"SM got pregnant while on active duty. Her husband was in Germany at the time. SM was afraid and confused."

"SM was Ftr for one day. SM was Platoon Guide and he just quit working. Fiance and he were to be married the weekend preceeding this change in performance and she left because of a fight they had. He just lost interest in everything."

## II. INTERPERSONAL RELATIONS WITH PEERS

"SM's military appearance fell below standard. SM went AWOL for a 24-hour period. SM felt that the other members of the Platoon were making fun of him more than usual. SM was being laughed at continuously because of the way he talked and walked and his awkward way of doing things. At first I don't think it affected him at all, but then I noticed him hiding under his bunk and in the shower more than usual."

"SM first got an Article 15 for mutual afay. And then he could not understand why things was happen to him. Also other NCOs saw his behavior as a poor soldier. SM also got another Article 15 and is finally being release for his own good. SM could not understand why he couldn't fight others."

"SM stated his peers was harrassing him. The other member in the platoon always made accusation about his behavior. SM got depress and started withdrawing from others."

## III. FAMILY/PERSONAL PROBLEMS

"SM came to me and told me he had family problems. His mother was sick and at home alone. SM couldn't think clearly at school and in the Platoon. SM attitude was so low every one around him also make them feel low."

"SM arrived in company with a lot of financial and family problems. SM is sole parent, 3 kids and have not received BAQ. SM did not have enough money to support family without BAQ. SM could not perform in school or company area. SM was always reported for sick call. SM was in a leadership position and taking her personal problems out on her squads."

"SM was having problems back home with his daughter being uncontrollable. SM did not know who to turn to for help."

"Poor performance in school. Military bearing was lacking, room not cleaned to standards. Attitude became unbearable. Worrying about his daughter. Her school work dropped. She started running wild. He just wanted to go home and get things straight. Didn't want to do anything else."

#### IV. SATISFACTION WITH MOS/EXPECTATIONS

"SM was reclassified to a MOS that she did not want. She wanted the medical field but was assigned to the communications field. SM would not accept another MOS."

"SM have a lack of knowledge of difference MOS, was told he would be a radio repairman when he enlisted and later found out he was to be trained as a radio operator. SM feel that he was lied to. He didn't try to do his best in class and wanted out of the Army."

#### V. SATISFACTION WITH ARMY/EXPECTATIONS

"Upon arriving to the Company, SM did what he was told to follow orders without question, but after two weeks, SM started missing formation, riding sick call and doing bad in classes. SM said he was told the Army would help him to buy a house, get a loan and that he would be paid about four time the amount he was getting as an E-1. His school work went down. He would fail classes purposely."

"SM entered military without parents consent and once here thought he had made a mistake. SM had no outside activities other than the Army and trying to get discharged."

#### VI. MILITARY BEARING

"SM did not like to keep up his appearance with military standards, and other ways told me about his and my observation on the SM. He just did not want to take care of himself in his appearance."

#### VII. REGIMEN

"SM did not show up for details on time."

#### VIII. MOS-RELATED FACTORS

"SM showed a great lack of respect for all in the chain of command. SM would talk back and wouldn't listen or try to understand what we were trying to tell him. From the soldier. With the exception of his school, which he did badly in, all other areas were OK."

#### IX. NON-AIT DISTRACTIONS

"SM did not have time to study because of inspection and training."

#### X. PHYSICAL CONDITION

##### A. SICK CALL

"SM was depressed and could not adjust to military or civilian life."

##### B. INJURY

"SM marched with a limp and was continuously out of step. A large blister on bottom of foot. SM's foot was hurting him."

##### C. PREGNANCY

"SM got pregnant while on duty. Her husband was in Germany at the time. SM was afraid and confused."

#### XI. AUTHORITARIANISM

"Fighting, disrespect to a senior NCO. Wouldn't get out of bed. Wouldn't work. Talked back to NCOs. Poor attitude. Wrong company. Didn't like taking orders."

#### XII. ALCOHOL ABUSE

"SM has an alcohol problem. He is constantly drinking whenever he gets the chance."

**DIAGNOSTIC TEST MODEL**

# **31M10 Functional Basic Skills Education Package**

**Contract No. DABT60-81-C-0006  
Sequence No. A009**

**Prepared for:  
Department of the Army  
U. S. Training Support Center  
Fort Eustis, Virginia 23604**

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DIAGNOSTIC TEST MODEL

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## DIAGNOSTIC TEST MODEL

### INTRODUCTION

A two-level test has been constructed for identifying students who lack one or more functional basic skills prerequisite to the 31M10 course and for assigning the students to the appropriate instruction (FBSEP). Prior to entering 31M10 training, all students take the Screening Test, which yields scores in each of the nine FBSEP units. Students who score above the cutoff in all units proceed directly to the 31M10 course. Students who score below the cutoff on any unit(s) are assigned the Diagnostic Tests in the unit(s). The Diagnostic Test for a given unit yields scores for each lesson within the unit. FBSEP instruction is prescribed for lessons in which students score below the cutoff in the Diagnostic Tests.

A two-level test such as this promises considerable savings in testing time. Students without deficiencies take only enough items to verify that they are competent in all units. Only students who are deficient in basic skills require further testing, and that only in units with deficiencies, not in all units. Thus, each student is exposed to the minimum number of questions necessary to make an accurate diagnosis.

The purpose of the Screening Test is to identify students who are deficient in functional basic skills and to identify, for such students, the units within which deficiencies lie.

The purpose of the Diagnostic Tests is to identify the specific FBSEP lessons in which remediation is needed and to prescribe appropriate instruction.

Thus, a student's performance on the Screening Test determines which units of FBSEP are deficient (if any) and which Diagnostic Tests are to be taken. Performance on the Diagnostic Tests determines which lessons in FBSEP are to be assigned to the student. The total test package is constructed so as to guarantee that deficiencies are detected and remediation is prescribed in the most efficient, economical way possible.

Each unit in the Screening Test, and each lesson in the Diagnostic Tests, has a cutoff point. All decisions are based on the student's score relative to the cutoff point for the unit or lesson. Figure 1 depicts the decision flow for each unit.

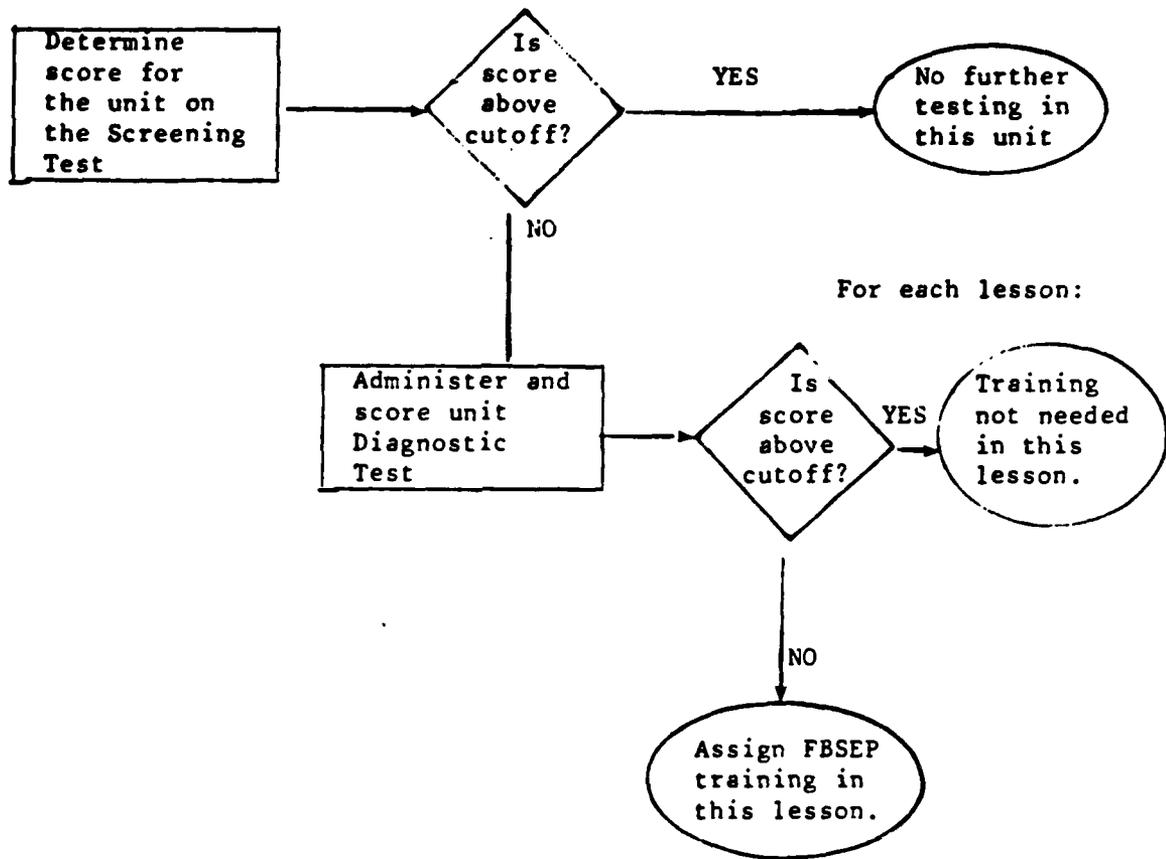


Figure 1. Use of Test Data for Lesson Assignment

A prescription is written for each student who scores below cutoff in one or more lessons. The prescription lists the assigned lessons in the order in which they are to be completed. It also shows the placement of the lessons relative to the AIT course, as well as the estimated time required for each one.

This Diagnostic Test Model (DTM) is designed to guide the test user in the administration and scoring of the tests, as well as the interpretation of the results. It is our belief that appropriate test usage rests on two kinds of information.

1. Technical information, e.g., information regarding test construction, reliability and validity, which provides the basis for understanding how the test works and for the interpretations and uses of test scores.

2. Explicit step-by-step instructions for use of the test, that is, for administration, scoring, and recording test performance, for writing FBSEP prescriptions, and for making predictions of AIT and FBSEP performance.

Consequently, this document is divided into four parts which serve different purposes and, sometimes, different users. Part I, Test Construction, describes the process of test development and includes tables of test specifications for all components of the tests. Part II, Technical Analyses, provides data on test reliability and validity, as well as relationships between test scores and FBSEP course performance. Part III, Administration and Scoring, includes explicit instructions for test use, from administration of the Screening Test through writing FBSEP prescriptions. Finally, Part IV, Predictive Functions of the DTM, provides decision tables and prediction tables for test score interpretation.

Thus, Parts I and II present primarily theoretical and background information which supports the test uses and interpretations described in Parts III and IV. Parts III and IV are more user-oriented. In fact, test administrators can probably skip Parts I and II entirely, if desired. However, readers who wish to understand the bases for the procedures described in Parts III and IV can find the answers in Parts I and II.

The primary consumer of the DTM is, of course, the test user. However, should changes in the FBSEP course become necessary in the future, e.g., additions to, or revisions of, the basic skills taught, the Screening and Diagnostic tests must be revised to measure the new or changed skills. Course designers will find Part I, Test Construction, especially the tables of test specifications, essential to test revision. Procedures for test revision, based on FBSEP course changes, are described more fully in the Course Management Plan.

## PART I. TEST CONSTRUCTION

### Item Development and Tryout

#### Item Construction

Analysis of the skills learned in the 31M10 course yielded a set of prerequisite competencies. (See the Functional BSEP Analysis Report, September 1981). Initially, six items were constructed to measure each of 74 skills.\*

The requirement for rapid scoring of numerous test papers necessitated the use of objective items. Multiple-choice format was chosen over other item formats (e.g., true-false, matching) because it is adaptable to measuring various types of skills at varying levels of complexity. The item writers were subject-matter experts in the competencies to be measured as well as being experienced in writing multiple-choice items.

They used the following guidelines:

1. The behavior required to answer the question must be the behavior described in the competency statement.
2. Each item must measure one, and only one competency. For example, an item measuring writing skill must not require a high degree of reading skill.
3. Insofar as possible, the content of the items was taken directly from 31M materials. If the use of actual 31M materials was not possible, as when they require technical knowledge taught in the 31M10 AIT course, materials as similar as possible in terms of content and structure were constructed.
4. To ensure items of high technical quality, all item writers adhered to the following sets of rules for writing multiple-choice items: Ebel (1965), Nunnally (1972), and Thorndike and Hagen (1977).

\* Additional, self-report items were constructed to measure the use of eleven strategies. None of these items were retained in the Screening and Diagnostic Tests.

To check adherence to the guidelines, each item was circulated among all the item writers, as well as other members of the project, for critique and, if necessary, revision. Judges also examined each item for possible problems in wording or structure, e.g., ambiguity, awkward sentences, possible bias. As an additional check before initial tryout at Fort Gordon, the items were administered under test-like conditions to 14 high school students having academic difficulties. Each student was interviewed following the test to identify items that were difficult to understand, ambiguous, or measuring skills other than those they were designed to measure. All such items were revised or discarded.

#### Initial Tryout

Because of the large number of items (510), the set was divided into two subsets (Form A/B and Form C/D), to be administered separately. Form A/B was administered to 95 and Form C/D to 68 students beginning the 31M10 course. The following indexes were computed for each item:

1. Index of item difficulty (P) - the percentage of the examinees who answered the item correctly.
2. Index of item discrimination ( $r_{pbi}$ ) - the correlation between the item score and the score on all six items measuring the same competency.

Items were retained as is, revised, or discarded on the basis of the following criteria:

1. Certain competencies were eliminated during verification of the competency analysis. All items measuring these competencies were discarded.
2. Items whose difficulty level was discrepant from the difficulty level of other items measuring the same competency were revised or discarded.
3. Items with low or negative correlations with other items measuring the same competency were revised or discarded.
4. Even if P and  $r_{pbi}$  were satisfactory, distractors (incorrect alternatives) were revised under the following conditions:
  - a. The distractor was seldom or never chosen. In such cases, a more plausible distractor was constructed.
  - b. The distractor was chosen disproportionately often. In such cases, the distractor was reworded to make it somewhat less plausible.

Though many items required some degree of revision, usually slight, few items were actually discarded and replaced, and then only if careful examination resulted in the decision that the item was not sufficiently congruent with the competency. All items (both those retained and those rewritten or revised) were subjected to careful scrutiny by two judges before being deemed adequate.

### Construction of Screening and Diagnostic Tests

Next, the retained, revised, and new items had to be grouped into two levels - the Screening Test and the Diagnostic Tests. In order to accommodate to the nature of the units and at the same time fulfill the purposes of the tests, the following plan was used in constructing the Screening and Diagnostic Tests.

The Screening Test yields a score in each of the nine FBSEP units. In each unit, the test includes at least two items from each constituent lesson. For example, Unit VIII, "Diagnosing Equipment Malfunctions," includes four lessons. The Unit VIII component of the Screening Test includes eight items, two from each of the four lessons.

In the Diagnostic Tests, there are short tests for each lesson in the unit (usually 4-8 items), and each Unit Diagnostic Test yields a score for each lesson in the unit. For example, the Unit VIII Diagnostic Test includes sixteen items, four from each lesson, and each set of four yields a score for that lesson.

For most units, items were randomly assigned to the Screening and Diagnostic Tests, subject to the restriction that, for each lesson, the average difficulty of the items in the Screening Test be approximately equal to the average difficulty of the items in the Diagnostic Test.

The following units are exceptions:

1. Unit III, "Listening Skills," and Unit IV, "Note-Taking for Demonstration," each with three constituent lessons. The items in these units are based on a prior lecture or demonstration, which requires group administration. Group administration is not possible in the Diagnostic Test, which is individualized. Therefore, the following procedure was used. A total of 12 items were selected to measure each unit. All items are administered during the Screening Test, following a group-administered lecture and demonstration. The Screening score for each of these two units is based on all twelve items. If a student scores below the cutoff, the unit is rescored to yield a score in each constituent lesson.

Thus, although there is only one level of administration, there are two levels of scoring, the first yielding unit scores and the second yielding lesson scores, as for all other units.

2. Unit V, "Recognizing a Part of a Whole." This unit contains only one lesson. Since assignment of a student to the unit is equivalent to assignment to the lesson, all six items were placed in the Screening Test. Students scoring below the cutoff on this unit are assigned to the lesson; no Diagnostic testing is required.

Notice that all Screening Test scores are based on at least six items, and in most cases eight or more. This reduces the probability of incorrect identification of students as needing (or not needing) FBSEP, and ensures that all (and only) students who truly lack basic skills will be assigned to Diagnostic testing and, subsequently, to FBSEP. In the Diagnostic Tests, each lesson score is based on at least four items, a number sufficient for reasonably reliable placement in FBSEP lessons.

Tables I-1 and I-2 give the test specifications for the Screening and Diagnostic Tests. The tables show the units, their constituent lessons, and the specific items corresponding to each lesson in the Screening and Diagnostic Tests.

Table I-1  
Screening Test - Table of Test Specifications

<u>Unit</u>	<u>Lesson (Competency)</u>	<u>Number of Items</u>	<u>Item Numbers</u>
I  Reading Comprehension	1. Vocabulary	2	43-44
	2. Strategies for Reading Sentences	2	41-42
	3. Reading Negative Sentences	2	39-40
	4. Reading Sentences with Dependent Clauses	2	37-38
	5. Ordering One, Two, or Three Tasks	4	33-36
	6. Determining the Order of Tasks: Multiple Actions	2	31-32
	7. Understanding Lists and Paragraphs	2	29-30
Total, Unit I		16	29-44
II  Using a Table of Contents	1. Chapters and Sections	2	51-52
	2. Using a Task List to Find a Task Description	4	53-56
	3. Tables with Paragraph Numbers and Page Numbers	4	57-60
Total, Unit II		10	51-60
III  Listening Skills	1. Remembering Information Heard in Lectures	4	1-4*
	2. Remembering Information Seen in Demonstrations	4	5-8*
	3. Recognizing When Important Information is Missing	4	9-12*
Total, Unit III		12	1-12

Table I-1 (continued)

<u>Unit</u>	<u>Lesson (Competency)</u>	<u>Number of Items</u>	<u>Item Numbers</u>
IV Note-Taking for Demonstration	1. Basic Note-Taking Skills	12	73-84*
	2. Taking Notes to Show Sequence	4	81-84*
	3. Taking Notes to Show Relationships	8	73-80*
	Total, Unit IV	12	73-84
V Recognizing a Part of a Whole	1. Recognizing a Part of A Whole	6	45-50**
VI Locating Information in Tables	1. The Structure of Tables and Diagrams	2	67-68** *
	2. Interpreting Column Headings	2	63-64
	3. Locating Information in 31M Tables	4	61-62, 65-66
	Total, Unit VI	8	61-68
VII Reading Cabling Diagrams	1. The Structure of Tables and Diagrams	2	67-68** *
	2. Identifying Connections in Simple and Complex Cabling Diagrams	4	69-72
	Total, Unit VII	6	67-72

Table I-1 (continued)

<u>Unit</u>	<u>Lesson (Competency)</u>	<u>Number of Items</u>	<u>Item Numbers</u>
VIII Diagnosing Equipment Malfunctions	1. Deciding Whether an Indication is Normal	2	17-18
	2. Deciding Whether There is Something Wrong Based on Two or More Indicators	2	19-20
	3. Finding Descriptions of Symptoms: One Indicator	2	13-14
	4. Finding Descriptions of Symptoms When There are Two or More Indicators	2	15-16
	Total, Unit VIII	8	13-20
IX Scale Reading	1. Labeling Place Value	2	27-28
	2. Numbering Scale Points	2	23-24
	3. Scales Divided into Tenths	2	25-26
	4. Comparing Scale Settings	2	21-22
	Total, Unit IX	8	21-28

\* Units III and IV have no separate Diagnostic Tests. If the unit score in the Screening Test is below cutoff, lesson scores are used for diagnosis and prescription.

\*\* Since Unit V contains only one lesson, the unit score on the Screening Test is used for both screening and diagnosis/prescription. There is no separate Diagnostic Test for Unit V.

\*\*\* The lesson, "The Structure of Tables and Diagrams," is the first lesson of both Unit VI and Unit VII. Therefore, it and its two items are listed twice in this table. In scoring the Screening Test, these two items are included in both the Unit VI and Unit VII scores.

Table I-2

Diagnostic Tests - Table of Test Specifications

A. Unit I. Reading Comprehension

<u>Lesson</u>	<u>Title</u>	<u>Number of Items</u>	<u>Item Numbers</u>
1	Vocabulary	4	1-4
2	Strategies for Reading Sentences	4	25-28
3	Reading Negative Sentences	4	17-20
4	Reading Sentences with Dependent Clauses	4	9-12
5	Ordering One, Two, or Three Tasks	8	13-16, 21-24
6	Determining the Order of Tasks: Multiple Actions	4	29-32
7	Understanding Lists and Paragraphs	4	5-8
Total, Unit I		32	

B. Unit II. Using a Table of Contents

<u>Lesson</u>	<u>Title</u>	<u>Number of Items</u>	<u>Item Numbers</u>
1	Chapters and Sections	4	1-4
2	Using a Task List to Find a Task Description	8	5-12
3	Tables with Paragraph Numbers and Page Numbers	8	13-20
Total, Unit II		20	

Table I-2 (continued)

C. Unit VI. Locating Information in Tables

<u>Lesson</u>	<u>Title</u>	<u>Number of Items</u>	<u>Item Numbers</u>
1	The Structure of Tables and Diagrams	4	13-16
2	Interpreting Column Headings	4	1,3,4,8
3	Locating Information in 31M Tables	8	2,5,6,7,9-12
Total, Unit VI			

D. Unit VII. Reading Cabling Diagrams

<u>Lesson</u>	<u>Title</u>	<u>Number of Items</u>	<u>Item Numbers</u>
1	The Structure of Tables and Diagrams	4	9-12
2	Identifying Connections in Simple and Complex Cabling Diagrams	8	1-8
Total, Unit VII		12	

E. UNIT VIII. Diagnosing Equipment Malfunctions

<u>Lesson</u>	<u>Title</u>	<u>Number of Items</u>	<u>Item Numbers</u>
1	Deciding Whether an Indication is Normal	4	1,3,5,6
2	Deciding Whether There is Something Wrong Based on Two or More Indicators	4	2,4,13,14
3	Finding Descriptions of Symptoms: One Indicator	4	9,11,15,16
4	Finding Descriptions of Symptoms When There are Two or More Indicators	4	7,8,10,12
Total, Unit VIII		16	

Table I-2 (continued)

F. Unit IX. Scale Reading

<u>Lesson</u>	<u>Title</u>	<u>Number of Items</u>	<u>Item Numbers</u>
1	Labeling Place Value	4	1,5,9,15
2	Numbering Scale Points	4	2,4,7,10
3	Scales Divided into Tenths	4	3,8,14,16
4	Comparing Scale Settings	4	6,11,12,13
Total, Unit IX		16	

### Determination of Cutoff Points

The tests were administered to 155 students beginning the 31M10 course in order to determine cutoff points and assess reliability and validity. Each student took all the tests - the Screening Test and all Diagnostic Tests. Since none of these students were assigned to FBSEP, even if needed, we called this group the Control Group.

A cutoff point of 75% correct had originally been proposed for all units (Screening Test) and lessons (Diagnostic Tests). Table I-3 gives the mean, standard deviation, 75% correct point, and percent of Control Group students below 75% correct on each unit of the Screening Test. The majority of students scored above 75% on most units. Since the majority of students do not experience great difficulty in the 31M10 course, and therefore probably do not require FBSEP training, the results seemed reasonable, and the 75% cutoff points for Units I, II, III, V, VI, VII, and IX were retained. However, Units IV and VIII, in which over half the students scored below 75%, were examined more closely.

In Unit IV, two-thirds of the students scored below 75%. The use of 75% as a cutoff appears unreasonably high for the following reasons:

1. Note-taking is a skill required throughout the 31M10 course. If students scoring below 75% on the Screening Test lack adequate note-taking skills, then about two-thirds of 31M10 students should experience considerable difficulty throughout the AIT course. Yet the proportion of such students is well below two-thirds.
2. Note-taking is probably more difficult during the Screening Test than in the 31M classroom for several reasons. For example, the lecturer/narrator on videotape cannot pace his presentation in response to student cues such as signs of bewilderment; students cannot ask to have a point repeated or clarified, as they can in the classroom.

As a result, the Unit IV cutoff point was changed to 7 (58%). Twenty-eight percent of the students scored below this cutoff point.

In Unit VIII, the cutoff point of 75% correct was retained, despite the high percentage of students scoring below 75%, because troubleshooting (the skill to which Unit VIII is prerequisite) presents some degree of difficulty to most 31M10 students.

On the Diagnostic Tests, the 75% cutoff points were retained for all lessons.

Table I-4 gives the cutoff points to be used on all units of the Screening Test and all lessons of the Diagnostic Tests.

**Table I-3**  
**Means, Standard Deviations, and 75% Correct Scores**  
**for Screening Test**

Unit	Number of Items	75% Correct Point	Mean	SD	Percent of Students below 75% Correct
I	16	12	13.12	2.56	20.5
II	10	7	8.96	1.52	6.4
III	12	9	9.60	2.05	26.9
IV	12	9	7.66	2.23	66.7
V	6	4	5.50	1.04	5.1
VI	8	6	6.65	1.62	19.2
VII	6	4	5.12	1.20	10.3
VIII	8	6	5.27	1.71	55.6
IX	8	6	6.44	1.44	24.4

Table I-4

## Cutoff Points on Screening and Diagnostic Tests

<u>Screening Test</u>			<u>Diagnostic Tests</u>		
<u>Unit</u>	<u>Number of Items</u>	<u>Cutoff Point</u>	<u>Lesson</u>	<u>Number of Items</u>	<u>Cutoff Point</u>
I	16	12	1	4	3
			2	4	3
			3	4	3
			4	4	3
			5	8	6
			6	4	3
			7	4	3
II	10	7	1	4	3
			2	8	6
			3	8	6
III	12	9	1	4	3
			2	4	3
			3	4	3
IV	12	7	1	12	7
			2	4	3
			3	8	6
V	6	4	1	6	4
VI	8	6	1	4	3
			2	4	3
			3	8	6
VII	6	4	1	4	3
			2	8	6
VIII	8	6	1	4	3
			2	4	3
			3	4	3
			4	4	3
IX	8	6	1	4	3
			2	4	3
			3	4	3
			4	4	3

## PART II. TECHNICAL ANALYSES

### Reliability

The Control Group was retested one week later for purposes of determining retest reliability. The conditions for retesting were the same as for testing, except that the sections of the Screening Test corresponding to Unit III, Lessons 1 and 2, and all of Unit IV were omitted. Most of Unit III and all Unit IV items are based on an audiotape and videotape presented during the testing session. Readministration of the tapes would probably have increased the students' ability to answer the questions over the original test session. Since use of the test-retest procedure to measure reliability assumes no change in examinee ability, this procedure was clearly inappropriate. For these units, split-half reliability was determined instead.

The following indexes of reliability were computed:

#### 1. Screening Test

##### a. Units I, II, V, VI, VII, VIII, IX

- (1) Retest reliability coefficient for each unit.
- (2) Standard error of measurement (SEM) for each unit, based on retest reliability.
- (3) Percentage of students who scored consistently above or below cutoff on test and retest for each unit.

##### b. Units III and IV

- (1) Split-half (odd-even) reliability coefficient for each unit.
- (2) SEM for each unit, based on split-half reliability.

#### 2. Diagnostic Tests - Units I, II, VI, VII, VIII, IX, and Lesson 3 in Unit III.

With only 4 items in most lessons, computation of lesson reliability coefficients and SEMs was inappropriate. The major reliability question is: Are students consistently assigned (or not assigned) to lessons? To answer this question, the percentage of students who scored consistently above or below cutoff was computed for each lesson. Only students who had scored below cutoff in the corresponding unit on the first administration of the Screening Test were used in computing these indexes, since, in actual practice, only those students would take the Diagnostic Test.

All indexes of reliability are reported in Table II-1. Reliability coefficients tend to be low, due to both the small number of items per unit and restricted range of scores. (Most distributions of unit

Table II-1

Reliability of Screening Test Unit Scores  
and Diagnostic Test Lesson Scores

Unit	Number of Items	Reliability Coefficient*	SEM	Percentage of Consistent Classifications	Lesson	Percentage Consistent Classifications
I	16	.436	1.92	75	1	82
					2	75
					3	86
					4	75
					5	64
					6	57
					7	68
II	10	.193	1.37	83	1	62
					2	87
					3	87
III	12	.676	1.17		3	50
IV	12	.583	1.44			
V	6	.314	0.86	92**		
VI	8	.316	1.34	77	1	68
					2	64
					3	84
VII	6	.267	1.03	84	1	69
					2	54
VIII	8	.313	1.42	54	1	84
					2	77
					3	73
					4	75
IX	8	.417	1.01	76	1	70
					2	64
					3	70
					4	72

\* Retest reliability for Units I, II, V, VI, VII, VIII, IX; split-half reliability for Units III and IV.

\*\* Since Unit V contains only one lesson, the consistency of unit assignment is also the consistency of lesson assignment.

scores showed a marked negative skew, with the majority of students scoring near the ceiling. This is to be expected in minimum competency tests.)

The percentage of consistent classifications, the most meaningful reliability estimate for tests in which cutoff points determine placement decisions, ranges from 52% to 92% for unit scores and from 54% to 87% for lesson scores. Thus, well over half of the students were consistently judged as either needing or not needing FBSEP in most units, and well over half of those needing FBSEP were consistently assigned to lessons.

### Validity

Two kinds of validity are relevant to competency tests such as the FBSEP tests: content validity and criterion-related validity. Content validity is necessary to ensure that the tests are measuring the 31M10 prerequisites identified by the course analysis. Criterion-related validity is important because the Screening Test is intended to identify students who are likely to experience difficulty in the AIT course. Therefore, evidence is needed that test performance is predictive of AIT performance.

Content validity was built into the Screening and Diagnostic Tests through the test construction process, described in Part I. The content of the tests is best described by Tables I-1 and I-2, the Tables of Test Specifications. The remainder of this section deals with criterion-related validity.

### Criterion Measures

Measures of AIT course performance were obtained for the 155 Control Group students after they had completed the course. During the AIT course, two types of formal evaluation occur:

1. Performance tests of the skills learned during the week are given in Weeks 1, 2, 5, 6, and 10 of the 11-week AIT course. The tests are worth 100 points each, with 70 the minimum passing score. Students who score below 70 are remediated and retested.
2. An end-of-course (EOC) test is given in Week 11. It has 8 parts, each scored GO or NO GO. Students who score NO GO on any part are remediated and retested.

During verification of the competency analysis, two criterion measures were developed based on the weekly performance tests and EOC test. The same two measures were used for test validation. They are:

1. TESTSUM - The sum of scores on the five weekly performance tests. This is a continuous variable which can be used in computations of correlation coefficients and regression equations.
2. Membership in one of four criterion categories:
  - a. I - Highly successful students - those who score above 70 on all performance tests and receive GO on all parts of the EOC Test without remediation.
  - b. II - Moderately successful students - those who either score below 70 on one or more performance tests or receive one or more NO GOs on the EOC Test, but not both. Such students require some remediation to complete the course successfully.
  - c. III - Marginally successful students - those who score below 70 on one or more performance tests and also receive one or more NO GOs on the EOC test. Such students require considerable remediation to complete the course successfully.

A fourth category, academic failures, had originally been planned. This would include students who score below 70 on three performance tests and are reclassified or discharged for academic reasons. However, no students fell in this group, either during verification or in the Control Group. Therefore, this category was dropped.

Note that the two criteria are not independent in that performance test scores contribute to both TESTSUM and criterion group membership. Criterion group membership, which includes EOC Test performance as well as performance tests, is more comprehensive. However, it is a category variable and does not lend itself as well to correlational analysis.

#### Relationship of Test Scores to TESTSUM

142 of the Control Group students completed all five performance tests. Their TESTSUM ranged from 342 to 500, with a mean of 452.42 and a standard deviation of 34.54.

Table II-2 shows the incorrelations among unit scores on the Screening Test and the correlation of each unit with TESTSUM. The following units were positively and significantly related to TESTSUM, from highest to lowest:

Unit IV.	Note-Taking
Unit III.	Listening Skills
Unit I.	Reading Comprehension
Unit IX.	Scale Reading
Unit VI.	Locating Information in Tables
Unit VIII.	Diagnosing Equipment Malfunctions

The multiple correlation (R) of the Screening Test unit scores with TESTSUM was 0.466. Regarded as a predictive validity coefficient, this compares favorably with validity coefficients of published tests for predicting job performance.

Table II-3 gives beta weights (B), t-values for indicating the significance of each B, and  $b_{yx}$ , the regression coefficients in the regression equation for all units of the Screening Test. Only Units III and IV make significant independent contributions to the prediction of TESTSUM.

The regression constant ( $a_{yx}$ ) is 372.555. Therefore, the regression equation for predicting TESTSUM (T) from Screening Test unit scores ( $X_I, X_{II}, \dots, X_{IX}$ ) is:

$$\begin{aligned} \text{Predicted } T = & 1.73X_I - 4.09X_{II} + 3.93X_{III} + 3.54X_{IV} \\ & + 0.97X_V + 2.25X_{VI} - 1.00X_{VII} \\ & + 0.50X_{VIII} + 1.67X_{IX} + 372.55 \end{aligned}$$

The standard error of estimate is 31.58.

Another indication of the relationship between test performance and TESTSUM was computed as follows: On the basis of Screening and Diagnostic Tests scores, each 31M10 student is assigned to between zero and 29 FBSEP lessons. Though lesson assignment was not actually carried out for the Control Group, the number of lessons needed, based on test scores, was determined for each student. Mean TESTSUM was computed as a function of number of FBSEP lessons needed. The results are shown in Table II-4 and Figure II-1. The relationship is quite clear. Students who needed 0 to 2 FBSEP lessons achieved an average TESTSUM above the mean TESTSUM for all students, while students who needed 3 or more lessons achieved an average TESTSUM below the total mean.

In sum, Screening and Diagnostic Test scores show significant, positive correlations with AIT performance as measured by TESTSUM, the sum of AIT performance test scores.

Table 11-2

Table of Intercorrelations among Unit Scores on Screening Test and TESTSUM

Unit	I	II	III	IV	V	VI	VII	VIII	IX	TESTSUM
I Reading Comprehension		.40	.41	.30	.39	.37	.34	.37	.39	.29**
II Using a Table of Contents			.35	.14	.53	.37	.38	.16	.23	.06
III Listening Skills				.29	.10	.24	.29	.27	.35	.33**
IV Note-Taking for Demonstration					.15	.34	.30	.17	.29	.35**
V Recognizing a Part of a Whole						.37	.34	.18	.18	.09
VI Locating Information in Tables							.67	.21	.27	.23*
VII Reading Cabling Diagrams								.27	.26	.18
VIII Diagnosing Equipment Malfunctions									.43	.19*
IX Scale Reading										.26**

\* p < .05

\*\* p < .01

Table II-3

Beta Weights (B), and Regression Coefficients ( $b_{yx}$ ) for  
Predicting TESTSUM from Screening Test Unit Scores

	Unit	B	$b_{yx}$	t
I	Reading Comprehension	.12	1.73	1.27
II	Using a Table of Contents	-.16	-4.09	-1.57
III	Listening Skills	.22	3.93	2.42*
IV	Note-Taking for Demonstration	.21	3.54	2.49*
V	Recognizing a Part of a Whole	.03	0.97	0.30
VI	Locating Information in Tables	.10	2.25	0.90
VII	Reading Cabling Diagrams	-.03	-1.00	-0.31
VIII	Diagnosing Equipment Malfunctions	.03	0.50	0.28
IX	Scale Reading	.07	1.67	0.77

\*  $p < .05$

Table II-4

Relation between Number of FBSEP Lessons Needed and TESTSUM

Number of FBSEP Lessons Needed

	0	1	2	3	4	5	6	7	8 or More	Total
N	55	7	22	21	8	6	5	10	8	142
TESTSUM Mean	465.96	467.29	457.41	446.29	431.38	426.00	417.80	435.10	433.38	452.42
TESTSUM SD	31.07	29.18	25.53	35.97	37.12	17.31	34.58	45.73	34.19	34.54

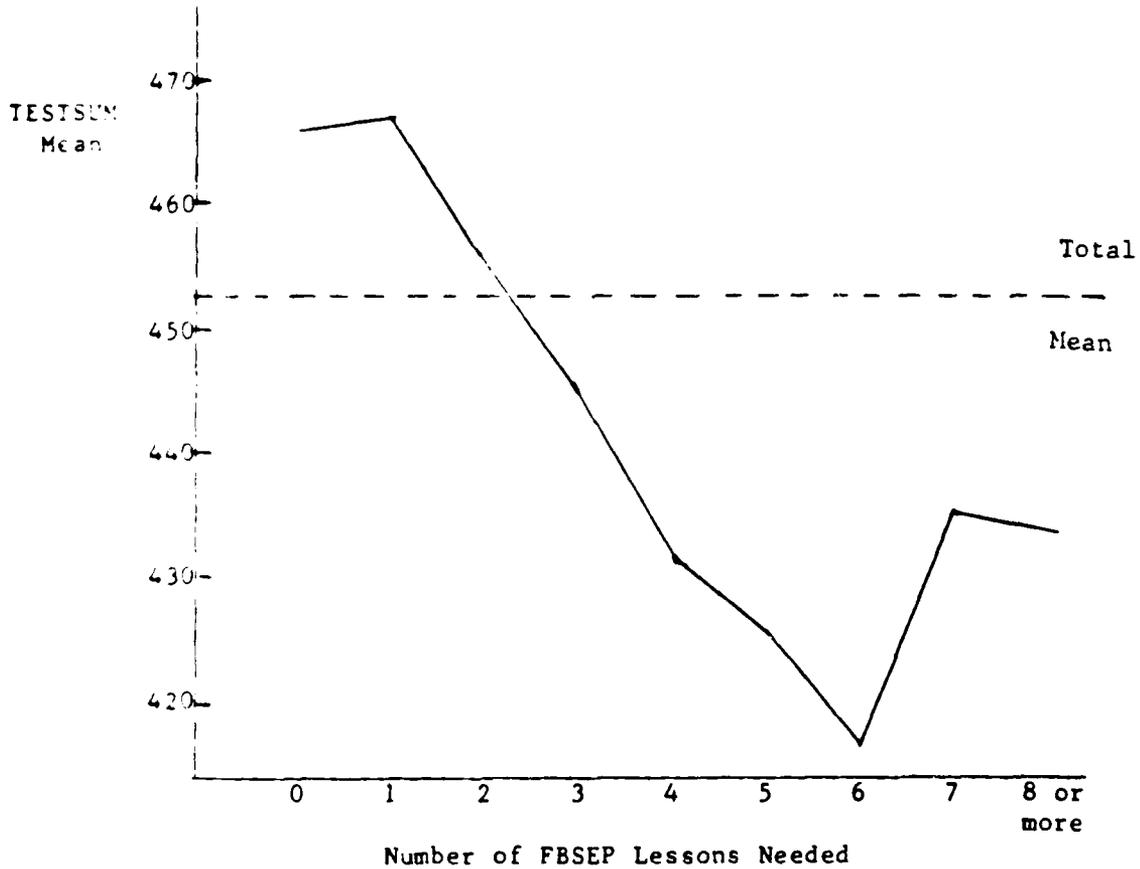


Figure II-1. Relation between Number of FBSEP Lessons Needed and TESTSUM

## Relationship of Test Scores to Criterion Categories

Complete course performance data (performance and EOC tests) were available on 137 of the Control Group students. Of these, 55 fell in Category I, 68 in Category II, and 14 in Category III.

An additional eleven students had left the course before completion for various reasons (e.g., TDP, reclassification), some of which may have been related to academic difficulties. We called this group Category IV.

Table II-5 shows the number of students in each criterion category as a function of the Screening Test score (above vs. below cutoff) in each unit. Chi squares were computed to determine whether the relationship between test scores and category membership was significant.\* The relationship was significant in Units I, III, IV, VI, and IX, but not in Unit VIII. This means that students who score above cutoff in Units I, III, IV, VI, or IX of the Screening Test are more likely to be highly successful in the 31M10 AIT course than students who score below cutoff.

Table II-5 is based on each unit score considered individually. What is the relationship between overall performance on the Screening Test and course performance? Overall Screening Test performance can be measured in terms of the number of units above cutoff on the Screening Test. Of the 148 students, 28 scored above cutoff on all nine units, 96 on six to nine units, and 24 on five units or less. Table II-6 shows the relationship between number of units above cutoff and criterion category membership. The Chi Square of 20.78 (df = 6) is significant at the .005 level. Thus, the higher the overall Screening Test performance, the greater the likelihood of a high level of success in the 31M10 course.

Students are assigned to needed lessons in FBSEP based on their Diagnostic Test scores. With few exceptions, the number of students who needed each individual lesson was too small to compute a measure of relationship to criterion category membership. However, it was possible to determine, for each student in the Control Group, the total number of lessons needed. This ranged from zero to 26. Eighty-five students needed no more than two lessons, 36, between three and five lessons, and 27, six or more. Table II-7 shows the number of students in each criterion category as a function of number of lessons needed. The relationship was highly significant ( $X^2 = 25.60$ , df = 6, p. <.001). Thus, students who need (but do not get) many FBSEP lessons tend to be less successful in the AIT course than students who need few lessons.

\*  $X^2$  could not be computed for Units II, V, and VII because of low expected frequencies (less than 2.0) in several cells.

Table II-5

Relationship between Score on Each Unit of the Screening Test  
and Criterion Category Membership

Unit	Score on Screening Test	Frequency in Each Criterion Category				X <sup>2</sup>
		I	II	III	IV	
I	Above cutoff	45	56	12	5	8.92*
	Below cutoff	10	12	2	6	
II	Above cutoff	53	66	13	7	Not computed†
	Below cutoff	2	2	1	4	
III	Above cutoff	49	44	9	6	11.72**
	Below cutoff	6	24	5	5	
IV	Above cutoff	49	47	7	3	22.33**
	Below cutoff	6	21	7	8	
V	Above cutoff	54	64	13	10	Not computed†
	Below cutoff	1	5	1	1	
VI	Above cutoff	45	58	9	6	7.83*
	Below cutoff	10	10	5	5	
VII	Above cutoff	50	60	13	9	Not computed†
	Below cutoff	5	6	1	2	
VIII	Above cutoff	28	30	8	2	4.76
	Below cutoff	27	38	6	9	
IX	Above cutoff	48	49	6	6	9.57*
	Below cutoff	7	19	5	5	

\*  $p < .05$ \*\*  $p < .01$ † Low expected frequencies (less than 2) preclude computation of  $X^2$ .

Table 11-6

Criterion Category Membership as a Function  
of Number of Screening Test Units above Cutoff

Number of Units above Cutoff	Criterion Category				Total
	I	II	III	IV	
All	16	10	1	1	28
6 to 8	35	48	9	4	96
0 to 5	4	10	4	6	24
Total	55	68	14	11	148

Table II-7

Criterion Category Membership as a Function  
of Number of FBSEP Lessons Needed

Number of FBSEP Lessons Needed*	Criterion Category				Total
	I	II	III	IV	
0 to 2	42	36	4	3	85
3 to 5	6	22	6	2	36
6 or more	7	10	4	6	27
Total	55	68	14	11	148

\* Based on Screening and Diagnostic Test Scores.

In sum, all measures of Screening and Diagnostic Test performance were significantly related to performance in the AIT course, whether measured in terms of TESTSUM or criterion category membership. Thus, test scores have considerable validity for predicting success in the 31M10 course.

#### Relationship of Test Scores to Performance in FBSEP

After FBSEP lesson development had been completed, 235 students entering the 31M10 AIT course were tested and assigned to needed lessons, based on their test scores. This group was called the Experimental Group. One hundred-five of the 235 students were assigned to one or more FBSEP lessons. After they had completed their assigned lessons, it was possible to examine the relationship between their performance in FBSEP and their test scores.

The following measures of FBSEP performance were obtained:

1. Performance on the tests embedded within the lessons themselves (checkpoints). A score of 80% correct was generally required to pass a checkpoint. A student passed a lesson if he attained 80% correct on all lesson checkpoints, either without a Review Exercise (Form A) or after a Review Exercise (Form B).
2. Performance on retention tests (post-tests) administered one to two weeks after lesson completion. Again, a score of 80% correct was required to pass.

All lesson checkpoint scores for all assigned lessons were available for 81 of the 105 students assigned to FBSEP.\* Of these, 31 were assigned to 1 or 2 lessons, 26 to 3 to 5 lessons, and 24 to six or more lessons. Post-test scores were available for 76 of the 81. Table II-8 shows the number and percent of students passing each lesson and each post-test as a function of number of lessons assigned. In both cases, percent passing decreases as number of lessons increases. Since number of lessons assigned depends on Screening and Diagnostic Test performance, Table II-8 shows that students who did better on the tests (required few lessons) were more likely to pass the lessons and post-tests than students who did worse on the tests (required many lessons).

\* The remaining 24 students either did not complete all assigned lessons, or one or more of their checkpoint scores were missing.

Table II-8

FBSEP Performance as a Function of Number of Lessons Assigned

Number of Lessons Assigned*	Lesson Performance		Post-test Performance	
	Number of Students	Number (Percent) Passing All Lessons	Number of Students	Number (Percent) Passing All Post-tests
1-2	31	30 (97)	31	23 (74)
3-5	26	19 (73)	24	7 (29)
6 or more	24	11 (46)	21	1 (5)
Total	81		76	

\* Based on Screening and Diagnostic Test scores.

Lesson completion time was also examined in relation to lesson assignment. All FBSEP lessons are self-paced. Therefore, different students require different amounts of time to complete each lesson. In addition, since different students are assigned to different numbers of lessons, there is considerable variation in time required to complete all assigned lessons. Completion times for one or more lessons, were recorded during FBSEP instruction for 96 students. Table II-9 shows the number of students, median completion time, range of completion time, completion time range of the middle 60% of the students, and average time per lesson as a function of number of lessons for which completion times were available. For example, the last line of the table shows that two students had completion times recorded for 14 lessons. (These two student may have been assigned to more than 14 lessons, but times were recorded for only 14 of them.) Their median completion time for all 14 lessons was 31.0 hours, the range was 29.2 to 32.8 hours, and the average time per lesson was 2.2 hours. Since N was only two, no 60% range could be computed.

Table II-9 shows that average time per lesson is about one-and-a-half to two hours. Using this information, it is possible to extrapolate the table to numbers of lessons greater than 14. For example, we would expect that students assigned to all 29 lessons (i.e., below cutoff on all Diagnostic Tests) would require, on the average, about 43.5 to 58.0 hours to complete their assigned lessons.\* This falls far short of the 180 to 240 hours allowable for FBSEP instruction. Therefore, all students should be able to complete all assigned lessons in less than 180 hours, no matter how many lessons are assigned.

\*  $43.5 = 29 \times 1.5$  hours  
 $58.0 = 29 \times 2.0$  hours

Table II-9

## Completion Time as a Function of Number of Lessons

No. of Lessons for Which Completion Times Were Recorded	Number of Students (N)	Time to Complete (Hours)			Average Time Per Lesson
		Median	Range **	60% Range***	
1	20	1.3	.4 to 5.5	.8 to 2.7	1.3
2	18	2.4	.5 to 12.3	1.0 to 6.1	1.2
3	19	6.3	1.3 to 11.7	3.0 to 9.5	2.1
4	8	7.8	2.0 to 10.3	3.1 to 9.9	1.9
5	9	9.4	2.8 to 14.7	5.3 to 13.9	1.9
6	7	8.0	3.8 to 12.8	4.5 to 11.3	1.3
7	2	11.6	7.6 to 10.6	--	1.6
8	3	11.8	8.7 to 10.0	--	1.5
9	1	7.8	--	--	0.9
10	3	19.6	14.3 to 20.9	--	2.0
11	2	18.2	13.2 to 23.3	--	1.7
12	1	20.6	--	--	1.7
13	1	24.9	--	--	1.9
14	2	31.0	29.2 to 32.8	--	2.2

\* This includes only lessons for which completion times were available.

\*\* Computed when  $N \geq 2$ .

\*\*\* computed when  $N \geq 7$ .

## PART III. ADMINISTRATION AND SCORING

### General Procedure

#### Screening Test

The Screening Test is administered to all students prior to entry in the 31M10 course. Students can be tested in groups of up to 25 with a single test administrator and one monitor, or in groups of up to 50 with a single administrator and two monitors. All the items are in a single reusable booklet, with a separate machine-scorable answer sheet. The test requires a maximum of 2.5 hours of testing time.

The instructions, printed on the front of the test booklet, are read aloud by the test administrator prior to the start of testing. The students listen to a taped lecture, watch a videotaped demonstration, and answer the items for Units III and IV as a group. Students then proceed through the rest of the test at their own pace.

Scoring of the Screening Test occurs in two stages: First, incorrect items are marked by passing the answer sheets through a scoring machine. Second, the scorers count the number of correct answers in each unit by referring to a scoring key. Each unit is marked off on the key. Students who score above the cutoff on all units are finished with testing. Students who score below the cutoff on any unit(s) are assigned to the Diagnostic Tests for those units, except for Units III, IV, and V. In the case of Units III and IV, a score below cutoff results in scoring of the constituent lessons in the Screening Test and assignment to appropriate FBSEP instruction; in Unit V, a score below the cutoff results in assignment to that FBSEP lesson.

#### Diagnostic Tests

The Diagnostic Test for any given student is an individualized package consisting of only the tests for units in which he/she scored below the cutoff on the Screening Test. The tests for all the lessons within a given unit are bound together in a single reusable booklet with separate answer sheet. Thus, there are six Diagnostic Test booklets, one for each unit except Units III, IV, and V. For example, a student who scores below cutoff on the Screening Test in Units VI and VII would be given two booklets, one for each of the two units. Instructions for taking the Diagnostic Tests are the same as for the Screening Test. Students proceed through the tests at their own pace.

Scoring of each Diagnostic Test is accomplished by means of a scoring key. The scorer uses a record sheet and an information sheet to fill out a FBSEP prescription assigning students to FBSEP lessons in which they score below the cutoff. Detailed instructions to be followed by scorers are found in the next section. Scoring keys can be found in Appendix B.

Instructions for Administration and Scoring  
of the Screening Test

A. General Instructions

Before students arrive, make sure that you have an adequate supply of the following materials:

1. Screening Test Booklets (one for each student).
2. Screening Test Answer Sheets (one for each student).
3. Blank sheets of paper (one for each student).
4. Well-sharpened number 2 pencils with erasers.
5. Operational tape recorder.
6. Operational videotape recorder and TV monitor.
7. Audiotape entitled "Movie Projector Lecture."
8. Videotape entitled "Movie Projector Demonstration."

B. Instructions for Administering the Screening Test

NOTE: All instructions for test administration that are enclosed within blocks are to be read aloud, word-for-word, to the students.

1. Seat students as far apart from one another as possible. Make sure all students can see the TV monitor clearly from where they are sitting. Make sure that each student has adequate space for writing.

2. After students are seated, read the following instructions aloud.

Today, you will be taking a test to measure some basic skills that are important for success in the 31M course. In a moment, I will distribute the test materials. Please do not open the test booklet or mark the answer sheet until I tell you to do so.

3. Distribute the following materials to each student:

- a. a Screening Test booklet.
- b. a Screening Test answer sheet.
- c. a blank sheet of paper.
- d. a pencil.

4. Read the following instructions:

Write your name, last name first, on the answer sheet in the space provided. Write today's date, which is \_\_\_\_\_.

5. Wait for students to fill in their name and the date, then say:

Look at the instructions on the cover of your test booklet. Please read these instructions silently while I read them aloud.

The instructions are printed below as they appear on the test booklet. Read them aloud:

This is a test of your ability in some skills that are important for learning in the 31M course. In order to do well in the course, you must be able to learn from lectures and from demonstrations, interpret equipment indicators, and read materials such as your Soldier's Manual and Army technical manuals. The questions in this test measure some of these important listening, watching, interpreting, and reading skills. They do not measure skills taught in the 31M course itself, but rather skills which help you to learn from the instruction in the course.

All the questions in the test are multiple choice. You must read each question, then choose the one answer which you feel is the best one and mark it on your answer sheet. Here are some instructions which will help you to earn your best score:

1. Read each question carefully before choosing an answer. Sometimes, people get questions wrong just through carelessness, not because they don't know the answer.
2. Read all of the answer choices carefully. Most questions have four choices. Some have only two or three.
3. Choose the answer which you feel is the best one, only one answer to each question.
4. On your answer sheet, find the answer space that has the same number as the question you are working on. For example, if you are working on question number 20, make sure that you use the answer space numbered 20 on your answer sheet.
5. Blacken the space under the letter of the answer you have chosen on the answer sheet. For example, suppose that, on question 20, you decide that the answer marked c is correct. Then you must blacken the space under c beside number 20 on the answer sheet, like this:

a b c d  
20. o o ● o

Do not mark your test booklet.

6. Mark only one answer for each question. Do not mark two or more choices for any questions.
7. If you are not sure about an answer to a question, make the best choice that you can. There is no penalty for wrong answers. But do not guess wildly.

6. Ask whether there are any questions, and answer them.
7. Read the following instructions:

Do not open your test booklet until I tell you to do so. In the 31M course, you will often listen to lectures about equipment and how it works. In the first part of the test, you will listen to a taped lecture about operating a movie projector. Listen carefully so that you will remember what is in the lecture. Do not take notes. After the tape is over, wait for further instructions.

8. Play the tape entitled "Movie Projector Lecture." Make sure that all students can hear. (Appendix A contains a script of the tape.)
9. At the end of the lecture, turn off the tape recorder and say:

Open your test booklet to the first page, and answer questions 1 through 4. Then stop. Remember: Mark your answers on the answer sheet, not in the test booklet.

10. Give the students enough time to answer the first four questions. Monitor them closely to make sure that they are marking their answer sheets correctly and that no one goes on to the next part. When everyone has finished, say:

In the 31M course, you will often watch demonstrations showing you how to operate equipment. Now, you will watch part of a film about operating a movie projector. Watch the film closely, so that you will remember what is in the film. Do not take notes. When the film stops, wait for further instructions.

11. Play the videotape, Phase I, "Set Up." Make sure that all the students can see and hear. (Appendix A contains a script of the videotape. The script indicates the beginning and end of Phase I.)

12. Stop the tape at the end of Phase I. Say:

Open your test booklet to question number 5 and answer questions 5 through 8. Then stop.

13. Give the students enough time to answer questions 5 through 8. Monitor them closely to make sure that no one goes on to the next part. When everyone has finished, say:

During the next part of the film, I want you to take notes about what you see and hear. Use the blank sheet of paper for taking notes. Later in the test, you will use your notes to answer questions about the demonstration.

14. Before re-starting the videotape, make sure that all students have their blank paper and pencils ready to take notes.
15. Show the rest of the videotape (Phases 2 and 3)
16. Read the following instructions:

You will do the rest of the test on your own. There will be no more lectures or demonstrations. Now open your test booklet to question number 9, and answer all the rest of the questions in the test booklet.

17. Ask if there are any questions, and answer them. Tell the students to go ahead and complete the test.

During the rest of the test, monitor the students to make sure that they are working steadily through the booklet.

18. Collect booklets, answer sheets, students' notes on the videotape, and pencils when students have finished. (The notes can be discarded.)

C. Instructions for Scoring the Screening Test and Identifying Students Who Require Further Testing/Prescriptions

The Screening Test is used in order to identify students with deficiencies and to indicate in what broad areas (units) these deficiencies lie. A deficiency in a unit is defined as a score below the unit cutoff. Table III-1 summarizes the decision process for the Screening test. The table is followed by step-by-step instructions for scoring, identification of students who require further testing/prescriptions, and recording of results.

Instructions for Scoring the Screening Test:

1. Make sure that the scoring key for Side 1 of the answer sheet has been entered into the scoring machine.
2. Feed the answer sheets, with Side 1 up, into the machine, one at a time. The machine will enter a mark beside each incorrect answer.
3. Repeat Steps 1 and 2 for Side 2.
4. Use the Screening Test Scoring Key to obtain a score on each unit for each student. The items in each unit are marked on the scoring key. The unit score is the number of items answered correctly.
5. After all answer sheets have been scored, enter the names of the students and their scores on a Screening Test Record Sheet (see Table III-2). Be careful to place scores in the correct columns.
6. After unit scores for all students have been recorded, go down each unit column and circle the scores which are below the cutoff. (The cutoff point in each unit is given at the top of the column.)

(A sample Screening Test Record Sheet which has been correctly filled in is shown in Table III-3.)

7. Make arrangements to have all students with one or more circled scores return for further testing and/or FBSEP assignment.

Table III-1  
Screening Test Decision Table

<u>Unit</u>	<u>Cutoff Point</u>	<u>Decision if Score Is At or Above Cutoff</u>	<u>Decision if Score is Below Cutoff</u>
I	12	No further testing or prescription in this unit  	Assign Unit I Diagnostic Test
II	7		Assign Unit II Diagnostic Test
III	9		Rescore, using Unit III Diagnostic Key
IV	7		Rescore, using Unit IV Diagnostic Key
V	4		Assign to FBSEP, Unit V, Lesson 1
VI	6		Assign Unit VI Diagnostic Test
VII	4		Assign Unit VII Diagnostic Test
VIII	6		Assign Unit VIII Diagnostic Test
IX	6		Assign Unit IX Diagnostic Test



Table III-3

## SCREENING TEST RECORD SHEET - SAMPLE

Name	Unit Cutoff	I 12	II 7	III 9	IV 7	V 6	VI 6	VII 4	VIII 6	IX 6
BARTH, T	7367	14	10	12	10	6	7	6	8	6
BOUCHARD, M	1733	(11)	8	12	7	6	7	6	(5)	8
CHAPPELL, C	4474	<del>12</del>	<del>8</del>	<del>12</del>	(6)	5	7	5	(5)	6
DEAL, W.	7541	16	9	12	12	6	6	5	6	6
FOUNTAIN FOUNTAIN, S	1296	(11)	10	(8)	7	6	6	5	6	7
GOODMAN, M	2709	15	10	12	10	6	7	6	8	8
GUTZEIT, S	7713	15	9	11	10	6	8	6	8	6
HAYEMAN, D	3817	16	10	11	11	6	8	6	8	8
HAIR, M	4852	12	9	9	(4)	6	(5)	6	6	(3)
HAWORTH, J	7267	(9)	10	(3)	(1)	6	(5)	4	6	(3)
HORAN, T.	2175	16	10	10	8	6	8	6	7	6
JOHNSON, O	5962	16	10	10	8	6	8	6	(4)	7
JOHNSON, S.	5727	15	10	12	9	6	8	5	6	8
KEMP, P.	0587	12	8	9	(5)	6	7	6	6	7
KEY, T.	4791	16	10	12	9	6	8	6	7	6
MASON, L	7729	15	10	10	8	6	(5)	4	8	(4)
MOTON, S	0570	12	8	(5)	7	6	6	6	(5)	(4)
MCKINLEY, L.	1047	12	10	9	7	5	6	(3)	(4)	(4)
PERRY, M.	4353	13	9	10	7	6	7	(3)	(4)	6
PYKKONEN,	0226	13	10	9	9	6	7	5	7	(5)
SASSAMAN, W.	5927	16	8	11	8	6	7	6	7	8
STONE, M	8002	13	(6)	9	8	5	7	5	7	(4)
THOMAS, B	2056	12	8	12	11	5	8	6	(2)	8
WATSON, M.	0925	14	9	12	7	6	6	5	6	(5)

8. Prepare a Student Diagnostic Record Sheet (See Table III-4) for each student who is to return for further testing.
  - a. Fill in the student's name and the date.
  - b. In column (1), "UNIT," circle the numbers of the units in which the student scored below cutoff.
9. Prepare a package of Diagnostic Tests for each student. For example, the package for a student with II, VI, and VIII circled in the Unit column should include the Diagnostic Tests for Units II, VI, and VIII.

No Diagnostic Tests are used for Units III, IV, and V. Special instructions for diagnosis and prescription of lessons in Units III and IV are given below.

#### Instructions for Diagnosis and Prescription

The purpose of diagnostic testing is to determine the specific skill areas (lessons) within which deficiencies lie and to assign students to needed lessons. Table III-5 summarizes the diagnostic decision process. Below are step-by-step instructions for scoring, recording results, and writing prescriptions for FBSEP.

#### A. General Instructions

Before students arrive, make sure that you have an adequate supply of the following materials:

1. An individualized package of Diagnostic Tests for each student scoring below cutoff in one or more of Units I, II, VI, VII, VIII, IX.
2. Well-sharpened number 2 pencils with erasers.
3. A Diagnostic Record Sheet for each student, with units below cutoff circled in column (1).
4. Functional BSEP Prescription Sheets (one per student).

Also make sure that you have the following:

1. Diagnostic scoring keys.
2. Functional BSEP Information Sheet.

Table III-4  
STUDENT DIAGNOSTIC RECORD SHEET

Name \_\_\_\_\_ Date \_\_\_\_\_

(1) UNIT	(2) Lesson	(3) Cutoff Point	(4) Student's Score	(5) Check Here if Score is Below Cutoff
I	1	3		
	2	3*		
	3	3		
	4	3		
	5	6		
	6	3		
	7	3		
II	1	3		
	2	6		
	3	6		
III	1	3		
	2	3		
	3	3		
IV	1	7†		
	2	3		
	3	6		
V	1	4		
VI	1	3		
	2	3		
	3	6		
VII	1	3		
	2	6		
VIII	1	3		
	2	3		
	3	3		
	4	3		
IX	1	3		
	2	3		
	3	3		
	4	3		

\* If the student scores 3 or 4 in this lesson, but scores less than 3 in Lesson 3 and/or 4, place a check mark in Column (5) for Lesson 2.

† If Unit IV is circled in Column (1), place a check mark in Column (5) for Lesson 1.

Table III-5

## Diagnostic Decision Table

<u>Unit</u>	<u>Lesson</u>	<u>Cutoff Point</u>	<u>Decision if Score Is at or Above Cutoff</u>	<u>Decision if Score Is Below Cutoff</u>
I	1	4	No instruction needed in this lesson.	Prescribe this lesson.
	2	4	If Unit I, Lesson 3 and 4 scores are also at or above cutoff, no instruction is needed in this lesson. <u>If Unit I, Lesson 3 or 4 score is below cutoff, prescribe this lesson first.</u>	Prescribe this lesson.
	3	4	No instruction needed in this lesson	Prescribe this lesson. Prescribe Unit I, Lesson 2 as a prerequisite, regardless of Lesson 2 score.
	4	4	No instruction needed in this lesson.	Prescribe this lesson. Prescribe Unit I, Lesson 2 as a prerequisite, regardless of Lesson 2 score.
	5	8	No instruction needed in this lesson.	Prescribe this lesson.
	6	4	No instruction needed in this lesson.	Prescribe this lesson.
	7	4	No instruction needed in this lesson.	Prescribe this lesson.
II	1	3	No instruction needed in this lesson.	Prescribe this lesson.
	2	6	No instruction needed in this lesson.	Prescribe this lesson.
	3	6	No instruction needed in this lesson.	Prescribe this lesson.

Table III-5 (cont'd)

<u>Unit</u>	<u>Lesson</u>	<u>Cutoff Point</u>	<u>Decision if Score Is at or Above Cutoff</u>	<u>Decision if Score Is Below Cutoff</u>
III	1	3	No instruction needed in this lesson.	Prescribe this lesson.
	2	3	No instruction needed in this lesson.	Prescribe this lesson.
	3	3	No instruction needed in this lesson.	Prescribe this lesson.
IV	1	7	No instruction needed in this lesson.	Prescribe this lesson.
	2	3	No instruction needed in this lesson.	Prescribe this lesson, to follow Unit IV, Lesson 1.
	3	6	No instruction needed in this lesson.	Prescribe this lesson. Make sure that Unit IV Lesson 1 has been prescribed to precede this lesson.
V	1	4	No instruction needed in this lesson.	Prescribe this lesson.
VI	1	3	No instruction needed in this lesson.	Prescribe this lesson.
	2	3	No instruction needed in this lesson.	Prescribe this lesson.
	3	6	No instruction needed in this lesson.	Prescribe this lesson.
VII	1	3	No instruction needed in this lesson.	Prescribe this lesson.
	2	6	No instruction needed in this lesson.	Prescribe this lesson.

Table III-5 (cont'd)

<u>Unit</u>	<u>Lesson</u>	<u>Cutoff Point</u>	<u>Decision if Score Is at or Above Cutoff</u>	<u>Decision if Score Is Below Cutoff</u>
VIII	1	3	No instruction needed in this lesson.	Prescribe this lesson.
	2	3	No instruction needed in this lesson.	Prescribe this lesson.
	3	3	No instruction needed in this lesson.	Prescribe this lesson.
	4	3	No instruction needed in this lesson.	Prescribe this lesson.
IX	1	3	No instruction needed in this lesson.	Prescribe this lesson.
	2	3	No instruction needed in this lesson.	Prescribe this lesson.
	3	3	No instruction needed in this lesson.	Prescribe this lesson.
	4	3	No instruction needed in this lesson.	Prescribe this lesson.

**B. Instructions for Administering the Diagnostic Tests**

The Diagnostic Tests are administered as individualized packages, based on each student's performance on the Screening Test. The tests to be included in the package for each student are determined by consulting the Diagnostic Assignment Sheet. The units in which each student scored below cutoff are listed beside the student's name. Do the following:

1. Students who are assigned only to Units III, IV, and/or V require no further testing. FBSEP assignments are made on the basis of Screening Test performance (see "Special Instructions for Units III, IV, and V" below). Ask these students to wait until the other students have started working on their Diagnostic Test packages.
2. Students assigned to one or more of Units I, II, VI, VII, VIII, and IX should be given a pencil and their individualized Diagnostic Test packages containing a booklet and answer sheet for each unit assigned.
3. Students should be instructed to complete the tests in any order desired, then to bring all test materials to a scorer immediately after completion.

**C. Special Instructions for Units III, IV, and V.**

Units III, IV and V differ from other units in that both screening and diagnostic decisions are based on performance in the Screening Test. The following procedures are to be followed for scoring and recording the results in Units III, IV, and V:

1. Unit V. This unit has only one lesson. If the student scored below cutoff in this unit of the Screening Test, do the following:
  - a. Record the student's unit score in the Diagnostic Record Sheet, column (4).
  - b. Place a check mark in column (5).
2. Unit III.
  - a. Re-score the Unit III items on the student's Screening Test answer sheet, using the Unit III Diagnostic Scoring Key (See Appendix B) to obtain a score for each lesson.

b. Record the score for each lesson in column (4) of the student's Diagnostic Record Sheet.

c. For each score below cutoff, place a check mark in column (5).

3. Unit IV.

a. Re-score the Unit IV items on the student's Screening Test answer sheet, using the Unit IV Diagnostic Scoring Key (See Appendix B) to obtain a score for each lesson.

b. Record the score for each lesson in column (4) of the student's Diagnostic Record Sheet.

c. For each score below cutoff, place a check mark in column (5).

D. Instructions for Scoring the Diagnostic Tests and Recording Results

1. Score each Diagnostic Test, using the appropriate key, and enter lesson scores in column (4).

2. Compare each lesson score with the cutoff point for the lesson. If the lesson score is below cutoff, place a check mark in column (5) of the Student Diagnostic Record Sheet.

NOTE: the following two lessons need special attention:

a. Unit IV, Lesson 1. All students assigned to Unit IV are assigned to this lesson. If unit IV is circled in column (1), make sure that there is a check mark in column (5) for Lesson 1.

b. Unit I, Lesson 2. Students assigned to Lesson 3 or 4 or both in this unit must take Lesson 2 first. If there is a check mark in column (5) for Lesson 3 and/or 4, place a check mark in column (5) for Unit I, Lesson 2, regardless of the score on this lesson. Table III-6 shows a sample of a correctly completed Student Diagnostic Record Sheet.

TABLE III-6

STUDENT DIAGNOSTIC RECORD SHEET - SAMPLE

Name Haworth, J 7267 Date 27 July 82  
Last First

(1) UNIT	(2) Lesson	(3) Cutoff Point	(4) Student's Score	(5) Check Here if Score is Below Cutoff
<b>I</b>	1	3	3	
	2	3*		✓
	3	3		✓
	4	3		
	5	6		✓
	6	3		
	7	3		
II	1	3		
	2	6		
	3	6		
<b>III</b>	1	3	1	✓
	2	3	2	✓
	3	3	0	✓
<b>IV</b>	1	3†	1	✓
	2	3	0	✓
	3	6	0	✓
V	1	4		
<b>VI</b>	1	3	3	✓
	2	3	4	✓
	3	6	4	✓
VII	1	3		
	2	6		
VIII	1	3		
	2	3		
	3	3		
	4	3		
<b>IX</b>	1	3	3	
	2	3	4	
	3	3	1	✓
	4	3	3	

\* If the student scores 3 or 4 in this lesson, but scores less than 3 in Lesson 3 and/or 4, place a check mark in Column (5) for Lesson 2.

† If Unit IV is circled in Column (1), place a check mark in Column (5) for Lesson 1.

E. Instructions for Writing FBSEP Prescriptions

Each student's prescription is written by filling in a FBSEP Prescription Sheet immediately after completion of Diagnostic Test scoring (See Table III-7). The prescription is based on the check marks in column (5) of the student's Diagnostic Record Sheet. In addition, you will need to refer to the Functional BSEP Information Sheet (Table III-8).

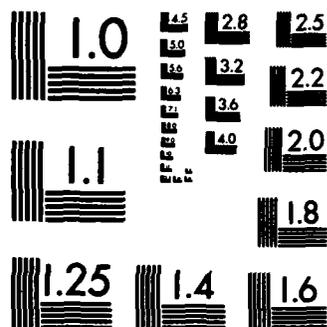
Students are assigned to all lessons having check marks in column (5) of the Student Diagnostic Record Sheet. In rare cases, this column will have no check marks. If so, dismiss the student. No FBSEP instruction is indicated.

If one or more check marks are in column (5), follow the procedure below:

1. Enter the student's name and the date.
2. Find the first check mark in column (5) of the student's Diagnostic Record Sheet. This is the first lesson to be assigned.
3. Find the lesson on the Functional BSEP Information Sheet, and use that information to fill in the first row of the student's Functional BSEP Prescription Sheet, as follows:
  - a. In column (1), "Sequence," write the time at which instruction for the lesson is to be delivered. For example, if the lesson is Unit III, Lesson 2, which is in Block 1, you would write "Before AIT" in column (1). For Unit VIII, Lesson 3, in Block 2, you would write "Before Week 5" in column (1).
  - b. In the remaining columns of the Prescription Sheet, write the Unit number, lesson number, lesson title, and estimated time required.
4. Follow the same procedure for each of the other lessons having a check mark on the student's Diagnostic Record Sheet.
5. After all prescribed lessons have been entered, add the estimated time required for the lessons, and enter the sum at the bottom of column (5) of the Prescription Sheet.
6. Tell the student where and when to report for Functional BSEP instruction. Answer any questions the student may have.







MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

Table III-8

Functional BSEP Information Sheet

This sheet provides information needed for writing student prescriptions. It lists all Functional BSEP units and lessons according to the time at which instruction is to be delivered, relative to the 31M10 AIT course. It also lists the estimated time required for each lesson.

Block 1: FRONT-LOADED FBSEP UNITS AND LESSONS. THESE ARE TO BE PRESCRIBED PRIOR TO STARTING THE AIT COURSE.

<u>Unit</u>	<u>Lesson</u>	<u>Title</u>	<u>Estimated Time Required (Hr:Min)</u>
I Reading Compre- hension	1	Vocabulary . . . . .	3:00
	2	Strategies for Reading Sentences . . . . .	4:45
	3	Reading Negative Sentences . . . . .	0:45
	4	Reading Sentences with Dependent Clauses . . . . .	1:00
	5	Ordering One, Two, or Three Tasks . . . . .	1:00
	6	Determining the Order of Tasks: Multiple Actions . . . . .	1:00
	7	Understanding Lists and Paragraphs . . . . .	1:10
II Using a Table of Contents	1	Chapters and Sections . . . . .	2:00
	2	Using a Task List to Find a Task Description . . . . .	2:00
	3	Tables with Paragraph Numbers and Page Numbers . . . . .	2:00
III Listening Skills	1	Remembering Information Heard in Lectures . . . . .	4:30
	2	Remembering Information Seen in Demonstrations . . . . .	3:00
	3	Recognizing When Important Information Is Missing . . . . .	1:45
IV Note- Taking for Demonstration	1	Basic Note-Taking Skills . . . . .	3:30
	2	Taking Notes to Show Sequence . . . . .	2:00
	3	Taking Notes to Show Relationships . . . . .	1:55

Table III-8 (cont'd)

<u>Unit</u>	<u>Lesson</u>	<u>Title</u>	<u>Estimated Time Required (Hr:Min)</u>
V Recognizing a Part of a Whole	1	Recognizing a Part of a Whole . . . . .	1:00
VI & VII	1	The Structure of Tables and Diagrams . . . . .	0:45
VI Locating Information in Tables	2	Interpreting Table Headings . . . . .	1:15
	3	Locating Information in 31M Tables . . . . .	1:25
VII Reading Cabling Diagrams	2	Identifying Connections in Simple and Complex Cabling Diagrams . . . . .	1:50
IX Scale Reading	1	Labeling Place Value . . . . .	1:00
	2	Numbering Scale Points . . . . .	0:25
	3	Scales Divided into Tenths . . . . .	0:30
	4	Comparing Scale Settings . . . . .	0:30

Block 2: FUNCTIONAL BSEP LESSONS TO BE PRESCRIBED BEFORE THE FIFTH WEEK OF THE AIT COURSE

<u>Unit</u>	<u>Lesson</u>	<u>Title</u>	<u>Required (Hr:Min)</u>
VIII Diag- nosing Equip- ment Malfunc- tions	1	Deciding Whether an Indication is Normal . . . . .	0:30
	2	Deciding Whether There Is Something Wrong Based on Two or More Indicators . . . . .	0:35
	3	Finding Descriptions of Symptoms: One Indicator . . . . .	0:45
	4	Finding Descriptions of Symptoms When There Are Two or More Indicators . . . . .	0:55

7. Make an extra copy of each Prescription Sheet. One copy is to be retained by the student and the other by the FBSEP staff.

Table III-9 shows a sample of a filled-in Prescription Sheet.



#### PART IV. PREDICTIVE FUNCTIONS OF THE DTM

Besides decisions concerning lesson placement in FBSEP, the DTM has a number of predictive functions as well. That is, given the student test scores and using information presented in Part II, it is possible to make predictions concerning the student's performance on the test, in FBSEP, and in the AIT course. The predictive functions are:

1. Identification of soldiers who lack prerequisite competencies required for entry into 31M10 training.
2. Identification of what specific prerequisite competency is below the minimum level required for entry into the 31M10 MOS training.
3. The amount of remediation that will be required for the student to achieve the minimum level of proficiency.
4. The extent to which the student has mastered prerequisite competencies after being exposed to remedial training.
5. A regression model (or equivalent) capable of predicting student probability of successful 31M10 AIT completion prior to and following exposure to remedial training, expressed in terms of confidence levels.
6. The regression model (or equivalent) shall also predict the likelihood of not enough time for individual students to complete the 31M10 Functional BSEP in 240 hours and 180 hours.

The six predictive functions are discussed in turn. Tables or other decision aids are presented for use in making predictions for individual students.

##### 1. Identification of Soldiers Who Lack Prerequisite Competencies

This, of course, is the purpose of the Screening Test. Students who score below cutoff in a unit are predicted to lack one or more competencies within that unit.

However, Screening Test unit scores are not perfectly reliable, as the reliability information of Part II of this document shows. Sometimes, students who possess all the component competencies score below cutoff, and sometimes students who lack one or more competencies score above cutoff. That is, a student's obtained score may differ somewhat from his/her true score.

Though true unit scores are not directly measurable, they can be estimated by computing confidence intervals around a student's obtained unit score. To do so, one must use the standard error of measurement (SEM) for the unit. The 95% confidence interval is given by the formula;

$$X \pm 2SEM,*$$

where X is the obtained score. This formula yields a range of scores within which students' true scores will fall in 95 cases out of 100.

Table IV-1 gives the SEM and 2SEM for each unit. To compute the 95% confidence interval for a given score, subtract 2SEM from the score, then add 2SEM to the score. For example, in Unit I, Lesson 1, 2SEM = 3.84. If a student scores 9 on this unit, the 95% confidence interval is  $9 \pm 3.84$ . Since,  $9 - 3.84 = 5.16$  and  $9 + 3.84 = 12.84$ , we can be 95% confident that this student's true score is somewhere between 5.16 and 12.84.

## 2. Identification of Specific Competencies below the Minimum Level

Specific competencies are measured by the lesson scores of the Diagnostic Tests. Like the unit scores, they are not perfectly reliable. In fact, given the brevity of the lesson tests (4-8 items each), one would expect reliability coefficients to be quite low. A more meaningful measure of reliability of lesson scores is consistency of placement. That is, based on lesson scores, are students consistently assigned (or consistently not assigned) to the lessons?

The procedure for determining the consistency of lesson assignment was described in Part II of this document. Table IV-2 gives the percentage of consistent classifications for each lesson of Units I, II, V, VI, VII, VIII, and IX. Though consistency was not determined for most lessons of Units III and IV, the relatively high reliability of these units makes consistent classification probable.

\* More accurately, the formula should be "Estimated true score  $\pm 1.96SEM$ ," but the formula above yields approximately the same result.

Table IV-1

Standard Error of Measurement (SEM) and 2SEM  
for Each Unit of the Screening Test

<u>Unit</u>	<u>SEM</u>	<u>2SEM</u>
I	1.92	3.84
II	1.37	2.74
III	1.17	2.34
IV	1.44	2.88
V	0.86	1.72
VI	1.34	1.68
VII	1.03	2.06
VIII	1.42	2.84
IX	1.01	2.02

95% confidence interval for a student's unit score (X) is given by the formula:

$$X \pm 2SEM$$

Table IV-2

Probability of Consistent Placement of Students Scoring  
below Cutoff in the Corresponding Unit\*

<u>Unit</u>	<u>Lesson</u>	<u>Probability of Consistent Placement</u>
I	1	.82
	2	.75
	3	.86
	4	.75
	5	.64
	6	.57
	7	.68
II	1	.62
	2	.87
	3	.87
III	3	
V	1	.92
VI	1	.68
	2	.64
	3	.84
VII	1	.69
	2	.54
VIII	1	.84
	2	.77
	3	.73
	4	.75
IX	1	.70
	2	.64
	3	.70
	4	.72

\* Probability of consistent placement could not be determined for Lessons 1 and 2 of Unit III and all lessons of Unit IV, due to inappropriateness of test-retest procedure for these lessons.

Table IV-2 can be used as follows. Given that a student has scored below cutoff on a unit of the Screening Test, the probabilities of his/her being consistently assigned to the lessons of the unit are given in the table. For example, a student who scored below cutoff on Unit II of the Screening Test has a .62 chance of being consistently assigned/not assigned to Lesson 1. This means that, whether his Lesson 1 score assigns him/her to the lesson or not, the chances are 62 in 100 that, were he/she to retake the Lesson 1 test, the same decision (assignment vs. non-assignment) would be made. The same kind of interpretation is possible for other lessons, using the appropriate probabilities from the table.

### 3. Amount of Remediation Required

FBSEP lessons are self-paced. Therefore, different students take different amounts of time to complete any given lesson. Nevertheless, there are several ways to estimate the amount of time that will be required by a student. The best estimate is obtained by adding the numbers in the "Estimated Time Required" column (column 5) of the student's FBSEP Prescription Sheet. Since the estimated time for each lesson represents the median time actually required by a group of FBSEP students, the sum approximates the time which would be required by the "average" student. However, it must be remembered that no student is truly "average," and deviations from these times are to be expected.

Another way to estimate the time required is to use the 60% range of completion times found for varying numbers of assigned lessons (See Table II-9). For any given number of lessons assigned (from one to six) the 60% range was found by determining the amount of time required by the middle 60% of students who had that number of lessons assigned. Data were insufficient to determine the 60% range for seven or more assigned lessons. However, it is possible to extrapolate beyond six lessons in the following way: the figures given in Table II-9 show that the lower limit of the 60% range is usually about 0.8 times the number of lessons assigned, while the upper limit is usually about 2.7 times the number of lessons assigned. These figures have been used to estimate 60% ranges for any number of lessons, from 1 to 29.

The results are shown in Table IV-3. The table is used as follows: Enter the table with the number of lessons to which the student has been assigned. When you say that the student will probably complete his/her FBSEP lessons within the range given for that number of lessons, you can expect to be right about 60 times out of 100. That is, about 60 out of every 100 students with that number of lessons assigned will complete all their lessons between the lower and upper limits of the 60% range. For example, a student who has been assigned to 12 lessons has a 60% chance of completing all 12 lessons in between 9.6 and 32.4 hours of instruction.

Table IV-3

60% Range of Time Required for Completion, In Hours,  
as a Function of Number of Lessons Assigned

<u>Number of Lessons Assigned</u>	<u>60% Range in Hours*</u>
1	0.8 to 2.7
2	1.0 to 6.1
3	3.0 to 9.5
4	3.1 to 9.9
5	5.3 to 13.9
6	4.5 to 11.3
7	5.6 to 18.9
8	6.4 to 21.6
9	7.2 to 24.3
10	8.0 to 27.0
11	8.8 to 29.7
12	9.6 to 32.4
13	10.4 to 35.1
14	11.2 to 37.8
15	12.0 to 40.5
16	12.8 to 43.2
17	13.6 to 45.9
18	14.4 to 48.6
19	15.2 to 51.3
20	16.0 to 54.0
21	16.8 to 56.7
22	17.6 to 59.4
23	18.4 to 62.1
24	19.2 to 64.8
25	20.0 to 67.5
26	20.8 to 70.2
27	21.6 to 72.9
28	22.4 to 75.6
29	23.2 to 78.3

\* Computed for 1 to 6 lessons; extrapolated for the rest, based on the formula; Range =  $.8N$  to  $2.7N$ , where  $N$  is the number of lessons assigned.

#### 4. Predicting Success in FBSEP

Not all students assigned to FBSEP complete all their lessons successfully. Furthermore, students who are assigned to few lessons are more likely to pass them all than students assigned to many, as was shown in Part II, Table II-8. The data of that table are the basis for Table IV-4, (A) and (B). Table IV-4(A) is used to predict probability of passing all assigned lessons. Passing a lesson is defined as passing all lesson checkpoints (embedded tests), either without additional remediation (Form A) or after additional remediation (Form B). Table IV-4(B) is used to predict probability of passing all post-tests (retention tests) given one to two weeks after the end of FBSEP instruction.

To use these tables, enter each one with the number of lessons on the FBSEP Prescription Sheet. For example, a student who has been assigned to 4 lessons has a probability of .73 (73 chances in 100) of passing all four lessons. He/she has a probability of .29 (29 chances in 100) of passing all four post-tests.

#### 5. Predicting the Probability of Successful AIT Completion

Probability of successful AIT completion prior to exposure to remedial training can be predicted, on the basis of the predictive validity data presented in Part II, which related test performance to AIT performance. Screening Test unit scores can be entered into a regression equation for predicting TESTSUM, the sum of scores on the five performance tests of the AIT course. The number of Screening Test scores above cutoff can be used to predict probability of membership in each of four criterion categories:

- I. Highly successful AIT students.
- II. Moderately successful AIT students.
- III. Marginally successful AIT students.
- IV. Students who left the AIT course prior to completion.

More complete definitions of these categories can be found in Part II of this document.

Criterion category membership can also be predicted on the basis of number of FBSEP lessons prescribed (i.e., number of lesson scores below cutoff). Each of these three prediction functions will be described in turn.

Table IV-4

Probability of FBSEP Success as a Function  
of Number of Lessons Assigned

A. Probability of Passing All Assigned Lessons

<u>Number of Lessons Assigned</u>	<u>Probability of Passing All Lessons</u>
1-2	.97
3-5	.73
6 or more	.46

B. Probability of Passing All Post-tests Given One to Two Weeks Later

<u>Number of Lessons Assigned</u>	<u>Probability of Passing All Post-tests</u>
1-2	.74
3-5	.29
6 or more	.05

### Using Screening Test Scores to Predict TESTSUM

The regression equation for predicting TESTSUM from Screening Test unit scores is:

$$\begin{aligned} \text{Predicted } T = & 1.73X_I - 4.09X_{II} + 3.93X_{III} + 3.54X_{IV} \\ & + 0.97X_V + 2.25X_{VI} - 1.00X_{VII} + 0.50X_{VIII} \\ & + 1.67X_{IX} + 372.55. \end{aligned}$$

where:

$T = \text{TESTSUM}$

1.73, -4.09, ...1.67 are the regression weights for Unit I, II, ...IX.

$X_I = \text{student's score in Unit I}$

$X_{II} = \text{student's score in Unit II}$

$X_{III} = \text{student's score in Unit III, etc.}$

372.55 is a constant

A student's predicted TESTSUM is obtained by multiplying each of his/her unit scores by the regression weight for that unit, adding the products as required by the equation, then adding the constant 372.55.

To assist in the calculation of the predicted TESTSUM, all of the possible products of regression weight times unit score are presented for each unit in Table IV-5. This table can be used to predict a student's TESTSUM given the student's scores on the various units of the Screening Test. The steps to follow when predicting TESTSUM are:

1. Identify the student's score for each unit as measured by the Screening Test.
2. Locate each score in the appropriate column of Table IV-5.
3. Once a score for a unit has been located, look at the value to the immediate right of the score (in the next column). This is the score multiplied by the regression weight. You will have nine such products.

Table IV-5

Products of Unit Score Times Regression Weight  
for Each of Nine Units in the Screening Test

Score on Unit I	Product of Score x 1.73	Score on Unit II	Product of Score x -4.09	Score on Unit III	Product of Score x 3.93
0	0.00	0	0.00	0	0.00
1	1.73	1	-4.09	1	3.93
2	3.46	2	-8.18	2	7.86
3	5.19	3	-12.27	3	11.79
4	6.92	4	-16.36	4	15.72
5	8.65	5	-20.45	5	19.65
6	10.38	6	-24.54	6	23.58
7	12.11	7	-28.63	7	27.51
8	13.84	8	-32.72	8	31.44
9	15.57	9	-36.81	9	35.37
10	17.30	10	-40.90	10	39.30
11	19.03			11	43.23
12	20.76			12	47.16
13	22.49				
14	24.22				
15	25.95				
16	27.68				

Score on Unit IV	Product of Score x 3.57	Score on Unit V	Product of Score x 0.97	Score on Unit VI	Product of Score x 2.25
0	0.00	0	0.00	0	0.00
1	3.54	1	0.97	1	2.25
2	7.08	2	1.94	2	4.50
3	10.62	3	2.91	3	6.75
4	14.16	4	3.88	4	9.00
5	17.70	5	4.85	5	11.25
6	21.24	6	5.82	6	13.50
7	24.78			7	15.75
8	28.32			8	18.00
9	31.86				
10	35.40				
11	38.94				
12	42.48				

Table IV-5 (cont'd)

Score on Unit VII	Product of Score x -1.00	Score on Unit VIII	Product of Score x 0.50	Score on Unit IX	Product of Score x 1.67
0	0.00	0	0.00	0	0.00
1	-1.00	1	0.50	1	1.67
2	-2.00	2	1.00	2	3.34
3	-3.00	3	1.50	3	5.01
4	-4.00	4	2.00	4	6.68
5	-5.00	5	2.50	5	8.35
6	-6.00	6	3.00	6	10.02
		7	3.50	7	11.69
		8	4.00	8	13.36

4. Sum all of the products for the student.

Since two of the products will be negative rather than positive (those for Units II and VII), the easiest way to find the sum is as follows:

- a. First, add the products for Units I, III, IV, V, VI, VIII, and IX. (These are all the positive products.)
  - b. Second, subtract the product for Unit II.
  - c. Third, subtract the product for Unit VII. The result will be the sum of all nine products.
5. Finally, add the constant 372.55 to the sum of products. The result is the student's predicted TESTSUM.
6. Round the predicted TESTSUM to the nearest whole number.

For example, consider a student whose unit scores on the Screening Test are as shown in column (2) below:

(1) <u>Unit</u>	(2) <u>Student's Score</u>	(3) <u>Product</u>
I	9	15.57
II	10	-40.90
III	3	11.79
IV	1	3.54
V	6	5.82
VI	5	11.25
VII	4	-4.00
VIII	6	3.00
IX	3	5.01

First, we find the student's Unit I score (9) in Table IV-5 under "Score on Unit I" and find, in the next column, that the product of his/her score times the regression weight is 15.57. The student's score in Unit II (10), has a product of -40.90. Similarly, we find the remaining products, from Units III through IX. The products are listed above, in column (3).

Next, we add the positive products from Units I, III, IV, V, VI, VIII, and IX:

$$15.57 + 11.79 + 3.54 + 5.82 + 11.25 + 3.00 + 5.01 = 55.98$$

We then subtract the Negative Unit II and Unit VII products in turn:

$$55.98 - 40.90 = 15.08$$

$$15.08 - 4.00 = 11.08$$

Finally, we add 372.55:

$$11.08 + 372.55 = 383.63.$$

The student's predicted TESTSUM is 383.63. Rounded to the nearest whole number, is is 384. We estimate that, if this student enters AIT without remedial FBSEP training, the sum of his/her five performance test scores will be about 384.

Of course, not every prediction made by the equation is accurate. In fact, a certain amount of error is expected. The standard error of estimate is a measure of this expected error. For the regression equation above, the standard error of estimate is 31.58.

The standard error of estimate (31.58) can be used to compute a 95% confidence interval for a student's predicted TESTSUM by using the formula:

$$\text{Predicted T} \pm 2 \times 31.58$$

or

$$\text{Predicted T} \pm 63.16$$

The formula gives an upper and a lower limit between which we can be 95% confident that the student's TESTSUM will actually lie. This means that predictions made in this way will be correct in 95 out of 100 cases.

Consider the student whose predicted TESTSUM was 384. Using the formula above, we compute his/her 95% confidence interval:

$$384 \pm 63.16 = 320.84 \text{ to } 447.16.$$

We are 95% confident that this student's actual TESTSUM (assuming no remedial training) will be somewhere between about 321 and 447.

### Using Screening Test Scores to Predict Criterion Category Membership

Table IV-6(A) gives the probability of membership in each of the four criterion categories listed on page 62 as a function of number of Screening Test units above cutoff. For example, a student with six of the nine units above cutoff who is not remediated has a .36 probability of being highly successful in the AIT course (Category I), a .50 probability of being moderately successful (Category II), a .09 probability of being marginally successful (Category III), and a .04 probability of leaving the course prior to completion (Category IV).

### Using Diagnostic Scores (Number of FBSEP Lessons Needed) to Predict Criterion Category Membership

Table IV-6(B) gives the probability of membership in each criterion category as a function of the number of lessons prescribed for a student, but not delivered. For example, a student who needs 8 lessons but does not get them has a .26 probability of being highly successful in the AIT course (Category I), a .37 probability of being moderately successful (Category II), a .15 probability of being marginally successful (Category III), and a .22 probability of leaving the course prior to completion (Category IV).

Predictions of AIT success following exposure to remedial training are not possible at this time, due to lack of time to collect AIT performance data for students who have completed FBSEP.

### 6. Predicting Probability of FBSEP Completion Within 180 and Within 240 Hours

Table IV-3 shows that the estimated upper limit of the 60% range of completion times for all 29 lessons is far short of 180 hours. It is, of course, possible that an exceptionally slow student with a very long prescription may require longer than 180 hours or even 240 hours. However, it is extremely unlikely. We estimate the probability of insufficient time to complete FBSEP within 180 or 240 hours to be close to zero.

Table IV-6

Tables for Predicting Criterion Category Membership,  
Assuming No Remediation

A. Probability of Criterion Category Membership as a Function  
of Number of Screening Test Units above Cutoff

Number of Units above Cutoff	Criterion Category			
	I	II	III	IV
All 9	.57	.36	.04	.04
6 to 8	.36	.50	.09	.04
0 to 5	.17	.42	.17	.25

B. Probability of Criterion Category Membership as a Function  
of Number of Lessons Prescribed

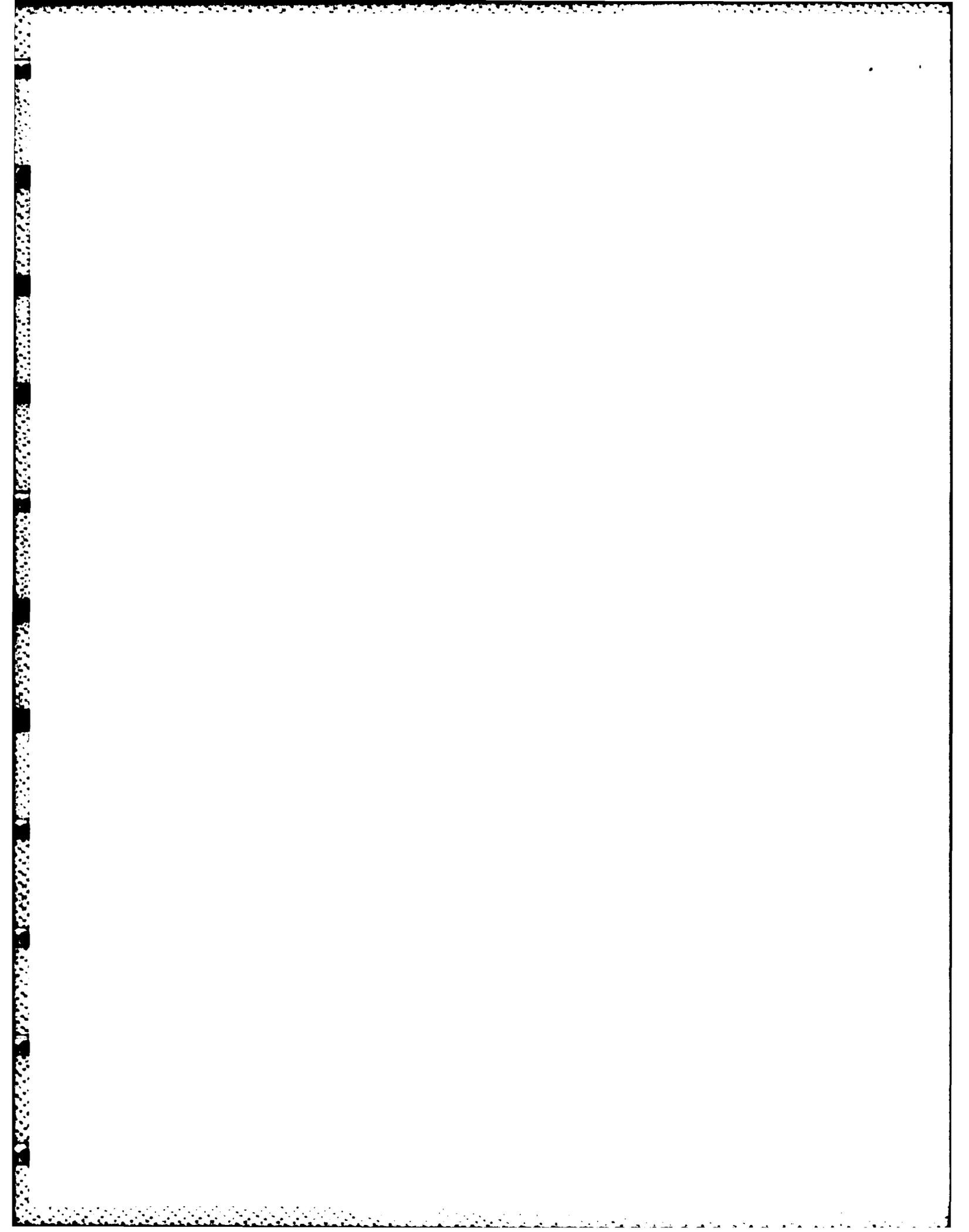
Number of Lessons Prescribed	Criterion Category			
	I	II	III	IV
0 to 2	.49	.42	.05	.04
3 to 5	.17	.61	.17	.06
6 or more	.26	.37	.15	.22

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APPENDIX A

SCRIPTS OF

MOVIE PROJECTOR LECTURE

MOVIE PROJECTOR DEMONSTRATION

## MOVIE PROJECTOR LECTURE

### Audio Script

This is a short lecture on the characteristics of the 16mm movie projector. Later, you will see a demonstration on how to set up and operate this kind of projector. Right now, however, you will hear some background information about the 16mm movie projector.

The particular movie projector we are working with is a sound projector. It is made up of three systems: the projection system, the film transport system, and the audio - or sound - system. I'll repeat that. The three systems are: ...

Now we'll talk a little about each of these systems.

The function of the projection system is to show a large, clear picture on the screen. The most important parts of the projection system are the lamp and the lenses. I'll repeat that. The most important parts of the projector system ...

The function of the film transport system is to move the film past the lens at a steady rate. Two important parts of the film transport system are the motor and the reels. The motor and the reels.

The function of the audio system is - of course - to reproduce the sound that is on the film. Two important parts of the audio system are the amplifier and the speaker. The amplifier and the speaker.

Let's talk now about the size of the film. Movie film comes in 3 widths: 8mm, 16mm, and 35mm. The movies you see in a theatre are usually 35mm. Educational film shown in the classroom are either 8mm or 16mm. The projector we are describing takes 16mm film. This next point is important. Remember that a projector that is made to show one size of film cannot be used to show a different sized film. The 16mm film projector can only take 16mm film.

The term "motion picture" isn't really accurate. The motion you see when watching a movie is actually an illusion. A film is made up of a very large number of still pictures, called "frames." Each frame is just slightly different from the frame before it. When these frames are projected at the correct speed, they give the illusion of smooth motion. The standard speed for a sound film is 24 frames per second. I'll repeat that: 24 frames per second.

Finally, let's talk about the physical characteristics and the capabilities of the particular 16mm projector that will be used in the demonstration.

The projector can be carried easily. The case has a carrying handle on top.

The speaker is located in the projector itself. It is not separate.

The projector also has several special capabilities.

First, it has a reverse function. This allows you to run the film in reverse and show the motion backward.

Second, it has a stop action function. This allows you to stop the film at a particular frame so you can study it.

That is the end of the lecture.

---

(At this point, students are directed to answer Questions 1-4 of the Screening Test.)

Title Movie Projector Demonstration

Page 1 of 4

Program \_\_\_\_\_

Media Videotape

Time \_\_\_\_\_

Visual	Audio
M.S. Narrator.	This demonstration is on how to operate a movie projector. We'll break the procedure down into 3 phases.
C.U. Graphic.	The phases are: Set up. Automatic Threading. And Running the Film.
M.S. Projector. Narrator shows inside of cover.	For this demonstration, we are using a 16mm sound projector. Most projectors have the instructions inside the cover.
M.S. Narrator demonstrates steps. Step 1	Phase 1 has 5 steps: Step 1. Place the projector on a level and sturdy surface.
Step 2	Step 2. Plug the projector in.
Step 3	Step 3. Extend the reel arm. This is called the reel arm because it holds the reel of film. It will extend so far, then it will lock in place. You can hear the click. (Sound) Extend the other reel arm to the horizontal position. It will lock in place too. (Sound)
Step 4	Step 4. Place the reel of film on the front reel arm.
M.S. Points to lens.	You can tell the front by looking for the lens. The lens is at the front of the projector.
M.S. Positions reel. Tests it.	The reel will snap into place. Make sure it is secure.

Visual	Audio
<p>M.S. Points to film coming off reel.</p>	<p>Position the reel of film so the film comes off the front of the reel, <u>NOT</u> the back.</p> <p>I'll repeat that: Position the reel of film so the film comes off the front of the reel, <u>NOT</u> the back.</p>
<p>M.S. Positions take-up reel.</p>	<p>Then put the empty reel, or take-up reel, on the other reel arm. I'll repeat that name: the empty reel is called the <u>take-up</u> reel.</p>
<p>C.U. Turns on Volume Control.</p>	<p>Step 5. Turn on the Volume Control. That's the switch down in front here. Turn it to the ON position. That turns on the power.</p> <p>That is the end of Phase 1.</p>
<p>At this point, the test administrator turns off the VTR and directs the students to answer Questions 5-8 of the Screening Test.</p>	
<p>M.S. Narrator.</p>	<p>Now for Phase 2. Phase 2 is Threading the Projector. This is an automatic-threading machine which simplifies the threading.</p> <p>Phase 2 has 5 steps:</p>
<p>C.U. Turns on motor/lamp switch.</p>	<p>Step 1. Turn on the motor-lamp switch to Forward Position. I'll repeat that. This switch is called the motor lamp switch. Turn it to Forward Position. It is marked FWD and has the Number 1 because it is Step 1.</p>

Title Movie Projector Demonstration

Page 3 of 4

Program \_\_\_\_\_

Media Videotape

Time \_\_\_\_\_

Visual	Audio
M.S. Holds up leader.	Step 2. Trim the leader. This white part is called
C.U. End of leader.	the leader. Look at the end of it. The end
	may be ragged, or cut at an angle. If that's
	the case, the leader won't thread through the
	machine properly. You'll have to trim it.
C.U. Points to	The cutter is here, on the front of the
C.U. Demonstrates	projector. To trim the leader just insert it
C.U. procedure.	in the slot and press the cutter. The leader
	is now ready for threading.
M.S. Points to Auto	Step 3. Push the Auto Load lever. That is the lever
C.U. Load lever.	here. It's marked with the Number 3. Push
C.U. Positions it.	it forward.
C.U. Inserts film.	Step 4. Insert the film here where you see the
	Number 4. It will automatically thread
M.S. Narrator behind	through the machine.
M.S. projector.	Step 5. Allow at least 3 feet of leader to run
M.S. Demonstrates	through the end of the machine. Then turn
M.S. action.	off the motor-lamp switch.
C.U. Attaches leader	Attach the leader to the take-up reel.
C.U. to reel.	Insert the end into the slot on the reel.
	Tighten it by turning the reel.
M.S. Narrator.	Now you're ready for Phase 3 - Running the Film.

Title Movie Projector Demonstration

Page 4 of 4

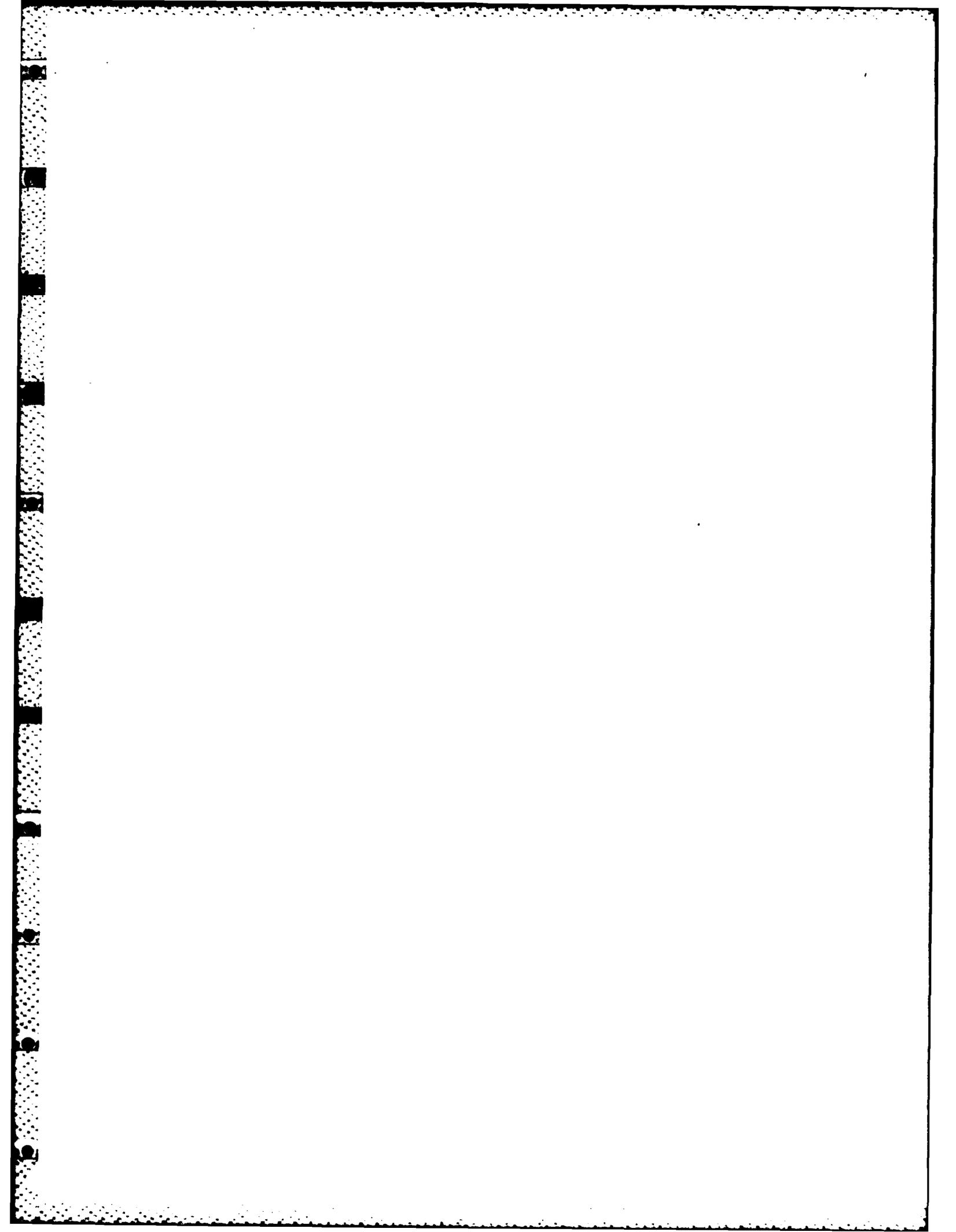
Program \_\_\_\_\_

Media Videotape

Time \_\_\_\_\_

Visual	Audio
C.U. Turns switch to lamp position.	Step 1. Turn the motor-lamp switch to Lamp position. That turns on the light.
C.U. Adjusts focus.	Step 2. FOCUS. The focus knob is here. Adjust the focus until you have a sharp picture.
C.U. Turns up volume.	Step 3. Adjust the volume. Then you're all set to show the film. (Sound of film.)
M.S. Narrator.	This concludes the procedure for operating the projector.

At this point, students are directed to complete the rest of the Screening Test, beginning with Item No. 9.



APPENDIX B

· ALL SCORING KEYS

SCREENING TEST - SCORING KEY

Unit III	1.	a	b	c	d	Unit IX	22.	a	b	c	d	Unit I	43.	a	b	c	d	Unit VI	64.	a	b	c	d		
	2.	o	o	o	o		23.	a	b	c	d		44.	a	b	c	d		65.	a	b	c	d		
	3.	a	b	c	d		24.	o	o	o	o		45.	o	o	o	o		66.	o	o	o	o		
	4.	o	o	o	o		25.	a	b	c	d		46.	a	b	c	d		67.	a	b	c	d		
	5.	a	b	c	d		26.	o	o	o	o		47.	o	o	o	o		68.	o	o	o	o		
	6.	o	o	o	o		27.	a	b	c	d		48.	a	b	c	d		Unit VII	69.	a	b	c	d	
	7.	a	b	c	d		28.	o	o	o	o	49.	o	o	o	o	70.	a		b	c	d			
	8.	o	o	o	o		Unit I	29.	a	b	c	d	50.	a	b	c	d	71.		a	b	c	d		
	9.	a	b	c	d			30.	o	o	o	o	Unit V	51.	o	o	o	o		72.	o	o	o	o	
	10.	o	o	o	o			31.	a	b	c	d		52.	a	b	c	d		Unit IV	73.	a	b	c	d
	11.	a	b	c	d			32.	o	o	o	o		53.	o	o	o	o			74.	a	b	c	d
	12.	o	o	o	o			33.	a	b	c	d		54.	a	b	c	d	75.		o	o	o	o	
Unit VIII	13.	a	b			34.		o	o	o	o	55.		o	o	o	o	76.	a		b	c	d		
	14.	o	o			35.		a	b	c	d	56.		a	b	c	d	77.	o		o	o	o		
	15.	a	b			36.		o	o	o	o	57.	o	o	o	o	78.	a	b		c	d			
	16.	o	o			37.		a	b	c	d	58.	a	b	c	d	79.	o	o	o	o				
	17.	a	b			38.		o	o	o	o	59.	o	o	o	o	80.	a	b	c	d				
	18.	o	o			39.		a	b	c	d	60.	a	b	c	d	81.	o	o	o	o				
Unit IX	19.	a	b			Unit I		40.	o	o	o	o	Unit II	61.	o	o	o	o	Unit VI	82.	a	b	c	d	
	20.	o	o	c	d		41.	a	b	c	d	62.		a	b	c	d	83.		o	o	o	o		
	21.	a	b	c	d		42.	o	o	o	o	63.		o	o	o	o	84.		a	b	c	d		
	cont.						cont.					cont.													

Note: These two items are scored in Both Unit VI and Unit VII.

DIAGNOSTIC TEST - UNIT I

SCORING KEY

Lesson 1	1.	a	b	c	d	Lesson 3	17.	a	b	c	d
	2.	o	e	o	o		18.	o	o	o	e
	3.	a	b	c	d		19.	a	b	c	d
	4.	o	o	o	e		20.	o	e	o	o
Lesson 7	5.	a	b	c	d	Lesson 5	21.	a	b	c	d
	6.	o	e	o	o		22.	o	o	e	o
	7.	a	b	c	d		23.	o	o	o	e
	8.	o	o	o	e		24.	o	o	e	o
Lesson 4	9.	a	b	c	d	Lesson 2	25.	a	b	c	d
	10.	o	o	e	o		26.	o	e	o	o
	11.	a	b	c	d		27.	o	o	e	o
	12.	o	o	e	o		28.	o	o	e	o
Lesson 5	13.	a	b	c	d	Lesson 6	29.	a	b	c	d
	14.	o	o	e	o		30.	e	o	o	o
	15.	a	b	c	d		31.	e	o	o	o
	16.	o	o	e	o		32.	o	e	o	o

Note: Questions 13-16 plus 21-24 yield scores for Lesson 5.

DIAGNOSTIC TEST - UNIT II

SCORING KEY

Lesson 1

1.	a	b	c	d		17.	a	b	c	d
	o	o	o	●			o	●	o	o
2.	a	b	c	d		18.	a	b	c	d
	o	o	o	●			o	o	●	o
3.	a	b	c	d		19.	a	b	c	d
	o	o	●	o			o	●	o	o
4.	a	b	c	d		20.	a	b	c	d
	●	o	o	o			o	●	o	o

Lesson 3 (cont'd)

Lesson 2

5.	a	b	c	d
	o	o	●	o
6.	a	b	c	d
	●	o	o	o
7.	a	b	c	d
	o	●	o	o
8.	a	b	c	d
	o	o	o	●
9.	a	b	c	d
	o	o	●	o
10.	a	b	c	d
	o	o	o	●
11.	a	b	c	d
	o	o	●	o
12.	a	b	c	d
	o	o	o	●

Lesson 3

13.	a	b	c	d
	o	o	●	o
14.	a	b	c	d
	o	o	o	●
15.	a	b	c	d
	●	o	o	o
16.	a	b	c	d
	●	o	o	o

DIAGNOSTIC TEST - UNIT III

SCORING KEY

NOTE: Use this template only when student's score on the Screening Test, Unit III is below cutoff point.

1.	a	b	c	d
	o	o	o	e
2.	a	b	c	d
	o	e	o	o
3.	a	b	c	d
	o	o	e	o
4.	a	b	c	d
	o	o	e	o
5.	a	b	c	d
	o	o	o	e
6.	a	b	c	d
	o	e	o	o
7.	a	b	c	d
	o	e	o	o
8.	a	b	c	d
	o	o	o	e
9.	a	b	c	d
	o	o	e	o
10.	a	b	c	d
	o	o	o	e
11.	a	b	c	d
	e	o	o	o
12.	a	b	c	d
	o	o	e	o

Lesson 1

Lesson 2

Lesson 3

DIAGNOSTIC TEST - UNIT IV - SCORING KEY

NOTE: Use this template only when student's score on the Screening Test, Unit IV is below cutoff point.

Note: The Lesson 1 score is the same as the Unit score on the Screening Test.

Lesson 1

Lesson 3

Lesson 2

	a	b	c	d
73.	o	●	o	o
	a	b	c	d
74.	o	o	●	o
	a	b	c	d
75.	o	o	o	●
	a	b	c	d
76.	o	o	●	u
	a	b	c	d
77.	●	o	o	o
	a	b	c	d
78.	o	o	o	●
	a	b	c	d
79.	o	o	o	●
	a	b	c	d
80.	o	●	o	o
	a	b	c	d
81.	o	●	o	o
	a	b	c	d
82.	o	●	o	o
	a	b	c	d
83.	●	o	o	o
	a	b	c	d
84.	o	o	●	o

DIAGNOSTIC TEST - UNIT VI

SCORING KEY

Lesson 2

	a	b	c	d
1.	●	○	○	○
	a	b	c	d
3.	○	●	○	○
	a	b	c	d
4.	○	●	○	○
	a	b	c	d
8.	○	●	○	○

Lesson 3

	a	b	c	d
2.	●	○	○	○
	a	b	c	d
5.	●	○	○	○
	a	b	c	d
6.	○	●	○	○
	a	b	c	d
7.	○	○	●	○
	a	b	c	d
9.	○	○	○	●
	a	b	c	d
10.	○	○	●	○
	a	b	c	d
11.	○	○	○	●
	a	b	c	d
12.	○	○	○	●

Lesson 1

	a	b	c	d
13.	○	○	●	○
	a	b	c	d
14.	○	○	●	○
	a	b	c	d
15.	○	○	●	○
	a	b	c	d
16.	●	○	○	○

DIRECTIONS TO SCORER

To score Lessons 3 and 4, position template so the arrow below is at the left edge of the student's Answer Sheet.

DIAGNOSTIC TEST - UNIT VII

SCORING KEY

1.	a	b	c	d
	●	○	○	○
2.	a	b	c	d
	○	●	○	○
3.	a	b	c	d
	○	○	●	○
4.	a	b	c	d
	●	○	○	○
5.	a	b	c	d
	○	○	●	○
6.	a	b	c	d
	●	○	○	○
7.	a	b	c	d
	●	○	○	○
8.	a	b	c	d
	○	●	○	○
9.	a	b	c	d
	○	○	●	○
10.	a	b	c	d
	○	○	●	○
11.	a	b	c	d
	○	○	●	○
12.	a	b	c	d
	●	○	○	○

Lesson 2

Lesson 1



DIAGNOSTIC TEST - UNIT IX

SCORING KEY

Lesson 1

	a	b	c	d
1.	●	○	○	○
5.	●	○	○	○
9.	○	○	●	○
15.	○	●	○	○

Lesson 2

	a	b	c	d
2.	○	○	○	●
4.	○	○	●	○
7.	○	●	○	○
10.	○	○	●	○

DIRECTIONS TO SCORER:

To score Lesson 2, position template so arrow #1 is at the left edge of the Student's Answer Sheet.

Lesson 3

	a	b	c	d
3.	○	●	○	○
8.	●	○	○	○
14.	○	○	●	○
16.	○	○	●	○

DIRECTIONS TO SCORER:

To score Lesson 3, position template so arrow #2 is at the left edge of the Student's Answer Sheet.

Lesson 4

	a	b		
6.	○	●		
11.	○	○	●	○
12.	○	○	●	○
13.	○	○	●	○

DIRECTIONS TO SCORER:

To score Lesson 4, position template so arrow #3 is at the left edge of the Student's Answer Sheet.

31M10  
DIAGNOSTIC TESTS

ADDENDA

All answer sheets (except Screening Test)

All scoring keys (including Screening Test)

Screening Test Record Sheet

Student Diagnostic Record Sheet

FBSEP Prescription Sheet

FBSEP Information Sheet

DIAGNOSTIC TEST - UNIT I

ANSWER SHEET

NAME \_\_\_\_\_

DATE \_\_\_\_\_

	Last				First				
1.	a	b	c	d	17.	a	b	c	d
	o	o	o	o		o	o	o	o
2.	a	b	c	d	18.	a	b	c	d
	o	o	o	o		o	o	o	o
3.	a	b	c	d	19.	a	b	c	d
	o	o	o	o		o	o	o	o
4.	a	b	c	d	20.	a	b	c	d
	o	o	o	o		o	o	o	o
5.	a	b	c	d	21.	a	b	c	d
	o	o	o	o		o	o	o	o
6.	a	b	c	d	22.	a	b	c	d
	o	o	o	o		o	o	o	o
7.	a	b	c	d	23.	a	b	c	d
	o	o	o	o		o	o	o	o
8.	a	b	c	d	24.	a	b	c	d
	o	o	o	o		o	o	o	o
9.	a	b	c	d	25.	a	b	c	d
	o	o	o	o		o	o	o	o
10.	a	b	c	d	26.	a	b	c	d
	o	o	o	o		o	o	o	o
11.	a	b	c	d	27.	a	b	c	d
	o	o	o	o		o	o	o	o
12.	a	b	c	d	28.	a	b	c	d
	o	o	o	o		o	o	o	o
13.	a	b	c	d	29.	a	b	c	d
	o	o	o	o		o	o	o	o
14.	a	b	c	d	30.	a	b	c	d
	o	o	o	o		o	o	o	o
15.	a	b	c	d	31.	a	b	c	d
	o	o	o	o		o	o	o	o
16.	a	b	c	d	32.	a	b	c	d
	o	o	o	o		o	o	o	o

DIAGNOSTIC TEST - UNIT II

ANSWER SHEET

NAME \_\_\_\_\_

DATE \_\_\_\_\_

	Last	First
	a b c d	a b c d
1.	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	17. <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
	a b c d	a b c d
2.	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	18. <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
	a b c d	a b c d
3.	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	19. <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
	a b c d	a b c d
4.	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	20. <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
	a b c d	
5.	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	
	a b c d	
6.	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	
	a b c d	
7.	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	
	a b c d	
8.	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	
	a b c d	
9.	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	
	a b c d	
10.	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	
	a b c d	
11.	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	
	a b c d	
12.	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	
	a b c d	
13.	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	
	a b c d	
14.	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	
	a b c d	
15.	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	
	a b c d	
16.	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	

DIAGNOSTIC TEST - UNIT VI

ANSWER SHEET

NAME \_\_\_\_\_

DATE \_\_\_\_\_

\_\_\_\_\_ Last

\_\_\_\_\_ First

- |     |   |   |   |   |
|-----|---|---|---|---|
|     | a | b | c | d |
| 1.  | o | o | o | o |
|     | a | b | c | d |
| 2.  | o | o | o | o |
|     | a | b | c | d |
| 3.  | o | o | o | o |
|     | a | b | c | d |
| 4.  | o | o | o | o |
|     | a | b | c | d |
| 5.  | o | o | o | o |
|     | a | b | c | d |
| 6.  | o | o | o | o |
|     | a | b | c | d |
| 7.  | o | o | o | o |
|     | a | b | c | d |
| 8.  | o | o | o | o |
|     | a | b | c | d |
| 9.  | o | o | o | o |
|     | a | b | c | d |
| 10. | o | o | o | o |
|     | a | b | c | d |
| 11. | o | o | o | o |
|     | a | b | c | d |
| 12. | o | o | o | o |
|     | a | b | c | d |
| 13. | o | o | o | o |
|     | a | b | c | d |
| 14. | o | o | o | o |
|     | a | b | c | d |
| 15. | o | o | o | o |
|     | a | b | c | d |
| 16. | o | o | o | o |



DIAGNOSTIC TEST - UNIT VIII

ANSWER SHEET

NAME

DATE

\_\_\_\_\_  
Last

\_\_\_\_\_  
First

- |     |                       |                       |                       |                       |
|-----|-----------------------|-----------------------|-----------------------|-----------------------|
|     | a                     | b                     |                       |                       |
| 1.  | <input type="radio"/> | <input type="radio"/> |                       |                       |
|     | a                     | b                     |                       |                       |
| 2.  | <input type="radio"/> | <input type="radio"/> |                       |                       |
|     | a                     | b                     |                       |                       |
| 3.  | <input type="radio"/> | <input type="radio"/> |                       |                       |
|     | a                     | b                     |                       |                       |
| 4.  | <input type="radio"/> | <input type="radio"/> |                       |                       |
|     | a                     | b                     |                       |                       |
| 5.  | <input type="radio"/> | <input type="radio"/> |                       |                       |
|     | a                     | b                     |                       |                       |
| 6.  | <input type="radio"/> | <input type="radio"/> |                       |                       |
|     | a                     | b                     |                       |                       |
| 7.  | <input type="radio"/> | <input type="radio"/> |                       |                       |
|     | a                     | b                     |                       |                       |
| 8.  | <input type="radio"/> | <input type="radio"/> |                       |                       |
|     | a                     | b                     |                       |                       |
| 9.  | <input type="radio"/> | <input type="radio"/> |                       |                       |
|     | a                     | b                     |                       |                       |
| 10. | <input type="radio"/> | <input type="radio"/> |                       |                       |
|     | a                     | b                     |                       |                       |
| 11. | <input type="radio"/> | <input type="radio"/> |                       |                       |
|     | a                     | b                     |                       |                       |
| 12. | <input type="radio"/> | <input type="radio"/> |                       |                       |
|     | a                     | b                     | c                     | d                     |
| 13. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|     | a                     | b                     | c                     | d                     |
| 14. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|     | a                     | b                     |                       |                       |
| 15. | <input type="radio"/> | <input type="radio"/> |                       |                       |
|     | a                     | b                     |                       |                       |
| 16. | <input type="radio"/> | <input type="radio"/> |                       |                       |

DIAGNOSTIC TEST - UNIT IX

ANSWER SHEET

NAME \_\_\_\_\_ DATE \_\_\_\_\_

                    Last

                    First

- |     |                       |                       |                       |                       |
|-----|-----------------------|-----------------------|-----------------------|-----------------------|
|     | a                     | b                     | c                     | d                     |
| 1.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|     | a                     | b                     | c                     | d                     |
| 2.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|     | a                     | b                     | c                     | d                     |
| 3.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|     | a                     | b                     | c                     | d                     |
| 4.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|     | a                     | b                     | c                     | d                     |
| 5.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|     | a                     | b                     |                       |                       |
| 6.  | <input type="radio"/> | <input type="radio"/> |                       |                       |
|     | a                     | b                     | c                     | d                     |
| 7.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|     | a                     | b                     | c                     | d                     |
| 8.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|     | a                     | b                     | c                     | d                     |
| 9.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|     | a                     | b                     | c                     | d                     |
| 10. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|     | a                     | b                     | c                     | d                     |
| 11. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|     | a                     | b                     | c                     | d                     |
| 12. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|     | a                     | b                     | c                     | d                     |
| 13. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|     | a                     | b                     | c                     | d                     |
| 14. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|     | a                     | b                     | c                     | d                     |
| 15. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|     | a                     | b                     | c                     | d                     |
| 16. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |







Functional BSEP Information Sheet

This sheet provides information needed for writing student prescriptions. It lists all Functional BSEP units and lessons according to the time at which instruction is to be delivered, relative to the 31M10 AIT course. It also lists the estimated time required for each lesson.

Block 1: FRONT-LOADED FBSEP UNITS AND LESSONS. THESE ARE TO BE PRESCRIBED PRIOR TO STARTING THE AIT COURSE.

<u>Unit</u>	<u>Lesson</u>	<u>Title</u>	<u>Estimated Time Required (Hr:Min)</u>
I Reading Compre- hension	1	Vocabulary . . . . .	3:00
	2	Strategies for Reading Sentences . . . . .	4:45
	3	Reading Negative Sentences . . . . .	0:45
	4	Reading Sentences with Dependent Clauses . . . . .	1:00
	5	Ordering One, Two, or Three Tasks . . . . .	1:00
	6	Determining the Order of Tasks: Multiple Actions . . . . .	1:00
	7	Understanding Lists and Paragraphs . . . . .	1:10
II Using a Table of Contents	1	Chapters and Sections . . . . .	2:00
	2	Using a Task List to Find a Task Description . . . . .	2:00
	3	Tables with Paragraph Numbers and Page Numbers . . . . .	2:00
III Listening Skills	1	Remembering Information Heard in Lectures . . . . .	4:30
	2	Remembering Information Seen in Demonstrations . . . . .	3:00
	3	Recognizing When Important Information Is Missing . . . . .	1:45
IV Note- Taking for Demonstration	1	Basic Note-Taking Skills . . . . .	3:30
	2	Taking Notes to Show Sequence . . . . .	2:00
	3	Taking Notes to Show Relationships . . . . .	1:55

<u>Unit</u>	<u>Lesson</u>	<u>Title</u>	<u>Estimated Time Required (Hr:Min)</u>
V Recognizing a Part of a Whole	1	Recognizing a Part of a Whole . . . . .	1:00
VI & VII	1	The Structure of Tables and Diagrams . . . . .	0:45
VI Locating Information in Tables	2	Interpreting Table Headings . . . . .	1:15
	3	Locating Information in 31M Tables . . . . .	1:25
VII Reading Cabling Diagrams	2	Identifying Connections in Simple and Complex Cabling Diagrams . . . . .	1:50
IX Scale Reading	1	Labeling Place Value . . . . .	1:00
	2	Numbering Scale Points . . . . .	0:25
	3	Scales Divided into Tenths . . . . .	0:30
	4	Comparing Scale Settings . . . . .	0:30

Block 2: FUNCTIONAL BSEP LESSONS TO BE PRESCRIBED BEFORE THE FIFTH WEEK OF THE AIT COURSE

<u>Unit</u>	<u>Lesson</u>	<u>Title</u>	<u>Required (Hr:Min)</u>
VIII Diag- nosing Equip- ment Malfunc- tions	1	Deciding Whether an Indication is Normal . . . . .	0:30
	2	Deciding Whether There Is Something Wrong Based on Two or More Indicators . . . . .	0:35
	3	Finding Descriptions of Symptoms: One Indicator . . . . .	0:45
	4	Finding Descriptions of Symptoms When There Are Two or More Indicators . . . . .	0:55

SCREENING TEST - SCORING KEY

Unit III	1.	a	b	c	d	Unit IX	22.	a	b	c	d	Unit VI	43.	a	b	c	d	Unit VII	64.	a	b	c	d
	2.	a	b	c	d		23.	a	b	c	d		44.	a	b	c	d		65.	a	b	c	d
	3.	a	b	c	d		24.	a	b	c	d		45.	a	b	c	d		66.	a	b	c	d
	4.	a	b	c	d		25.	a	b	c	d		46.	a	b	c	d		67.	a	b	c	d
	5.	a	b	c	d		26.	a	b	c	d		47.	a	b	c	d		68.	a	b	c	d
	6.	a	b	c	d		27.	a	b	c	d		48.	a	b	c	d		69.	a	b	c	d
	7.	a	b	c	d		28.	a	b	c	d		49.	a	b	c	d		70.	a	b	c	d
	8.	a	b	c	d		29.	a	b	c	d		50.	a	b	c	d		71.	a	b	c	d
	9.	a	b	c	d		30.	a	b	c	d		51.	a	b	c	d		72.	a	b	c	d
	10.	a	b	c	d		31.	a	b	c	d		52.	a	b	c	d		73.	a	b	c	d
	11.	a	b	c	d		32.	a	b	c	d		53.	a	b	c	d		74.	a	b	c	d
	12.	a	b	c	d		33.	a	b	c	d		54.	a	b	c	d		75.	a	b	c	d
Unit VIII	13.	a	b	c	d	Unit I	34.	a	b	c	d	Unit II	55.	a	b	c	d	Unit IV	76.	a	b	c	d
	14.	a	b	c	d		35.	a	b	c	d		56.	a	b	c	d		77.	a	b	c	d
	15.	a	b	c	d		36.	a	b	c	d		57.	a	b	c	d		78.	a	b	c	d
	16.	a	b	c	d		37.	a	b	c	d		58.	a	b	c	d		79.	a	b	c	d
	17.	a	b	c	d		38.	a	b	c	d		59.	a	b	c	d		80.	a	b	c	d
	18.	a	b	c	d		39.	a	b	c	d		60.	a	b	c	d		81.	a	b	c	d
	19.	a	b	c	d		40.	a	b	c	d		61.	a	b	c	d		82.	a	b	c	d
	20.	a	b	c	d		41.	a	b	c	d		62.	a	b	c	d		83.	a	b	c	d
Unit IX	21.	a	b	c	d	Unit VI	42.	a	b	c	d	63.	a	b	c	d	84.	a	b	c	d		
	cont.						cont.					cont.											

Note: These two items are scored in both Unit VI and Unit VII.

DIAGNOSTIC TEST - UNIT I

SCORING KEY

Lesson 1	1.	a	b	c	d	Lesson 3	17.	a	b	c	d
	2.	a	b	c	d		18.	a	b	c	d
	3.	a	b	c	d		19.	a	b	c	d
	4.	a	b	c	d		20.	a	b	c	d
Lesson 7	5.	a	b	c	d	Lesson 5	21.	a	b	c	d
	6.	a	b	c	d		22.	a	b	c	d
	7.	a	b	c	d		23.	a	b	c	d
	8.	a	b	c	d		24.	a	b	c	d
Lesson 4	9.	a	b	c	d	Lesson 2	25.	a	b	c	d
	10.	a	b	c	d		26.	a	b	c	d
	11.	a	b	c	d		27.	a	b	c	d
	12.	a	b	c	d		28.	a	b	c	d
Lesson 5	13.	a	b	c	d	Lesson 6	29.	a	b	c	d
	14.	a	b	c	d		30.	a	b	c	d
	15.	a	b	c	d		31.	a	b	c	d
	16.	a	b	c	d		32.	a	b	c	d

Note: Questions 13-16 plus 21-24 yield scores for Lesson 5.

DIAGNOSTIC TEST - UNIT II

SCORING KEY

	a	b	c	d		a	b	c	d	
Lesson 1	1.	o	o	o	(	17.	o	(	o	o
		a	b	c	d		a	b	c	d
	2.	o	o	o	(	18.	o	o	(	o
		a	b	c	d		a	b	c	d
	3.	o	o	(	o	19.	o	(	o	o
		a	b	c	d		a	b	c	d
	4.	o	o	o		20.	o	o	o	o
		a	b	c	d					
Lesson 2	5.	o	o	(	o					
		a	b	c	d					
	6.	(	o	o	o					
		a	b	c	d					
	7.	o	(	o	o					
		a	b	c	d					
	8.	o	o	o	(					
		a	b	c	d					
	9.	o	o	(	o					
		a	b	c	d					
	10.	o	o	o	(					
		a	b	c	d					
11.	o	o	(	o						
	a	b	c	d						
12.	o	o	o	(						
	a	b	c	d						
Lesson 3	13.	o	o	(	o					
		a	b	c	d					
	14.	o	o	o	(					
		a	b	c	d					
	15.	(	o	o	o					
	a	b	c	d						
16.	o	o	o							

DIAGNOSTIC TEST - UNIT IV - SCORING KEY

NOTE: Use this template only when student's score on the Screening Test, Unit IV is below cutoff point.

Note: The Lesson 1 score is the same as the Unit score on the Screening Test.

Lesson 1

Lesson 3

Lesson 2

73.	a	b	c	d
	o	o	o	o
74.	a	b	c	d
	o	o	o	o
75.	a	b	c	d
	o	o	o	o
76.	a	b	c	d
	o	o	o	o
77.	a	b	c	d
	o	o	o	o
78.	a	b	c	d
	o	o	o	o
79.	a	b	c	d
	o	o	o	o
80.	a	b	c	d
	o	o	o	o
81.	a	b	c	d
	o	o	o	o
82.	a	b	c	d
	o	o	o	o
83.	a	b	c	d
	o	o	o	o
84.	a	b	c	d
	o	o	o	o

DIAGNOSTIC TEST - UNIT III

SCORING KEY

NOTE: Use this template only when student's score on the Screening Test, Unit III is below cutoff point.

1.	a	b	c	d	Lesson 1
	o	o	o	)	
2.	a	b	c	d	
	o	)	o	o	
3.	a	b	c	d	Lesson 2
	o	o	)	o	
4.	a	b	c	d	
	o	o	)	o	
5.	a	b	c	d	Lesson 3
	o	o	o	)	
6.	a	b	c	d	
	o	)	o	o	
7.	a	b	c	d	Lesson 3
	o	)	o	o	
8.	a	b	c	d	
	o	o	o	)	
9.	a	b	c	d	Lesson 3
	o	o	)	o	
10.	a	b	c	d	
	o	o	o	)	
11.	a	b	c	d	Lesson 3
	)	o	o	o	
12.	a	b	c	d	
	o	o	)	o	

↑

DIAGNOSTIC TEST - UNIT VI

SCORING KEY

Lesson 2

	a	b	c	d
1.	o	o	o	
	a	b	c	d
3.	o	o	o	o
	a	b	c	d
4.	o	o	o	o
	a	b	c	d
8.	o	o	o	o

Lesson 1

	a	b	c	d
13.	o	o	o	o
	a	b	c	d
14.	o	o	o	o
	a	b	c	d
15.	o	o	o	o
	a	b	c	d
16.	o	o	o	o

Lesson 3

	a	b	c	d
2.	o	o	o	o
	a	b	c	d
5.	o	o	o	o
	a	b	c	d
6.	o	o	o	o
	a	b	c	d
7.	o	o	o	o
	a	b	c	d
9.	o	o	o	o
	a	b	c	d
10.	o	o	o	o
	a	b	c	d
11.	o	o	o	o
	a	b	c	d
12.	o	o	o	o

**DIRECTIONS TO SCORER**

To score Lessons 3 and 4, position template so the arrow below is at the left edge of the student's Answer Sheet.

↓

DIAGNOSTIC TEST - UNIT VII

SCORING KEY

1.	a	b	c	d
	(	o	o	o
2.	a	b	c	d
	o	(	o	o
3.	a	b	c	d
	o	o	(	o
4.	a	b	c	d
	(	o	o	o
5.	a	b	c	d
	o	o	(	o
6.	a	b	c	d
	(	o	o	o
7.	a	b	c	d
	(	o	o	o
8.	a	b	c	d
	o	(	o	o
9.	a	b	c	d
	o	o	(	o
10.	a	b	c	d
	o	o	(	o
11.	a	b	c	d
	o	o	(	o
12.	a	b	c	d
	(	o	o	o

Lesson 2

Lesson 1

DIAGNOSTIC TEST - UNIT VIII

SCORING KEY

Lesson 1

1.	a	b
	o	—
3.	a	b
	o	—
5.	a	b
	o	—
6.	a	b
	—	o
7.	a	b
	—	o
8.	a	b
	—	o
10.	a	b
	—	o
12.	a	b
	o	—

Lesson 2

2.	a	b		
	o	—		
4.	a	b		
	—	o		
13.	a	b	c	d
	o	o	—	o
14.	a	b	c	d
	o	o	o	—

Lesson 4

Lesson 3

9.	a	b
	—	o
11.	a	b
	—	o
15.	a	b
	—	o
16.	a	b
	—	o

DIRECTIONS TO SCORER

To Score Lesson 2, position template so Arrow #1 is at the left edge of student's Answer Sheet.

DIRECTIONS TO SCORER

To score Lesson 3, position template so Arrow #2 is at the left edge of student's Answer Sheet.

DIAGNOSTIC TEST - UNIT IX

SCORING KEY

Lesson 1

1.    a b c d  
       o o o o

5.    a b c d  
       o o o o

9.    a b c d  
       o o o o

15.   a b c d  
       o o o o

Lesson 2

2.    a b c d  
       o o o o

4.    a b c d  
       o o o o

7.    a b c d  
       o o o o

10.   a b c d  
       o o o o

DIRECTIONS TO SCORER:

To score Lesson 2, position template so arrow #1 is at the left edge of the Student's Answer Sheet.

Lesson 3

3.    a b c d  
       o o o o

8.    a b c d  
       o o o o

14.   a b c d  
       o o o o

16.   a b c d  
       o o o o

DIRECTIONS TO SCORER:

To score Lesson 3, position template so arrow #2 is at the left edge of the Student's Answer Sheet.

Lesson 4

6.    a b  
       o o

11.   a b c d  
       o o o o

12.   a b c d  
       o o o o

13.   a b c d  
       o o o o

DIRECTIONS TO SCORER:

To score Lesson 4, position template so arrow #3 is at the left edge of the Student's Answer Sheet.

1

2

3

SCREENING TEST FOR 31M10 BASIC SKILLS EDUCATION PACKAGE

Instructions

This is a test of your ability in some skills that are important for learning in the 31M course. In order to do well in the course, you must be able to learn from lectures and from demonstrations, interpret equipment indicators, and read materials such as your Soldier's Manual and Army technical manuals. The questions in this test measure some of these important listening, watching, interpreting, and reading skills. They do not measure skills taught in the 31M course itself, but rather skills which help you to learn from the instruction in the course.

All the questions in the test are multiple choice. You must read each question, then choose the one answer which you feel is the best one and mark it on your answer sheet. Here are some instructions which will help you to earn your best score:

1. Read each question carefully before choosing an answer. Sometimes, people get questions wrong just through carelessness, not because they don't know the answer.
2. Read all of the answer choices carefully. Most questions have four choices. Some have only two or three.
3. Choose the answer which you feel is the best one, only one answer to each question.
4. On your answer sheet, find the answer space that has the same number as the question you are working on. For example, if you are working on question number 20, make sure that you use the answer space numbered 20 on your answer sheet.
5. Blacken the space under the letter of the answer you have chosen on the answer sheet. For example, suppose that, on question 20, you decide that the answer marked c is correct. Then you must blacken the space under c beside number 20 on the answer sheet, like this:

          a  b  c  d  
20.  o  o  ●  o

Do not mark your test booklet.

6. Mark only one answer for each question. Do not mark two or more choices for any questions.
7. If you are not sure about an answer to a question, make the best choice that you can. There is no penalty for wrong answers. But do not guess wildly.

If you follow these instructions, your score will accurately reflect your ability in these important skills.

There are 84 questions on this test and you will have about two hours to answer them. The test administrator will tell you when to begin and will give you further instructions, if needed.

**REMEMBER:** Do not mark the test booklets. Mark all your answers on the answer sheets.

Recall the lecture you just heard on the movie projector. Use the information in that lecture to answer the next four questions.

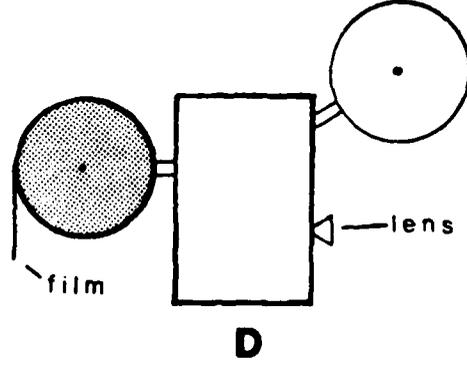
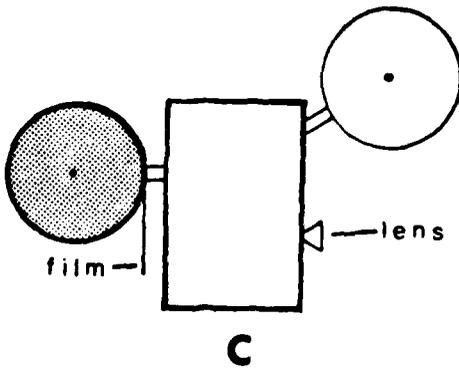
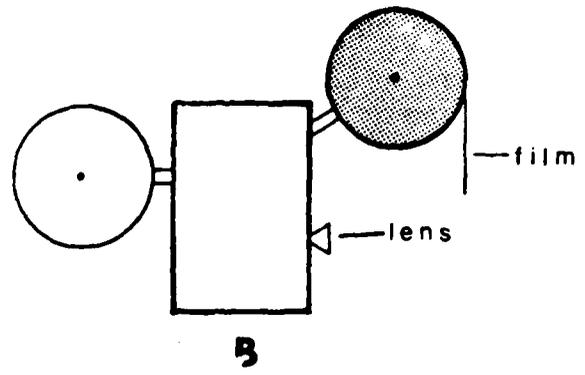
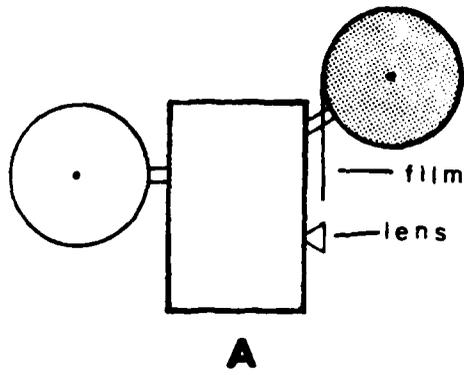
1. The projector described in the lecture is made up of a number of systems. Which of the following correctly lists all the systems?
  - a. 1. Projection system  
2. Motor system  
3. Amplifier system
  - b. 1. Film transport system  
2. Stop action system  
3. Projection system  
4. Frame system
  - c. 1. Film transport system  
2. Projection system
  - d. 1. Projection system  
2. Film transport system  
3. Audio system
  
2. A 16mm film projector can be used to show what size films?
  - a. 8mm or 16 mm
  - b. 16mm only
  - c. 16mm or 35mm
  - d. 8mm, 16mm, or 35mm
  
3. The standard speed for a sound film is how many frames per second?
  - a. 16
  - b. 20
  - c. 24
  - d. 34
  
4. Which of the following correctly describes some of the physical characteristics and capabilities of the projector?
  - a. It has a reverse function and a separate speaker.
  - b. It does not have stop-action. It does have slow motion.
  - c. It has a reverse function and stop-action.
  - d. It has a built-in speaker and slow motion.

DO NOT GO TO THE NEXT PAGE UNTIL YOU ARE TOLD TO DO SO.

Recall the demonstration you just saw on operating a movie projector. Use what you remember to answer the next four questions.

5. Which of the following represents the correct order in which the five set up steps are performed in the movie projector demonstration?
- a. Step 1. Plug in the projector.  
Step 2. Set projector on a level, sturdy surface.  
Step 3. Extend reel arms.  
Step 4. Turn on volume control.  
Step 5. Place film on front reel arm.
  - b. Step 1. Set projector on a level, sturdy surface.  
Step 2. Extend reel arms.  
Step 3. Turn on volume control.  
Step 4. Place film on front reel arm.  
Step 5. Plug in the projector.
  - c. Step 1. Place film on front reel arm.  
Step 2. Extend reel arms.  
Step 3. Plug in projector.  
Step 4. Set projector on level, sturdy surface.  
Step 5. Turn on volume control.
  - d. Step 1. Set projector on level, sturdy surface.  
Step 2. Plug in projector.  
Step 3. Extend reel arms.  
Step 4. Place film on front reel arm.  
Step 5. Turn on volume control.
6. The volume control is located:
- a. near the top toward the front of the projector.
  - b. near the bottom toward the front of the projector.
  - c. near the top toward the back of the projector.
  - d. near the bottom toward the back of the projector.

7. Which of the following pictures shows the correct way to place the reel of film on the projector.



- a. A
- b. B
- c. C
- d. D

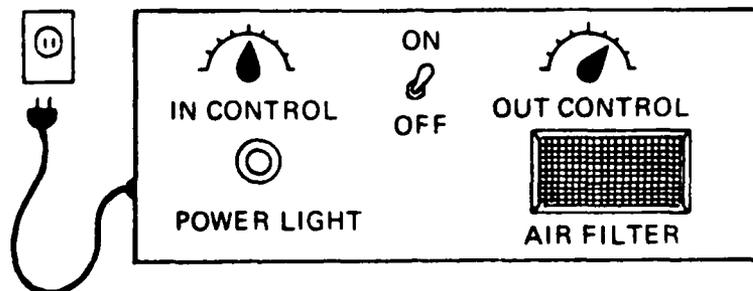
8. The instructions for running a projector can be found:

- a. alongside the lens.
- b. on the outside of the projector case.
- c. on the case containing the film reel.
- d. inside the projector cover.

DO NOT GO ON TO THE NEXT PAGE UNTIL YOU ARE TOLD TO DO SO.

9. Look at the drawing below. Then answer the question.

You are working with a piece of equipment that looks like this:



You are told to carry out the following instructions. Which can you not do without further information?

- Plug the power plug into the outlet.
  - Check to see whether the power light is on.
  - Make sure that both controls are correctly adjusted.
  - Place the ON-OFF switch in the OFF position.
10. Here are notes you have just taken during a lecture about raising an antenna:

Attach one guy wire between the 9th and 10th mast sections and the other between the 19th and 20th mast sections. Guy wires are colored - one red, one green. Make sure colors are in right places on mast. Add 5 more mast sections after second guy wire is attached.

Which of the following questions should you ask the sergeant before you try to raise the antenna.

- How many mast sections do we need?
  - What colors are the guy wires?
  - How many guy wires are there?
  - Which color guy wire goes in which place?
11. Your sergeant gives you the following instructions:

"First, increase the voltage to 25. Next, decrease it to 10. When the voltage reaches 50, turn the equipment off."

What is wrong with these instructions?

- The sergeant did not tell you how the voltage changes from 10 to 50.
- The sergeant did not tell you what to do second.
- The sergeant did not tell you what to do first.
- The sergeant did not tell you when to turn the equipment off.

12. Your sergeant gives you these instructions for starting a generator which you have never seen before:

1. Place the circuit breaker in the off position.
2. Place the remote-local switch in the local position.
3. Turn the voltage adjusting knob all the way to the left.
4. Set the voltage selector switch to the correct setting.
5. Pull the choke control all the way out.
6. Press the start-stop switch to start until the engine starts, then release.

Which of the following questions must you ask the sergeant before you try to start the generator yourself?

- a. What should I do with the choke control?
- b. What should I do with the start-stop switch after the engine starts?
- c. What is the correct setting of the voltage selector switch?
- d. What should I do with the remote-local switch?

Questions 13 through 20 give you a description of a symptom or a normal indication, then ask you to decide whether something is wrong with a piece of equipment. Pay close attention to the following definitions, and refer back to them whenever you need to:

NORMAL INDICATION: What is supposed to happen when the equipment is working properly.

SYMPTOM: An indication that there is something wrong with the piece of equipment; not what is supposed to happen.

13. Symptom: Light does not go on when switch is in first position.

What sign would tell you there is something wrong with your equipment at this step in the troubleshooting procedure?

- a. The light does not go on when the switch is in the first position.
- b. The light goes on when the switch is in the first position.

14. Symptom: Buzzer sounds when ON-OFF button is pushed.

You push the ON-OFF button. The buzzer does not sound. Is this a sign that something is wrong with your equipment?

- a. Yes
- b. No

15. Symptom: Power indicator light does not light and no indication on voltage meter.

The power indicator light on your equipment goes on, and the voltage meter reads 25 volts. Is this a sign that something is wrong with your equipment?

- a. Yes
- b. No

16. Symptom: Reading of less than 50 on the voltage meter, and buzzer sounds.

You get a reading of 30 on the voltage meter. The buzzer sounds. Is this a sign that something is wrong with your equipment?

- a. Yes
- b. No

17. Normal Indication: TONE meter decreases, then increases with TONE control at medium setting.

You set the TONE control at medium setting. The TONE meter goes from 50 to 25 and stays there. Is this a sign that something is wrong with your equipment?

- a. Yes
- b. No

18. Normal Indication: TEST meter indicates in green area when TEST button is pushed.

What sign would tell you that there is nothing wrong with your equipment at this step in the troubleshooting procedure?

- a. TEST meter does not indicate in green area when TEST button is pushed.
- b. TEST meter indicates in green area when TEST button is pushed.

19. Normal Indication: Alarm does not sound and SIGNAL lamp lights.

Your alarm sounds and your SIGNAL lamp does not light. Is this a sign that something is wrong with your equipment?

- a. Yes
- b. No

20. Normal Indication: Multimeter indication increases then decreases; buzzer sounds briefly.

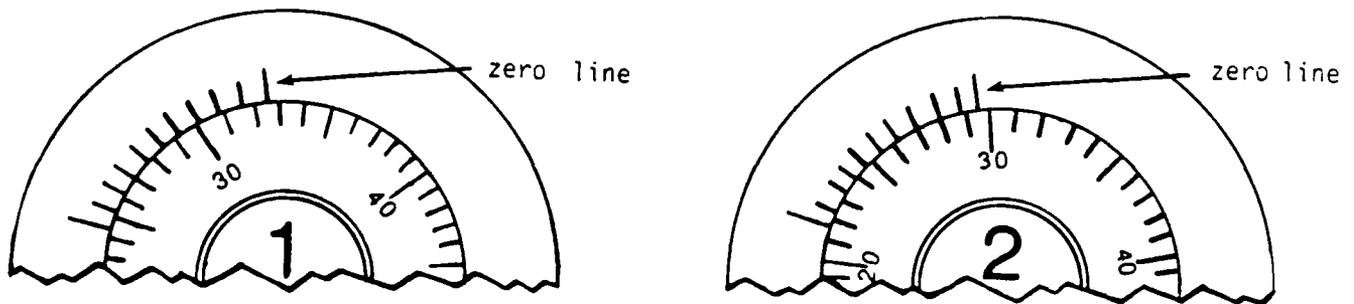
Results on four pieces of equipment:

- I. Multimeter indication goes from 50 to 0, then back to 50; buzzer goes on and stays on.
- II. Multimeter indication goes from 0 to 50 and stays there; buzzer goes on, then off.
- III. Multimeter indication goes from 0 to 50, then back to 0; buzzer goes on, then off.
- IV. Multimeter indication goes from 0 to 50 and stays there; buzzer goes on and stays on.

Which of the pieces of equipment is or are O.K.?

- a. I only
- b. III only
- c. I and III
- d. I, II, and III

21. Look at the drawing and then answer the question.

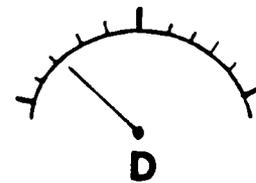
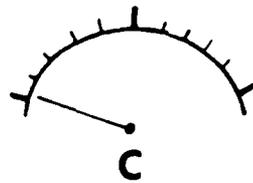
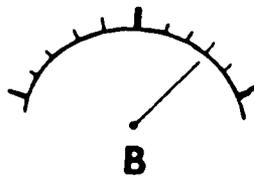
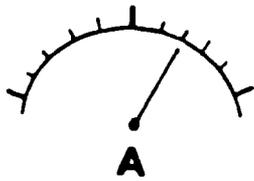
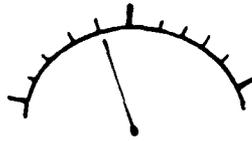


This type of dial is read by looking for the zero line, then seeing which mark on the numbered line is closest to it.

Compare the readings on the two dials. The reading on dial 2 is how many marks from the reading on dial 1?

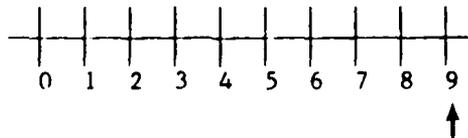
- a. between 0 and 2
- b. between 2 and 4
- c. between 4 and 6
- d. between 6 and 8

22. The top picture below shows a meter with the needle pointing to a particular mark. Below that are pictures of similar meters. Which of them shows a reading that is within 2 marks of the reading on the top meter?



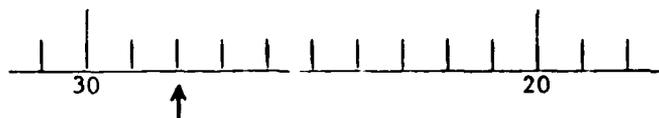
- a. A
- b. B
- c. C
- d. D

23. The scale below measures tens. What is the scale value with the arrow beneath it?

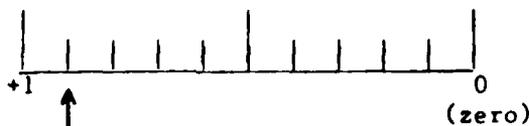


- a. 0.9
- b. 9
- c. 90
- d. 0.09

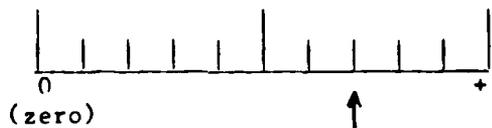
24. Some military scales have the lower values on the right, as shown here. What is the value of the line with the arrow beneath it?



- a. 22  
 b. 28  
 c. 32  
 d. 38
25. Some military scales have the zero line on the right, as shown here. The scale below measures values between 0 and 1. The zero mark is labeled. What is the value of the line with the arrow beneath it?



- a. 0.1  
 b. 0.2  
 c. 0.8  
 d. 0.9
26. The scale below measures values between 0 and 1. The zero mark is labeled. What is the value of the line with the arrow beneath it?



- a. 0.07  
 b. 0.7  
 c. 7.0  
 d. 7.1
27. What numeral is located in the ones place in 580.9.
- a. 0  
 b. 5  
 c. 8  
 d. 9

28. 692.2 The place identified by the arrow is the:



- a. tenths place.
- b. hundreds place.
- c. ones place.
- d. tens place.

Read the following paragraph. Then answer items 29 and 30.

In order to become more proficient, the operator should familiarize himself with the diagrams and records necessary to properly maintain and operate tactical communications systems. The individual operator may or may not come in contact with all of the diagrams and records required for tactical communications systems. However, he should try to gain a working knowledge of as many as possible. This will require a knowledge of some military symbols, military organizations, and communications diagrams.

29. According to the paragraph above, diagrams and records are important for:

- a. maintaining tactical communications systems.
- b. understanding military symbols.
- c. using communications diagrams.
- d. working with military organizations.

30. According to the paragraph above, the operator who wants to learn about the diagrams and records associated with his job must:

- a. become more proficient.
- b. learn about maintenance.
- c. operate tactical communications systems.
- d. gain knowledge of some military symbols.

In items 31 through 42 below, read the material and then answer the question which follows the material.

31. Set receiver meter switch to MULT. Adjust MULT PEAK control for maximum meter indication. LOW SIGNAL lamp goes out.

Which of the following describes the correct order of events?

- a. Lamp goes out. Set switch. Adjust control.
- b. Set switch. Lamp goes out. Adjust control.
- c. Adjust control. Set switch. Lamp goes out.
- d. Set switch. Adjust control. Lamp goes out.

32. Connect field wire from IN binding post of Unit I to OUT binding post of Unit II. Turn on the units and allow 5 minutes for warmup. Establish communications between the two units.

You have connected the field wire and turned on the units. What must you do next?

- a. Connect the two binding posts.
- b. Wait 5 minutes.
- c. Turn on the units.
- d. Establish communications.

33. Turn on water after unrolling hose to its full length and connecting it to water tap.

Which of the following says the same thing?

- a. Unroll hose. Turn on water. Connect hose.
- b. Turn on water. Connect hose. Unroll hose.
- c. Unroll hose. Connect hose. Turn on water.
- d. Connect hose. Turn on water. Unroll hose.

34. Before going on with the checks, turn off all the equipment and notify the other stations in the system about the situation.

Which of the following describes what you should do, in the correct order?

- a. Turn off equipment. Go on with checks. Notify stations.
- b. Notify stations. Go on with checks. Turn off equipment.
- c. Turn off equipment. Notify stations. Go on with checks.
- d. Go on with checks. Turn off equipment. Notify stations.

35. Operate the METER SELECT switch to SERV FAC and then the SERV SEL switch to 0.

What should you do first?

- a. Operate the SERV FAC switch.
- b. Operate the SERV SEL switch.
- c. Operate the METER SELECT switch.
- d. Operate the 0 switch.

36. Line up the system and then record the meter indications.

What should you do second?

- a. Line up the meter indications.
- b. Record the meter indications.
- c. Line up the system.
- d. Record the system indications.

37. When you are receiving the radio signal from the distant transmitter, your receive signal light will go on.

Which of the following says the same thing?

- a. Turn on the receive signal light in order to receive the radio signal.
- b. The receive signal light tells you when the radio signal is being received.
- c. Turn on the radio signal and the receive signal light will automatically go on.
- d. The receive signal light tells you that you are sending out a radio signal.

38. When a trouble symptom occurs, refer to the appropriate troubleshooting checklist.

Which of the following says the same thing?

- a. Begin troubleshooting as soon as you notice a trouble symptom.
- b. Turn to the troubleshooting checklist as soon as you notice a trouble symptom.
- c. Turn to the troubleshooting checklist before a trouble symptom occurs.
- d. You can prevent a trouble symptom from occurring, if you turn to the troubleshooting checklist.

39. Do not operate the equipment without a filter.

According to the instruction above, how should you operate the equipment?

- a. with a filter
- b. without a filter
- c. with proper care
- d. with proper instructions

40. In some situations, it is impossible to remove all radio equipment.

Which of the following says the same thing?

- a. Radio equipment must sometimes be left behind.
- b. Radio equipment must always be left behind.
- c. Radio equipment must never be left behind.
- d. Radio equipment is too valuable to be left behind.

41. Cleaning compound is flammable and its fumes are poisonous.

Which of the following does not say the same thing?

- a. Cleaning compound can be dangerous.
- b. Cleaning compound can catch fire.
- c. Cleaning compound fumes should not be breathed in.
- d. Cleaning compound is safe to use.

42. Be careful when erecting the antenna system in winds stronger than 25 miles per hour.

Which of the following says the same thing?

- a. Antenna systems don't work in strong winds.
- b. Antenna systems cannot be built in strong winds.
- c. Antenna systems should be built carefully in strong winds.
- d. Strong winds cannot overturn antenna systems.

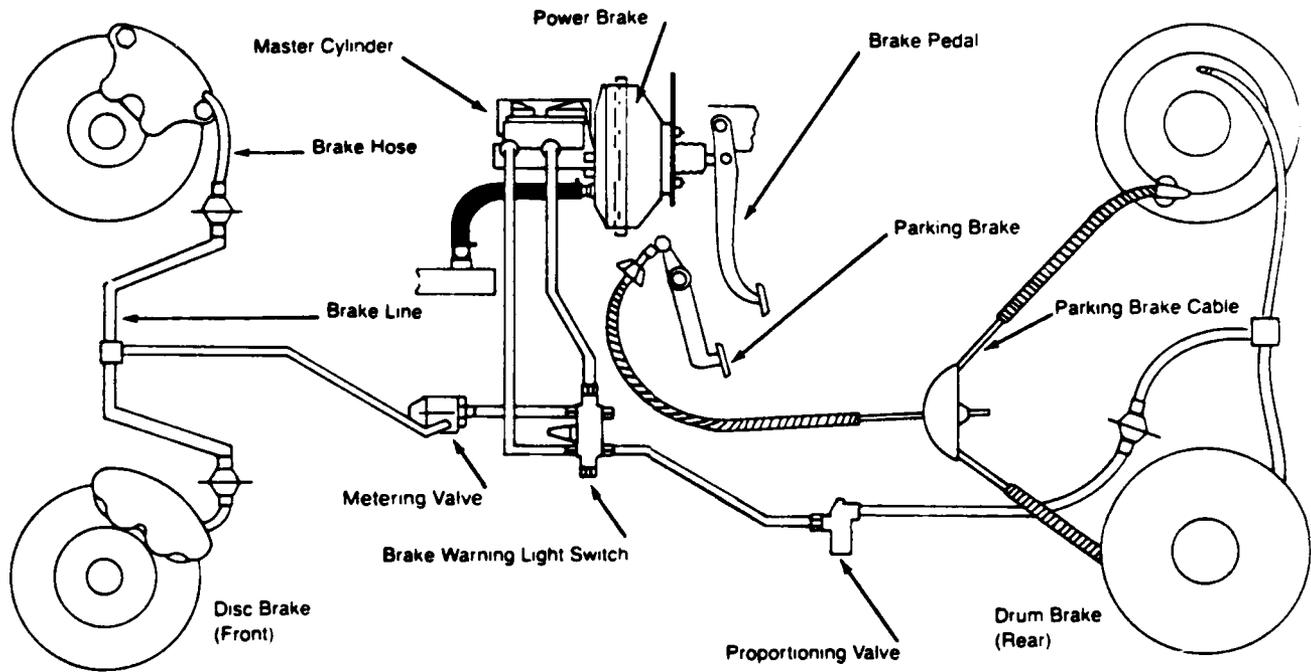
43. In the sentence, "The meter indicates minimum level," the term minimum level means:

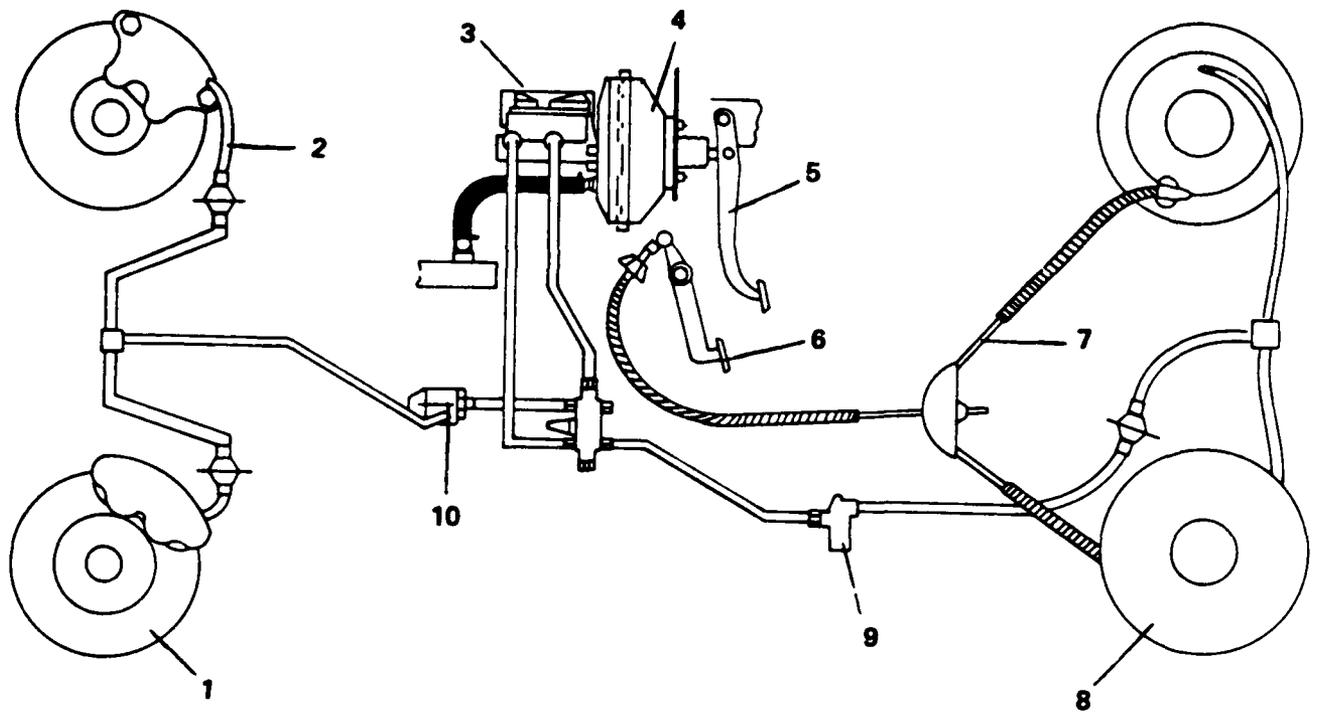
- a. the highest possible level.
- b. the lowest possible level.
- c. the only possible level.
- d. a level that is neither too high nor too low.

44. In the sentence, "The buzzer will sound momentarily," the word momentarily means:

- a. very loudly.
- b. for a short amount of time.
- c. very softly.
- d. at the rate of 60 sounds per minute.

The diagram below is of a typical brake system for an automobile. Look over the labeled parts, then turn to the next page and answer the question concerning the diagram.



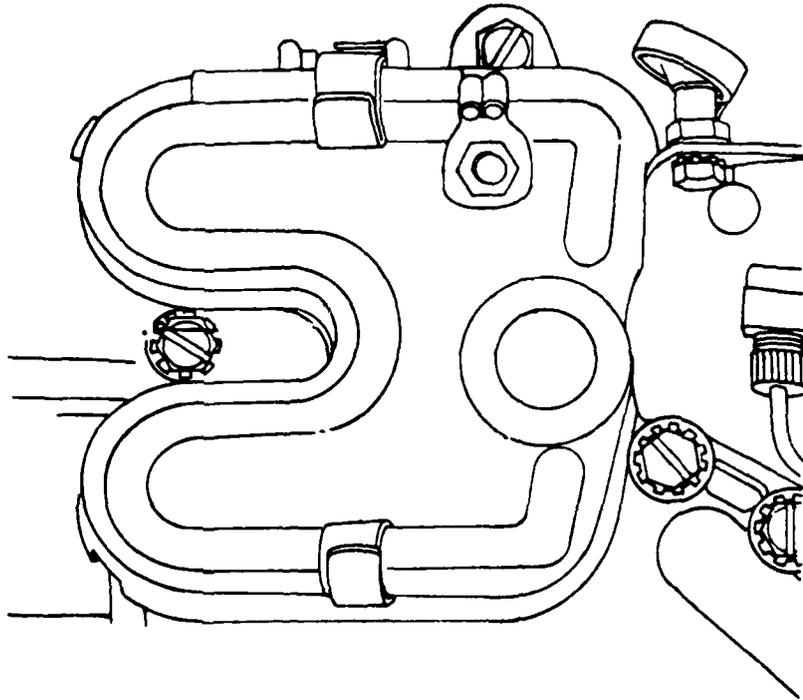


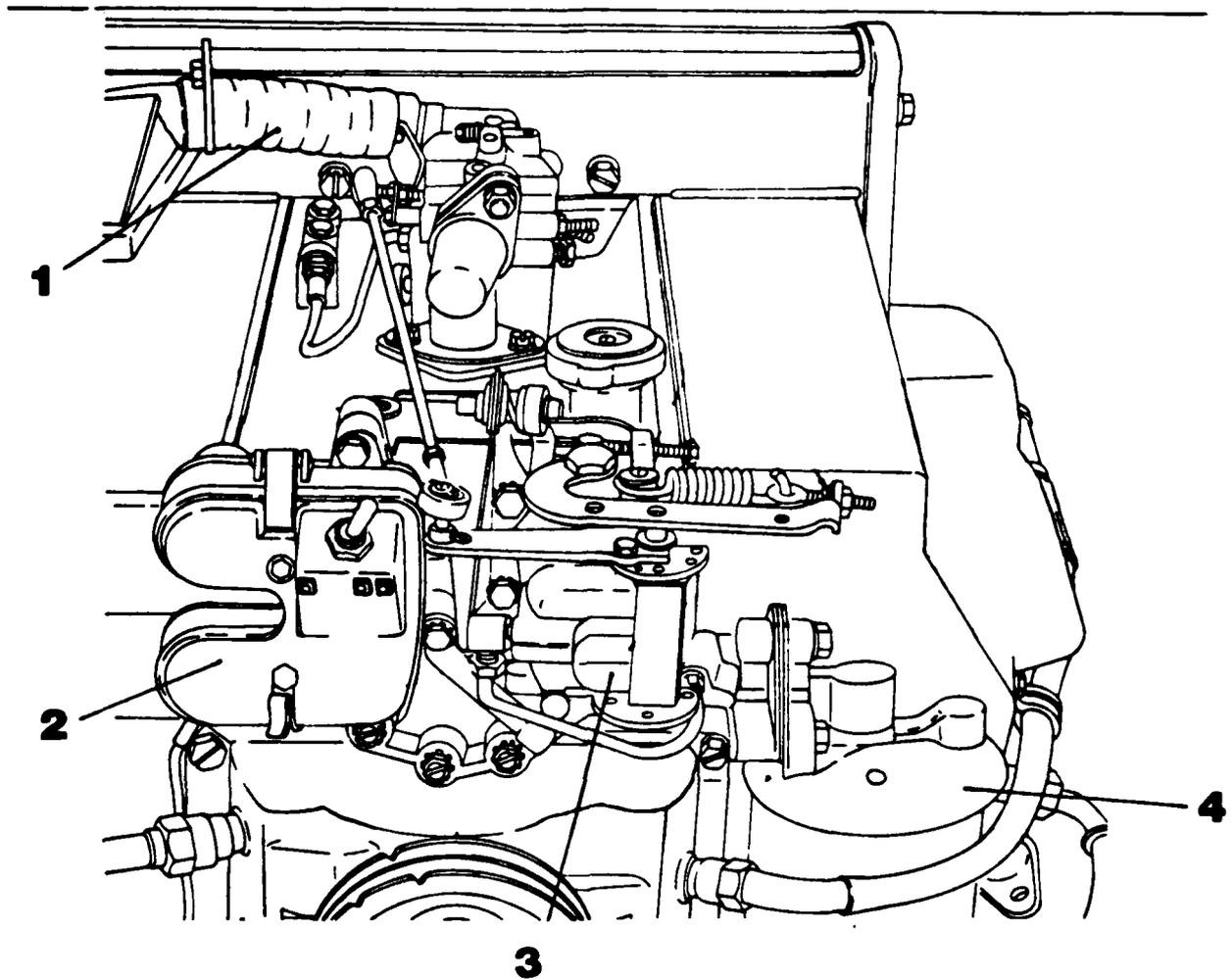
45. The following question refers to the above diagram. This diagram is identical to the one on the page before, except that the parts have numbers instead of labels. When answering the question, you may refer back to the diagram with the labeled parts.

The master cylinder is part number.

- a. 10
- b. 8
- c. 4
- d. 3

Below is a cut-away drawing of a breaker point on a 6-horsepower gasoline engine. Use it to answer the question on the next page.



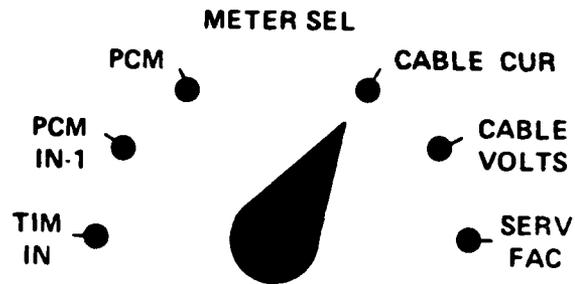


46. Above is a drawing of a section of the 6 horsepower gasoline engine.

Which numbered part is the breaker point?

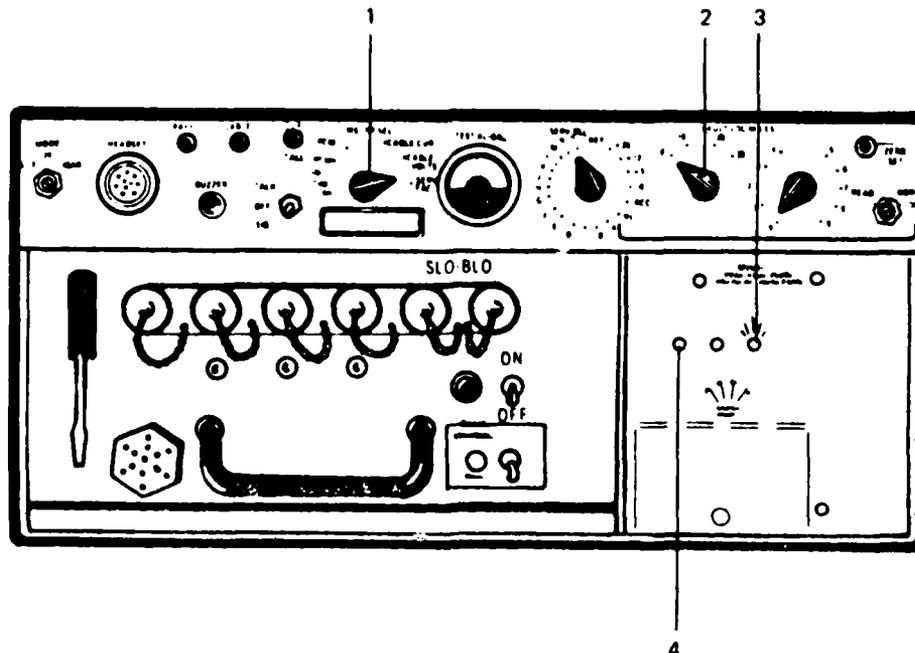
- a. 1
- b. 2
- c. 3
- d. 4

47. Below is a drawing of a meter select switch.



On the piece of equipment shown below, which of the numbered parts is the meter select switch?

- a. 1
- b. 2
- c. 3
- d. 4

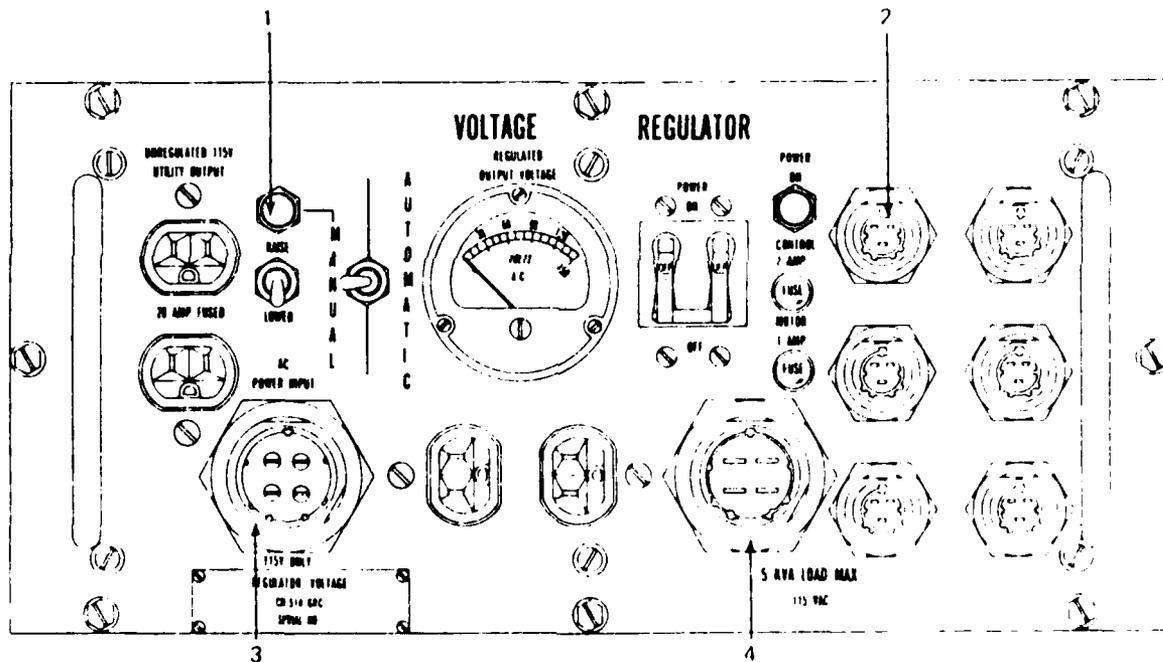


48. On the right is a drawing of a particular type of power connector.

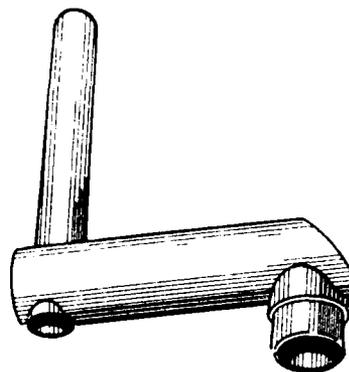


Which of the numbered parts on the drawing below shows the same type of power connector?

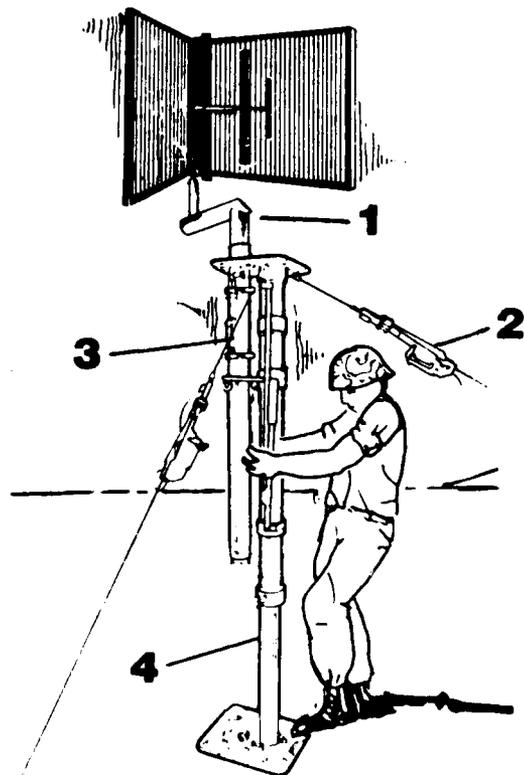
- a. 1
- b. 2
- c. 3
- d. 4



49. On the right is a drawing of an antenna mount.

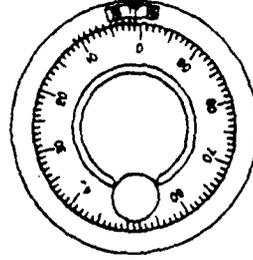


Which of the numbered parts on the drawing on the left is the antenna mount?



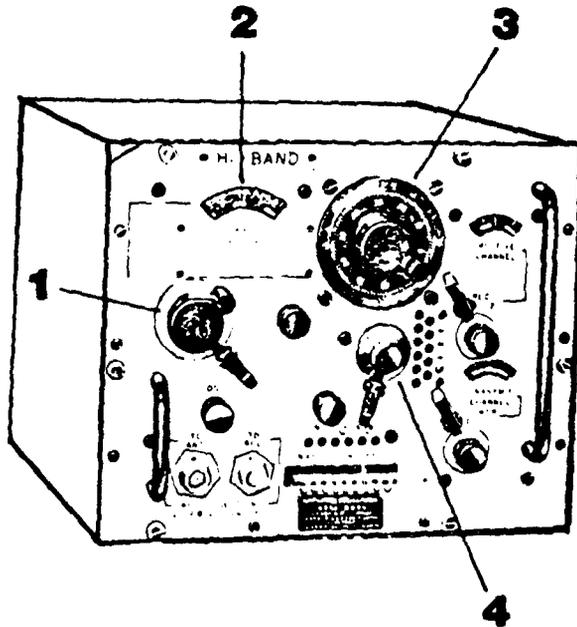
- a. 1
- b. 2
- c. 3
- d. 4

50. On the right is a drawing of a wavemeter.



Which of the numbered parts on the photograph on the right is a wavemeter?

- a. 1
- b. 2
- c. 3
- d. 4



Printed below is part of the Table of Contents from a Manual. It outlines the contents for Chapter 2: SKILL LEVEL TASKS and Chapter 3: DUTY POSITION TASKS. Use it to answer questions 51 and 52.

NOTE: The first part of the page number refers to the chapter, the second number refers to a page in that chapter (e.g., page 2-9 refers to Chapter 2, page 9).

	PAGE
CHAPTER 2. SKILL LEVEL TASKS	2-1
Task List	2-1
Task Summaries for Skill Level 1	2-9
Task Summaries for Skill Level 2	2-315
Task Summaries for Skill Level 3	2-385
CHAPTER 3. DUTY POSITION TASKS	3-1
Task List	3-1
Task Summaries for Skill Level 1	3-10
Task Summaries for Skill level 2	3-200
Task Summaries for Skill Level 3	3-310

51. On what page is the Task List for DUTY POSITION TASKS?

- a. 2-1
- b. 3-1
- c. 2-9
- d. 3-10

52. You are at Skill Level 1. On what page are the Task Summaries for Skill Level 1, SKILL LEVEL TASKS, located?

- a. 2-1
- b. 2-9
- c. 3-1
- d. 3-10

Printed below is a list of tasks and the page numbers on which they are found. Refer to the list to answer questions 53 through 56.

<u>TASK NO</u>	<u>TITLE</u>	<u>PAGE</u>
113-593-7002	Inspect Operation of Telephone Terminal Sets	2-378
113-593-7004	Direct Operator's Daily Preventive Maintenance of Telephone Terminal Sets	2-382
113-593-7029	Direct Organizational Preventive Maintenance of Telephone Terminal Sets	2-385
113-593-7009	Inspect Installation of Radio Repeater Sets	2-388
113-593-7010	Inspect Operation of Radio Repeater Sets	2-391
113-593-7011	Direct Operator's Daily Preventive Maintenance of Radio Repeater Sets	2-394
113-593-7031	Direct Organizational Preventive Maintenance of Radio Repeater Sets	2-397
113-593-4019	Repair Multichannel Equipment at Organizational Level Using Special Tools and Test Equipment	2-400
113-601-7033	Direct Installation of Generator Sets	2-402
113-601-7034	Direct Operator's Preventive Maintenance on Power Generator Sets	2-405
113-623-3003	Prepare Maintenance Request, DA Form 2407	2-407
113-623-3004	Prepare Preventive Maintenance Schedule and Record, DD Form 314	2-415
113-623-7046	Counsel Subordinate Personnel	2-419

53. Task No. 113-593-7011 is on page:

- a. 2-378.
- b. 2-391.
- c. 2-394.
- d. 2-397.

54. If you need information on Task No. 113-601-7033, you must go to page:

- a. 2-405.
- b. 2-388.
- c. 2-394.
- d. 2-402.

55. Task No. 113-593-7009 is:

- a. Inspect Operation of Telephone Terminal Sets.
- b. Direct Operator's Daily Preventive Maintenance of Telephone Terminal Sets.
- c. Direct Organizational Preventive Maintenance of Telephone Terminal Sets.
- d. Inspect Installation of Radio Repeater Sets.

56. Tasks whose numbers begin with 113-593 are to be found:

- a. at the beginning of the list.
- b. in the middle of the list only.
- c. at the end of the list.
- d. all through the list.

Here is part of a Table of Contents. Do not try to read it, but refer to it to answer questions 57 through 60.

NOTE: Paragraph and page numbers have two parts. The first part stands for the chapter. In paragraph numbers, the second part stands for the paragraph in the chapter. In page numbers, the second part is the page in the chapter. For example, paragraph 4-11 means Chapter 4, paragraph 11. Page 4-6 means Chapter 4, page 6.

	Paragraph	Page
<b>CHAPTER 3. OPERATING INSTRUCTIONS</b>		
Section I. Operator's controls and indicators		
Transmitter controls and indicators	3-1	3-1
Receiver controls and indicators	3-2	3-3
Regulator, Voltage CN-514/GRC controls and indicators	3-3	3-4
Section II. Tuning procedures		
General	3-4	3-13
Installation of tuning units	3-5	3-14
Determination of channel frequency	3-6	3-14
Preliminary starting procedures	3-7	3-14
Receiver tuning procedures	3-8	3-15
Transmitter tuning requirements	3-9	3-19
Transmitter tuning procedures	3-10	3-21
Single stack loop-back operational tests	3-11	3-27
Section III. System lineup procedures		
General	3-12	3-80
Fdm system lineup	3-13	3-31
Pcm system lineup	3-14	3-32
System checks and adjustments	3-15	3-33
Multiplex terminal adjustments	3-16	3-34
Section IV. Routine operating procedures		
General	3-17	3-34
Order wire operation	3-18	3-34
Monitoring equipment	3-19	3-35
Stopping procedure	3-20	3-36
<b>CHAPTER 4. OPERATOR'S MAINTENANCE</b>		
Scope of operator's maintenance	4-1	4-1
Operator's preventive maintenance	4-2	4-1
Preventive maintenance checks and services periods	4-3	4-1
Daily preventive maintenance checks and services chart	4-4	4-2
Weekly preventive maintenance checks and services chart	4-5	4-2
Cleaning	4-6	4-3
Visual inspection	4-7	4-3
Operational checklist	4-8	4-3
Replacement of indicator lamps	4-9	4-5
Replacement of fuses	4-10	4-5
Replacement of aid filter	4-11	4-6

57. On what page would you find "Routine operating procedures - Stopping procedure"?
- a. 3-20
  - b. 3-34
  - c. 3-35
  - d. 3-36
58. Your instructor tells you to turn to page ten, Chapter 3. What should the page number look like?
- a. 10-3
  - b. 10
  - c. 3-10
  - d. 3
59. What paragraph would you turn to to read about Cleaning?
- a. 4-3
  - b. 4-6
  - c. 4-7
  - d. 6-4
60. Your instructor tells you to turn to paragraph 3-14. What topic is introduced there?
- a. Installation of tuning units
  - b. Determination of channel frequency
  - c. Pcm system lineup
  - d. Preliminary starting procedures

Here is part of a table used for maintenance checks of equipment. Do not try to read it, but refer to it to answer questions 61 through 63.

Table 4-1. Operator/Crew Preventive Maintenance Checks and Services

NOTE

The checks in the "interval" column are to be performed in the order listed

B—Before operation D—During operation A—After operation W—Weekly

Item No.	Interval				Item to be Inspected	Procedures Check and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W			
1				•	AN/TRC-145	Check for completeness of the AN/TRC-145.	Upon completion of PMCS checks, available equipment is insufficient to support the unit mission.
2				•	Generator Set	<p><b>WARNING</b></p> <p>Wheels must be blocked, brakes set, and leg support down in support position before attempting to roll up the tarpaulin and before starting to assemble or set up the equipment for operation</p> <p>a. Inspect unit for oil leaks and broken or missing parts.</p> <p>b. Periodically monitor the engine oil pressure gage for low or fluctuating reading.</p> <p><b>CAUTION</b></p> <p>There must be free circulation of air around the generator sets at all times during operation. Inadequate ventilation is a major cause of damage to the equipment. Never operate the generator in enclosed area unless the exhaust gases are vented to the outside.</p> <p><b>WARNING</b></p> <p>Inhalation of exhaust fumes may result in serious illness or death.</p> <p>c. Start unit and check for correct operation.</p>	b. Excessive loss of oil due to burn or leakage.
		•		•	Lubrication		
			•		Controls and instruments	d. Inspect for cracks and bends. Check for chipped paint and spot paint where required.	c. Neither power unit operates properly.
		•		•	Frame	e. Check grounding system for proper installation. Inspect the ground stud threads, bonding straps, and shock mounts. Tighten loose ground connections	e. Unable to ground properly.
			•		Grounding		
3				•	Generator trailer	<p><b>CAUTION</b></p> <p>Place all tags describing condition of the trailer in a conspicuous location so that they will not be overlooked.</p> <p>a. Be alert for unusual noises or improper operation</p> <p>b. Investigate and correct or report any faults noted during operation</p> <p>c. Inspect suspension system and associated mounting parts for damage</p>	
		•		•	General		
			•	•	Operating faults		
			•	•	Suspension system		
4				•	OUTSIDE Shelter	a. Check for skinpunctures, cracks, or open seams that could permit moisture to enter the shelter.	a. Excessive moisture enters the shelter causing a potential shock hazard.
		•		•	Grounding	b. Check grounding to see that it is properly installed. Tighten loose ground connections.	b. Ground system connections cannot be properly tightened.
			•	•	Power and signal cables	c. Tighten loose connections and adjust cable grips so that they relieve the connector of weight of cable	
			•	•	Exhaust blower vent covers	d. Be sure the exhaust blower vent covers are open and the airflow is not obstructed.	
			•	•	Doors air filter cover	e. Be sure the entrance door air filter vent cover is open and unobstructed.	

61. Which of the following needs to be checked only once a week?

- a. AN/TRC-145
- b. Generator set
- c. Suspension system
- d. Lubrication

62. The column heading "D" stands for:

- a. Daily
- b. Do not check
- c. During operation
- d. Damage

63. Which column tells you what unit to check?

- a. Item No.
- b. Interval
- c. Item to be Inspected
- d. Procedures

Here is part of a chart for troubleshooting a radio terminal. Do not try to read it, but refer to it to answer questions 64 and 65.

**a. Radio Terminal Troubleshooting Chart.**

Item No.	Symptom	Possible trouble	Corrective measure
1	ALARMS FRAME indicator of TD-352/U lights, buzzer sounds, and TEST ALIGN meter indicates in green area with METER SELECT switch at PCM IN and TIMING IN.	Defective TD-352/U	Troubleshoot TD-352/U (app A).
2	ALARMS FRAME indicator of TD-352/U lights, buzzer sounds, and TEST ALIGN meter does not indicate in green area with METER SELECT switch at PCM IN and/or TIMING IN. TD-202/U and AN/GRC-50A(V) indicate normally.	a. Defective CG-1040B/U cable between TD-352/U and TD-202/U. b. Defective TD-202/U	a. Check and replace if necessary. b. Troubleshoot TD-202/U (app A).
3	ALARMS FRAME indicator of TD-352/U and ALARMS TRAFFIC indicator of TD-202/U light, buzzer sounds, TEST ALIGN meter of TD-202/U does not indicate in green area with METER SELECT switch at FROM RADIO RCVR. AN/GRC-50A(V) operates normally, order wire normal.	Defective pcm component at distant terminal or repeater.	Request distant terminal or repeater troubleshooting.
4	Order wire very noisy or no reception, but all other indications on TD-352/U, TD-202/U, and AN/GRC-50A(V) are normal.	a. Defective CX-7872/TCC cable between TD-202/U and R-1331(P)/GRC. b. Defective TD-202/U	a. Check and replace if necessary. b. Troubleshoot TD-202/U (app A).
5	ALARMS FRAME indicator of TD-352/U and ALARMS TRAFFIC indicator of TD-202/U light and TEST METER does not indicate in green area with METER SELECT switch at FROM RADIO RCVR, all indications on AN/GRC-50A(V) are normal except for noisy or no order wire.	a. Defective CG-409H/U cable between R-1331(P)/GRC and TD-202/U. b. Defective R-1331(P)/GRC	a. Check and replace if necessary. b. Troubleshoot R-1331(P)/GRC (app A).
6	ALARMS FRAME indicator of TD-352/U ALARMS TRAFFIC indicator of TD-202/U and R-1331(P) GRC SQUELCH NO SIGNAL indicator light, buzzer sounds, and no order wire.  <i>Note.</i> In 24-channel operation, both TD-352/U's have this symptom.	a. Defective antenna cable b. Defective Antenna AT-903/G. c. Defective R-1331(P)/GRC d. AT-903/G not properly oriented. e. Defective T-893(P)/GRC at distant terminal or repeater.	a. Check and replace if necessary. b. Check and replace if necessary. c. Troubleshoot R-1331(P)/GRC (app A). d. Check orientation. e. Keep AN/GRC-50A(V) operating on assigned frequency. Periodically try order wire and wait response. Send man to distant terminal or repeater.
7	Distant terminal or repeater indicates loss of pcm, no indication on TEST ALIGN meter of local TD-202/U with METER SELECT switch at TO RADIO XMTR.	Defective TD-202/U	Troubleshoot TD-202/U (app A).

64. In order to find out how to fix something, you must look in the column labeled:

- a. Step No.
- b. Symptom.
- c. Possible trouble.
- d. Corrective measure.

65. If the symptom "Order wire very noisy" occurs, a possible trouble is:

- a. Defective CX-7872/TCC.
- b. DEFECTIVE R-1331(P)/GRC.
- c. Defective pcm component.
- d. Defective TD-352/U.

Here is part of a chart for troubleshooting some radio equipment. Do not try to read it, but refer to it to answer question 66.

Step	Unit	Action	Normal indication	Corrective measures
68	AM-1955(*)/GRC or AM-1956(*)/GRC.	Detune REC SIG-1 control for minimum indication on multimeter.	Multimeter indicates minimum level.	
69	R-1148(P)/GRC or R-1331(*)/GRC.	Rotate SQUELCH INCR SENS control counter clockwise until squelch alarms operate.	NO SIGNAL indicator lights and buzzer sounds. Depress SQUELCH BUZZER OFF pushbutton.	Check V12 on second IF assembly 3A5. If buzzer sounds but indicator does not light, change indicator lamp.
70	AM-1955(*)/GRC or AM-1956(*)/GRC.	Readjust REC SIG-1 control for maximum indication on multimeter.	NO SIGNAL indicator extinguishes and buzzer sounds. Depress SQUELCH BUZZER OFF pushbutton.	
		<i>For 4-channel fdm operation only</i>		
71	Fdm multiplex equipment.	Connect spiral-4 cable from multiplex equipment to RCVR OUT terminals (fig. 6-3). Have multiplex terminal transmit 1-kc test tone at 0 dbm.		
72	T-893(P)/GRC	Set multimeter selector switch to 1 KC IN and adjust FDM INPUT LEVELS control for indication within green area of multimeter scale.	Multimeter indicates in green area of meter scale.	Check V4 in baseband assembly 2A3.
73	T-893(P)/GRC	Set multimeter selector switch 1 KC MOD.	Multimeter indicates in green area of meter scale.	Check V1 and V2 on baseband assembly 2A3. Check V5 on afc assembly 2A4. Check all tubes on modulator assembly 2A5.
74	R-1148(P)/GRC or P-1331(*)/GRC.	Set multimeter selector switch to 1 KC OUT and adjust FDM OUTPUT LEVEL control for indication within green area of multimeter scale.	Multimeter indicates green area of meter scale.	Check V7, V8, and V9 in second IF assembly 3A5. Check tubes V5, V6, and V9 in baseband assembly 3A3. If meter indication obtained is not in green area, replace V9 until requirement is met. Do not discard unsatisfactory tubes;

66. In step 72, the unit you are troubleshooting is the:

- a. IKC IN.
- b. T-893(P)/GRC.
- c. V4 in baseband assembly 2A3.
- d. FDM INPUT LEVELS.

This section asks you to look at patch panel diagrams, then answer questions about the diagrams.

67.

P A T C H P A N E L				
	SYSTEM 1		SYSTEM 2	
	Red	Blue	Red	Blue
Part 1	○ L	○ A	○ R	○
Part 2	○ P	○	○ N	○ C
Part 3	○	○ T	○ E	○

In the diagram above, letters P and C are both located in:

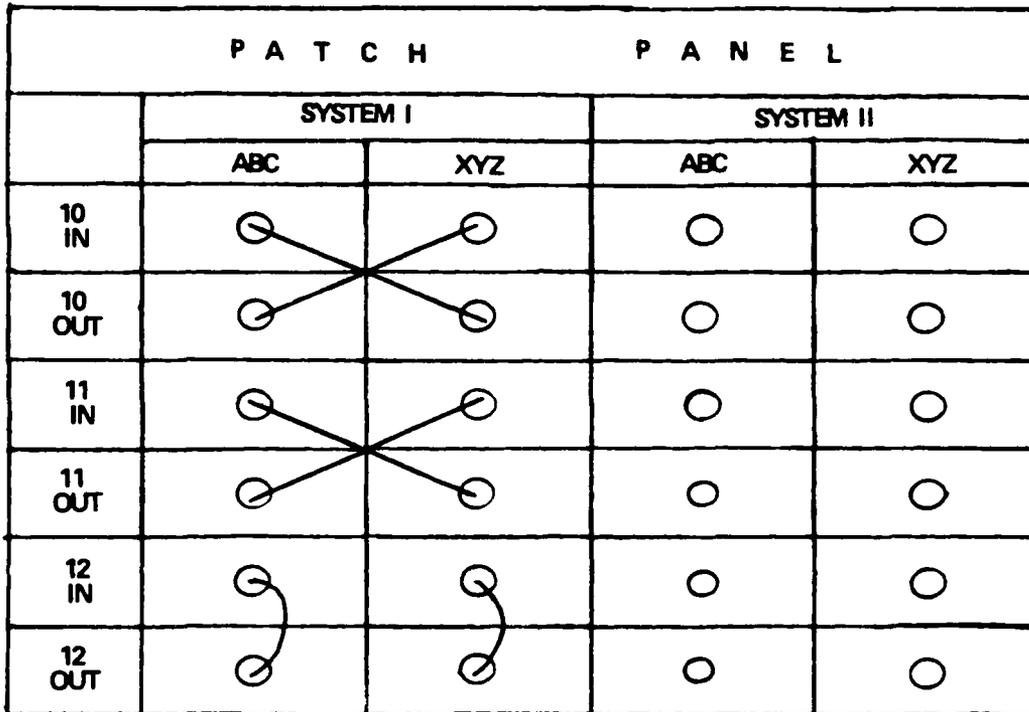
- a. Part 1.
- b. System 2.
- c. Red.
- d. Part 2.

V I D E O P A T C H P A N E L								
	SYSTEM I		SYSTEM II		SYSTEM III		SYSTEM IV	
	A	B	A	B	A	B	A	B
Red	○	○	○	○	○	○	○	○
Green	○	○	○	○	○	○	○	○
White	○	○	○	○	○	○	○	○

The rows on the above diagram are labeled by:

- a. colors.
- b. Roman numerals.
- c. letters.
- d. circles.

69. The solid lines connecting the circles are cables. Look at the way the cables are connected to the patch panel below. Use the diagram to answer the question which follows it.



Which statement is true about the diagram above?

- ABC - 12 IN is connected to XYZ - 12 IN for System I.
- Only System I has cables connected.
- ABC - 10 IN is connected to XYZ - 10 OUT for System II.
- System I is connected to System II.

70. The next four diagrams show different ways of connecting cables on a patch panel. Which diagram shows System I connected to System II?

- a. Diagram 1
- b. Diagram 2
- c. Diagram 3
- d. Diagram 4

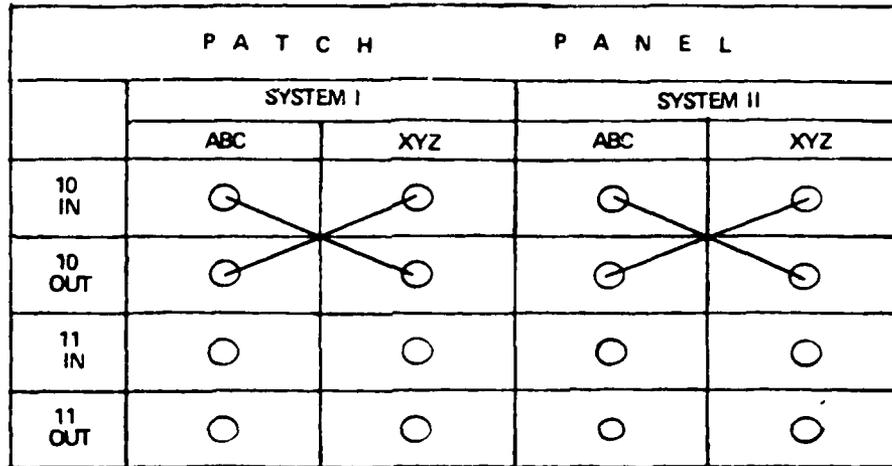


Diagram 1

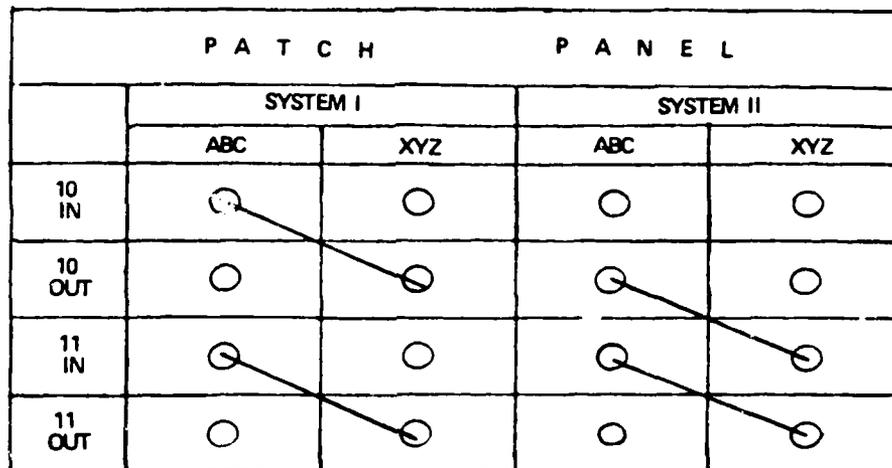


Diagram 2

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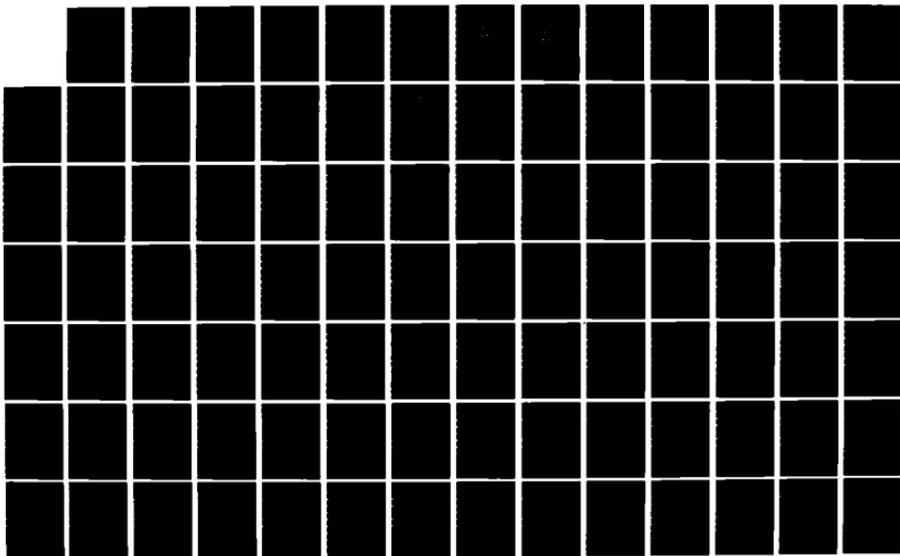
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DABT60-81-C-0006

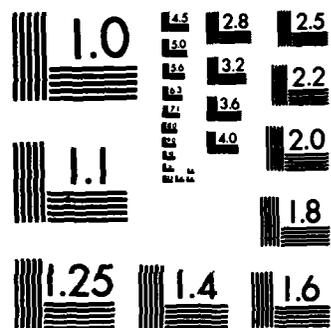
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MICROCOPY RESOLUTION TEST CHART  
 NATIONAL BUREAU OF STANDARDS-1963-A

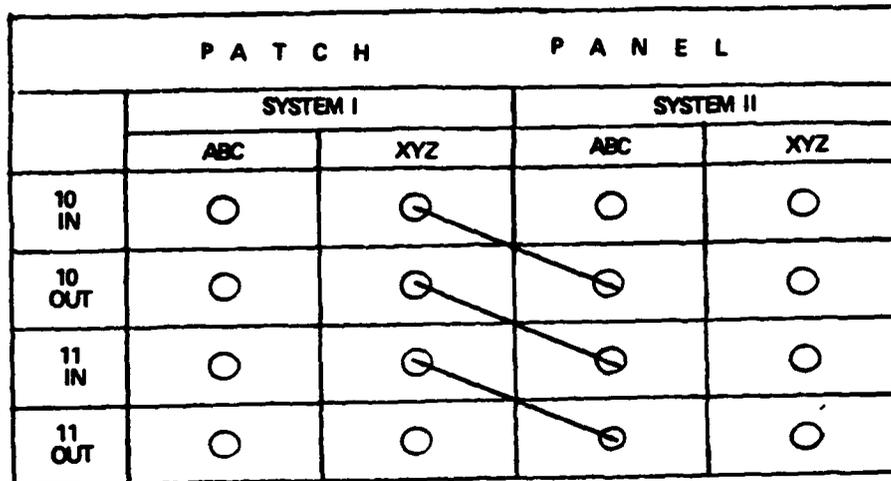


Diagram 3

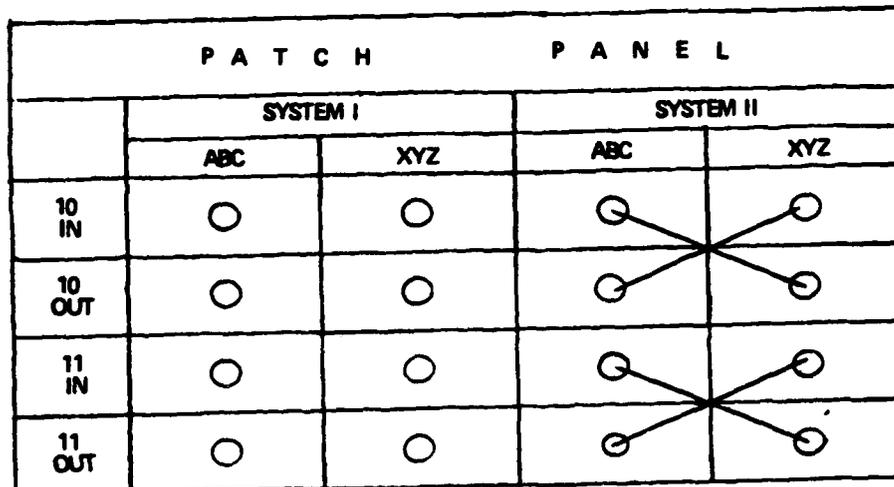


Diagram 4

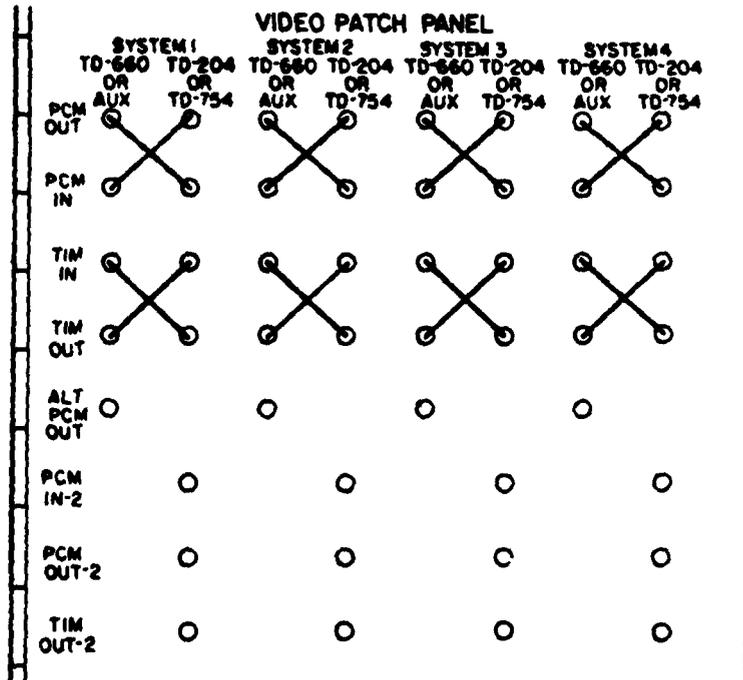
71.

V I D E O P A T C H P A N E L								
	SYSTEM I		SYSTEM II		SYSTEM III		SYSTEM IV	
	A	B	A	B	A	B	A	B
Red	○	○	○	○	○	○	○	○
Green	○	○	○	○	○	○	○	○
White	○	○	○	○	○	○	○	○

Which statement is true concerning System II above?

- a. A-Red is connected to A-Green and B-Red is connected to B-Green.
- b. A-White is connected to B-White and A-Red is connected to B-Green.
- c. A-Red is connected to B-Red and A-Green is connected to B-Green.
- d. A-Red is connected to B-Green and B-Red is connected to A-Green.

72. On the right is a diagram which shows all possible ways of cabling a video patch panel with four systems. Use this diagram to answer the question below.



Which of the following diagrams on the next two pages shows the correct cabling connections if only Systems 2 and 4 are being used?

- a. Diagram 1
- b. Diagram 2
- c. Diagram 3
- d. Diagram 4

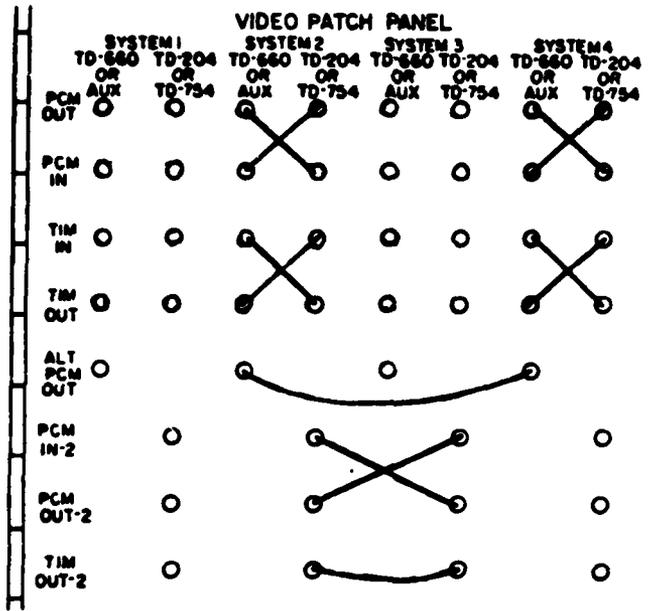


Diagram 1

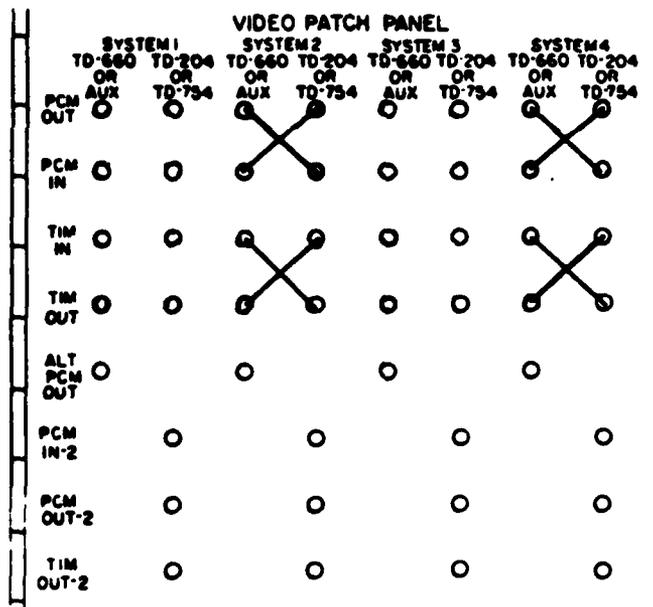


Diagram 2

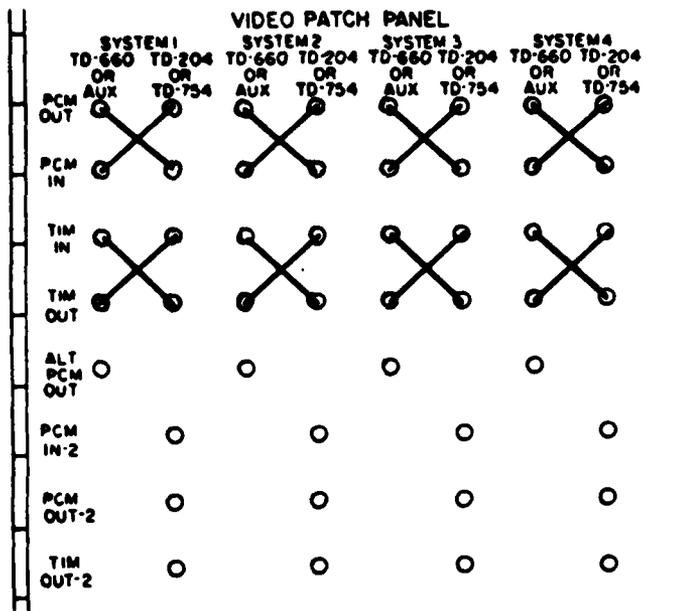


Diagram 3

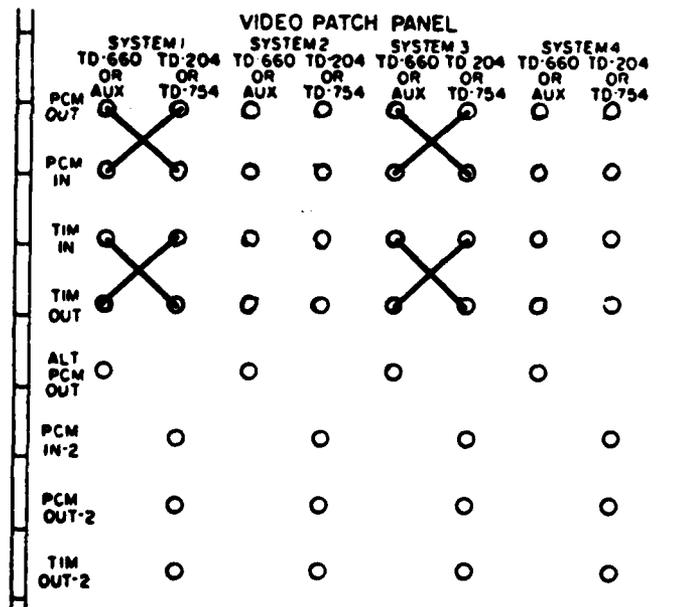
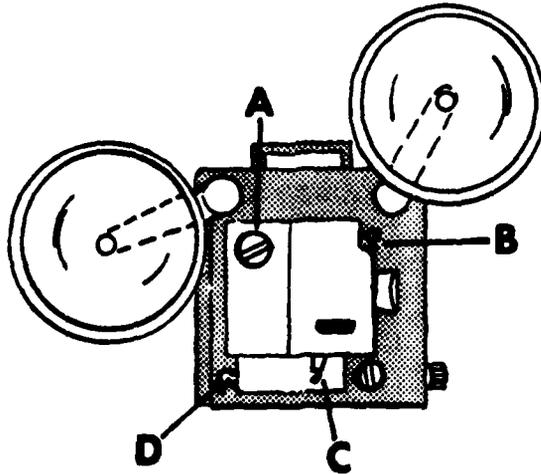


Diagram 4

Recall the demonstration you saw earlier on operating a movie projector. Refer to your notes on that demonstration as you answer the following questions.

73. On the picture below, which letter shows where the film is inserted for threading.



- a. A
- b. B
- c. C
- d. D

74. On the picture above, which letter shows the location of the autoloader lever?

- a. A
- b. B
- c. C
- d. D

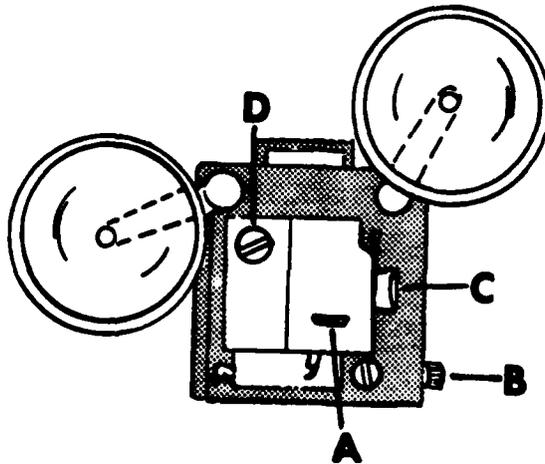
75. In threading the projector, the motor/lamp switch is placed at the \_\_\_\_\_ position.

- a. motor
- b. lamp
- c. automatic
- d. forward

76. The cutter is used for:

- a. focusing the projector.
- b. running enough film through the projector.
- c. trimming the leader.
- d. inserting the film in the take-up reel.

77. On the picture below, which letter shows the focus knob?



- a. A
- b. B
- c. C
- d. D

78. Which of the following controls is not used in running the projector?

- a. The focus knob.
- b. The volume control.
- c. The motor/lamp switch.
- d. The autoloader lever.

79. Which of the following is a statement related to running the movie projector?

- a. You will hear a click when the reel arm locks into place.
- b. The film leader is white.
- c. This projector automatically threads itself.
- d. Adjust the focus until you have a sharp, clear picture.

80. To project light onto the screen, you use the:
- focus knob.
  - motor/lamp switch.
  - autoload lever.
  - volume control.
81. There are five steps in threading the projector. Which of the following shows the correct order of three of the steps?
- Push autoload lever.
    - Trim leader.
    - Insert film in projector.
  - Trim leader.
    - Push autoload lever.
    - Insert film in projector.
  - Push autoload lever.
    - Insert film in projector.
    - Trim leader.
  - Trim leader.
    - Insert film in projector.
    - Push autoload lever.
82. In threading the projector, after running at least 3 feet of film through the projector, the next step is to:
- push the autoload lever.
  - turn off the motor/lamp switch.
  - insert the film in the take-up reel.
  - tighten the film.
83. There are 3 steps you do in running the projector. Which of the following shows the 3 steps in the correct order?
- Project light on the screen.
    - Focus the picture.
    - Adjust the volume.
  - Focus the picture.
    - Project light on the screen.
    - Adjust the volume.
  - Adjust the volume.
    - Focus the picture.
    - Project light on the screen.
  - Project light on the screen.
    - Adjust the volume.
    - Focus the picture.

84. In threading and running the projector, the motor/lamp switch is operated three times. Which of the following shows the three settings of the motor/lamp switch in the correct order?

- a. Forward, Reverse, Lamp.
- b. Lamp, Reverse, Off.
- c. Forward, Off, Lamp.
- d. Lamp, Off, Forward.

**DIAGNOSTIC TEST FOR 31M10 FUNCTIONAL BASIC SKILLS EDUCATION PACKAGE**

**Unit I - Reading Comprehension**

1. In the sentence, "The radio receiver is defective," the word defective means:
  - a. turned off.
  - b. faulty, something wrong.
  - c. working at full power.
  - d. used for military purposes.
  
2. In the sentence, "Monitor all 12 channels of the radio," the word monitor means:
  - a. eliminate.
  - b. check.
  - c. maintain.
  - d. increase.
  
3. In the sentence, "Energize the main circuit breakers," the word energize means:
  - a. force.
  - b. set.
  - c. turn on.
  - d. interlock.
  
4. Which of the following lines is horizontal?
  - a. 
  - b. 
  - c. 
  - d. 

Read the following paragraph. Then answer questions 5 and 6.

System lineup consists of checking the system signal levels from station to station in the system. The lineup is required to insure that the system provides the optimum communication from terminal to terminal. The lineup procedures provide a means for setting and checking the receiver levels at all stations in the system. The procedures use front panel controls only, and the levels are indicated on the front panel meters.

5. Which of the following is not mentioned in the paragraph above?
- The location of stations in the system.
  - Purpose and procedures of system lineup.
  - The location of controls used in lineup.
  - Checking receiver signal levels.
6. In the paragraph above, another word for station is:
- system.
  - terminal.
  - receiver.
  - front panel.

Read the following paragraph. Then answer questions 7 and 8.

The T/R-37 is a set of radio components that can be transported by air or vehicle and is used in forward area communication systems. It can be configured to provide radio or cable, secure or nonsecure communication facilities. The equipment may be arranged for use as a terminal, a repeater, or as a cable-to-radio conversion facility.

7. This paragraph includes:
- the steps for configuring a T/R-37.
  - a list of the radio components in a T/R 37.
  - the fact that the T/R can be used as a terminal, repeater, or cable-to-radio conversion facility.
  - the difference between secure and nonsecure communication facilities.

8. Which of the following is not included in the paragraph on the previous page?

- a. The T/R-37 can be carried by plane.
- b. The T/R-37 can be arranged in various ways.
- c. The T/R-37 can be used as a secure cable terminal.
- d. The T/R-37 can be used as a 12- or 24-channel system.

In order to complete each item below, read the material and then answer the question which follows the material.

9. When engine reaches operating pressure, place emergency stop switch in normal position.

Which of the following says the same thing?

- a. Put the emergency stop switch in normal position after the engine has reached operating pressure.
- b. Put the emergency stop switch in normal position before the engine has reached operating pressure.
- c. Put the emergency stop switch in normal position to make the engine reach operating pressure.
- d. When the emergency stop switch is in normal position, the engine will reach operating pressure.

10. If a test consists of four questions, you will be required to answer three questions correctly to get a passing score for the test.

Which of the following says the same thing?

- a. You need to get four questions right to pass the test.
- b. You need only two right answers to pass the test.
- c. You need at least three right answers to pass the test.
- d. You must take four tests to get a passing score.

11. When the power is restored, wait about 2 minutes, then set the AFC-TUNE switch to the original setting.

Which of the following says the same thing?

- a. Wait two minutes. The power will come on. Set the switch.
- b. The power will come on. Set the switch. Wait two minutes.
- c. Set the switch. Wait two minutes. The power will come on.
- d. The power will come on. Wait two minutes. Set the switch.

12. When communication is established with the BRAVO terminal, request BRAVO terminal to send tone.

This sentence tells you to:

- a. send a tone to BRAVO terminal after communication is established.
- b. establish communication with BRAVO terminal in order to send a tone to them.
- c. ask BRAVO terminal to send a tone after communication is established.
- d. listen to a tone from BRAVO terminal, then establish communication.

13. Before turning off the power, reset the dial to zero and wait 60 seconds.

Which of the following describes what you should do, in the correct order?

- a. Wait. Turn off power. Reset dial.
- b. Turn off power. Reset dial. Wait.
- c. Reset dial. Wait. Turn off power.
- d. Reset dial. Turn off power. Wait.

14. Add egg whites to the batter after whipping them until they are stiff.

What must you do first?

- a. Whip egg whites.
- b. Check egg whites for proper stiffness.
- c. Whip batter.
- d. Add egg whites to the batter.

15. Connect the red and black wires to the PHONE binding posts after presetting the telephone.

What must you do first?

- a. Preset the telephone.
- b. Find the binding posts.
- c. Connect the wires to the binding posts.
- d. Connect the red wire, then the black one.

16. Before restarting the generator, wait 3 minutes. Then open the fuel valve. Next, pull back the throttle.

What do these directions tell you to do first?

- a. Open the fuel valve.
- b. Pull back the throttle.
- c. Wait 3 minutes.
- d. Restart the generator.

17. To install the antenna, not more than four people are needed.

How many people are needed?

- a. Four or less.
- b. Four or more.
- c. More than four.
- d. Less than four.

18. The power generated by an oscillator is normally neither stable enough nor great enough to provide reliable transmission over long distances.

Over long distances, the power of the oscillator is:

- a. stable.
- b. great.
- c. reliable.
- d. weak.

19. Do not hold the START button for longer than 15 seconds.

This direction tells you to hold the START button for:

- a. at least 15 seconds.
- b. 15 seconds or longer.
- c. longer than 15 seconds.
- d. exactly 15 seconds, no more, no less.

20. Output voltage shall not be adjusted to more than 115 volts.

This direction tells you to adjust the voltage to:

- a. more than 115 volts.
- b. 115 volts or less.
- c. about 115 volts.
- d. at least 115 volts.

21. Disconnect the cable from the connector and operate the switch to SERV FAC.

What should you do second?

- a. Disconnect the cable.
- b. Operate the switch.
- c. Connect the SERV FAC.
- d. Disconnect the connector.

22. Put the locking lever in the UNLOCK position and pull wire until the guys are tight.

What should you do first?

- a. Tighten the guys.
- b. Pull the wire.
- c. Unlock the lever.
- d. Lock the lever.

23. Set the receiver switch to MULT. Adjust the MULT PEAK control for a maximum meter indication.

What should you do first?

- a. Set the MULT PEAK control.
- b. Read the meter indication.
- c. Read the receiver controls.
- d. Set the receiver switch.

24. Operate the METER SELECT switch to SERV FAC and the SERV SEL switch to M.

What should you do second?

- a. Operate the METER SELECT switch.
- b. Operate the SERV FAC switch.
- c. Operate the SERV SEL switch.
- d. Operate the M switch.

25. Extreme cold causes cables to become hard and brittle.

Which of the following says the same thing?

- a. Cables harden in cold weather.
- b. Brittle cables can easily snap.
- c. Cables become stronger in cold weather.
- d. Hard cables are useless.

26. Extreme weather conditions have a significant effect upon radio equipment.

Which of the following does not say the same thing?

- a. Wind can interfere with radio communication.
- b. Weather conditions do not interfere with radio communication.
- c. Rain can interfere with radio communication.
- d. Weather conditions interfere with radio communication.

27. One of the most important advantages of radio in cold weather is its transportability.

Which of the following says the same thing?

- a. Radio cannot be transported in cold areas.
- b. Radio has no disadvantages in cold areas.
- c. Radio is easy to transport in cold areas.
- d. Radio is difficult to transport in cold areas.

28. Adjust the heater thermostat control to the desired temperature setting.

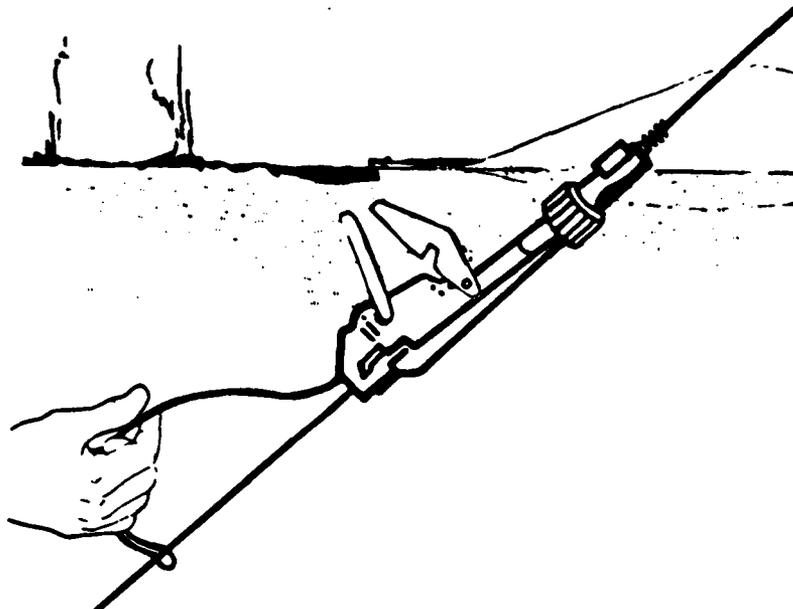
Which of the following says the same thing?

- a. Cold weather will cause the thermostat to turn on.
- b. The thermostat control will select the temperature automatically.
- c. You must set the thermostat to the temperature you want.
- d. turn on the heater blower when the temperature is low.

29. Press the catch in the uppen end of the lowest mast section, and rotate the mast section through half a turn, left or right. Disconnect the lowest mast section from the next lowest, and withdraw it from the launcher.

Which of the following describes the correct order of events?

- a. Rotate the mast section. Press the catch. Disconnect the mast section. Withdraw the mast section.
- b. Press the catch. Rotate the mast section. Disconnect the mast section. Withdraw the mast section.
- c. Press the catch. Rotate the mast section. Withdraw the mast section. Disconnect the mast section.
- d. Press the catch. Disconnect the mast section. Rotate the mast section. Withdraw the mast section.



To remove the slack from guy wires: Put the locking lever in the UNLOCK position and pull wire until the guys are tight. Lock the guys by pushing the locking levers down. Secure the levers in the locked position with the locking catches.

30. What is the second step you must do?
- a. Pull the wire.
  - b. Unlock the locking lever.
  - c. Secure the locking lever.
  - d. Lock the guys.

31. Separate whites from yolks of 3 eggs. Add yolks to batter and stir until smooth.

What is the second step described above?

- a. Add yolks to batter.
- b. Separate whites from yolks of eggs.
- c. Stir batter and yolks until smooth.
- d. Beat yolks.

32. Lift the handset from the cradle and turn the handcrank. Press the switch and talk. Then release it and listen.

What must you do just before you press the switch?

- a. Lift the handset from the cradle.
- b. Turn the handcrank.
- c. Talk.
- d. Release the switch.

**DIAGNOSTIC TEST FOR 31M10 FUNCTIONAL BASIC SKILLS EDUCATION PACKAGE**

**UNIT II - Using a Table of Contents**



Printed below is part of the Table of Contents from a Manual. It outlines the content for Chapter 2: SKILL LEVEL TASKS, and Chapter 3: DUTY POSITION TASKS. Use it to complete the next four questions.

Note: The first part of the page number refers to the chapter, the second number refers to a page in that chapter (e.g., page 2-9 refers to Chapter 2, page 9).

	PAGE
CHAPTER 2. SKILL LEVEL TASKS	2-1
Task List	2-1
Task Summaries for Skill Level 1	2-9
Task Summaries for Skill Level 2	2-315
Task Summaries for Skill Level 3	2-385
CHAPTER 3. DUTY POSITION TASKS	3-1
Task List	3-1
Task Summaries for Skill Level 1	3-10
Task Summaries for Skill Level 2	3-200
Task Summaries for Skill Level 3	3-310

1. You are Skill Level 1. On what page are the Task Summaries for Skill Level 1, DUTY POSITION TASKS?
  - a. 3-1
  - b. 2-9
  - c. 2-1
  - d. 3-10
  
2. You are Skill Level 3. On what page are the Task Summaries for DUTY POSITION TASKS, Skill Level 3?
  - a. 2-385
  - b. 3-200
  - c. 2-9
  - d. 3-310

3. You are Skill Level 2. On what page are the Task Summaries for DUTY POSITION TASKS, Skill Level 2?
- a. 2-315
  - b. 2-9
  - c. 3-200
  - d. 3-365
4. On what page is the Task List for SKILL LEVEL TASKS?
- a. 2-1
  - b. 2-9
  - c. 2-315
  - d. 3-1

Printed below is a list of tasks and the page numbers on which they are found. Refer to the list to answer questions 5 through 12.

<u>TASK NO</u>	<u>TITLE</u>	<u>PAGE</u>
113-593-7002	Inspect Operation of Telephone Terminal Sets	2-378
113-593-7004	Direct Operator's Daily Preventive Maintenance of Telephone Terminal Sets	2-382
113-593-7029	Direct Organizational Preventive Maintenance of Telephone Terminal Sets	2-385
113-593-7009	Inspect Installation of Radio Repeater Sets	2-388
113-593-7010	Inspect Operation of Radio Repeater Sets	2-391
113-593-7011	Direct Operator's Daily Preventive Maintenance of Radio Repeater Sets	2-394
113-593-7031	Direct Organizational Preventive Maintenance of Radio Repeater Sets	2-397
113-593-4019	Repair Multichannel Equipment at Organizational Level Using Special Tools and Test Equipment	2-400
113-601-7033	Direct Installation of Generator Sets	2-402
113-601-7034	Direct Operator's Preventive Maintenance on Power Generator Sets	2-405
113-623-3003	Prepare Maintenance Request, DA Form 2407	2-407
113-623-3004	Prepare Preventive Maintenance Schedule and Record, DD Form 314	2-415
113-623-7046	Counsel Subordinate Personnel	2-419

5. If you need information on Task No. 113-623-3004, you must go to page:
- a. 2-400
  - b. 2-407
  - c. 2-415
  - d. 2-419
6. On the list, Task No. 113-593-7010 is on page:
- a. 2-391
  - b. 2-378
  - c. 2-388
  - d. 2-394
7. If you need information on Task No. 113-593-7029, you must go to page:
- a. 2-382
  - b. 2-385
  - c. 2-388
  - d. 2-391
8. The tasks whose center numbers are 623 are to found on page or pages:
- a. 2-407 only.
  - b. 2-407 and 2-415.
  - c. 2-407 and 2-419.
  - d. 2-407, 2-415, and 2-419.
9. Task No. 113-623-3004 is:
- a. Direct Installation of Generator Sets.
  - b. Direct Operator's Preventive Maintenance on Power Generator Sets.
  - c. Prepare Preventive Maintenance Schedule and Record, DD Form 314.
  - d. Counsel Subordinate Personnel.

10. Task 113-593-7031 deals with:
  - a. directing operator's preventive maintenance of telephone terminal sets.
  - b. directing operator's preventive maintenance of radio repeater sets.
  - c. directing organizational preventive maintenance of telephone terminal sets.
  - d. directing organizational preventive maintenance of radio repeater sets.
  
11. Tasks whose numbers begin with 113-623 are to be found:
  - a. at the beginning of the list.
  - b. in the middle of the list.
  - c. at the end of the list.
  - d. all through the list.
  
12. Tasks 113-601-7033 and 113-601-7034 both deal with:
  - a. installation.
  - b. preventive maintenance.
  - c. operation.
  - d. generator sets.

Here is part of a Table of Contents. Do not try to read it, but refer to it to answer the questions 13 through 20.

Note: Paragraph and page numbers have two parts. The first part stands for the chapter. In paragraph numbers, the second part stands for the paragraph in the chapter. In page numbers, the second part is the page in the chapter.

For example, paragraph 4-11 means Chapter 4, paragraph 11. Page 4-6 means Chapter 4, page 6.

	Paragraph	Page
<b>CHAPTER 3. OPERATING INSTRUCTIONS</b>		
Section I. Operator's controls and indicators		
Transmitter controls and indicators	3-1	3-1
Receiver controls and indicators	3-2	3-3
Regulator, Voltage CN-514 GRC controls and indicators	3-3	3-4
Section II. Tuning procedures		
General	3-4	3-13
Installation of tuning units	3-5	3-14
Determination of channel frequency	3-6	3-14
Preliminary starting procedures	3-7	3-14
Receiver tuning procedures	3-8	3-15
Transmitter tuning requirements	3-9	3-19
Transmitter tuning procedures	3-10	3-21
Single stack loop-back operational tests	3-11	3-27
Section III. System lineup procedures		
General	3-12	3-30
Fdm system lineup	3-13	3-31
Pcm system lineup	3-14	3-32
System checks and adjustments	3-15	3-33
Multiplex terminal adjustments	3-16	3-34
Section IV. Routine operating procedures		
General	3-17	3-34
Order wire operation	3-18	3-34
Monitoring equipment	3-19	3-35
Stopping procedure	3-20	3-36
<b>CHAPTER 4. OPERATOR'S MAINTENANCE</b>		
Scope of operator's maintenance	4-1	4-1
Operator's preventive maintenance	4-2	4-1
Preventive maintenance checks and services periods	4-3	4-1
Daily preventive maintenance checks and services chart	4-4	4-2
Weekly preventive maintenance checks and services chart	4-5	4-2
Cleaning	4-6	4-3
Visual inspection	4-7	4-3
Operational checklist	4-8	4-3
Replacement of indicator lamps	4-9	4-5
Replacement of fuses	4-10	4-5
Replacement of aid filter	4-11	4-6

13. Page 3-19 means the:
- a. 19th paragraph of Chapter 3.
  - b. third page of Chapter 19.
  - c. 19th page of Chapter 3.
  - d. 19th page of Section 3.
14. On what page would you find "OPERATOR'S MAINTENANCE - Visual Inspection"?
- a. 4-7
  - b. 4-8
  - c. 3-4
  - d. 4-3
15. On what page would you find Operational Checklist in Chapter 4?
- a. 3
  - b. 4
  - c. 7
  - d. 8
16. Your instructor tells you to turn to page 4, Chapter 3. What topic is introduced there?
- a. Regulator, Voltage CN-514/GRC controls and indicators.
  - b. Tuning procedures - General.
  - c. Cleaning.
  - d. Preventive maintenance checks and services periods.
17. What paragraph would you turn to read about Installation of tuning units?
- a. 3-4
  - b. 3-5
  - c. 3-13
  - d. 3-14

18. What paragraph would you look up to read about Order wire operation?
- a. Chapter 3, paragraph four.
  - b. Chapter 3, paragraph thirty-four.
  - c. Chapter 3, paragraph eighteen.
  - d. Paragraph 3, Chapter one.
19. Your instructor tells you to turn to Chapter 3, paragraph 4. What topic is introduced there?
- a. Regulator, Voltage CN-514/GRC controls and indicator.
  - b. General tuning procedures.
  - c. Preventive maintenance checks and services periods.
  - d. Preliminary starting procedures.
20. Your instructor tells you to turn to Chapter 3, paragraph 13. What page is that paragraph on?
- a. 3-13
  - b. 3-31
  - c. 3-30
  - d. 3-32

**DIAGNOSTIC TEST FOR 31M10 FUNCTIONAL BASIC SKILLS EDUCATION PACKAGE**

**UNIT VI - Locating Information in Tables**

Here is part of a chart for troubleshooting some radio equipment. Do not try to read it, but refer to it to answer questions 1 through 5.

Step	Unit	Action	Normal indication	Corrective measures
68	AM-1955(*)/GRC or AM-1956(*)/GRC.	Detune REC SIG-1 control for minimum indication on multimeter.	Multimeter indicates minimum level.	
69	R-1148(P)/GRC or R-1331(*)/GRC.	Rotate SQUELCH INCR SENS control counter clockwise until squelch alarms operate.	NO SIGNAL indicator lights and buzzer sounds. Depress SQUELCH BUZZER OFF pushbutton.	Check V12 on second IF assembly 3A5. If buzzer sounds but indicator does not light, change indicator lamp.
70	AM-1955(*)/GRC or AM-1956(*)/GRC.	Readjust REC SIG-1 control for maximum indication on multimeter.	NO SIGNAL indicator extinguishes and buzzer sounds. Depress SQUELCH BUZZER OFF pushbutton.	
71	Fdm multiplex equipment.	<i>For 4-channel fdm operation only</i>		
		Connect spiral-4 cable from multiplex equipment to RCVR OUT terminals (fig. 6-3). Have multiplex terminal transmit 1-kc test tone at 0 dbm.		
72	T-893(P)/GRC	Set multimeter selector switch to 1 KC IN and adjust FDM INPUT LEVELS control for indication within green area of multimeter scale.	Multimeter indicates in green area of meter scale.	Check V4 in baseband assembly 2A3.
73	T-893(P)/GRC	Set multimeter selector switch 1 KC MOD.	Multimeter indicates in green area of meter scale.	Check V1 and V2 on baseband assembly 2A3. Check V5 on afc assembly 2A4. Check all tubes on modulator assembly 2A5.
74	R-1148(P)/GRC or P-1331(*)/GRC.	Set multimeter selector switch to 1 KC OUT and adjust FDM OUTPUT LEVEL control for indication within green area of multimeter scale.	Multimeter indicates green area of meter scale.	Check V7, V8, and V9 in second IF assembly 3A5. Check tubes V5, V6, and V9 in baseband assembly 3A3. If meter indication obtained is not in green area, replace V9 until requirement is met. Do not discard unsatisfactory tubes;

EQUIPMENT PERFORMANCE

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1. Which column tells you which piece of equipment is being checked?
  - a. Unit
  - b. Action
  - c. Normal indication
  - d. Corrective measures
  
2. The corrective measure at step 72 is:
  - a. Check V4 in baseband assembly 2A3.
  - b. Set multimeter selector switch to 1 KC IN.
  - c. Multimeter indicates in green area of meter scale.
  - d. Check V1 and V2 on baseband assembly 2A3.
  
3. Which column tells you the first thing to do at each step?
  - a. Unit
  - b. Action
  - c. Normal indication
  - d. Corrective measures
  
4. Which column tells you a suggested remedy for the trouble?
  - a. Normal indication
  - b. Corrective measures
  - c. Action
  - d. Step
  
5. At step 68, the normal indication is:
  - a. Multimeter indicates minimum level.
  - b. NO SIGNAL indicator lights and buzzer sounds.
  - c. Multimeter indicates in green area of meter scale.
  - d. Detune REC SIG-1 control for minimum indication on multimeter.

Here is part of a chart for troubleshooting a radio terminal. Do not try to read it, but refer to it to answer the next 3 questions.

Item No.	Symptom	Possible trouble	Corrective measure
1	ALARMS FRAME indicator of TD-352/U lights, buzzer sounds, and TEST ALIGN meter indicates in green area with METER SELECT switch at PCM IN and TIMING IN.	Defective TD-352/U	Troubleshoot TD-352/U (app A).
2	ALARMS FRAME indicator of TD-352/U lights, buzzer sounds, and TEST ALIGN meter does not indicate in green area with METER SELECT switch at PCM IN and/or TIMING IN. TD-202/U and AN/GRC-50A(V) indicate normally.	a. Defective CG-1040B/U cable between TD-352/U and TD-202/U. b. Defective TD-202/U	a. Check and replace if necessary. b. Troubleshoot TD-202/U (app A).
3	ALARMS FRAME indicator of TD-352/U and ALARMS TRAFFIC indicator of TD-202/U light, buzzer sounds, TEST ALIGN meter of TD-202/U does not indicate in green area with METER SELECT switch at FROM RADIO RCVR. AN/GRC-50A(V) operates normally, order wire normal.	Defective pcm component at distant terminal or repeater.	Request distant terminal or repeater troubleshooting.
4	Order wire very noisy or no reception, but all other indications on TD-352/U, TD-202/U, and AN/GRC-50A(V) are normal.	a. Defective CX-7872/TCC cable between TD-202/U and R-1331(P)/GRC. b. Defective TD-202/U	a. Check and replace if necessary. b. Troubleshoot TD-202/U (app A).
5	ALARMS FRAME indicator of TD-352/U and ALARMS TRAFFIC indicator of TD-202/U light and TEST METER does not indicate in green area with METER SELECT switch at FROM RADIO RCVR, all indications on AN/GRC-50A(V) are normal except for noisy or no order wire.	a. Defective CG-409H/U cable between R-1331(P)/GRC and TD-202/U. b. Defective R-1331(P)/GRC	a. Check and replace if necessary. b. Troubleshoot R-1331(P)/GRC (app A).
6	ALARMS FRAME indicator of TD-352/U ALARMS TRAFFIC indicator of TD-202/U and R-1331(P)/GRC SQUELCH NO SIGNAL indicator light, buzzer sounds, and no order wire.  <i>Note.</i> In 24-channel operation, both TD-352 U's have this symptom.	a. Defective antenna cable b. Defective Antenna AT-903/G. c. Defective R-1331(P)/GRC d. AT-903/G not properly oriented. e. Defective T-893(P)/GRC at distant terminal or repeater.	a. Check and replace if necessary. b. Check and replace if necessary. c. Troubleshoot R-1331(P)/GRC (app A). d. Check orientation. e. Keep AN/GRC-50A(V) operating on assigned frequency. Periodically try order wire and wait response. Send man to distant terminal or repeater.
7	Distant terminal or repeater indicates loss of pcm, no indication on TEST ALIGN meter of local TD-202/U with METER SELECT switch at TO RADIO XMTR.	Defective TD-202/U	Troubleshoot TD-202/U (app A).

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6. At Item No. 7, the corrective measure is:
  - a. Troubleshoot TD-352/U (app. A).
  - b. Troubleshoot TD-202/U (app. A).
  - c. Request distant terminal or repeater troubleshooting.
  - d. Defective TD-202/U.
  
7. The second possible trouble in Item No 4 is:
  - a. Order wire very noisy.
  - b. Defective CX-7872/TCC cable.
  - c. Defective TD-202/U.
  - d. Defective R-1331(P)/GRC.
  
8. If your equipment is not working properly and you want to know why, you should look in the:
  - a. Item No. column.
  - b. Possible trouble column.
  - c. Symptom column.
  - d. Corrective measure column.

Here is part of a table used for maintenance checks of equipment. Do not try to read it, but refer to it to answer the next 4 questions.

**NOTE.**

The checks in the "interval" column are to be performed in the order listed  
**B**—Before operation    **D**—During operation    **A**—After operation    **W**—Weekly

Item No.	Interval				Item to be Inspected	Procedures Check and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W			
1				•	AN/TRC-145	Check for completeness of the AN/TRC-145	Upon completion of PMCS checks, available equipment is insufficient to support the unit mission
2					Generator Set	<p><b>WARNING</b></p> <p>Wheels must be blocked, brakes set, and leg support down in support position before attempting to roll up the tarpaulin and before starting to assemble or set up the equipment for operation.</p> <p>a. Inspect unit for oil leaks and broken or missing parts.</p> <p>b. Periodically monitor the engine oil pressure gage for low or fluctuating reading.</p>	
		•		•	Lubrication	<p><b>CAUTION</b></p> <p>There must be free circulation of air around the generator sets at all times during operation. Inadequate ventilation is a major cause of damage to the equipment. Never operate the generator in enclosed area unless the exhaust gases are vented to the outside.</p> <p><b>WARNING</b></p> <p>Inhalation of exhaust fumes may result in serious illness of death.</p>	b. Excessive loss of oil due to burn or leakage
		•			Controls and instruments	c. Start unit and check for correct operation.	c. Neither power unit operates properly.
			•		Frame	d. Inspect for cracks and bends. Check for chipped paint and spot paint where required.	
	•	•			Grounding	e. Check grounding system for proper installation. Inspect the ground stud threads, bonding straps, and shock mounts. Tighten loose ground connections.	e. Unable to ground properly.
3					Generator trailer	<p><b>CAUTION</b></p> <p>Place all tags describing condition of the trailer in a conspicuous location so that they will not be overlooked.</p>	
		•			General	a. Be alert for unusual noises or improper operation	
			•		Operating faults	b. Investigate and correct or report any faults noted during operation.	
			•		Suspension system	c. Inspect suspension system and associated mounting parts for damage.	
4		•		•	<i>OUTSIDE</i> Shelter	a. Check for skinpunctures, cracks, or open seams that could permit moisture to enter the shelter.	a. Excessive moisture enters the shelter causing a potential shock hazard.
	•				Grounding	b. Check grounding to see that it is properly installed. Tighten loose ground connections.	b. Ground system connections cannot be properly tightened.
			•		Power and signal cables	c. Tighten loose connections and adjust cable grips so that they relieve the connector of weight of cable.	
			•		Exhaust blower vent covers	d. Be sure the exhaust blower vent covers are open and the airflow is not obstructed.	
			•		Doors air filter cover	e. Be sure the entrance door air filter vent cover is open and unobstructed.	

Unit VI  
Diagnostic Test

9. Which of the following needs to be checked both before and during operation of the Generator Set (Item No. 2 in the table)?
- a. Outside shelter
  - b. Inspecting for oil leaks
  - c. Controls and instruments
  - d. Grounding
10. The frame of the generator set must be checked:
- a. Before operation.
  - b. During operation.
  - c. After operation.
  - d. Weekly.
11. The column heading "A" stands for:
- a. Alarms Indicator
  - b. Applications.
  - c. AN/TRC/145.
  - d. After operation.
12. The power and signal cables must be checked:
- a. Before operation.
  - b. During operation.
  - c. After operation.
  - d. Weekly.

Printed below is a patch panel diagram. Use the diagram to answer the next 4 questions.

P A T C H P A N E L				
	SYSTEM 1		SYSTEM 2	
	Red	Blue	Red	Blue
Part 1	○ L	○ A	○ R	○
Part 2	○ P	○	○ N	○ C
Part 3	○	○ T	○ E	○

13. An example of a column heading in the diagram is:

- a. Part 1.
- b. Part 3.
- c. Red.
- d. Patch panel.

14. The letter in System 2, Red, Part 2 is:

- a. P.
- b. E.
- c. N.
- d. C.

15. Letters A and T are both in:

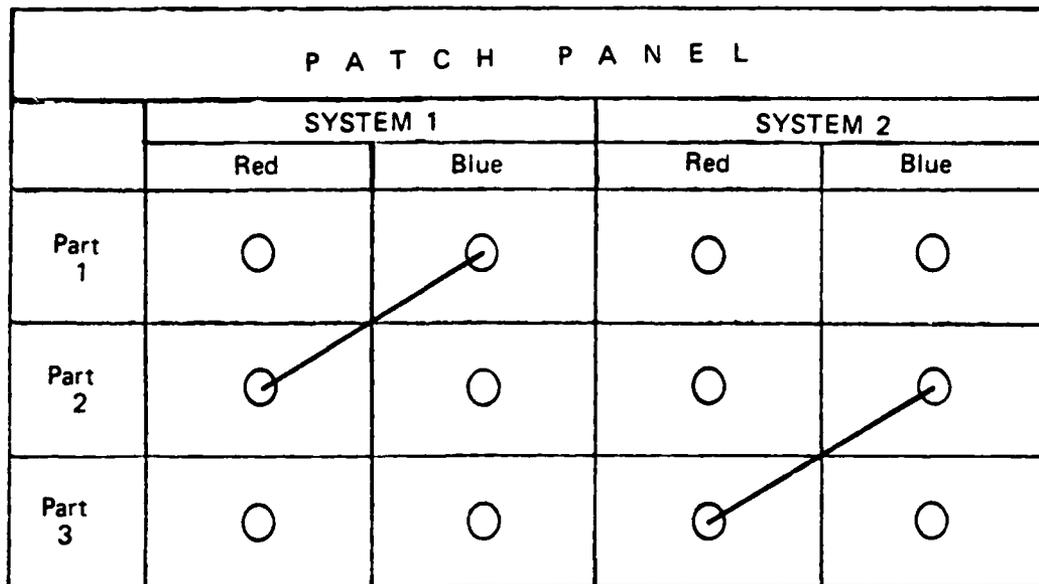
- a. Part 1.
- b. System II, Red.
- c. System I, Blue.
- d. System I, Part 3.

16. Letter L is in:

- a. System 1, Red, Part 1.
- b. System 1, Red, Part 2.
- c. System 2, Red, Part 1.
- d. System 1, Blue, Part 1.

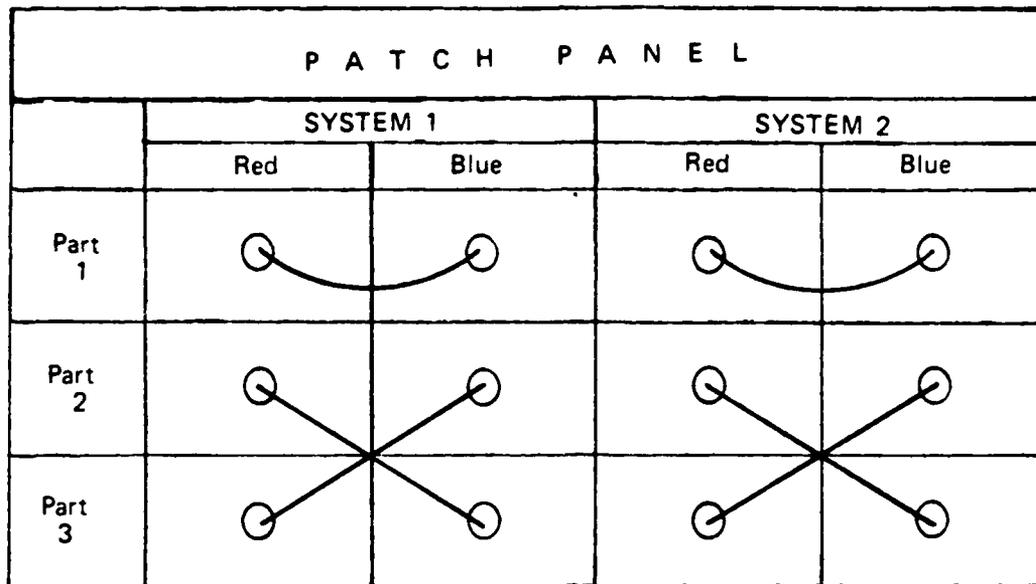
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UNIT VII - Reading Cabling Diagrams



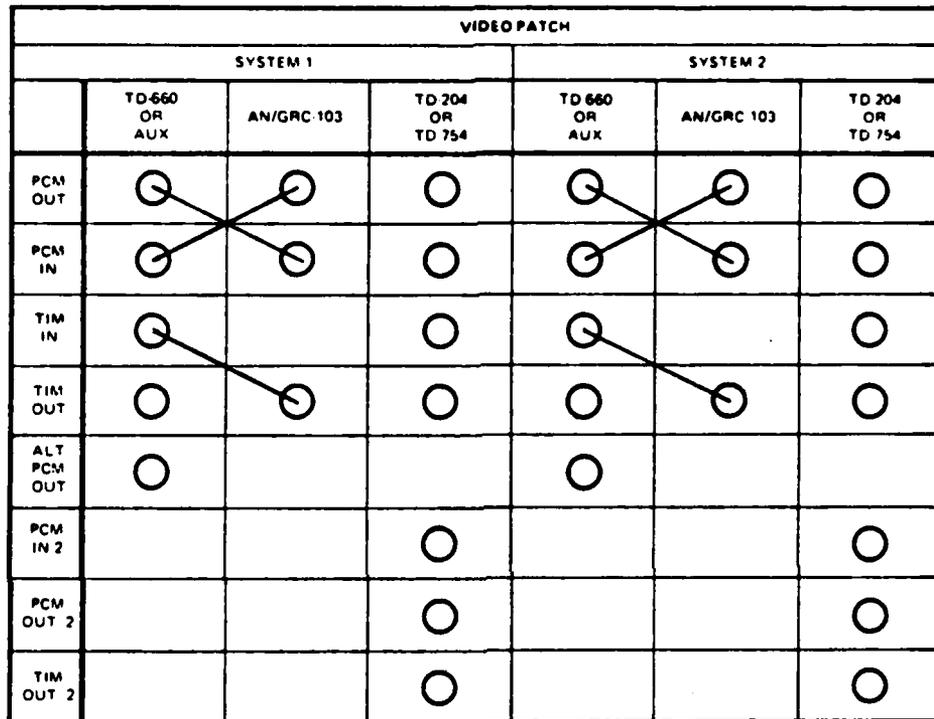
1. Printed above is a patch panel diagram. The solid lines connecting the circles represent cables. Which of the following best describes how the cables in the above diagram are connected?
- For System 1: Part 1-Blue is connected to Part 2-Red.  
For System 2: Part 2-Blue is connected to Part 3-Red.
  - For System 1: Part 1-Red is connected to Part 2-Blue.  
For System 2: Part 1-Red is connected to Part 2-Blue.
  - For System 1: Part 1-Red is connected to Part 1-Blue.  
For System 2: Part 3-Red is connected to Part 3-Blue.
  - For System 1: Part 2-Red is connected to Part 3-Blue.  
For System 2: Part 3-Red is connected to Part 2-Blue.

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2. Printed above is a diagram of a patch panel. Which statement is true concerning the diagram?
- System 1 is connected to System 2.
  - Part 1-Red is connected to Part 1-Blue in both Systems.
  - Blue is connected to Blue in both Systems.
  - Part 1-Red is connected to Part 2-Blue in both Systems.

Here is a diagram which shows you the correct way to connect the cables of Systems 1 and 2 on the video patch panel. Take a moment to look it over. Then answer the question below.



3. Which of the diagrams on the next two pages shows the correct way to connect the cables for System 1 only. Use the above diagram as a guide.
- Diagram 1
  - Diagram 2
  - Diagram 3
  - Diagram 4

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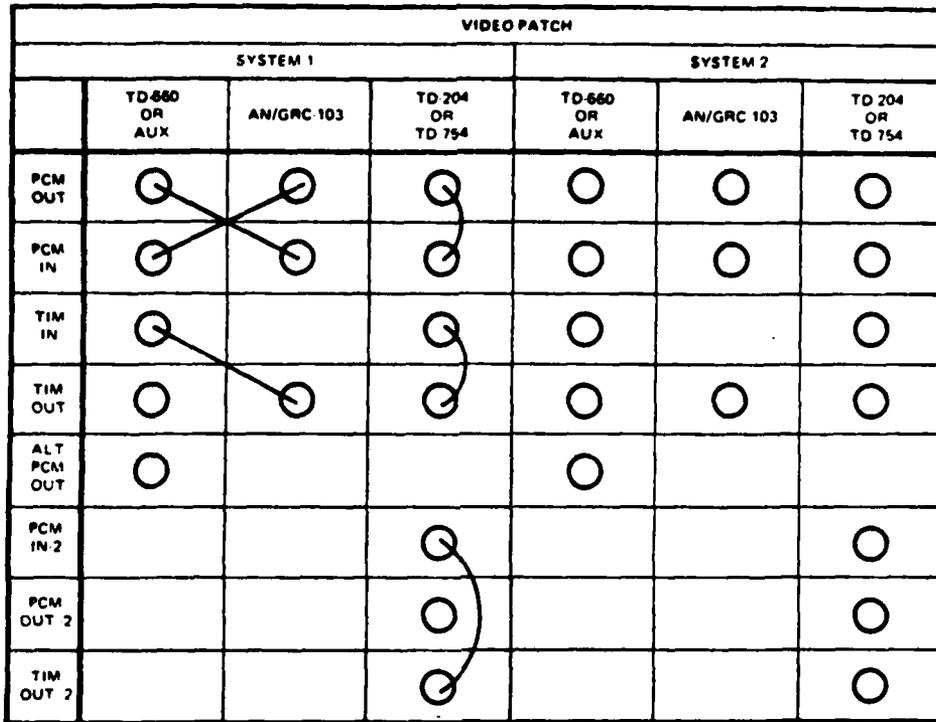


Diagram 1

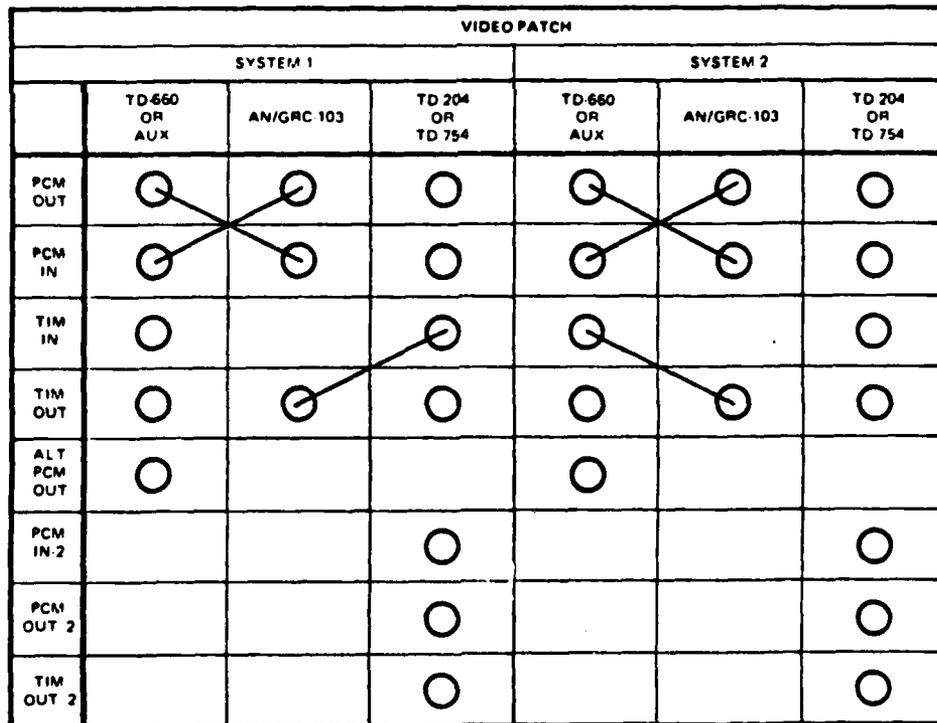


Diagram 2

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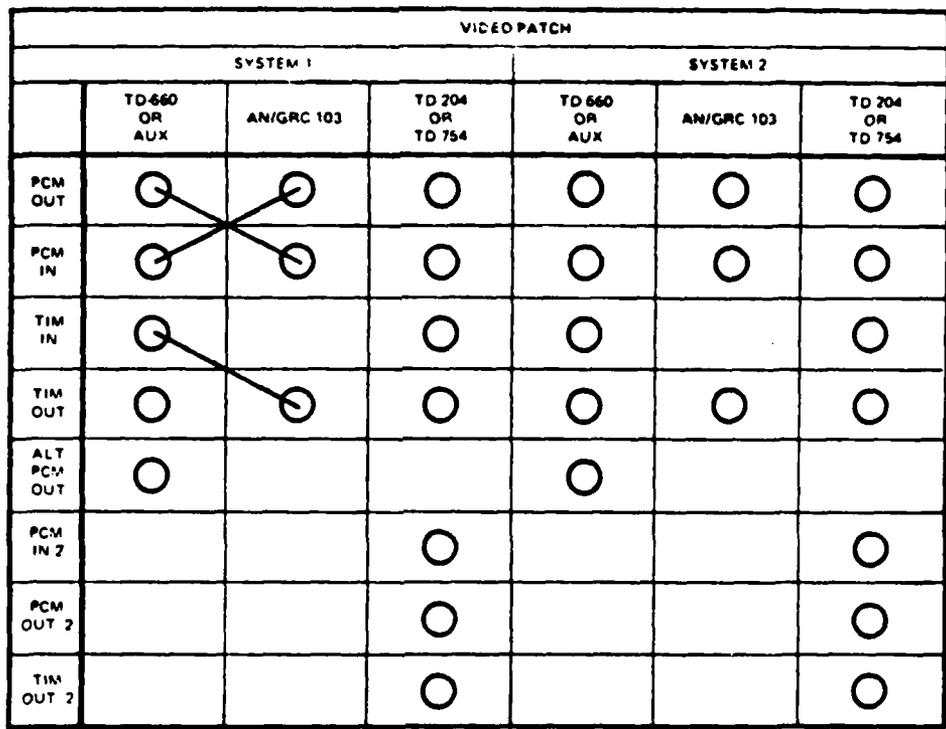


Diagram 3

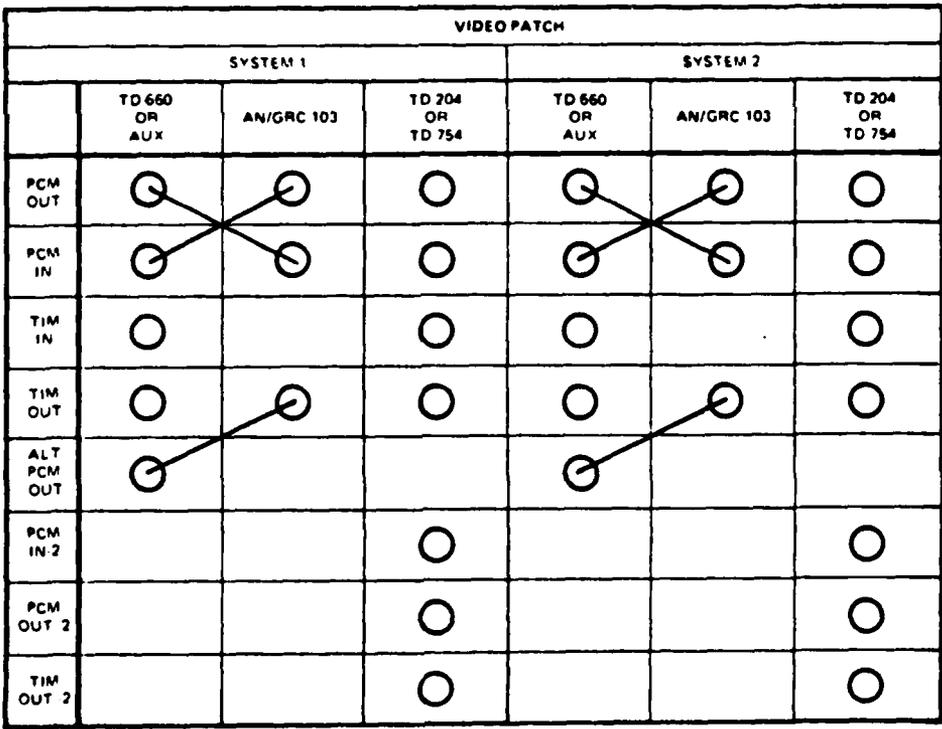


Diagram 4

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4. Which of the following 4 diagrams shows Part 1-Red connected to Part 2-Blue, and Part 1-Blue connected to Part 2-Red for System 2 only?

- a. Diagram 1
- b. Diagram 2
- c. Diagram 3
- d. Diagram 4

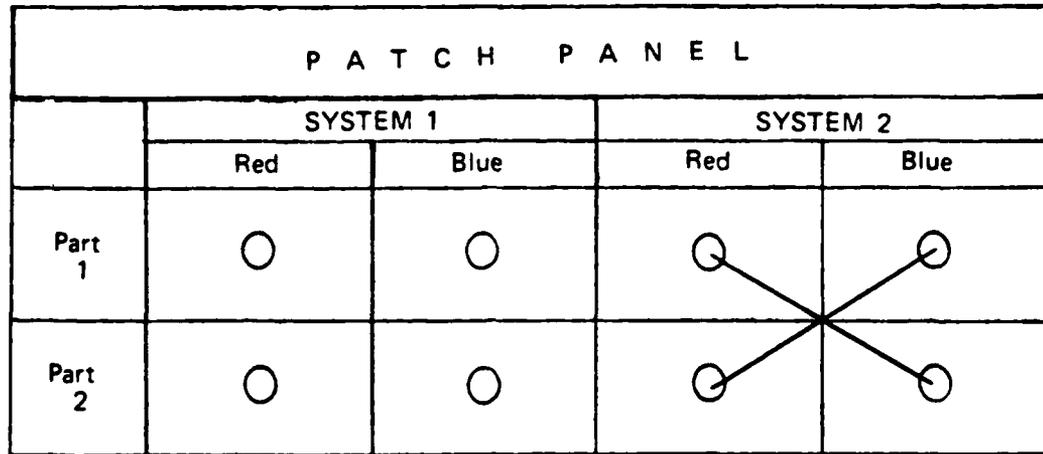


Diagram 1

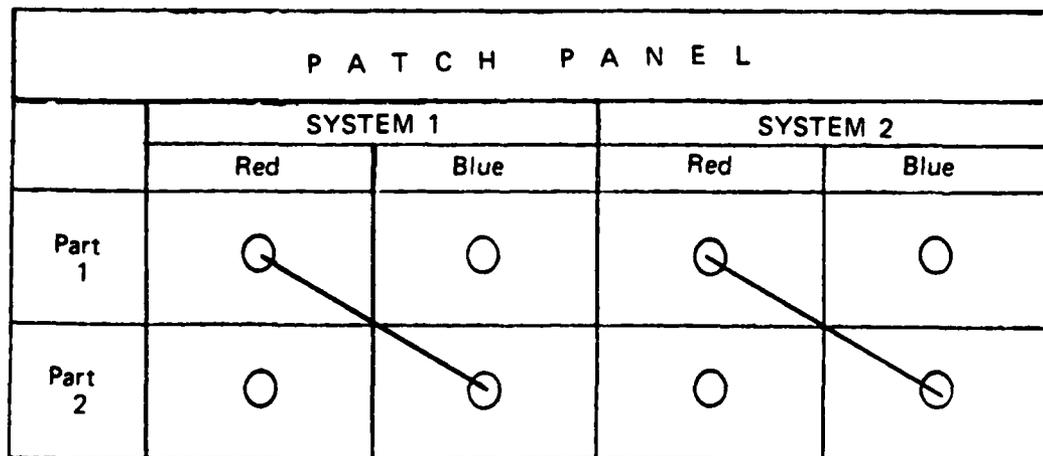


Diagram 2

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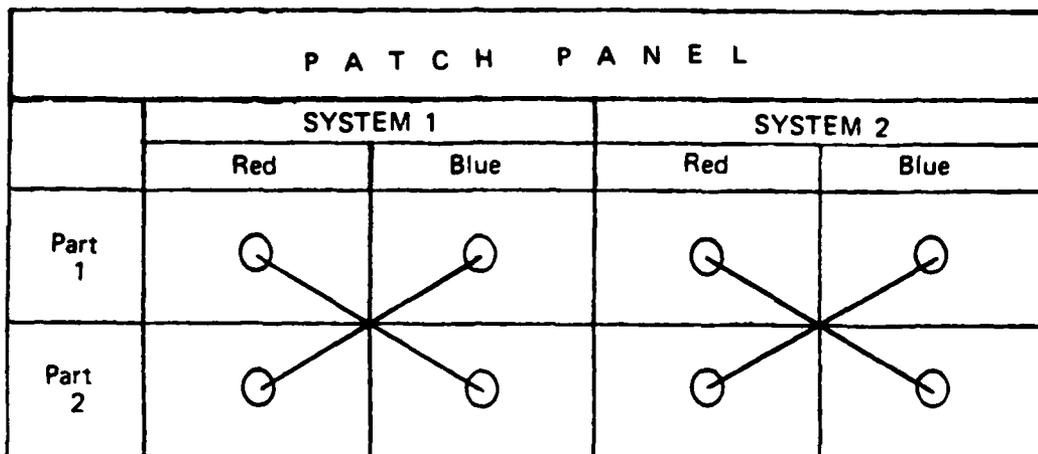


Diagram 3

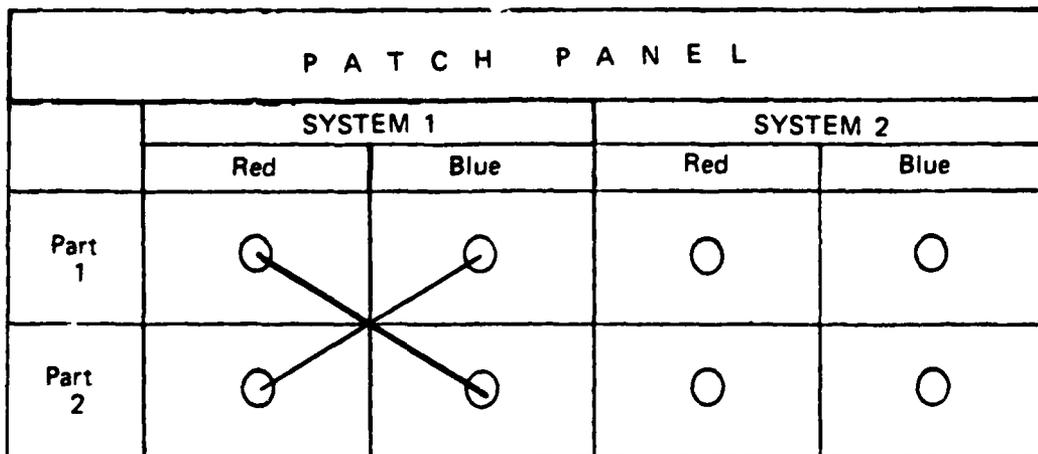
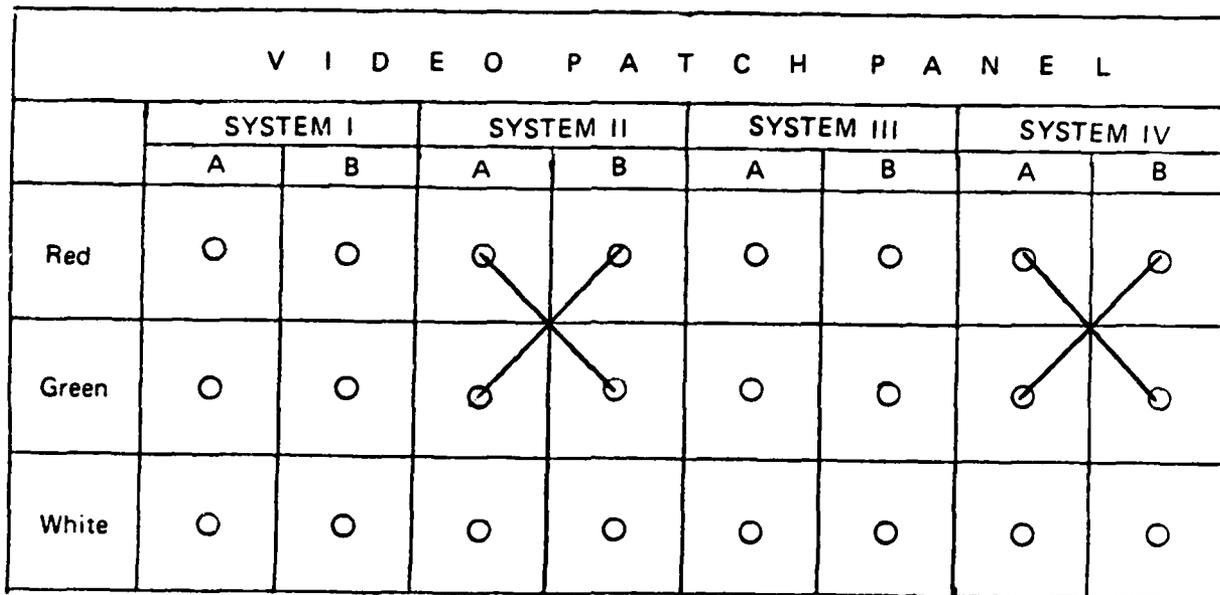


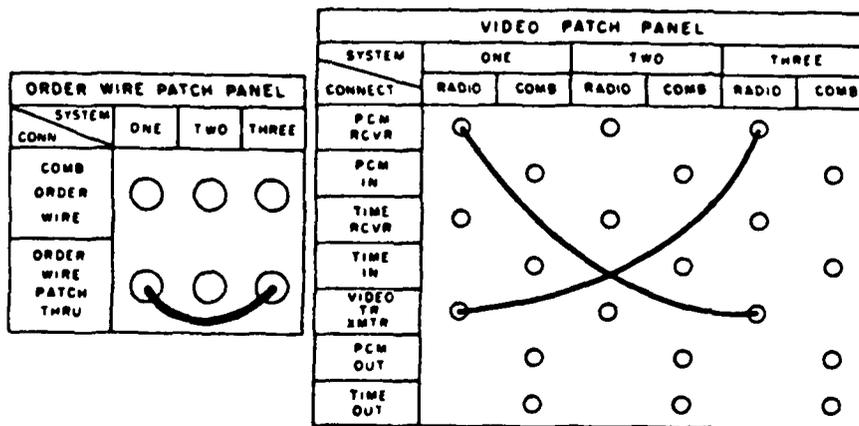
Diagram 4



Printed above is a diagram of a video patch panel. The lines connecting the circles are cables.

5. When a system is cabled, it is being used. Which systems above are being used?
  - a. Systems I and II
  - b. Systems I and III
  - c. Systems II and IV
  - d. Systems III and IV

Below is a diagram which shows typical cable connections for a radio. System 1 and 3 cable connections are shown as examples. The diagram does not show all possible cable connections.



6. Which of the diagrams on the next two pages shows the correct cable connections if you were to connect System 2 and System 3? Use the above diagram as a guide.

- a. Diagram 1
- b. Diagram 2
- c. Diagram 3
- d. Diagram 4

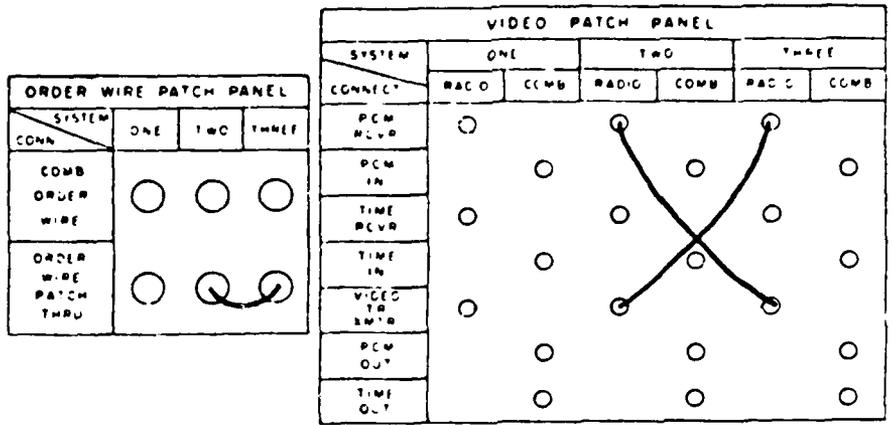


Diagram 1

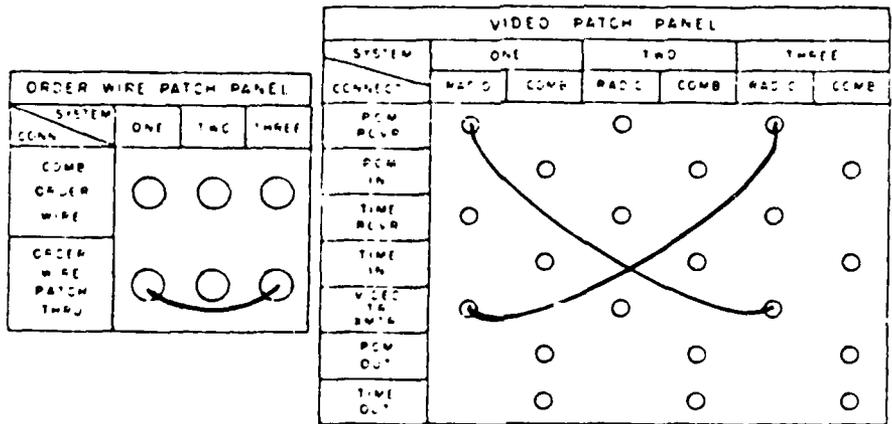


Diagram 2

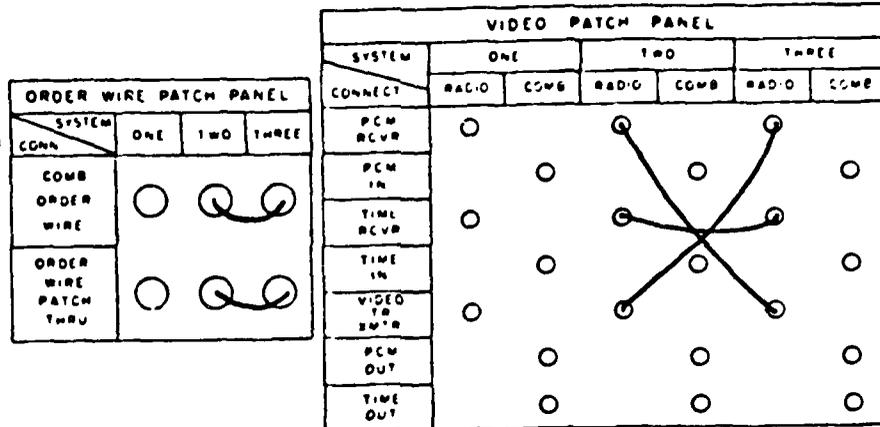


Diagram 3

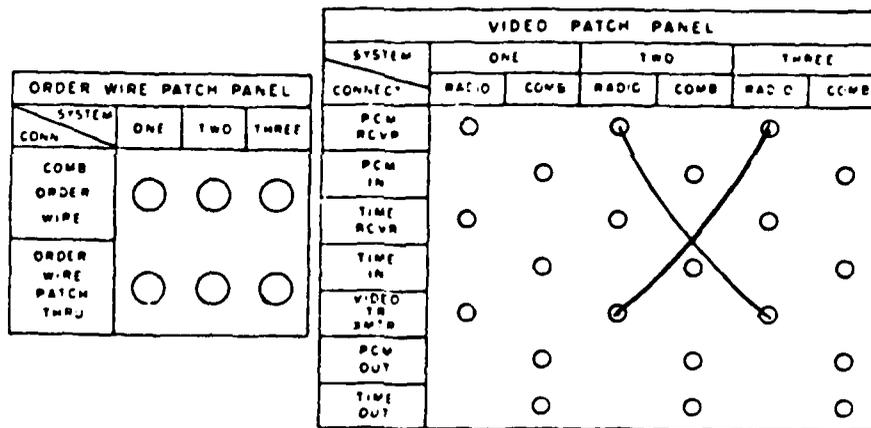
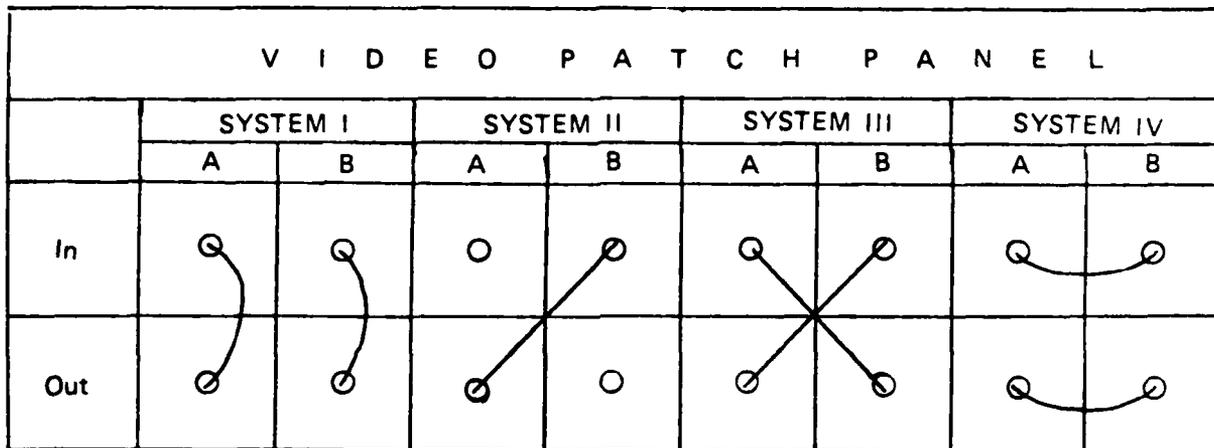


Diagram 4

Printed below is a diagram of a video patch panel. The lines connecting the circles are cables. Use the diagram to answer the next two questions.



7. Which system above has Part A-In connected to Part A-Out and Part B-In connected to Part B-Out?
- System I
  - System II
  - System III
  - System IV
8. System IV above has:
- A-In connected to A-Out.
  - A-In connected to B-In.
  - A-In connected to B-Out.
  - A-Out connected to B-In.

Printed below is a patch panel diagram. Use the diagram to answer the next 4 questions.

P A T C H P A N E L				
	SYSTEM 1		SYSTEM 2	
	Red	Blue	Red	Blue
Part 1	<input type="radio"/> L	<input type="radio"/> A	<input type="radio"/> R	<input type="radio"/>
Part 2	<input type="radio"/> P	<input type="radio"/>	<input type="radio"/> N	<input type="radio"/> C
Part 3	<input type="radio"/>	<input type="radio"/> T	<input type="radio"/> E	<input type="radio"/>

9. An example of a column heading in the diagram is:

- a. Part 1.
- b. Part 3.
- c. Red.
- d. Patch panel.

10. The letter in System 2, Red, Part 2 is:

- a. P
- b. E
- c. N
- d. C

11. Letters A and T are both in:

- a. Part 1.
- b. System II, Red.
- c. System I, Blue.
- d. System I, Part 3.

12. Letter L is in:

- a. System I, Red, Part 1.
- b. System I, Red, Part 2.
- c. System II, Red, Part 1.
- d. System I, Blue, Part 1.

DIAGNOSTIC TEST FOR 31M10 FUNCTIONAL BASIC SKILLS EDUCATION PACKAGE

UNIT VIII - Diagnosing Equipment Malfunctions

The questions in this section ask you to decide whether something is wrong with a piece of equipment. Pay close attention to the following definitions, and refer back to them whenever you need to:

**NORMAL INDICATION:** What is supposed to happen when the equipment is working properly.

**SYMPTOM:** An indication that there is something wrong with the piece of equipment; not what is supposed to happen.

Here is part of a table for checking a piece of equipment. Use it to answer the next six questions.

<u>Action</u>	<u>Normal Indication</u>
1. Set POWER switch to ON.	POWER ON indicator lights.
2. Set MANUAL-AUTOMATIC switch to MANUAL.	Meter indicates voltage greater than 25 and MANUAL indicator lamp lights.
3. Set RAISE-LOWER switch to RAISE then to LOWER.	Meter indicates increase in voltage then decrease in voltage.
4. Set MANUAL-AUTOMATIC switch to AUTOMATIC.	MANUAL indicator light goes out. Meter indicates a voltage change and settles at 115 volts.
5. Set VOLUME control to HIGH.	VOLUME meter indicates 10 or more.
6. Push CUT-OFF button.	VOLUME meter indicates decrease in voltage.

1. You do action No. 1 (Set POWER switch to ON) and the POWER ON indicator lights up. Is that a sign that something is wrong with your equipment?

- Yes
- No

2. You do action No. 2. The MANUAL indicator lamp lights up. The meter indicates a voltage of 75. Is this a sign that something is wrong with your equipment?
  - a. Yes
  - b. No
  
3. You do action No. 3. The voltage meter goes from 75 to 100, then to 70. Is this a sign that something is wrong with your equipment?
  - a. Yes
  - b. No
  
4. You do action No. 4. The MANUAL indicator lamp stays lit. The voltage meter increases to 115. Is this a sign that something is wrong with your equipment?
  - a. Yes
  - b. No
  
5. You do action No. 5. The VOLUME meter indicates 15. Is this a sign that something is wrong with your equipment?
  - a. Yes
  - b. No
  
6. You do action No. 6. The VOLUME meter does not change. Is this a sign that something is wrong with your equipment?
  - a. Yes
  - b. No

Refer to the table below when answering the next six questions. Notice that the table describes symptoms (signs that something is wrong).

<u>Step No.</u>	<u>Symptom</u>	<u>Step No.</u>	<u>Symptom</u>
1	ALARMS FRAME indicator lights, buzzer sounds, and TEST ALIGN meter indicates in green area.	4	LOW POWER indicator lights and blower does not operate.
2	ALARMS FRAME indicator and ALARMS TRAFFIC indicator lights, buzzer sounds.	5	No indication on TEST ALIGN meter.
3	TEST ALIGN meter does not indicate in green area.	6	NO SIGNAL indicator lights, buzzer sounds.

7. You do step No. 1 and the ALARMS FRAME indicator lights, buzzer sounds, and TEST ALIGN meter indicates in the green area. Is that a sign that something is wrong with your equipment?

- a. Yes
- b. No

8. You do step No. 2. What should happen on your equipment if there is nothing wrong with it?

- a. ALARMS FRAME indicator and ALARMS TRAFFIC indicators do not light. Buzzer does not sound.
- b. ALARMS FRAME indicator and ALARMS TRAFFIC indicators light. Buzzer sounds.

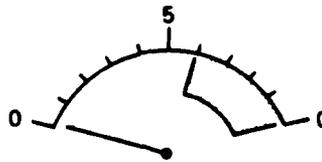
9. You do step No. 3. The TEST ALIGN meter does not indicate in the green area. Is that a sign that something is wrong with your equipment?

- a. Yes
- b. No

10. You do step No. 4. The LOW POWER indicator lights and the blower does not operate. Is that a sign that something is wrong with your equipment?

- a. Yes
- b. No

11. At step No. 5, the TEST ALIGN meter looks like this.



Is this a sign that something is wrong with your equipment?

- a. Yes
- b. No

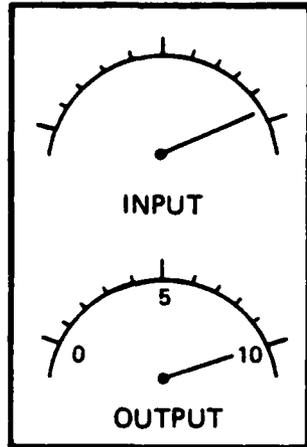
12. You do step No. 6. The NO SIGNAL indicator does not light, the buzzer does not sound. Is that a sign that something is wrong with your equipment?

- a. Yes
- b. No.

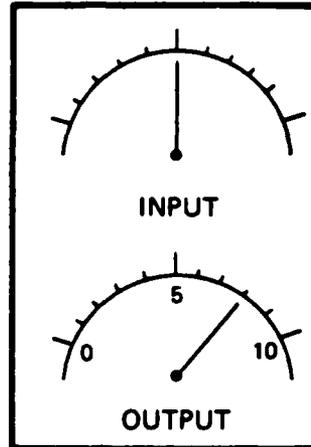
In the next four items, you are given a normal indication or a symptom. Read it, and then answer the question.

13. Normal Indication: Reading of 10 on OUTPUT meter. INPUT meter indicates in center.

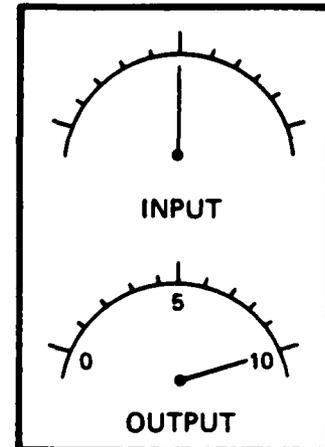
Which of the following shows a normal reading?



A



B



C

- a. A
- b. B
- c. C
- d. None of them

14. Normal Indication: Buzzer goes on and ALARM light lights.

Results on three pieces of equipment:

- I. Buzzer goes on; ALARM light does not light.
- II. Buzzer goes on; ALARM light lights.
- III. Buzzer does not go on; ALARM light does not light.

Which of the pieces of equipment has something wrong?

- a. III only
- b. I and II only
- c. I, II, and III
- d. I and III only

15. Symptom: Meter indicates in orange area with POWER switch at OFF.

You put the POWER switch at OFF. The meter indicates in the orange area. Is this a sign that something is wrong with your equipment?

- a. Yes
- b. No

16. Symptom: No indication on meter when switch is at ON.

What sign would tell you that there is nothing wrong with your equipment?

- a. An indication on the meter when switch is at ON.
- b. No indication on the meter when switch is at ON.

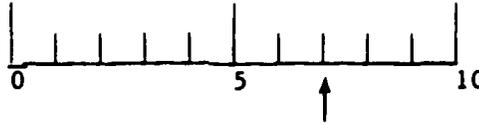
**DIAGNOSTIC TEST FOR 31M10 FUNCTIONAL BASIC SKILLS EDUCATION PACKAGE**

**UNIT IX - Scale Reading**

1. What numeral is in the tenths place in 297.6.

- a. 6
- b. 2
- c. 7
- d. 9

2.

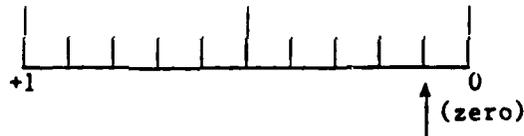


The above scale measures values by the hundreds. What is the scale value with the arrow beneath it?

- a. 0.7
- b. 7
- c. 70
- d. 700

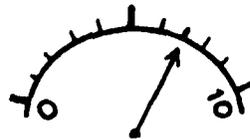
3. Some military scales have the zero line on the right, as shown here. The scale measures values between zero and one. The zero mark is labeled. What is the value of the line with the arrow beneath it?

- a. .01
- b. 0.1
- c. 0.2
- d. 1.0



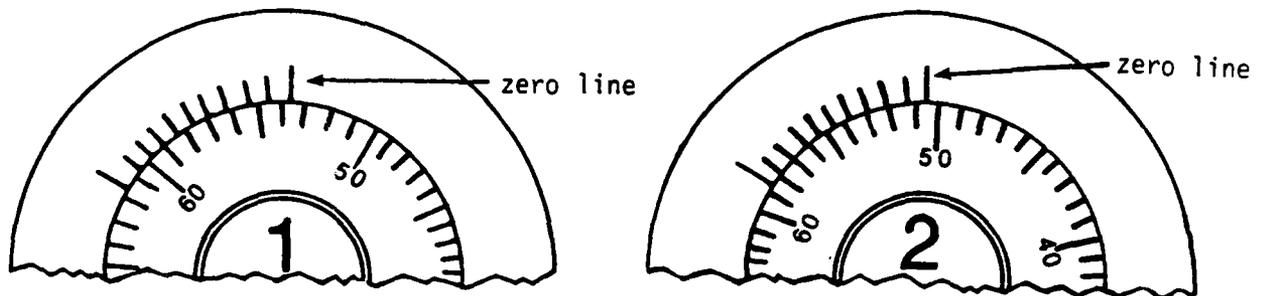
4. The scale on the right measures units or ones. The reading on the scale is:

- a. 0.07
- b. 0.7
- c. 7.0
- d. 70.0



5. 184.9 The place identified by the arrow is the:

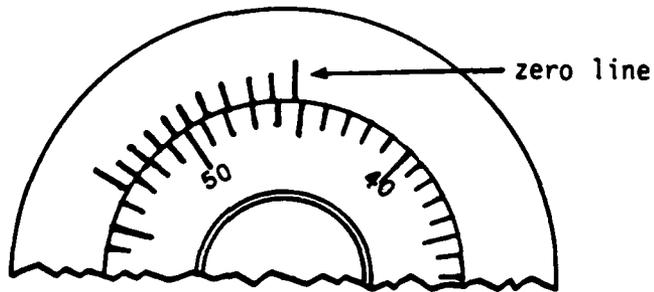
- a. ones place.
- b. tens place.
- c. hundreds place.
- d. tenths place.



6. This type of dial is read by looking for the zero line, then seeing which mark on the numbered line is closest to it.

Is the reading on Dial 2 within 2 marks of the reading on Dial 1?

- a. Yes
- b. No

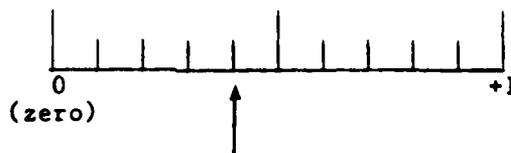


7. This type of dial is read by looking for the zero line, then seeing which mark on the numbered line is closest to it.

(Notice that the numbers go from right to left.)

The reading on this dial is closest to:

- a. 40
  - b. 45
  - c. 50
  - d. 55
8. The scale shown here measures values between zero and one. The zero mark is labeled. What is the value of the line with the arrow beneath it?



- a. 0.4
- b. 0.5
- c. 4.0
- d. 0.05

9. 761.7      The place identified by the arrow is the:



- a. hundreds place.
- b. ones place.
- c. tens place.
- d. tenths place.

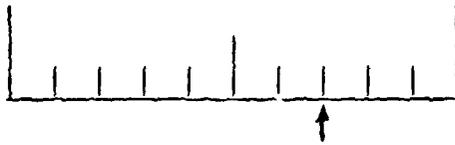
10.



The above scale measures values by ones. What is the scale value with the arrow above it?

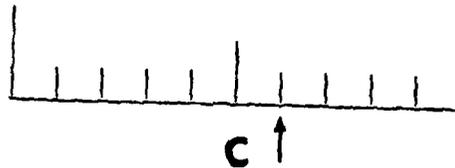
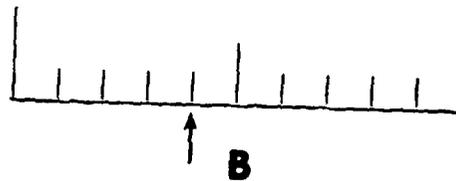
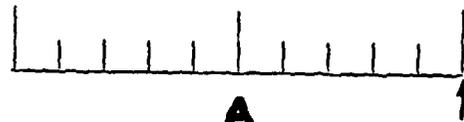
- a. 53
- b. 57
- c. 58
- d. 62

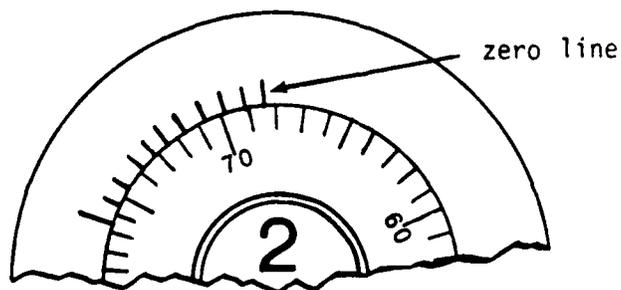
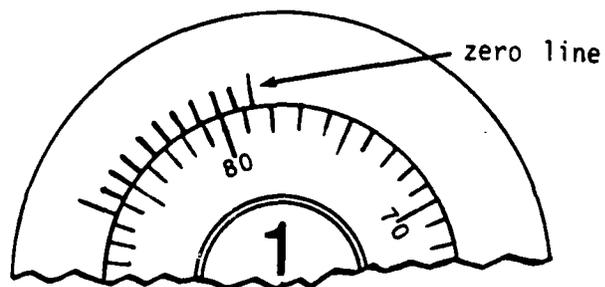
11. Look at this scale. Note the position of the arrow.



Which scale below shows the arrow within 2 marks of the position of the arrow above?

- a. A
- b. B
- c. C
- d. D

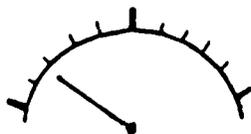




12. This type of dial is read by looking for the zero line, then seeing which mark on the numbered line is closest to it.

The difference between the readings on these two dials is about:

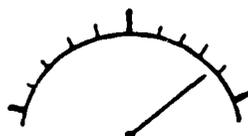
- a. zero
  - b. 2
  - c. 10
  - d. 20
13. Look at the meters below and note the positions of the needles. Which two meters show readings that are within 2 marks of each other?



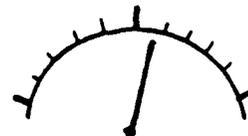
**A**



**B**



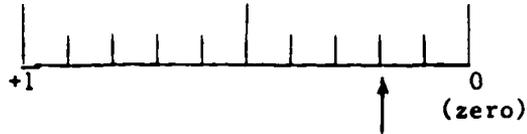
**C**



**D**

14. Some military scales have the zero line on the right, shown here. The scale below measures values between zero and one. The zero mark is labeled. What is the value of the line with the arrow beneath it?

- a. 0.02
- b. 0.08
- c. 0.2
- d. 8.0

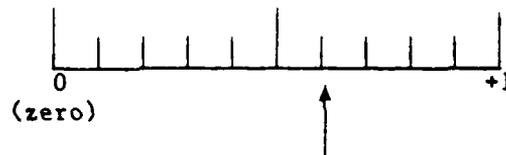


15. 933.5 The place identified by the arrow is the:

- a. tenths place.
- b. hundreds place.
- c. ones place.
- d. tens place.

16. The scale shown here measures values between zero and one. The zero mark is labeled. What is the value of the line with the arrow beneath it?

- a. 6.0
- b. 1.6
- c. 0.6
- d. 0.06



TRAINING MATERIALS -- REVIEW EXERCISES

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 2

Exercise #3, Part 2 (Alternate)

(To be used if Card Set #1 is not available.)

Use your notes from the demonstration on adjusting the GAIN control to help you number these steps in the right order. Use "1" for the first step, "2" for the second step, etc.

- \_\_\_\_\_ Adjust FINE TUNE
- \_\_\_\_\_ Remove jack
- \_\_\_\_\_ Set MEASURE SEL switch to OFF
- \_\_\_\_\_ Adjust GAIN
- \_\_\_\_\_ Set MEASURE SEL switch to CHECK GAIN

CHECK YOUR ANSWERS ON PAGE 21.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 2

Exercise #4, Part 2 (Alternate)

(To be used if Card Set #2 is not available.)

Use your notes from the demonstration on adjusting the Orderwire Transmitter Amplifier Output to help you number these steps in the right order. Use "1" for the first step, "2" for the second step, etc.

- \_\_\_\_\_ Connect measure jack
- \_\_\_\_\_ Set SEND OW switch to ON, adjust GAIN
- \_\_\_\_\_ Set SEND OW switch to OFF
- \_\_\_\_\_ Slide panel back
- \_\_\_\_\_ Set MEASURE NON-SEL switch to OW TR AMP OUT
- \_\_\_\_\_ Hold ATTENUATOR buttons down
- \_\_\_\_\_ Set MEASURE NON-SEL switch to OFF
- \_\_\_\_\_ Slide panel out
- \_\_\_\_\_ Release ATTENUATOR buttons

CHECK YOUR ANSWERS ON PAGE 22.

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REVIEW EXERCISE 1

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UNIT I. READING COMPREHENSION

Lesson 1. Vocabulary

In this lesson, you have been learning the meanings of many words. to give you more practice, you will complete this exercise. Here is how it works.

1. Make a list of all the words you missed on the checkpoint you have just completed. (Ask your instructor for blank paper for this purpose.)
2. Look up the meanings of those words in your Student Guide. Read all the meanings carefully. Read them over many times.
3. Review the meanings of all the words in the checkpoint you have just completed. Use the Word Lists to help you. Study the words until you are confident that you will do well on the next checkpoint.

WHEN YOU HAVE FINISHED STUDYING,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR FORM B  
OF THE CHECKPOINT YOU JUST COMPLETED.

UNIT I. READING COMPREHENSION

Lesson 1. Vocabulary

You have been dealing with many words and their definitions in this lesson. To give you more practice, do the following:

1. Look over all of the words you have missed on tests for Word Lists and checkpoints. (You may need to ask your instructor for your checkpoints.)
2. Make a list of all the words you missed in the tests and checkpoints. (Ask your instructor for blank paper.)
3. Look up the correct definitions of those words you missed and write the definition beside each word.
4. Review the meanings of other words in the lesson.
5. Study all of the words and definitions until you are confident that you will do well on the next checkpoint. The next checkpoint will contain 30 words from those defined in this lesson. Be sure you know all of the words in the lesson so that you will do well.

WHEN YOU HAVE FINISHED STUDYING,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR  
CHECKPOINT 6, FORM B IN UNIT I - LESSON 1.

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REVIEW EXERCISE 1

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UNIT I. READING COMPREHENSION

Lesson 2. Strategies for Understanding Sentences

In this section, you learned to use five guidelines to help you understand sentences about radios and radio equipment. Here are the guidelines.

Guidelines for Understanding Sentences

1. Pay close attention to new terms and their definitions.
2. Do not skip over terms you do not understand. Find out what they mean before you go on.

If you do not understand a sentence the first time you read it, do the following:

3. Read the sentence again, slowly and carefully.
4. Read the sentence out loud.
5. Form an image (a picture in your mind) of what the sentence says.

This review exercise will give you additional practice in reading and understanding sentences. Do the exercises slowly and carefully. When you check your answers, make sure you understand them before you go on.

Here is a sentence about RF communication. Read it and make sure you understand it. Then answer the questions below.

Even though many different signals, carrying many different messages, are radiating toward the receiver, the receiver can select just one to listen to.

#### EXERCISE 1

1. Which of the following sentences says the same thing as the one above?
  - a. The receiver can select one signal from the many radiating toward it.
  - b. The receiver radiates many different signals, carrying many different messages.
  - c. Many different signals, carrying many different messages, select the receiver to listen to.
  
2. Another word that means the same thing as select is:
  - a. send.
  - b. listen.
  - c. choose.
  - d. hear.

CHECK YOUR ANSWERS ON PAGE 11.

Here is a short passage about the meaning of frequency. Read it. Then answer the questions that follow.

The receiver can select just one signal because each radio wave has a certain frequency. To get an idea of what frequency means, consider what happens in the following situation: Two people stand about 20 feet apart holding a rope taut between them. If the person on one end jerks the rope, waves are sent to the person on the other end. A gentle jerk will send out a few long waves like this:

Wave A: 

A rapid, hard jerk sends out many short waves like this:

Wave B: 

ANSWER THE FOLLOWING QUESTION:

One of the sentences in the passage is: "Two people stand about 20 feet apart holding a rope taut between them." What does the word taut mean?

---

"Taut" means tight.

Did you know this word before you read the passage? If not, did you find out its meaning before going on? If your answer to either question is "Yes," you probably understood the meaning of the whole sentence.

But if you continued reading without knowing what "taut" meant, you probably did not understand the sentence.

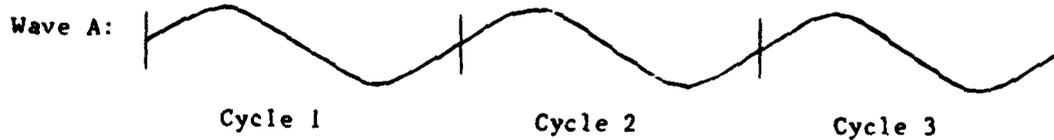
Remember the second guideline for understanding the meaning of what you read: Do not skip over terms you do not understand. Find out what they mean before you go on.

Here is some more information about radio wave frequencies:

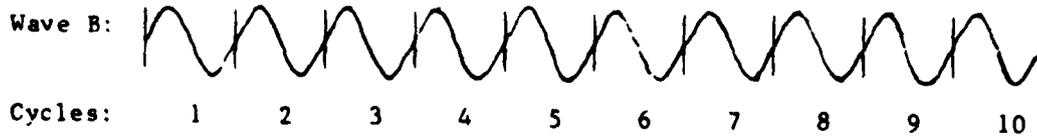
Notice that each wave repeats the same pattern over and over again:



Each time this pattern occurs, it is called a cycle. Wave A has only three cycles:



Wave B has 10 cycles:



Suppose that it takes exactly one second for each wave to travel from one end of the rope to the other. Then we can say that Wave A has a frequency of 3 cycles per second (3 cycles/sec.), and Wave B has a frequency of 10 cycles/sec.

Make sure you understand the passage. Then answer the question on the next page.

EXERCISE 2

According to the passage, a radio wave repeats this pattern over and over again:



Every time this pattern occurs, it is called a cycle.

How many cycles are in the following wave?



- a. 1
- b. 4
- c. 5
- d. 8

CHECK YOUR ANSWER ON PAGE 11.

Continue reading about radio waves:

Like waves traveling along a rope, different radio waves have different frequencies. But RF frequencies are much higher. RF frequencies can vary between about 20,000 cycles/sec. and 30,000,000,000 cycles/sec.

Here is one sentence from the passage above:

RF frequencies can vary between about 20,000 cycles/sec. and 30,000,000,000 cycles/sec.

Write another sentence which says the same thing:

---

---

---

ASK YOUR INSTRUCTOR TO CHECK YOUR ANSWER.

---

Here are two more sentences about radio frequencies. Read them and make sure you understand them.

The oscillator in the transmitter is tuned to generate waves of a certain frequency. If the transmitter antenna is oriented toward a distant receiver, and if the distant receiver is tuned to the same frequency, the receiver will pick up signals from the transmitter.

### EXERCISE 3

ANSWER THE FOLLOWING QUESTIONS. LOOK AT THE PASSAGE WHENEVER YOU NEED TO.

1. Fill in the blanks:

The oscillator is the part of the \_\_\_\_\_ which generates radio waves. Each radio wave has a certain \_\_\_\_\_. The receiver can intercept messages from the transmitter provided that it is \_\_\_\_\_ to the same frequency as the transmitter.

2. In Question No 1, intercept means the same thing as:
- a. hold up.
  - b. pick up.
  - c. stop.
  - d. send.

CHECK YOUR ANSWERS ON PAGE 11.

Here is one more passage about radio frequencies.

Another word for "cycles/sec." is Hertz. The abbreviation for Hertz is Hz. So, if a transmitter or receiver is tuned to 100,000 cycles/sec., we can say that it is tuned to 100,000 Hz. In 31M references, you will see the term Hz more often than cycles/sec.

As you know, RF frequencies can be very high, like 500,000,000 Hz. This is 500 million Hz. It takes a lot of zeros to write 500,000,000 Hz. Therefore, a shorter way has been developed to express thousands or millions of Hertz. This is done by using the terms kilo-Hertz (kHz) and Megahertz (MHz) as follows:

1,000 Hertz makes 1 kilo-Hertz (abbreviated kHz).

1,000,000 Hertz makes 1 Megahertz (abbreviated MHz).

As you can see, "kilo" means thousand, and "Mega" means million.

By using these new terms, high frequencies can be written without using lots of zeroes. For example, a RF of 50,000,000 Hz can be written as 50 MHz. A RF of 70,000 Hz can be written as 70 kHz. Here are some more examples:

16 MHz = 16,000,000 (16 million) Hz.

850 kHz = 850,000 (850 thousand) Hz.

In your job as a 31M, you will not need to convert Hz to kHz or MHz, or the other way around. But you will often need to read about frequencies expressed as kHz or MHz. Now you know what they mean.

#### EXERCISE 4

ANSWER THE FOLLOWING QUESTIONS. REFER BACK TO THE PASSAGE WHENEVER YOU NEED TO.

1. Fill in the blanks.

Hertz means the same thing as \_\_\_\_\_. Hertz is abbreviated Hz. So 25,000 cycles/sec. can be written 25,000 \_\_\_\_\_. One thousand \_\_\_\_\_ is equal to one kilo-Hertz, abbreviated kHz. So 68,000 Hz equals 68 \_\_\_\_\_. One Megahertz (MHz) is equal to \_\_\_\_\_ Hz. So we can write 2,000,000 Hz as 2 \_\_\_\_\_.

2. As a 31M, will you sometimes have to change frequencies from Hz to kHz or MHz or the other way around? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 12.

This is the end of the Review Exercise for Section B. In Section B, you have learned several guidelines for reading materials about radios and radio equipment. You practiced using the guidelines by reading sentences and short passages and answering questions. By using the guidelines, you should be able to read and understand material about radio equipment.

ANSWER KEYS TO EXERCISES IN UNIT, LESSON 2, REVIEW EXERCISE 1

Unit I, Lesson 2  
Review Exercise 1

10

ANSWERS TO EXERCISE 1

1. a. is correct.
    - b. is wrong, because the receiver receives signals. It does not radiate them.
    - c. is wrong, because the receiver selects the signals. The signals do not select the receiver.
  
  2. c.
- 

ANSWER TO EXERCISE 2

The answer is b. 4.

---

ANSWERS TO EXERCISE 3

1. The oscillator is the part of the transmitter which generates radio waves. Each radio wave has a certain frequency. The receiver can intercept messages from the transmitter provided that it is tuned to the same frequency as the transmitter.
  
  2. b. pick up.
-

ANSWERS TO EXERCISE 4

1. Hertz means the same thing as cycles/sec.. Hertz is abbreviated Hz. So 25,000 cycles/sec. can be written 25,000 Hz. One thousand Hertz (or Hz) is equal to one kilo-Hertz, abbreviated kHz. So 68,000 Hz equals 68 kHz. One Megahertz (MHz) is equal to 1,000,000 Hz. So we can write 2,000,000 Hz as 2 MHz.
  2. No
- 

NOW TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM B  
IN UNIT I - LESSON 2

---

REVIEW EXERCISE 2

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UNIT 1. READING COMPREHENSION

Lesson 2. Strategies for Understanding Sentences

If you are having trouble reading task conditions, standards, and performance steps, it may be because you are not following the guidelines carefully. Ask yourself the following questions:

1. Are you paying close attention to new terms and their definitions? Your answer should be "Yes."

If you do not define one term in a sentence correctly, you may misread the entire sentence.

2. Are you skipping over terms you do not understand? Your answer should be "No."

If you do not understand one term in a sentence, you may misunderstand the whole sentence. Always find out the meanings of terms you do not know. Look them up, or ask your instructor.

3. Are you reading each sentence slowly and carefully? Your answer should be "Yes."

It is easy to read a sentence wrong when you read it too fast.

4. If you do not understand a sentence, do you try reading it out loud? Your answer should be "Yes."

Sometimes, the meaning of a sentence becomes clear when you hear yourself saying the sentence.

5. When a sentence is hard to understand, do you try to form an image of what the sentence says? Your answer should be "Yes."

Forming an image sometimes helps to make the meaning of a sentence clear.

Also, remember:

1. Two sentences can contain different words and still mean the same thing.

a. Rotate the antenna to the position indicated on the diagram  
means the same thing as

- b. Turn the antenna to the place marked on the diagram.

These two sentences mean the same thing, even though some of the words are changed.

"Rotate" is changed to "turn."

"Position" is changed to "place."

"Indicated" is changed to "marked."

But the new words mean the same thing as the old words. So the meaning of the whole sentence stays the same.

2. Two sentences can have the words in a different order but still mean the same thing.

a. You will need an operable TD-202  
means the same thing as

- b. An operable TD-202 is needed.

Here is another sentence that means the same thing as Sentence a. above.

- c. A TD-202 in good working order is required.

Sentence c. changes both some words and the word order. But it still means the same as Sentence a.

IF YOU DO NOT SEE THAT SENTENCES a., b., AND c. MEAN THE SAME THING,  
ASK YOUR INSTRUCTOR FOR HELP NOW.

So you see that sentences can have different words and different word orders, but still mean the same thing.

Does this mean that words and word order don't matter? No, it does not. Sometimes, two sentences can have the same words but mean different things. Look at the performance step below:

- a. Request distant terminal to send a test tone, and monitor indication on TEST ALIGN meter.

Now compare it with this one:

- b. Request distant terminal to send a test tone on the TEST ALIGN meter and monitor the indication.

Does Sentence b. say the same thing as Sentence a.? No, it does not. Read both sentences out loud. Do you notice the difference in meaning?

IF YOU DO NOT SEE THAT SENTENCES a. AND b. MEAN DIFFERENT THINGS,  
ASK YOUR INSTRUCTOR FOR HELP NOW.

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In the rest of this Review Exercise, you will have a chance to practice reading task conditions, standards, and performance steps.

Remember:

- Conditions tell you about the location, references, tools, and other things you need to know before you start the task.
- Standards tell you how well and how fast you must perform the task.
- Performance steps are step-by-step instructions for carrying out the task.

EXERCISE 1

READ THE FOLLOWING TASK CONDITIONS AND STANDARDS FOR TROUBLESHOOTING A GENERATOR. THEN ANSWER THE QUESTIONS WHICH FOLLOW.

CONDITIONS

This task is performed under all weather conditions in a field or a garrison location. You will need a 10 KW generator set, TM 5-6115-275-14, TM 38-750, DA Form 2404, 1 quart oil, clean rags, pliers, 8-inch flat tip screwdriver, 8-inch adjustable wrench, and fuses as required.

STANDARDS

This task has been performed correctly when any faults which you are authorized to correct have been corrected, and those faults that you, as an operator, cannot correct are recorded on DA Form 2404, without error, and reported to your immediate supervisor.

1. What references do you need? \_\_\_\_\_
  
2. Cpl. John Ames has fuses, clean rags, pliers, an 8-inch flat tip screwdriver, and one quart oil. What additional tool does he need?  
\_\_\_\_\_
  
3. If you find a defect which you are authorized to fix, what should you do? \_\_\_\_\_
  
4. What two things should you do with defects that you cannot fix?  
\_\_\_\_\_  
\_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 9.

Here are some things you should remember about performance steps:

- Operate means the same thing as set.
- Momentarily means "for a short time."
- Sequentially means "one after the other."
- Adjust means "turn slowly."
- Check means the same thing as insure and monitor.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

## EXERCISE 2

Read the following performance step:

Operate TEST TONE ON-OFF switch to OFF.

Read each of the following sentences. mark S if the sentence says the same thing as the performance step above and D if it says something different.

- \_\_\_\_\_ 1. Set TEST TONE ON-OFF switch to ON.
- \_\_\_\_\_ 2. Adjust TEST TONE until switch is OFF.
- \_\_\_\_\_ 3. Set TEST TONE ON-OFF switch in OFF position.
  
- 4. Adjust TUNE control until assigned channel number appears in CHANNEL indicator.

This performance step tells you to:

- a. turn the TUNE control slowly until the CHANNEL indicator shows the channel number that has been assigned.
  - b. turn the TUNE control and the CHANNEL indicator until the assigned channel number appears.
  - c. set the TUNE control to the channel number which appears in the CHANNEL indicator.
5. Operate START-STOP switch to START briefly, then release.

Another way to say this is:

- a. Operate START-STOP switch to START sequentially.
  - b. Operate START-STOP switch to START momentarily.
6. Monitor all 12 channels for clear signal.

Which of the following says the same thing?

- a. Adjust all 12 channels until the signal is clear.
- b. Insure that there is a clear signal on all 12 channels.
- c. Clear the signal on all 12 channels.

7. Adjust CORRECTION control for maximum indication on meter.
- a. What is the name of the control? \_\_\_\_\_
  - b. What indicator do you have to watch while you are turning the control? \_\_\_\_\_
  - c. When should you stop turning the control?  
\_\_\_\_\_
8. Detach the green guy from the tenth mast section.
- What should you do with the green guy?
- a. Fasten it to the tenth mast section.
  - b. Take it off the tenth mast section.
  - c. Hold it on the tenth mast section.

CHECK YOUR ANSWERS ON PAGE 10.

ANSWER KEYS TO EXERCISES IN UNIT, LESSON 2, REVIEW EXERCISE 2

Unit I, Lesson 2  
Review Exercise 2

8

ANSWERS TO QUESTIONS ON THE PREVIOUS PAGE.

1. TM 5-6225-275-14 and TM 38-750.
2. 8-inch adjustable wrench.
3. Correct it. (If you said "Fix it," that is O.K.)
4. Record them on DA Form 2404.

Report them to the immediate supervisor.

RE-READ ANY QUESTIONS WHICH YOU ANSWERED INCORRECTLY.

THEN CONTINUE WITH THE REVIEW EXERCISE.

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ANSWERS TO EXERCISE 2

1. D The performance step says set the tone to OFF, not ON.
2. D The performance step says, operate the switch called the TEST TONE ON-OFF switch. It does not tell you to do anything to the test tone.
3. S Set means the same thing as operate.  
The position is also the same (OFF).
4. a. If you chose b. or c., read the whole question again, slowly and carefully. Make sure that you understand why a. is correct.
5. b. Momentarily means "Operate briefly, then release."
6. b. Monitor means "Check" or "Insure."  
If you chose a. or c., read the whole question again, slowly and carefully. Make sure that you understand why b. is correct.
7. a. CORRECTION control.  
b. meter  
c. When there is a maximum indication on the meter.
8. b. Detach means "take off."

IF YOU ARE NOT SURE ABOUT ANY OF THE MATERIAL IN THIS REVIEW EXERCISE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THIS MATERIAL,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 2, FORM B  
IN UNIT I - LESSON 2.

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REVIEW EXERCISE

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UNIT I. READING COMPREHENSION

Lesson 3. Reading Negative Sentences

This Review Exercise will give you additional practice with negative sentences. Each question in the exercise gives a performance step. Read the performance step carefully. Make sure you understand it. Then answer the question that follows.

EXERCISE 1

1. Do not allow VOLTMETER to exceed 115 volts.
  - a. The VOLTMETER reads 115 volts. Is this all right? \_\_\_\_\_
  - b. The VOLTMETER reads 125 volts. Is this all right? \_\_\_\_\_
  - c. The VOLTMETER reads 100 volts. Is this all right? \_\_\_\_\_
  
2. Insure that bottom of carrier is no less than 12 inches above the frame.
  - a. The bottom of the carrier is 8 inches above the frame. Is this all right? \_\_\_\_\_
  - b. The bottom of the carrier is 12 inches above the frame. Is this all right? \_\_\_\_\_
  - c. The bottom of the carrier is 15 inches above the frame. Is this all right? \_\_\_\_\_
  - d. How high should the bottom of the carrier be?  
\_\_\_\_\_

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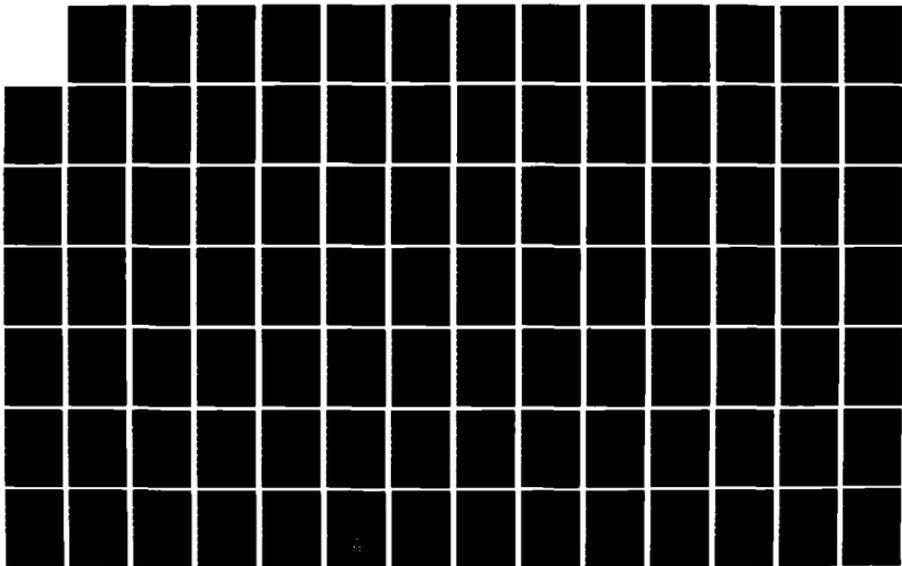
31M10 FUNCTIONAL BASIC SKILLS EDUCATION PACKAGE(U)  
APPLIED SCIENCE ASSOCIATES INC PITTSBURGH PA SEP 82  
DABT60-81-C-0006

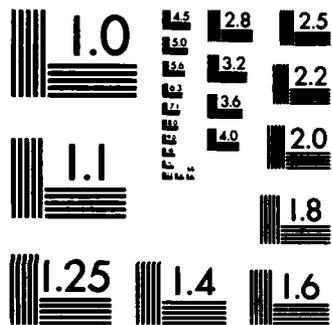
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NL





MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

3. Any action that cannot be performed without protective glasses must be reported to the chief.
- a. This action requires protective glasses. What should you do?  
\_\_\_\_\_
- b. This action does not require protective glasses. Do you need to report it to the chief? \_\_\_\_\_
- c. Report an action to the chief if it (Choose one):
- (1) requires protective glasses.  
(2) does not require protective glasses.
4. Failure to press DAMPEN button results in excess build-up of voltage.
- a. You do not want an excess build-up of voltage. What should you do? \_\_\_\_\_
- b. You did not press the DAMPEN button. What will happen?  
\_\_\_\_\_
5. If the meter reading is not greater than 10, set the CALL switch to ON.
- a. The meter reading is 5. Should you set the CALL switch to ON?  
\_\_\_\_\_
- b. The meter reading is 12. Should you set the CALL switch to ON?  
\_\_\_\_\_
6. No control should be adjusted to more than 30° from the vertical.
- a. The control is 20° from the vertical. Is this all right? \_\_\_\_\_
- b. The control is 30° from the vertical. Is this all right? \_\_\_\_\_
- c. The control is 40° from the vertical. Is this all right? \_\_\_\_\_

7. Request test tone from distant terminal if REC SIG lamp fails to light.

Your REC SIG lamp does not light. Should you request a test tone?

- a. Yes.
- b. No.
- c. The instruction is not clear on this point.

8. Raise the mast no higher than necessary.

The mast should be:

- a. as high as you can make it.
- b. not too high.

9. Check all four meters to insure no operation in excess of 25.

This means that:

- a. all four meters should read 25 or less.
- b. all four meters should read exactly 25.
- c. one meter should read more than 25.
- d. no meter should read less than 25.

10. Failure to set the START-STOP switch to START results in no power going into the radio.

If you set the START-STOP switch to STOP, what will happen?

- a. The START-STOP switch will go to START.
- b. Power will go into the radio.
- c. No power will go into the radio.

11. No control should be adjusted to more than 75.

Which of the following sets of adjustments is all right?

- a. Control 1: 20  
Control 2: 50  
Control 3: 80  
Control 4: 60
- b. Control 1: 50  
Control 2: 75  
Control 3: 75  
Control 4: 60
- c. Control 1: 80  
Control 2: 85  
Control 3: 90  
Control 4: 80

CHECK YOUR ANSWERS ON PAGE 6.

ANSWER KEY TO EXERCISE IN UNIT 1, LESSON 3, REVIEW EXERCISE

Unit 1, Lesson 3  
Review Exercise

5

ANSWERS TO EXERCISE 1

1. a. Yes.  
b. No.  
c. Yes.

Explanation: Any reading of 115 volts or less is all right.

2. a. No.  
b. Yes.  
c. Yes.  
d. 12 inches or more above the frame.

3. a. Report to the chief.  
b. No.  
c. (2)

Explanation: Another way of saying this performance step is:  
Any action that needs protective glasses must be reported to the chief.

4. a. Press the DAMPEN button.  
b. Excess build-up of voltage.

5. a. Yes.  
b. No.

Explanation: Another way of saying this performance step is:  
If the meter reading is less than 10, set the CALL switch to ON.

6. a. Yes  
b. Yes  
c. No

Explanation: Any adjustment of 30° or less is all right.  
Adjustments greater than 30° are not all right.

7. a. "Fails to light" means does not light. The instruction says: If the REC SIG lamp does not light, you should request a test tone.
8. b. "No higher than necessary" means not too high.
9. a. "No operation in excess of 25" means all operations equal to 25 or less.
10. c. If you set the START-STOP switch to STOP, you are failing to set it to START. This results in no power going into the radio.
11. b. "No control adjusted to more than 75" means all controls adjusted to 75 or less. Only b. has all four controls at 75 or less.

STUDY THE ANSWERS ABOVE AND MAKE SURE THAT YOU UNDERSTAND THEM.

IF YOU ARE STILL NOT SURE, ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE ANSWERS,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM B  
IN UNIT I - LESSON 3.

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REVIEW EXERCISE

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UNIT I. READING COMPREHENSION

Lesson 4. Reading Sentences with Dependent Clauses

When a sentence contains one or more dependent clauses, the sentence is often long and hard to read. You can do two kinds of things to help you understand the sentence. First use the five guidelines for understanding sentences which you learned in Lesson 2. They are repeated below:

Five Guidelines for Understanding Sentences

1. Pay close attention to new terms and their definitions.
2. Do not skip over terms you do not understand. Find out what they mean before you go on.

If you do not understand a sentence the first time you read it, do the following:

3. Read the sentence again, slowly and carefully.
4. Read the sentence out loud.
5. Form an image (a picture in your mind) of what the sentence says.

In addition, you can do the following:

1. Divide the sentence into main clause and dependent clause(s).
2. Read each clause by itself several times. Read the main clause first, then each dependent clause. Make sure that you understand each part.
3. Put the whole sentence together again.

Here are some sentences which are separated into parts for you. Do the following with each sentence:

1. Read each part by itself several times, slowly and carefully. Be sure that you understand each part by itself.
2. Use all the guidelines on the previous page to read each sentence. Be sure that you understand each one before you go to the next one. Ask your instructor for help if you do not understand a sentence.

Sentences:

Monitoring and operating checks normally are performed | while the system is in operation.

If identification codes have been assigned, | answer only those calls corresponding to the assigned identification code.

When a circuit is subjected to enemy jamming, | change from multichannel to single channel operation.

Multichannel systems are based on multiplex equipment | which combines multiple circuits into one carrier signal | that is sent over a single radio channel or cable link.

When you understand a sentence, you can answer questions about it. The rest of this review exercise gives you sentences to read and questions to answer. Make sure you understand each sentence before you answer the question. If you do not understand a sentence, you will probably not answer the question correctly.

#### EXERCISE 1

Each question below has a sentence to read and a question to answer. Read the sentence. Make sure you understand it. Then answer the question.

1. If Heater No. 2 was in use for heating the interior of the shelter, turn off the heater and operate the EQUIPMENT-HEATER switch to EQUIPMENT.

What position should the switch be in after you have finished performing the action described above? \_\_\_\_\_

2. Aerial photographs are useful in identifying roads, power lines, and other details which may affect the choice of a site for a radio terminal.

You are planning to install a radio terminal. In choosing a location, what kind of things must you take into consideration?

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3. Use the same sentence to answer this question:

You can find out where roads and power lines are located by using

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4. When a circuit is subjected to enemy jamming, change from multichannel to single channel operation.

Jamming is occurring. You should change to:

- a. multichannel operation.
- b. single channel operation.

5. If identification codes have been assigned, answer only those calls corresponding to the assigned identification code.

This sentence tells you:

- a. how to assign identification codes.
- b. what corresponds to the assigned identification code.
- c. what kinds of calls to answer.

6. Monitoring and operating checks normally are performed while the system is in operation.

You want to check the system. Should you shut it down first?

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7. Multichannel systems are based on multiplex equipment which combines multiple circuits into one carrier signal sent over a single radio channel or cable link.

Multiplex equipment:

- a. makes it possible to transmit many circuits on one radio channel or cable link.
  - b. converts a single radio channel to a cable link.
  - c. changes a carrier signal to a single radio channel or cable link.
- b. If the equipment is turned off by using the emergency stopping procedure, operate all circuit breakers and equipment power switches to OFF before attempting to restart to avoid excessive initial current drain on the power source.

This sentence tells the operator:

- a. how to turn the equipment off.
  - b. when to use the emergency stopping procedure.
  - c. how to set circuit breakers and switches after stopping.
9. If any indicators, meters, or dial lamps indicate an unusual condition, investigate immediately.

You should check right away if something different from the normal happens on: \_\_\_\_\_.

10. Rotate the launcher through 90 degrees until the yellow stripes on the upper and lower parts of the telescoping leg are in line.

What do you need to line up?

- a. The launcher.
- b. An angle of 90°.
- c. Two yellow stripes.

CHECK YOUR ANSWERS ON PAGE 6.

ANSWER KEY TO EXERCISE IN UNIT I, LESSON 4, REVIEW EXERCISE

Unit I, Lesson 4  
Review Exercise

5

ANSWERS TO EXERCISE 1

1. EQUIPMENT
2. roads, power lines, and other details.
3. aerial photographs.
4. a.
5. c.
6. No.
7. a.
8. c.
9. any indicators, meters, or dial lamps.
10. c.

IF YOU DO NOT UNDERSTAND ANY OF THESE ANSWERS,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THESE ANSWERS,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM B  
IN UNIT I - LESSON 4.

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REVIEW EXERCISE

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UNIT I. READING COMPREHENSION

Lesson 5. Ordering One, Two, or Three Tasks

Review of Basic Ideas

During the 31M course lectures and in the manuals you will use, directions will be given about the order of tasks or actions. Sometimes, one sentence will explain the order of two or three tasks. The tasks may appear in the sentence in the order they are to be done, or you may need to read carefully to figure out which task is to be done first, second, and third.

For example, study the directions given below:

Example A. Inspect all parts of the antenna kit before erecting the long range antenna.

Example B. Before erecting the long range antenna, inspect all parts of the antenna kit.

Example C. First, inspect all parts of the antenna kit and then erect the long range antenna.

Example D. Erect the long range antenna after inspecting all parts of the antenna kit.

All of these examples tell you to perform two tasks in this order:

1. Inspect all parts of the antenna kit.
2. Erect the long range antenna.

The tasks appear in the order they are to be performed in Example A and Example C. You have to read Example B and Example D more carefully to figure out which task comes first and which comes second. These examples deal with only two tasks.

Now, let's look at directions telling the order in which to do three tasks.

Example E. First, loosen the attaching bolts, then remove the front access plate before removing the lightning arresters.

Example F. Loosen the attaching bolts before removing the front access plate, and then remove the lightning arresters.

Example G. After loosening the attaching bolts, remove the front access plate and then remove the lightning arresters.

Example H. Before removing the front access plate, loosen the attaching bolts. Then remove the lightning arresters.

Example I. Before removing the front access plate and removing the lightning arresters, loosen the attaching bolts.

Example J. Remove the front access plate and remove the lightning arresters after loosening the attaching bolts.

All of these examples tell you to perform three tasks in this order:

1. Loosen the attaching bolts.
2. Remove the front access plate.
3. Remove the lightning arresters.

The tasks appear in the order they are performed in Examples E, F, and G. You have to read more carefully to figure out the order of performance in Examples H, I, and J. You can see that there are many ways to give the same set of directions. You will need to be able to figure out the order of performance from all of these types of directions.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 1

Directions: Read the statement below and answer the questions which follow.

First remove any interconnecting cables and then loosen the hardware.

1. Which of the tasks listed below is to be done first?
  - a. Remove hardware.
  - b. Remove interconnecting cables.
  - c. Loosen hardware.
  - d. Inspect the hardware.
  
2. Which of the tasks listed below is to be done second?
  - a. Remove hardware.
  - b. Remove interconnecting cable.
  - c. Loosen hardware.
  - d. Inspect the hardware.
  
3. Which of the following directions means the same thing?
  - a. Loosen the hardware before removing the interconnecting cables.
  - b. Remove any interconnecting cables after loosening the hardware.
  - c. Loosen the hardware after removing any interconnecting cables.
  - d. Remove any interconnecting cables and loosen the hardware at the same time.

Read the statement below and answer questions 4 through 7.

Insert the new assembly, and then tighten the hardware after pulling the old assembly straight up from the chassis.

4. Which of the tasks listed below is to be done first?
- a. Insert the new assembly.
  - b. Tighten the hardware.
  - c. Pull the old assembly straight up from the chassis.
  - d. Tighten the new assembly.
5. Which of the tasks listed below is to be done second?
- a. Insert the new assembly.
  - b. Tighten the hardware.
  - c. Pull the old assembly straight up from the chassis.
  - d. Tighten the new assembly.
6. Which of the tasks listed below is to be done third?
- a. Insert the new assembly.
  - b. Tighten the hardware.
  - c. Pull the old assembly straight up from the chassis.
  - d. Tighten the new assembly.
7. Which of the following directions means the same thing?
- a. Insert the new assembly after tightening the hardware and pulling the old assembly straight up from the chassis.
  - b. Before inserting the new assembly, pull the old assembly straight up from the chassis. Then tighten the hardware.
  - c. Pull the old assembly up from the chassis after tightening the hardware and inserting the new assembly.
  - d. Pull the old assembly up from the chassis after inserting the new assembly and then tighten the hardware.

CHECK YOUR ANSWERS ON PAGE 6.

**ANSWER KEY TO EXERCISE IN UNIT 1, LESSON 5, REVIEW EXERCISE**

**Unit 1, Lesson 5  
Review Exercise**

**5**

**ANSWERS TO QUESTIONS IN EXERCISE 1**

1. b.
2. c.
3. c.
4. c.
5. a.
6. b.
7. b.

**IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.**

**IF YOU UNDERSTAND ALL THE MATERIAL IN THIS REVIEW EXERCISE,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM B  
IN UNIT I - LESSON 5.**

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REVIEW EXERCISE

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UNIT 1. READING COMPREHENSION

Lesson 6. Determining the Order of Steps: Multiple Actions

Just to make sure that you understand what you are to do in this lesson, here is a short review for you.

In order to understand directions as they are given, you must be able to identify: (1) the order of the tasks, (2) which task comes before or after another task, and (3) a condensed form of the directions.

For example, read the directions given below:

Disconnect the power cable before removing the rear cover from the power box. Then disconnect the wires from the defective receptacle and remove it. Install the replacement receptacle.

The tasks are done in the following order:

1. Disconnect the power cable.
2. Remove the rear cover from the power box.
3. Disconnect the wires from the defective receptacle.
4. Remove the defective receptacle.
5. Install the replacement receptacle.

And given any task, you can tell what task should be done immediately before or immediately after it.

For example:

Question: What task is to be done just before installing the replacement receptacle?

Answer: Remove the defective receptacle.

Question: What task is to be done just after disconnecting the wires from the defective receptacle.

Answer: Remove the defective receptacle.

Question: What task is to be done just before disconnecting the wires from the defective receptacle.

Answer: Remove the rear cover from the power box.

We can condense the directions as follows:

Disconnect power cable. Remove rear cover. Disconnect wires.  
Remove receptacle. Install receptacle.

### EXERCISE 1

Read the directions below and answer the questions.

Disconnect the cable from the PCM IN connector and then operate the switch to SERV FAC. Loosen the front panel before pressing the button.

1. Which of the following tasks is to be done first?
  - a. Operate switch to SERV FAC.
  - b. Press button.
  - c. Disconnect cable from PCM IN.
  - d. Loosen front panel.
  
2. Which of the following tasks is to be done second?
  - a. Operate switch to SERV FAC.
  - b. Press button.
  - c. Disconnect cable from PCM IN.
  - d. Loosen front panel.
  
3. Which of the following tasks is to be done third?
  - a. Operate switch to SERV FAC.
  - b. Press button.
  - c. Disconnect cable from PCM IN.
  - d. Loosen front panel.

4. Which of the following tasks is to be done fourth?
- a. Operate switch to SERV FAC.
  - b. Press button.
  - c. Disconnect cable from PCM IN.
  - d. Loosen front panel.
5. Which of the tasks listed below is to be done just before operating the switch to SERV FAC?
- a. Disconnect cable from PCM IN connector.
  - b. Loosen the front panel.
  - c. Loosen the PCM IN connector.
  - d. Press the button.
6. Which of the tasks listed below is to be done just after operating the switch to SERV FAC?
- a. Disconnect cable from PCM IN connector.
  - b. Loosen the front panel.
  - c. Loosen the PCM IN connector.
  - d. Press the button.
7. Which of the tasks listed below is to be done just before loosening the front panel?
- a. Operate switch to SERV FAC.
  - b. Press button.
  - c. Disconnect cable from PCM IN.
  - d. Loosen front panel.
8. Which of the tasks listed below is to be done just after loosening the front panel?
- a. Operate switch to SERV FAC.
  - b. Press button.
  - c. Disconnect cable from PCM IN.
  - d. Loosen front panel.

9. Which of the following summarizes the directions best?
- a. Press button. Loosen panel. Operate switch to SERV FAC. Disconnect cable.
  - b. Operate switch to SERV FAC. Disconnect cable. Press button. Loosen panel.
  - c. Loosen panel. Press button. Disconnect cable. Operate switch to SERV FAC.
  - d. Disconnect cable. Operate switch to SERV FAC. Loosen panel. Press button.

CHECK YOUR ANSWERS ON PAGE 6.

ANSWER KEY TO EXERCISE IN UNIT I, LESSON 6 REVIEW EXERCISE

Unit I, Lesson 6  
Review Exercise

5

ANSWERS TO EXERCISE 1

1. c.
2. a.
3. d.
4. b.
5. a.
6. b.
7. a.
8. b.
9. d.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM B  
IN UNIT 1 - LESSON 6.

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REVIEW EXERCISE

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UNIT I. READING COMPREHENSION

Lesson 7. Understanding Lists and Paragraphs

You need to know a number of things about lists and paragraphs. For example, you need to be able to:

1. Tell if certain information is contained in the list or paragraph.
2. Identify other lists and paragraphs that say the same thing.

Use the following lists (Standards and Performance Measures) and Paragraph A to answer the questions that follow.

STANDARDS

1. Be physically fit to lead conditioning activities.
2. Give enough time between commands to permit the average man to understand the preparatory command before the command of execution is given.
3. Be able to form and control the extended rectangular formation, circle formation, and double-time column.
4. Lead each exercise in accordance with FM 21-20.
5. Demonstrate each exercise with cadence.
6. Follow guidance given concerning what, when, where, and how long activities are to be conducted.

PERFORMANCE MEASURES

1. How to Prepare. Once guidance is given concerning the conditioning requirement, preparations must be made.
2. Preparatory Commands. The preparatory command describes and specifies what is required. All preparatory commands are given with rising inflection.

3. **Commands of Execution.** The command of execution calls into action what has been prescribed. The interval between commands is long enough to permit the average man to understand the first one before the second one is given.
4. **Extended Rectangular Formation.** This is the formation used most frequently for carrying on physical training activities. It is the best type for large numbers of men because it is easy to control.
5. **Circle Formation.** This formation is effective for the conduct of various exercise activities. It has an advantage that you can supervise all of the men.
6. **Conditioning Run.** This is a column moving at double-time. Reflector-vested road guards must be placed ahead of and behind the column if the course follows a road.

#### PARAGRAPH A

On the march, the feet should be kept as dry as possible. If socks become damp from perspiration or wet from water, they should be changed to dry ones at the first opportunity. If necessary, socks may be dried by putting them under the shirt around the waist. Tender pressure spots should be relieved promptly by adjusting gear or applying adhesive tape. Once or twice daily during the march, the feet should be dusted lightly with foot powder, according to FOOT-123.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

## EXERCISE 1

Look at the Standards and Performance Measures to answer the following questions.

1. Put an X beside each of the following that are included in the Performance Measures list. (You may mark more than one.)
  - a. Be physically fit to lead conditioning activities.
  - b. How to Prepare. Once guidance is given concerning the conditioning requirement, preparations must be made.
  - c. Lead each exercise in accordance with FM 21-20.
  - d. Demonstrate each exercise with cadence.
  - e. Conditioning Run. This is a column moving at double-time. Reflector-vested road guards must be placed ahead of and behind the column if the course follows a road.
  
2. Put an X beside each of the following that are included in the Standards list. (You may mark more than one.)
  - a. Be physically fit to lead conditioning activities.
  - b. How to Prepare. Once guidance is given concerning the conditioning requirement, preparations must be made.
  - c. Lead each exercise in accordance with FM 21-20.
  - d. Demonstrate each exercise with cadence.
  - e. Conditioning Run. This is a column moving at double-time. Reflector-vested road guards must be placed ahead of and behind the column if the course follows a road.

3. Which of the following means the same thing as point 2 of Standards?
- a. Preparatory commands tell what to do and are given with rising inflection.
  - b. You must be fit to lead conditioning.
  - c. Pause between commands so everybody understands what you say.
  - d. Give guidance about the conditioning before giving preparation.
4. Does Point 2 of Performance Measures tell you how long the interval between commands should be?
- a. Yes
  - b. No

Look at Paragraph A to answer the following questions.

5. Put an X beside each of the following that are mentioned in Paragraph A. (You may mark more than one.)
- a. Put socks around your waist under a shirt to dry them out.
  - b. Always wear wool socks on marches.
  - c. Keep your feet dry on marches.
  - d. Apply medication to broken blisters.
  - e. Use foot powder 1 or 2 times each day of marching.

6. Put an X beside each of the following that are not mentioned in Paragraph A. (You may mark more than one.)

- a. Put socks around your waist under a shirt to dry them out.
- b. Always wear wool socks on marches.
- c. Keep your feet dry on marches.
- d. Apply medication to broken blisters.
- e. Use foot powder 1 or 2 times each day of marching.

CHECK YOUR ANSWERS ON PAGE 7.

ANSWER KEY TO EXERCISE IN UNIT I, LESSON 7, REVIEW EXERCISE

Unit I, Lesson 7  
Review Exercise

6

**ANSWERS TO EXERCISE 1**

1. b and e
2. a, c, and d
3. c
4. b
5. a, c, and e
6. b and d

**IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.**

**IF YOU UNDERSTAND ALL THE MATERIAL IN THIS REVIEW EXERCISE,  
TELL YOUR INSTRUCTOR YOU ARE READY FOR CHECKPOINT 1, FORM B  
IN UNIT 1 - LESSON 7.**

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REVIEW EXERCISE

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UNIT II. USING A TABLE OF CONTENTS

Lesson 1. Chapters and Sections

Review of Basic Ideas

You will need to look things up in manuals a lot in the 31M course. Usually, you will not be given the page number of the section you must look up. The quickest way to find what you are looking for is to use the Table of Contents.

The Table of Contents in a book is a list of all the chapters in that book. It also lists the first page number of each chapter.

The Table of Contents you will see in 31M manuals have some features that may be new to you.

FEATURE #1 - The chapters are usually divided into sections. The Table of Contents lists both chapters and sections, with page numbers for each section.

Here is an example of what this looks like:

	<u>Page</u>
Chapter 1: AN INTRODUCTION TO ELECTRICITY	1
Some Terms Used in Electronics	4
The Nature of Electricity	6
The Volt, Ampere and Watt	10
Resistance and Ohm's Law	13
Chapter 2: INDUCTANCE, IMPEDANCE, CAPACITANCE	16
Electricity Creates Magnetism	18
Tuning a Radio Circuit	21
Transformers	25
An Experiment with Electromagnetic Induction	26
An Experiment with the Transformer	31

**NOTICE THESE THINGS:**

1. The titles all in CAPITAL LETTERS are the chapters. They are also labeled Chapter 1, Chapter 2.
2. Under each chapter title are some other titles that are not all in capital letters. They are the titles of sections.

**FEATURE #2 - Page numbers will have two parts, like these:**

1-1  
1-3  
2-1  
2-7  
3-15

The FIRST number is always the CHAPTER number.

The SECOND number is the PAGE number.

So, 2-3 means Chapter 2, page 3.

**NOTE:** No matter how many sections are in a chapter, all the sections will have the same chapter number as part of their page number, like this:

Chapter 3: DUTY POSITION TASKS	3-1
Task List	3-1
Task Summaries for Skill Level 1	3-10
Task Summaries for Skill Level 2	3-198
Task Summaries for Skill Level 3	3-250



**NOTE:** Just by looking at the page number of a section, you CAN TELL what CHAPTER it is part of.

Unit II, Lesson 1  
Review Exercise

2

FEATURE #3 - The same section titles might show up in two or more chapters. So, to find a particular section, you will have to look at both the section title and the chapter title.

Here is an example of that.

Chapter 2: HOTEL TASKS	2-1
----> Romeo List	2-1
Delta Level	2-34
----> Papa Level	2-98
Chapter 3: ALFA TASKS	3-1
----> Romeo List	3-1
Tango Level	3-37
Golf Level	3-68
----> Papa Level	3-125
Yankee Level	3-207

Notice that both Chapter 2 and Chapter 3 have sections called Romeo List and Papa Level.

If you were told to look up Papa Level, you couldn't do it until you were told which chapter to look at.

- HINTS:
1. Take care when using the two-part page numbers NOT TO MIX UP the page part with the chapter part.
  2. When you write a two-part page number, remember to write the chapter part first, even if you are given the page number part first.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 1

1. If you are looking in a manual for page 3-12, what chapter will it be in? \_\_\_\_\_
2. Page 8-5 means Chapter \_\_\_\_\_ and page \_\_\_\_\_.
3. Page 6-12 means the \_\_\_\_\_ chapter and \_\_\_\_\_ page.
4. Page 5-30 means page \_\_\_\_\_ of Chapter \_\_\_\_\_.
5. If you are looking for page 2-27, you will find it in Chapter \_\_\_\_\_.
6. To find page 3-18, you must look on page \_\_\_\_\_ of Chapter \_\_\_\_\_.

NOW FOR SOME PRACTICE WRITING TWO-PART PAGE NUMBERS.

7. Write the two-part page number for Chapter 5, page 3.  
\_\_\_\_\_
8. Write the two-part page number for Chapter 8, page 15.  
\_\_\_\_\_
9. Write the two-part page number for Chapter 4, page 9.  
\_\_\_\_\_

NOTE: Read the next three questions carefully.

10. Write the two-part page number for page 18 of Chapter 5.  
\_\_\_\_\_
11. Write the two-part page number for page 8 of Chapter 10.  
\_\_\_\_\_
12. Write the two-part page number for page 2 of Chapter 1.  
\_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 8.

The Table of Contents below is a made-up one. It is like part of the Table of Contents in your Soldier's Manual. It is not the whole table of Contents. Look it over very quickly. Then use it to answer the questions that follow.

	Page
DELTA PAPA TASKS	3-1
Task List	3-1
Task Summaries for Sierra Lima 1	3-8
Task Summaries for Sierra Lima 2	3-227
Task Summaries for Sierra Lima 3	3-365
SIERRA LIMA TASKS	4-1
Task List	4-1
Task Summaries for Sierra Lima 1	4-11
Task Summaries for Sierra Lima 2	4-194
Task Summaries for Sierra Lima 3	4-210

- NOTE:
1. The chapter numbers were removed from this Table of Contents. But you can still tell what the chapter is from the page number.
  2. The section titles are the same for both chapters. So, to find a particular section, you will have to look at both the section title and the chapter title.

USE THE TABLE OF CONTENTS ABOVE WHEN ANSWERING THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 2

1. Is "Sierra Lima 1" part of a chapter title or a section title?

\_\_\_\_\_

2. What is the page number of the Task List for DELTA PAPA TASKS?  
(Give both parts of the page number.) \_\_\_\_\_

3. What is the page number of the Task Summaries for Sierra Lima 2  
of SIERRA LIMA TASKS? (Give both parts of the page number.)

\_\_\_\_\_

4. Is "Delta Papa Tasks" the title of a section or chapter?

\_\_\_\_\_

5. What is the chapter number of SIERRA LIMA TASKS? (Give only the  
chapter number, not the page number.) \_\_\_\_\_

6. What is the page number of the Task Summaries for Sierra Lima 3  
for DELTA PAPA TASKS? (Give both parts of the page number.)

\_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 9.

ANSWER KEYS TO EXERCISES IN UNIT II, LESSON 1, REVIEW EXERCISE

Unit II, Lesson 1  
Review Exercise

ANSWERS TO EXERCISE 1

1. 3
2. chapter 8  
page 5
3. 6th chapter  
12th page
4. page 30  
chapter 5
5. 2
6. page 18  
chapter 3
7. 5-3
8. 8-15
9. 4-9
10. 5-18
11. 10-8
12. 1-2

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON WITH THE REVIEW EXERCISE.

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ANSWERS TO EXERCISE 2

1. section title
2. 3-1
3. 4-194
4. chapter
5. 4
6. 3-365

IF YOU DO NOT UNDERSTAND ANY OF THE MATERIAL IN THIS REVIEW EXERCISE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS REVIEW EXERCISE,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM B  
IN UNIT II - LESSON 1.

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REVIEW EXERCISE 1

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UNIT II. USING A TABLE OF CONTENTS

Lesson 2. Using a Task List to Find a Task Description

Review of Basic Ideas

The Soldier's Manual contains step-by-step descriptions of a couple of hundred tasks. You will often need to look up a task description in performing your duties in the 31M course. The quickest way to find the task description you are looking for is to use the TASK LISTS.

A Task List is a kind of Table of Contents with some important differences.

DIFFERENCE #1 - The Task Lists are NOT at the FRONT of the manual. There are two Task Lists and they are at different places in the manual.

DIFFERENCE #2 - In the place where you usually find the Chapter numbers in a Table of Contents, the Task List has TASK NUMBERS.

DIFFERENCE #3 - The Task Numbers are NOT in neat order. There are often gaps between the numbers. Lower numbers sometimes come after higher numbers.

When the sergeant tells you to look up a task, he will usually just give you the Task Number. You will have to scan the Task Number column in the Task Lists to find the one you want. The Task List will tell you the page number of the task description you want.

Task Numbers are always divided into 3 sections like this:

113-503-1005

Here are some hints to help you scan the Task Numbers to quickly find the one you want.

HINT #1 - Look for the first section of the Task Number first.

HINT #2 - Look for the last section of the Task Number next.

HINT #3 - Check the middle section of the Task Number last.

Unit II, Lesson 2  
Review Exercise 1

1

Usually, you use the Task Number to look up a Task Description. But, if you have the Task Title, you might want to use that. Here are two features that help you scan the Task Titles to quickly find the one you want.

FEATURE #1 - All the task descriptions on the same piece of equipment are grouped together.

FEATURE #2 - The name of the piece of equipment is all in capital letters, like this: AN/TRC-145.

When you scan the Task Titles, first look for the name of the piece of equipment you want. Then read the rest of the task titles to find the exact task you want.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS REVIEW,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM B  
IN UNIT II - LESSON 2.

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REVIEW EXERCISE 2

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UNIT II. USING A TABLE OF CONTENTS

Lesson 2. Using a Task List to Find a Task Description

You have reviewed the procedure for looking up Task Numbers and Task Titles in a Task List. Of course, the reason you use a Task List is to find the page number of the Task Description. Each Task Description has several pages of step-by-step directions on how to do that particular task.

To see an example of a Task Description, turn to page 2-303 in your Soldier's Manual.

The next checkpoint asks you to use the Task List to find page numbers. Here is a review of some important points to remember.

POINT #1 - Always give both parts of a page number.

POINT #2 - Give the page number of the Task Description. See the example below. Do not give the page number of the Task List.

<u>TASK NO</u>	<u>TITLE</u>	<u>PAGE</u>
551-721-1031	Fill Out DD Form 518 (Accident Identification Card)	2-240

POINT #3 - Whether you are given a Task Number or Task Title, READ CAREFULLY, to make sure you have found the correct number or title.

POINT #4 - When you look at the Page Number column, double-check to make sure your eye has not skipped up or down to the next line.

For example, if you want the page number of Task 113-601-2009, make sure you write 2-247, not 2-242 or 2-258. This is an easy mistake to make.

113-601-1006	Install Generator Set, 3 KW, PU-625/G or PU-628/G	2-242
113-601-2009	Operate Generator Set, 3 KW, PU-625/G or PU-628/G	2-247 ←
113-601-3008	Perform Operator's Preventive Maintenance on Generator Set, 3 KW, PU-625/G or PU-628/G	2-258

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS REVIEW EXERCISE,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 2, FORM B  
IN UNIT II - LESSON 2.

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REVIEW EXERCISE 1

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UNIT II. USING A TABLE OF CONTENTS

Lesson 3. Tables with Paragraph Numbers and Page Numbers

Review of Basic Ideas

The Tables of Contents in the Technical Manuals (TMs) have more information in them than there is in the ordinary Table of Contents. The extra information might look confusing at first. After you get used to it, however, the extra information helps you to find what you are looking for very quickly.

Here are the main points to remember about these Tables of Contents.

FEATURE #1 - The Chapters are usually (but not always) divided into Sections.

FEATURE #2 - The Sections are divided into paragraphs.

FEATURE #3 - Each paragraph has a paragraph number and a page number.

Here is part of a Table of Contents from a TM to remind you what these features look like.

CHAPTER	Section		Paragraph	Page
4	MAINTENANCE			
	I.	Preventive maintenance		
		Scope of maintenance	4-1	4-1
		Operator's daily preventive maintenance checks and services	4-2	4-2
		Organizational monthly preventive maintenance checks and services	4-3	4-5
		Organizational quarterly preventive maintenance checks and services	4-4	4-8
	II.	Troubleshooting		
		System troubleshooting	4-5	4-10
		Cable link troubleshooting	4-6	4-14
		Assemblage troubleshooting	4-7	4-16
	III.	Organizational repair procedures		
		Component removal and replacement	4-8	4-22
		Electric heater repairs	4-9	4-22
		Exhaust blower repairs	4-10	4-22
		Distribution panel repairs	4-11	4-22
		Repair of power cable connectors and POWER ENTRANCE BOX receptacles	4-12	4-24
	IV.	DS, GS, and depot maintenance		
		Scope of direct support and general support maintenance	4-13	4-24
		Direct support repair procedures	4-14	4-25
		General support repair procedures	4-15	4-25
		Depot maintenance	4-16	4-29

Unit II, Lesson 3

Review Exercise 1

Here is another point to remember:

FEATURE #4 - Sometimes a Chapter won't be divided into Sections.  
But it will be divided into paragraphs.

Here is an example of that feature.

		Paragraph	Page
CHAPTER	3. OPERATING INSTRUCTIONS		
	Controls and indicators .....	3-1	3-1
	Energizing ac circuits .....	3-2	3-4
	Operating heaters, blowers, LS-147C/FI, and TA-312/PT .....	3-3	3-5
	Operating rack equipment .....	3-4	3-5
	Order-wire communication .....	3-5	3-6
	Monitoring channels .....	3-6	3-6
	Operation under unusual conditions .....	3-7	3-6
	Stopping procedure .....	3-8	3-7

NOTE:

The PARAGRAPH numbers have two parts:

The FIRST part is always the CHAPTER number.

The SECOND part is the PARAGRAPH number.

So, paragraph 5-21 means Chapter 5, paragraph 21.

The PAGE numbers have two parts:

The FIRST part is always the CHAPTER number.

The SECOND part is the PAGE number.

So, page 4-21 means Chapter 4, page 21.

REMEMBER:

When using these Tables of Contents, take care not to mix up the paragraph number and the page number.

EXERCISE 1

Here is part of a Table of Contents from a TM.  
Use it to answer the questions below.

		Paragraph	Page
CHAPTER	1. INTRODUCTION		
Section	I. General		
	Scope .....	1-1	1-1
	Index of publications .....	1-2	1-1
	Forms and records .....	1-3	1-1
	II. Description and data		
	Purpose and use .....	1-4	1-1
	Components .....	1-5	1-5
	Technical characteristics .....	1-6	1-5
	Description .....	1-7	1-7
CHAPTER	2. INSTALLATION		
	Unpacking and checking .....	2-1	2-1
	Siting .....	2-2	2-1
	Grounding .....	2-3	2-3
	Power connections .....	2-4	2-5
	Signal connections .....	2-5	2-5
	Interunit cable connections .....	2-6	2-6
	Preliminary checks and adjustments .....	2-7	2-6
	System alignment .....	2-8	2-12

1. What is the title of Chapter 2? \_\_\_\_\_
  
2. "Siting" is the title of a:
  - \_\_\_\_\_ a. Chapter
  - \_\_\_\_\_ b. Section
  - \_\_\_\_\_ c. paragraph
  
3. "Description and data" is the title of a:
  - \_\_\_\_\_ a. Chapter
  - \_\_\_\_\_ b. Section
  - \_\_\_\_\_ c. paragraph

4. "Scope" is the title of a :

- a. Chapter
- b. Section
- c. paragraph

5. "Introduction" is the title of a :

- a. Chapter
- b. Section
- c. paragraph

6. How many Sections are in Chapter 1? \_\_\_\_\_

You don't need the Table of Contents to answer the rest of the questions.

7. In what Chapter would you find paragraph 7-4? \_\_\_\_\_

8. In what chapter would you find page 6-8? \_\_\_\_\_

9. What does the page number 11-9 mean? (Include both page and Chapter numbers in your answer.)

\_\_\_\_\_

10. What does the paragraph number 3-5 mean? (Include both paragraph and Chapter numbers in your answer.)

\_\_\_\_\_

11. In both paragraph numbers and page numbers, the first part of the number refers to the \_\_\_\_\_.

Here is part of another Table of Contents from a TM. Use it to answer the questions that follow.

	Paragraph	Page
<b>CHAPTER 4. OPERATOR'S MAINTENANCE</b>		
Scope of operator's maintenance	4-1	4-1
Operator's preventive maintenance	4-2	4-1
Preventive maintenance checks and services periods	4-3	4-1
Daily preventive maintenance checks and services chart	4-4	4-2
Weekly preventive maintenance checks and services chart	4-5	4-2
Cleaning	4-6	4-3
Visual inspection	4-7	4-3
Operational checklist	4-8	4-3
Replacement of indicator lamps	4-9	4-5
Replacement of fuses	4-10	4-5
Replacement of aid filter	4-11	4-6
<b>CHAPTER 5. ORGANIZATIONAL MAINTENANCE</b>		
Section I. Maintenance		
Scope of organizational maintenance	5-1	5-1
Tools, materials, and test equipment required	5-2	5-1
Organizational preventive maintenance	5-3	5-1
Quarterly maintenance	5-4	5-1
Quarterly maintenance service and inspection chart	5-5	5-2
Additional maintenance items	5-6	5-3
Lubrication	5-7	5-3
Section II. Troubleshooting and repairs		
General instructions	5-8	5-6
Organization of troubleshooting procedures	5-9	5-6
Visual inspection	5-10	5-7
Equipment performance checklist	5-11	5-7
Trouble sectionalizing chart	5-12	5-23
Repairs and adjustments	5-13	5-24
Tube replacement procedures	5-14	5-26
Repairs	5-15	5-27

12. On what page does paragraph 5-14 start? \_\_\_\_\_
13. What is the number of the paragraph that starts on page 4-6?  
\_\_\_\_\_
14. What is the paragraph number of the paragraph titled "Repairs and Adjustments"? \_\_\_\_\_
15. You need to read about "Lubrication." To what page must you turn?  
\_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 7.

ANSWER KEY TO EXERCISE IN UNIT II, LESSON 3, REVIEW EXERCISE 1

Unit II, Lesson 3  
Review Exercise 1

ANSWERS TO EXERCISE 1

1. Installation
2. c. paragraph
3. b. section
4. c. paragraph
5. a. Chapter
6. 2 (or II, or two)
7. 7
8. 6
9. Chapter 11, page 9
10. Chapter 3, paragraph 5
11. Chapter
12. 5-26
13. 4-11
14. 5-13
15. 5-3

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM B  
IN UNIT II - LESSON 3.

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REVIEW EXERCISE 2

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UNIT II - LESSON 3

Roman Numerals (Numbers) Exercise

Roman numerals are called that because they were the numbers used by the ancient Romans. We no longer use them for doing math or arithmetic. But we do still use them for numbering sections in an outline, or sections in a Table of Contents, and so on.

For the 31M course, you usually won't need to read any Roman numerals higher than about X (which means 10). So this exercise will be short and pretty simple.

Here are the Roman numerals from 1 to 10.

I	.....	1
II	.....	2
III	.....	3
IV	.....	4
V	.....	5
VI	.....	6
VII	.....	7
VIII	.....	8
IX	.....	9
X	.....	10

If you want to, you can just memorize these ten Roman numerals. But there is a quicker way to learn them. And this way you will probably remember them better.

Notice that the Roman numerals are really letters of the alphabet.

Notice also that only three different letters are used. These three are combined in different ways to make up all the numbers between 1 and 10. (Of course, the whole Roman numeral system uses more than just three letters, but not many more.)

THESE ARE THE THREE LETTERS YOU WILL HAVE TO MEMORIZE:

I = 1

V = 5

X = 10

An easy way to memorize these Roman numerals is to get some practice writing them.

EXERCISE 1

1. To write five, the Romans used \_\_\_\_\_.
2. For the number ten, the Romans wrote \_\_\_\_\_.
3. For one, the Romans used \_\_\_\_\_.
4. The letter X equals \_\_\_\_\_.
5. The letter I equals \_\_\_\_\_.
6. V equals \_\_\_\_\_.
7. The Roman numeral for 10 is \_\_\_\_\_.
8. The Roman numeral for 5 is \_\_\_\_\_.
9. the Roman numeral for 1 is \_\_\_\_\_.
10. Write in the correct numbers:
  - a. V = \_\_\_\_\_
  - b. I = \_\_\_\_\_
  - c. X = \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 8.

Unit II, Lesson 3  
Review Exercise 2

Next, you need to know the rules for combining I, V, and X to make the numbers 2, 3, 4, 6, 7, 8, and 9.

RULE #1. To make 2, just put two I's together.  
To make 3, just put three I's together.

EXERCISE 2

1. II = \_\_\_\_\_

2. III = \_\_\_\_\_

3. 3 = \_\_\_\_\_

4. 2 = \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 9.

RULE #2. You can not put four of the same letter together.

So you can't write IIII to make 4.

RULE #3. When you put a smaller number in front of a larger number, it is just like subtracting.

IV = 1 subtracted from 5, or  $5 - 1$

IX = 1 subtracted from 10, or  $10 - 1$

### EXERCISE 3

WRITE THE CORRECT ROMAN NUMERALS IN THE BLANKS:

1. 9 = \_\_\_\_\_

2. 4 = \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 9.

RULE #4. If you put a smaller number after a larger number, it's just like adding them.

$$VI = 5 + 1$$

EXERCISE 4

1. Combine the Roman numerals I and V so they add up to 6.  
\_\_\_\_\_
2. Combine the Roman numerals I and X so they add up to 11.  
\_\_\_\_\_
3. Combine the Roman numerals II and V so they add up to 7.  
\_\_\_\_\_
4. Combine the Roman numerals II and X so they add up to 12.  
\_\_\_\_\_
5. Combine the Roman numerals III and V so they add up to 8.  
\_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 10.

EXERCISE 5

This is the last set of questions for this Review.  
Write in the correct numbers.

1. VI = \_\_\_\_\_
2. VIII = \_\_\_\_\_
3. IV = \_\_\_\_\_
4. III = \_\_\_\_\_
5. II = \_\_\_\_\_
6. V = \_\_\_\_\_
7. I = \_\_\_\_\_
8. XI = \_\_\_\_\_
9. X = \_\_\_\_\_
10. VII = \_\_\_\_\_
11. IX = \_\_\_\_\_

HAVE YOUR INSTRUCTOR SCORE THIS PAGE.

ANSWER KEY TO EXERCISES IN UNIT II, LESSON 3, REVIEW EXERCISE 2

Unit II, Lesson 3  
Review Exercise 2

ANSWERS TO EXERCISE 1

1. V
2. X
3. I
4. 10
5. 1
6. 5
7. X
8. V
9. I
10. a. 5  
b. 1  
c. 10

IF YOU GOT ANY WRONG, CROSS OUT THE WRONG ANSWER  
AND WRITE THE CORRECT ANSWER.

GO ON WITH THIS REVIEW EXERCISE.

---

ANSWERS TO EXERCISE 2

1. 2
2. 3
3. III
4. II

IF YOU GOT ANY WRONG, CROSS OUT THE WRONG ANSWER  
AND WRITE THE CORRECT ANSWER.

GO ON WITH THIS REVIEW EXERCISE.

---

ANSWERS TO EXERCISE 3

1. IX
2. IV

IF YOU GOT ANY WRONG, CROSS OUT THE WRONG ANSWER  
AND WRITE THE CORRECT ANSWER.

GO ON WITH THIS REVIEW EXERCISE.

---

ANSWERS TO EXERCISE 4

1. VI
2. XI
3. VII
4. XII
5. VIII

IF YOU GOT ANY WRONG, CROSS OUT THE WRONG ANSWER  
AND WRITE THE CORRECT ANSWER.

GO ON WITH THIS REVIEW EXERCISE.

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REVIEW EXERCISE

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UNIT III: LISTENING SKILLS

Lesson 2. Remembering Information Seen in Demonstrations

Section A

Selecting and Organizing What to Remember

In the 31M course, you will see demonstrations of how to operate the equipment. Most of the time you will be able to take notes. Sometimes, you won't be able to do that. This lesson will present ways to help you notice the important points in a demonstration and remember them more easily, even when you can't take notes.

Note these three important points about this lesson:

1. When you watch a demonstration, you first have to decide what is the most important information to remember.
2. Next, you have to do something to help you remember the information you have decided is important.
3. You have to do Steps 1 and 2 whether you take notes or not.

When you can't take notes (and in this lesson you won't), it is very necessary to pick out the most important kinds of information to remember.

Here is a list of the most important types of information you will need to look for and remember when watching demonstrations.

- . The PURPOSE of the procedure being demonstrated.
- . NAMES of switches, meters, jacks, etc.
- . LOCATIONS of switches, meters, jacks, etc.
- . ORDER of steps in the procedure.
- . ACTIONS you perform on the equipment.
- . SIGNS that tell you when a step is done correctly.

Here is an example of these types of information.  
The instructor starts the demonstration by saying this:

"This is a demonstration of how to do the critical tuning procedure on the AN/TRC-2X. First operate the Power switch to ON. Then check the Measure meter for a reading of 20. If the reading is 20, turn the Measure switch to position 3. Adjust the RF AMP tuning control for a maximum reading on the Measure meter. Disconnect the jumper cable from the Antenna jack."

#### EXERCISE 1

1. Put a check in front of each of the following types of information only if that type of information is included in the example given above.

- \_\_\_\_\_ Purpose of the procedure being demonstrated
- \_\_\_\_\_ Names of switches, meters, jacks, etc.
- \_\_\_\_\_ Locations of switches, meters, jacks, etc.
- \_\_\_\_\_ Actions you perform on the equipment.
- \_\_\_\_\_ Order of steps in the procedure.
- \_\_\_\_\_ Signs that tell you when a step is done correctly.

2. Write down one item of information from the example above that belongs to each type of information.

- a. The purpose of the procedure being demonstrated.

---

---

- b. Names of switches, meters, jacks, etc.

---

- c. Actions you perform on the equipment.

---

- d. Signs that tell you when a step is done correctly.

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CHECK YOUR ANSWERS ON PAGE 18.

Now you will get some practice in picking out these kinds of information in videotaped demonstrations. You will look at the same taped demonstrations you watched when you did the lesson earlier. The questions you will answer this time are different from the ones you answered earlier.

Directions:

1. TELL YOUR INSTRUCTOR YOU ARE READY TO WATCH THE VIDEOTAPED PRACTICE EXERCISES FOR THE UNIT III, LESSON 2 REVIEW EXERCISE.
2. WATCH THE VIDEOTAPE UNTIL THE FIRST FADEOUT.
3. TURN OFF THE VIDEOTAPE PLAYER.
4. ANSWER THE QUESTIONS BELOW.
5. DO NOT TAKE NOTES

START THE TAPE NOW.

EXERCISE 2

1. Where is the Measure switch located?
  - a. Power Supply
  - b. Test Panel
  - c. Amplifier
2. What sign tells you that you have correctly made the 200 Volt control adjustment? \_\_\_\_\_  
\_\_\_\_\_
3. What action do you perform with the 115 Volt AC Power switch?
  - a. Use a screwdriver to adjust it.
  - b. Make sure it is OFF.
  - c. Turn it to ON.

CHECK YOUR ANSWERS ON PAGE 19.

Directions:

1. RESET THE TAPE COUNTER TO ZERO.
2. WATCH THE SECOND PART OF THE DEMONSTRATION ON THE VIDEOTAPE.
3. AT THE NEXT FADEOUT (THE SCREEN GOES BLANK), TURN OFF THE VIDEOTAPE PLAYER.
4. ANSWER THE QUESTIONS BELOW.
5. DO NOT TAKE NOTES

START THE TAPE NOW.

EXERCISE 3

1. What action do you perform with the Measure Non-Selective switch?
  - a. Set it to Check 1 KC position.
  - b. Turn it to ON.
  - c. Use a screwdriver to turn it clockwise.
  
2. What sign tells you that the 1 KC control (inside the Test Panel) is adjusted correctly?  

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---
  
3. Where on the Test Panel is the 1 KC jack located?
  - a. Inside the top of the panel.
  - b. Upper center of the panel.
  - c. Bottom left of the panel.

CHECK YOUR ANSWERS ON PAGE 19.

## Section B

### Storing Information in Your Memory

After you pick out what information is important to remember, you often have to do something extra to help you remember it. This section will present three ways of remembering information you see in demonstrations: using Organizers, visualizing, and paraphrasing.

If you have been answering the questions correctly so far, you have already been storing information from the demonstrations in your memory - at least for a short while. The ways of remembering discussed here will help you store information in your memory for a longer time.

In this section of the Review Exercise, we will say more about using Organizers as a method to help you remember information.

The six types of information that you were looking for in Section A are Organizers. They help you to sort out all the information that you see when you watch a demonstration. (And they help guide you to what information will be important to remember.)

The advantage of using Organizers is that just a few Organizers will help you to remember a large amount of information.

If you found it a bit hard to keep track of the six types of information mentioned in Section A, here is a way to organize most of the same information using only three Organizers. Here are the Organizers:

#### NAMES -

- a. of the whole system (for example, AN/TCC-7)
- b. of components or units (for example, Power Supply)
- c. of switches, meters, etc. (for example, Measure switch)

#### LOCATIONS-

Where on the equipment the various switches, etc. are located.

NOTE: It will help you if you notice which switches and controls are located close together. Often you will do adjustments to a group of switches that are located together, one right after the other.

PROCEDURES-

- a. Purpose of the whole procedure (for example, Checking the High Frequency Control).
- b. The steps in the procedure
  - . What switch meter, etc. you use (for example, 200 Volt control)
  - . What you do with it (for example, turn it clockwise)
  - . Sign that you did it correctly (for example, the Test Meter will read zero)

You see that this is just a different way of grouping or organizing the types of information you have already had experience in looking for.

Now for some practice in organizing information you see in a demonstration.

Directions:

1. RESET THE TAPE COUNTER TO ZERO.
2. WATCH THE THIRD PART OF THE DEMONSTRATION ON THE VIDEOTAPE.
3. AT THE END, TURN OFF THE VIDEOTAPE PLAYER.
4. ANSWER THE QUESTION ON THE NEXT PAGE.
5. DO NOT TAKE NOTES.

START THE TAPE NOW.



You have just had some practice in using Organizers. Using Organizers is one way to help you remember information. Another way to remember is to say in your own words what you have just seen and heard. This method is called paraphrasing. To be most helpful, it must be done in the right way. Here are some points to remember when you use this method.

1. Use your own words. Do not just repeat exactly what the instructor said.
2. You can do this silently, while watching the demonstration.
3. Once you have described in your own words what the instructor said and did, do not repeat it. Instead, pay attention to the next thing the instructor does.
4. After the demonstration is over, you can repeat your descriptions to yourself, going over the whole procedure from the start.

You have already see examples of paraphrasing. Here's another.

The instructor said: "Set the circuit breaker on the TCC-7 to the ON position. The associated glow lamp should light."

The student said: "Turn the TCC-7 circuit breaker to ON. The light should go on."

NOTE: The student used different words but said the same thing.

The following is NOT an example of paraphrasing.

The instructor said: "You will need a screwdriver to make the next adjustment. Adjust the HF control for a zero reading on the test meter."

The student said: "You will need a screwdriver to make the next adjustment. Adjust the HF control for a zero reading on the test meter."

This is NOT an example of paraphrasing because the student said exactly the same words the instructor used.

Now for some practice in paraphrasing what you have seen in a demonstration.

Directions:

1. REWIND THE TAPE TO THE BEGINNING.
2. WATCH THE FIRST PART OF THE DEMONSTRATION ON THE TAPE.
3. AT THE FADEOUT (THE SCREEN GOES BLANK), TURN OFF THE VIDEOTAPE PLAYER.
4. ANSWER THE QUESTION BELOW.
5. DO NOT TAKE NOTES.
6. YOU CAN REPEAT THE DEMONSTRATION IF YOU WANT, BUT DO NOT LOOK AT THE QUESTIONS BEFORE YOU FINISH WATCHING THE TAPE.

START THE TAPE NOW.

EXERCISE 5

1. Describe in your own words the steps (actions) you just saw the instructor demonstrate. Begin by stating the purpose of the demonstration.

Purpose:

Step 1.

Step 2.

Step 3.

Step 4.

Step 5.

CHECK YOUR ANSWER ON PAGE 21.

Another way that many people use to remember demonstrations is to visualize what was done. This simply means to picture something in your mind after you have just seen it.

Remember that your visualized picture does not have to be complete in every detail. You only need to include the parts of the equipment you saw used in the demonstration.

You will include:

- all switches, controls, jacks that you will use.
- all meters you will have to look at.
- where on the equipment the instructor starts the procedure and where he goes to for each step that follows.

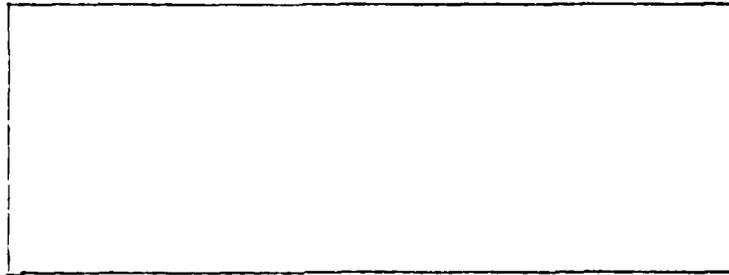
Directions:

1. RESET THE TAPE COUNTER TO ZERO.
2. WATCH THE SECOND PART OF THE DEMONSTRATION.
3. AT THE FADEOUT (THE SCREEN GOES BLANK), TURN OFF THE VIDEOTAPE PLAYER.
4. ANSWER THE QUESTIONS ON THE NEXT PAGE.
5. DO NOT TAKE NOTES.

START THE TAPE NOW.

EXERCISE 6

1. How many steps did the instructor do? \_\_\_\_\_
2. On the diagram below, write the number 1 to show the place where the instructor started the adjustments. Then write number 2 to show where the instructor moved for the next step, and so on.



TEST PANEL

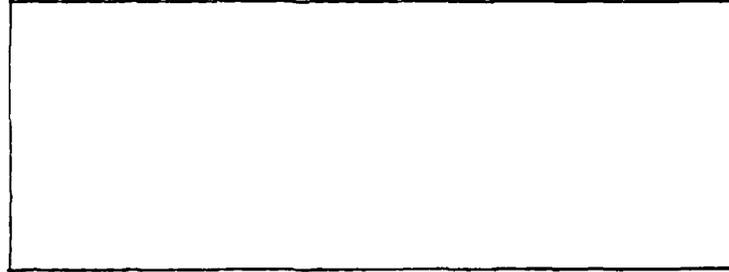
3. Name all the switches, dials, controls, jacks, meters, etc. that the instructor used in this demonstration. (Just name them. You don't have to say what the instructor did with them.)

---

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4. On the diagram below, draw each of the items you named in Question 3. (Your drawing should be very simple. Just draw a small circle to show a switch, control, jack, etc. Draw a larger circle if you want to show a meter.)

Be sure to label each item you draw. To show a control located inside the panel, just write the name of the control and draw an arrow to the part of the panel where the control is located.



TEST PANEL

CHECK YOUR ANSWERS ON PAGE 22.

## Section C

### Recalling What You Stored in Your Memory

In Section B you covered three methods of remembering information from demonstrations: Use of Organizers, paraphrasing, and visualizing.

Another helpful method is to turn the things the instructor does and says into questions you ask yourself. For example, the instructor said this:

"Connect the Test panel measure cord to the Transmitter Amplifier Our jack on the Orderwire Panel."

Here are some questions you might ask yourself based on that statement.

Question 1. What piece of equipment is the measure cord on?  
(The Test panel)

Question 2. Which jack is the cord plugged into?  
(The Transmitter Amplifier Our jack)

Question 3. Where is that jack?  
(On the Orderwire Panel)

Like paraphrasing, this method is used during the demonstration. But you should not spend so much time making up questions that you miss the next point the instructor says.

These four methods are ways of storing information in your memory.

Once you have information stored in your memory, you want to be able to remember or recall it when you need it. There are a few simple methods that can help you do this.

Some people recall things by using a word as a cue. This word can often be a name of a unit or section of a unit, or of a switch or whatever. When you have used Grouping and Repetition to store information in your memory, using a word to recall the information is helpful.

For example, by recalling the name of a particular switch you can recall where it is located and what action you do with the switch.

Other words you can use to cue recall of information are the Organizers you need to learn the information. For example: Location, order of steps, sign that a step has been performed correctly.

If you used the question method (Making up your own questions) to help store information in your memory, you can use those questions to help recall the information. For example, while you are adjusting a control, you can ask yourself, "How do I know when the adjustment is done right?"

If you used the visualizing method to learn the steps in a procedure, you should find it helpful to look at the spot on the equipment where you started your visualizing in order to recall the order of the next steps.

These methods for recalling information are related to the methods you used to put the information into your memory.

Now for a final exercise in using these methods. You will watch one more demonstration and answer some multiple choice questions about the information.

Here is a summary of all the points covered in this Review Exercise.

The most important types of information to look for in demonstrations:

- . PURPOSE of the procedure
- . NAMES of controls, switches, panels, jacks, etc.
- . LOCATIONS of controls, switches, panels, jacks, etc.
- . ACTIONS you perform on the equipment.
- . ORDER of steps in the procedure.
- . SIGNS that tell you when a step is done correctly.

The above are Organizers. They help you sort out a lot of different kinds of information and remember it more easily.

Paraphrasing - restating what the instructor said in your own words - is a help in remembering.

Visualizing - making a mental picture of what you have just seen - is another help in remembering.

Making up your own questions from what the instructor says and does is another help.

Directions:

1. RESET THE TAPE COUNTER TO ZERO.
2. WATCH THE THIRD PART OF THE DEMONSTRATION.
3. AT THE END OF THE TAPE, TURN OFF THE VIDEOTAPE PLAYER.
4. ANSWER THE QUESTION BELOW.
5. DO NOT TAKE NOTES.

START THE TAPE NOW.

EXERCISE 7

1. What was the demonstration about?
  - a. Setting the 1 kilocycle (KC) control.
  - b. Making the 200 Volt control adjustment.
  - c. Presetting the Power supply.
  - d. Checking the High Frequency (HF) control.
  
2. At the start of the procedure, the Measure Non-Selective switch must be set to which position?
  - a. Check 1 KC
  - b. Check HF
  - c. OFF
  - d. Transmission
  
3. Which of the following needs to be adjusted with a screwdriver?
  - a. Measure Non-Selective switch
  - b. HF control
  - c. HF jack

4. One of the adjustments must be made with a screwdriver. Which direction must you turn the screwdriver?
- a. left or right
  - b. left only
  - c. right only

CHECK YOUR ANSWERS ON PAGE 24.

ANSWER KEYS TO EXERCISES IN UNIT III, LESSON 2, REVIEW EXERCISE

Unit III, Lesson 2  
Review Exercise

ANSWERS TO EXERCISE 1

1. \_\_\_\_\_ Purpose of the procedure being demonstrated  
\_\_\_\_\_ Names of switches, meters, jacks, etc.  
\_\_\_\_\_ Locations of switches, meters, jacks, etc.  
\_\_\_\_\_ Actions you perform on the equipment.  
\_\_\_\_\_ Order of steps in the procedure.  
\_\_\_\_\_ Signs that tell you when a step is done correctly.
  
2. a. The purpose of the procedure being demonstrated.  
Initial tuning of the AN/TRC-2X.
  
- b. Names of switches, meters, jacks, etc.  
(Any of the following.) Power switch, Measure Meter, Measure switch, RF AMP tuning control, jumper cable, Antenna jack.
  
- c. Actions you perform on the equipment.  
(Any of the following.) Operate (or turn) the Power switch to ON, check measure meter for a reading of 20, turn Measure switch to position 3, adjust RF AMP tuning control, disconnect the jumper cable.
  
- d. Signs that tell you when a step is done correctly.  
A maximum reading on the Measure meter (tells you the RF AMP tuning control is adjusted correctly.

IF YOU DO NOT UNDERSTAND THESE ANSWERS,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE GOING ON  
WITH THIS REVIEW EXERCISE.

IF YOU GOT THESE ANSWERS RIGHT,  
GO ON WITH THIS REVIEW EXERCISE.

---

ANSWERS TO EXERCISE 2

1. b. Test Panel
2. The Test meter reads zero.
3. c. Turn it ON.

IF YOU MISSED MORE THAN ONE QUESTION,  
REWIND THE TAPE TO ZERO AND WATCH THE DEMONSTRATION AGAIN.  
WATCH FOR WHEN THE INFORMATION COMES UP.

IF YOU GOT THE ANSWERS RIGHT,  
GO ON WITH THE REVIEW EXERCISE.

---

ANSWERS TO EXERCISE 3

1. a. Set it to Check 1 KC position.
2. A zero reading on the Text Meter.
3. c. Bottom left of the panel.

IF YOU MISSED MORE THAN ONE QUESTION,  
REWIND THE TAPE TO ZERO AND WATCH THE DEMONSTRATION AGAIN.  
WATCH FOR WHEN THE INFORMATION COMES UP.

IF YOU GOT THE ANSWERS RIGHT,  
GO ON WITH THE REVIEW EXERCISE.

---

ANSWER TO EXERCISE 4

NOTE: You were asked to list at least two items for each Organizer.  
If you have more than two, that is fine. All the possible  
answers are given below.

1. a. NAMES

- . Measure Non-Selective switch
- . High Frequency (HF) control
- . Measure cord plug
- . HF jack

b. PROCEDURES

- . Set the Measure Non-Selective switch to the Check HF position.
- . Put the Measure cord plug into the HF jack.
- . Use a screwdriver to turn the HF control until the meter reads zero.
- . Set the Measure Non-Selective switch to OFF.

c. LOCATIONS

None.

IF YOU MISSED ANY PART OF THIS QUESTION, REWIND THE TAPE TO ZERO.  
WATCH THE DEMONSTRATION AGAIN AND WATCH FOR WHEN  
THE INFORMATION COMES UP.

IF YOU GOT THE ANSWER RIGHT,  
GO ON WITH THE REVIEW EXERCISE.

---

ANSWER TO EXERCISE 5

NOTE: Your answers do not have to be in exactly these words. But they must say the same thing.

1. Purpose: Making the 200 Volt control adjustment on the Power Supply (of the AN/TCC-7)
  - Step 1. Set the 115 Volt AC Power switch to the ON position. (An alarm will sound, then stop after a minute.)
  - Step 2. Set the Measure switch on the Test Panel to the 200 Volt Adjust position.
  - Step 3. Check that both the Measure Selective switch and Measure Non-Selective switch are OFF.
  - Step 4. (With a screwdriver) adjust the 200 Volt control.
  - Step 5. Return the Measure switch to the Transmission position.

IF YOU MISSED TWO OR MORE PARTS OF THE ANSWER,  
REWIND THE TAPE TO THE BEGINNING.  
WATCH THE DEMONSTRATION AGAIN AND WATCH FOR  
WHEN THE INFORMATION COMES UP.

IF YOU GOT THIS ANSWER RIGHT,  
GO ON WITH THE REVIEW EXERCISE.

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ANSWERS TO EXERCISE 6

1. 6

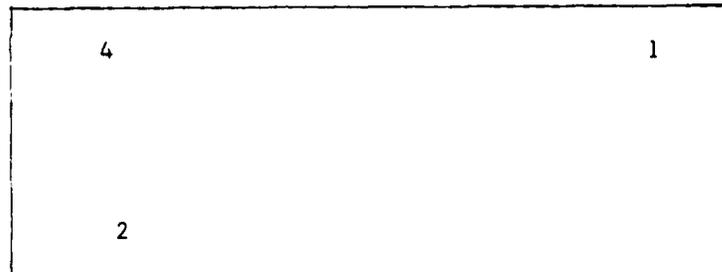
Explanation: The six steps were:

1. Slide the test panel forward.
2. Set the Measure Non-Selective switch to the Check 1 KC position.
3. Plug the Test panel cord into the 1 KC jack.
4. (With a screwdriver) adjust the 1 KC control.
5. Check the Test Meter. (It should read zero.)
6. Push the test panel back into position.

NOTE: You did not have to say what the steps were. If you combined steps 4 and 5 into one and got a total of 5, that is OK.

2.

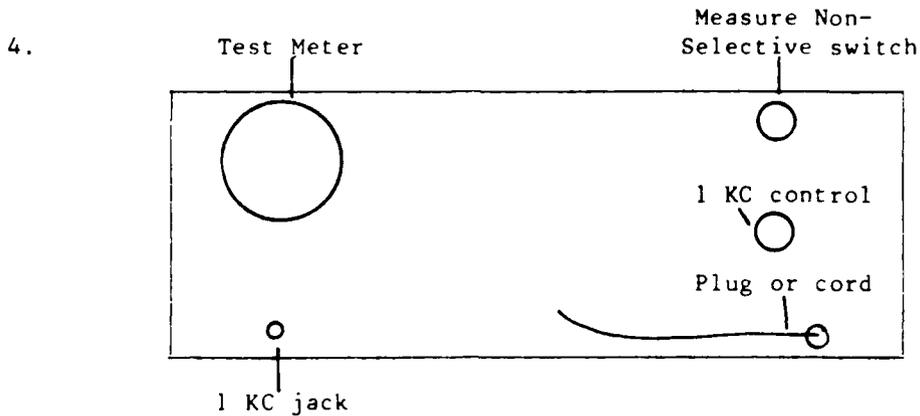
3



TEST PANEL

Explanation: You can't show sliding the test panel in and out of the rack. The first adjustment is setting the Measure Non-Selective switch. The number 3 is shown above the panel to indicate adjusting the control located inside the top of the panel.

3. 1 KC (or kilocycle) control, Measure Non-Selective switch,  
Test panel plug (or cord), 1 KC jack, Test meter



TEST PANEL

IF YOU MISSED TWO OR MORE OF THESE QUESTIONS,  
REWIND THE TAPE TO ZERO. WATCH THE DEMONSTRATION AGAIN.  
LOOK FOR THE INFORMATION AS IT COMES UP.

IF YOU GOT THESE ANSWERS RIGHT,  
GO ON WITH THE REVIEW EXERCISE.

ANSWERS TO EXERCISE 7

1. d. Checking the High Frequency (or HF) control.
2. b. Check HF
3. b. HF control
4. a. left or right

IF YOU DO NOT UNDERSTAND ANY OF THE MATERIAL IN THIS REVIEW EXERCISE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL OF THE MATERIAL IN THIS REVIEW EXERCISE,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A/B  
IN UNIT III, LESSON 2.

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REVIEW EXERCISE

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UNIT V. RECOGNIZING A PART OF A WHOLE

Lesson 1. Recognizing a Part of a Whole

When you are trying to identify a part of a whole, there are several helpful features that you can use. Depending on the part, one or more of these features can be used to identify the part. Let's review each of these helpful features.

1. Reading the labels. There are two different kinds of labels. Attached labels are located directly on the piece of equipment, either above or below the part, or on the left or right side of the part. Unattached labels are not found directly on the piece of equipment itself. Instead, unattached labels are used in pictures of pieces of equipment. These labels use arrows that point to the particular parts they name.

The difference between attached and unattached labels is presented in Figures 1 and 2 below. Figure 1 shows an attached label. The label shown in Figure 2 is unattached.

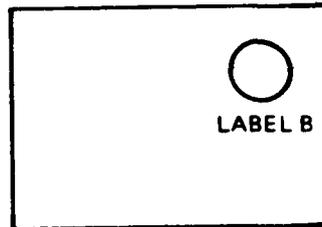


Figure 1. Attached Label

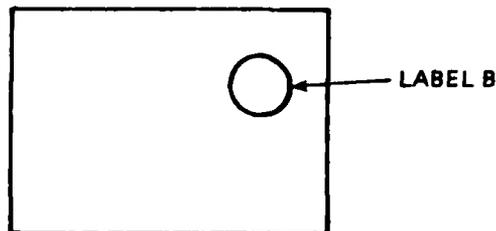


Figure 2. Unattached Label

If there are many labels, reading each label can become very time-consuming. Because of this, there are additional features that will help you to identify the part much more quickly. Also, labels are not always attached to pieces of equipment. You were shown this on the previous page in the case of unattached labels. When there are no attached labels, you will have to rely on these additional features to identify the part you are looking for.

2. Observing how the parts are arranged. There are two important things to remember about the location of a part. First, become familiar with the general location of the part. Ask yourself, Is it on the top half or bottom half of the piece of equipment? Is it on the left half or right half? Is it in one of the corners? Next, determine the specific location of the part. See what other parts are directly around the part you are looking for. This is especially important if several parts have the same shape and size.

In the example below, the two pieces of equipment are identical, except that the parts of the piece in Figure 1 are labeled.

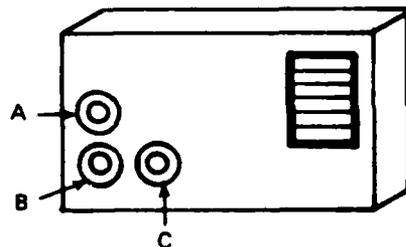


Figure 1.

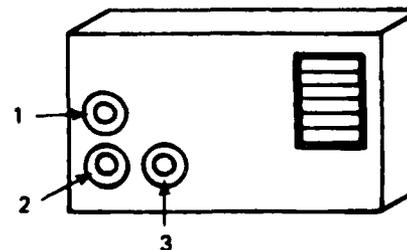


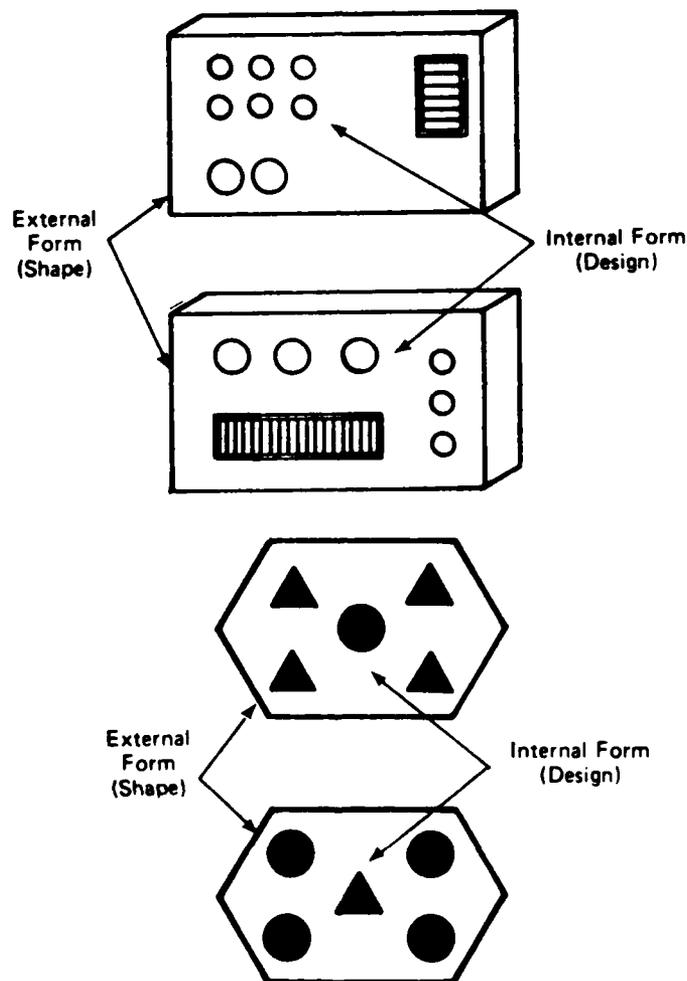
Figure 2.

Suppose you need to identify Part B on the piece of equipment in Figure 2. It is not labeled, so what can you do? By becoming familiar with how the parts are arranged on the piece of equipment in Figure 1, you can identify Part B in Figure 2. Part B is located in the bottom left corner. More specifically Part A is directly above it, and Part C is on its immediate right.

3. Checking the Forms. there are two features to look for when checking the form of a part: (1) shape and (2) design.

Shape is the external form or outside portion of the part. Look to see how the part is shaped. Does it look more like a circle or a square? Is it narrow or wide? These are the kinds of questions you should ask yourself.

Design is the internal form or inside portion of the part. If you are looking at a piece of equipment within a system, ask yourself, What does the general arrangement of the parts look like? Look at the examples shown below. The shape (external form) of the parts is identical. The design (interior form), however, is different.



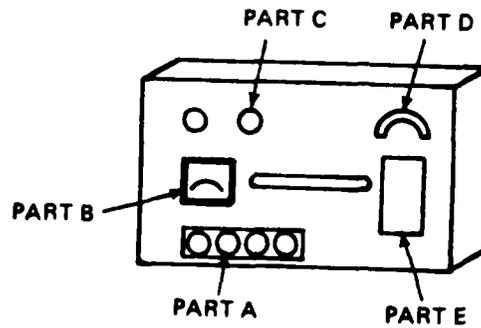
4. Checking the Relative Size. Checking the relative size of the part means that you should compare its size with other parts of the same piece of equipment (or within the same system, if comparing pieces of equipment). Ask yourself, Is the part I'm looking for larger or smaller than most of the other parts? If you find that the size of the part is identical or very similar to other parts, you will not be able to identify the part just by using this feature. It may help you to eliminate some choices, but it will not pinpoint the correct part. In order to identify the correct part, you will have to use one or more of the features already discussed.

EXERCISE 1

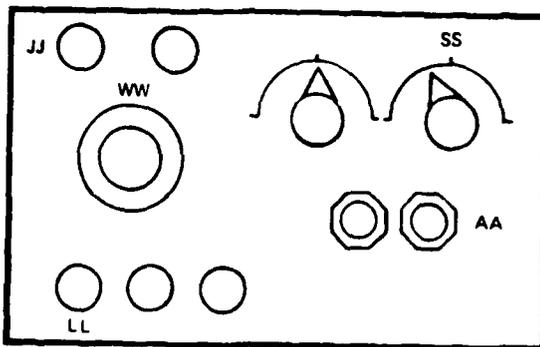
1. What are the four things you can do when looking for a part of a whole?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

2. On the right is a drawing of a piece of equipment. What kind of labeling is used?

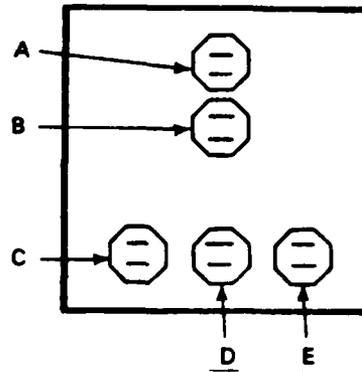


Look over the drawing below. Use it to answer the following two questions.



3. On the panel above, which of the labels is attached to the left side of the part?
- A. AA
  - b. JJ
  - c. SS
  - d. WW
4. The SS label is located:
- a. On the left of the part.
  - b. On the right of the part.
  - c. Above the part.
  - d. Below the part.

Look over the drawing on the right to see how the parts are arranged. Then answer the question below.



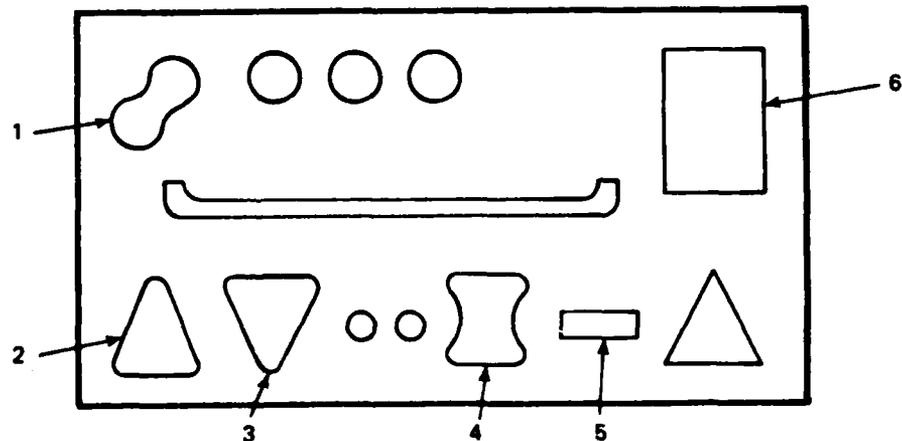
5. Suppose, after you saw the above drawing, you were given an identical drawing, except it did not contain any labels. How could you tell the difference between Part C and Part E?
- The size of the parts.
  - The shapes of the parts.
  - The location of the parts.
  - The design of the parts.

On the right is a drawing of one part of a piece of equipment. Notice how the part is shaped.

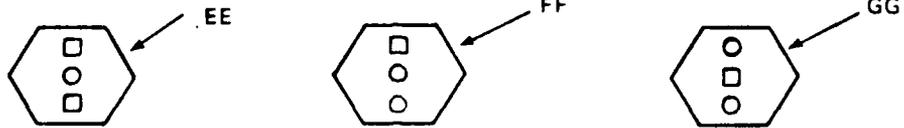


6. In the drawing below, which of the numbered parts is the part shown above?

- 2
- 3
- 4
- 5



Unit V, Lesson 1  
Review Exercise



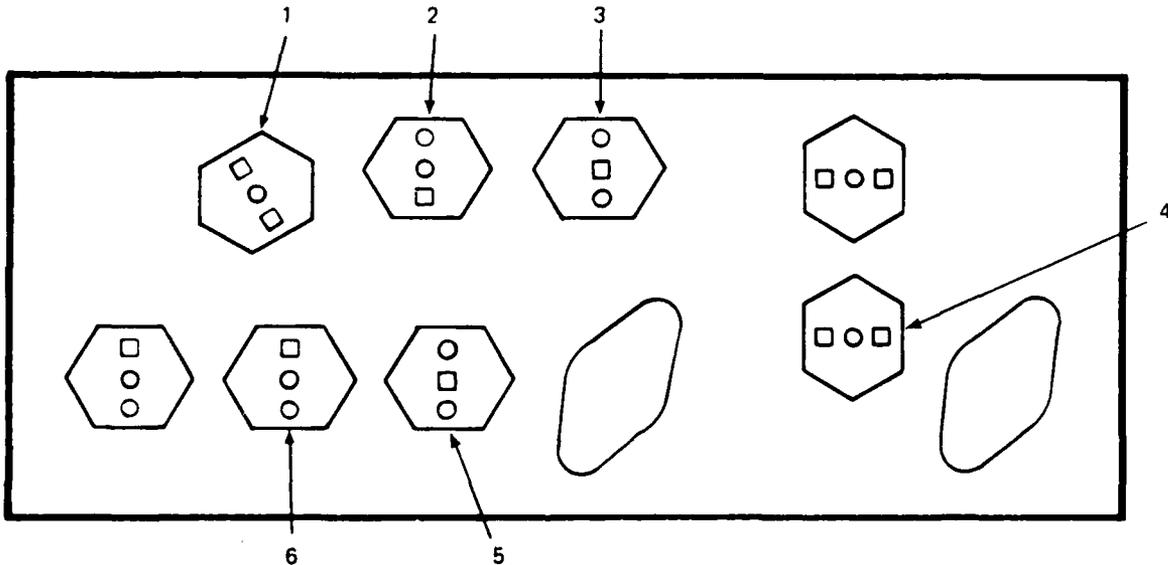
Above are drawings of three different parts of the piece of equipment shown below. Look closely at each of the parts. Then answer the following two questions.

7. The three parts shown above are different in:

- a. shape
- b. design
- c. size

8. Which of the numbered parts in the drawing below is Part FF?

- a. 1
- b. 3
- c. 4
- d. 6



CHECK YOUR ANSWERS ON PAGE 9.

ANSWER KEY TO EXERCISE IN UNIT V, LESSON 1, REVIEW EXERCISE

Unit V, Lesson 1  
Review Exercise

8

ANSWERS TO EXERCISE 1

1. 1. Read the labels.
2. Observe how the parts are arranged.
3. Check the forms.
4. Check the relative size
2. Unattached labels
3. b.
4. c.
5. c.
6. c.
7. b.
8. d.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS REVIEW EXERCISE,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM B  
IN UNIT V - LESSON 1.

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REVIEW EXERCISE

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UNIT VI. LOCATING INFORMATION IN TABLES  
UNIT VII. READING CABLING DIAGRAMS

Lesson 1. The Structure of Tables and Diagrams

In tables and cabling diagrams, information is organized in rows and columns. Rows go across like this: ----->. Columns go up and down like this: ↑↓. The title at the left of each row is called a row heading, and the title at the top of each column is called a column heading. To find any particular piece of information in the diagram or table, find the place where the row and column meet.

Here is an example of a table:

	A	B	C	D
1	Q			
2		M		P
3			R	
4		N		
5	S		T	

In this table, the following things are true. Examine the table while you read each sentence.

This table has 5 rows and 4 columns.

1, 2, 3, 4, and 5 are row headings.

A, B, C, and D are column headings.

Row 2 contains the letters M and P.

Column B contains the letters M and N.

The letter in Column B, Row 4 is N.

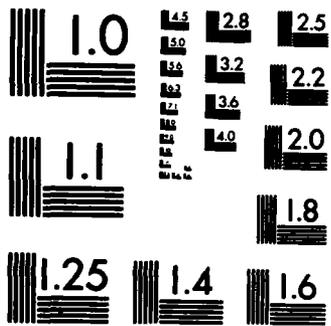
ANSWER THE QUESTIONS ON THE NEXT PAGE USING THE TABLE ABOVE.

EXERCISE 1

1. The letters S and T are both in \_\_\_\_\_.
2. The letters R and T are both in \_\_\_\_\_.
3. The letter Q is in Row \_\_\_\_\_ and Column \_\_\_\_\_.
4. The letter in C, 3 is \_\_\_\_\_.

CHECK YOUR ANSWERS ON PAGE 6.





MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

Cabling diagrams usually show connections among equipment components in two or more systems. Each column refers to one component in one system, as in the diagram below:

	SYSTEM 1		SYSTEM 2	
	DEF	GHI	DEF	GHI
CONNECTOR 1			Y	V
CONNECTOR 2	X	W	T	
CONNECTOR 3				Z

DEF and GHI are components in both SYSTEM 1 and SYSTEM 2. Notice that there are two columns headed "SYSTEM 1" (columns 1 and 2) and two columns headed "GHI" (columns 2 and 4). Each column refers to just one component within one system. Here are some things that are true in the diagram above. Find them in the diagram as you read the sentences.

Z is in SYSTEM 2, GHI, CONNECTOR 3.

X and Y are in different systems, but they are both in DEF.

Y and Z are both in SYSTEM 2, but in different components.

W and X are both in SYSTEM 1, CONNECTOR 2, but X is in DEF and W is in GHI.

#### EXERCISE 2

NOW ANSWER THE FOLLOWING QUESTIONS ABOUT THE DIAGRAM ABOVE:

1. V, W, and Z are all in \_\_\_\_\_.
2. The letter in SYSTEM 2, DEF, CONNECTOR 2 is \_\_\_\_\_.
3. The letters in SYSTEM 2, CONNECTOR 1 are \_\_\_\_\_.
4. The letters T and X are both in \_\_\_\_\_.

CHECK YOUR ANSWERS ON PAGE 6.

Some tables in the 31M course have two or more parts in each row. The parts are usually labeled a, b, etc. To locate information in the table, you must refer to the row number and the part within the row, like 2c, or 3b. Here is an example of such a table:

Step	Action	Result
1	a. Do L	a. W
	b. Do M	b. X
2	a. Do N	a. Y
	b. Do P	b. Z

Here are some of the things the table tells you. Find them in the table as you read each sentence.

The Action in Step 1b is Do M.

Y is the result in Step 2a.

"Do P" and "Z" are the action and result in Step 2b.

The results in Step 1 are W and X.

### EXERCISE 3

ANSWER THE FOLLOWING QUESTIONS ABOUT THE TABLE:

1. The action in Step 1a is \_\_\_\_\_.
2. The result in Step 1b is \_\_\_\_\_.
3. The action in Step 2 is \_\_\_\_\_.

CHECK YOUR ANSWERS ON PAGE 7.

ANSWER KEYS TO EXERCISES IN UNIT VI, LESSON 1, REVIEW EXERCISE

Unit VI, Lesson 1  
Review Exercise

5

ANSWERS TO EXERCISE 1

1. Row 5. (If you wrote just 5, that is O.K.)
2. Column C. (If you wrote just C, that is O.K.)
3. Row 1 and Column A
4. R

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
CONTINUE WITH THE REVIEW EXERCISE.

---

ANSWERS TO EXERCISE 2

1. GHI
2. T
3. V and Y
4. DEF, CONNECTOR 2

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
CONTINUE WITH THE REVIEW EXERCISE.

---

ANSWERS TO EXERCISE 3

1. Do L
2. X
3. Do N and Do P

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS REVIEW EXERCISE,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM B  
IN UNIT VI - LESSON 1.

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**REVIEW EXERCISE**

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**UNIT VI. LOCATING INFORMATION IN TABLES**

**Lesson 2. Interpreting Table Headings**

As a 3IM, you will sometimes need to refer to tables for troubleshooting or maintenance. First, you must make sure that you are using the right table by checking the title very carefully. Then, you must read the column headings. The column headings tell you what information is in each column.

In this review, you will find column headings used in 3IM tables and their definitions, and some exercises. Study the definitions. Then do the exercises which follow.

**Column Headings Used in Equipment Performance Checklists**

Column Heading	Definition
Unit	The piece of equipment or component that is being checked.
Action	What the operator must do to check the equipment.
Normal indication or Normal result	What should happen if the equipment is working properly.
Corrective measures	What the operator should do if the equipment is not working properly. Sometimes, this column tells the operator to perform some additional checks. At other times, it tells how to fix the equipment.
Fault symptom	A sign that the equipment is <u>not</u> working properly; a malfunction.
Suggested remedy	What the operator should do if the equipment is not working properly.

Do the following:

1. Cover the definitions with a piece of paper. Try to give the definition of each column heading from memory.
2. Cover the column headings. Try to give the heading for each definition from memory.
3. Go over any that you missed.
4. Do the matching exercise below.

#### EXERCISE 1

DO THE FOLLOWING EXERCISE WITHOUT LOOKING BACK AT THE PREVIOUS PAGES.

For each column heading listed below, find the matching definition on the right. Write its letter to the left of the column heading in the space provided.

Note: Sometimes, two column headings may have the same definition.

<u>Column Headings</u>	<u>Definitions</u>
_____ 1. Unit	a. What should happen if the equipment is working properly.
_____ 2. Action	b. What the operator should do if the equipment is not working properly.
_____ 3. Normal indication	c. What the operator must do to check the equipment.
_____ 4. Fault symptom	d. A sign that the equipment is <u>not</u> working properly; a malfunction.
_____ 5. Normal result	e. The piece of equipment or component that is being checked.
_____ 6. Corrective measures	
_____ 7. Suggested remedy	

CHECK YOUR ANSWERS ON PAGE 9.

### Column Headings Used in Troubleshooting Charts

Column Heading	Definition
Malfunction	A sign that something is wrong. This column contains descriptions of different things that can go wrong. The same as "Fault symptom"
Symptom	Same as "Malfunction," above.
Possible trouble	The defect in the equipment that probably caused the symptom or malfunction.
Probable cause	Same as "Possible trouble," above.
Corrective action or Corrective measure	What the operator should do if the equipment is not working properly.

Do the following:

1. Cover the definitions with a piece of paper. Try to give the definition of each column heading from memory.
2. Cover the column headings. Try to give the heading for each definition from memory.
3. Go over any that you missed.
4. Do the matching exercise on the next page.

EXERCISE 2

DO THIS MATCHING EXERCISE WITHOUT LOOKING BACK AT THE PREVIOUS PAGE.

<u>Column Headings</u>	<u>Definitions</u>
_____ 1. Symptom	a. A sign that something is wrong.
_____ 2. Malfunction	b. What the operator should do if the equipment is not working properly.
_____ 3. Possible trouble	c. The defect in the equipment that probably caused the symptom or malfunction.
_____ 4. Corrective measure	
_____ 5. Probable cause	
_____ 6. Corrective action	

CHECK YOUR ANSWERS ON PAGE 9.

Column Headings Used in Maintenance Tables

Column Heading	Definition
Item to Be Inspected	The piece of equipment or component that is being checked.
Procedure	What the operator must do to check the equipment.
References	Places to get more information, like paragraphs or figures in TMs.
Interval	How often maintenance operations are to be performed.
For readiness reporting, equipment is not ready/available if:	This column lists <u>symptoms</u> that may occur during maintenance. If any of these symptoms appears, the equipment is not ready or available for use.

Note: Explanations of subheadings under Interval are usually found in a key above the table or in accompanying reading material.

Do the following:

1. Cover the definitions with a piece of paper. Try to give the definition of each column heading from memory.
2. Cover the column headings. Try to give the heading for each definition from memory.
3. Go over any that you missed.
4. Do the matching exercise on the next page.

EXERCISE 3

DO THIS MATCHING EXERCISE WITHOUT LOOKING BACK AT THE PREVIOUS PAGE.

<u>Column Headings</u>	<u>Definitions</u>
_____ 1. Procedure	a. This column lists <u>symptoms</u> that may appear during maintenance.
_____ 2. For readiness reporting, equipment is not ready/available if:	b. The piece of equipment or component that is being checked.
_____ 3. Interval	c. How often maintenance operations are to be performed.
_____ 4. References	d. What the operator must do to check the equipment
_____ 5. Items to be Inspected	e. Places to get more information.

CHECK YOUR ANSWERS ON PAGE 10.

## EXERCISE 4

DO THIS MATCHING EXERCISE WITHOUT LOOKING BACK AT ANY PREVIOUS PAGES.

Note: This exercise includes column headings from all the kinds of checklists, charts, and tables in this lesson.

<u>Column Headings</u>	<u>Definitions</u>
___ 1. Probable cause	a. What should happen if the equipment is working properly.
___ 2. Symptom	b. A sign that the equipment is <u>not</u> working properly.
___ 3. Procedures	c. How often maintenance operations are to be performed.
___ 4. Item to Be Inspected	d. The defect in the equipment that probably caused the symptom or malfunction.
___ 5. Possible trouble	e. What the operator must do to check the equipment.
___ 6. Corrective measure	f. Places to get more information.
___ 7. Action	g. What the operator should do if the equipment is not working properly.
___ 8. Fault symptom	h. The piece of equipment or component that is being checked.
___ 9. Interval	
___ 10. Normal indication	
___ 11. Unit	
___ 12. References	
___ 13. Suggested remedy	
___ 14. Malfunction	

CHECK YOUR ANSWERS ON PAGE 11.

ANSWER KEYS TO EXERCISES IN UNIT VI, LESSON 2, REVIEW EXERCISE

Unit VI, Lesson 2  
Review Exercise

8

ANSWERS TO EXERCISE 1

- e 1.
- c 2.
- a 3.
- d 4.
- a 5.
- b 6.
- b 7.

REVIEW ANY DEFINITIONS THAT YOU MISSED.

THEN CONTINUE WITH THE REVIEW EXERCISE.

---

ANSWERS TO EXERCISE 2

- a 1.
- a 2.
- c 3.
- b 4.
- c 5.
- b 6.

REVIEW ANY DEFINITIONS THAT YOU MISSED.

THEN CONTINUE WITH THE REVIEW EXERCISE.

---

ANSWERS TO EXERCISE 3

- d   1.
- a   2.
- c   3.
- e   4.
- b   5.

REVIEW ANY DEFINITIONS THAT YOU MISSED.

THEN CONTINUE WITH THE REVIEW EXERCISE.

---

ANSWERS TO EXERCISE 4

- d 1.
- b 2.
- e 3.
- h 4.
- d 5.
- g 6.
- e 7.
- b 8.
- c 9.
- a 10.
- h 11.
- f 12.
- g 13.
- b 14.

REVIEW ANY DEFINITIONS YOU MISSED.

THEN TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM B  
IN UNIT VI - LESSON 2.

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REVIEW EXERCISE

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UNIT VI. LOCATING INFORMATION IN TABLES

Lesson 3. Locating Information In 31M Tables

Many kinds of tables are used in the 31M MOS. Among them are procedural checklists, troubleshooting charts, and maintenance tables. You must be able to locate information in these tables to do your job.

The rows of 31M tables are usually steps in a step-by-step procedure or item numbers. The column headings tell what kind of information is in each column of the table. Most of the column headings are words you already know, like "Action," "Corrective measures," and "Procedure."

Sometimes, column headings are used that have no obvious meaning, like letters. For example, many maintenance tables have headings like B, D, A, and W. In cases like this, look above the table to find a key or explanation for the letters.

To locate information in the table, you must use both row and column headings. First, find the row (step or item number). Next, find the column that has the kind of information you need. Finally, find the point where the row and column meet. Use your eyes and your fingers to guide you and make sure you have found the right place. This review exercise will give you more practice in locating information in various kinds of tables.

EXERCISE 1

USE THE CHECKLIST ON THE NEXT PAGE TO ANSWER THE FOLLOWING QUESTIONS.

1. What unit is being operated in Step 51? \_\_\_\_\_
2. What does the operator have to do in Step 51? \_\_\_\_\_  
\_\_\_\_\_
3. You are doing Step 49. If the equipment is working properly in Step 49, what should happen? \_\_\_\_\_  
\_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 10.

### CHECKLIST

EQUIPMENT PERFORMANCE	Step	Unit	Action	Normal indication	Corrective measures
				indication should be no less than 10. <b>LOW POWER</b> indicator should be extinguished.	(para 5-13b). If tubes are replaced, repeat tuning procedure from step 36 through step 47. Higher maintenance category repair required.
	48	T-893(P) GRC	Set multimeter selector switch to AFC LEVEL and adjust AFC LEVEL control for peak indication on multimeter.	Peak indication of more than 10 is obtained on multimeter and AFC meter indicates in center.	Check voltage supplied to afc assembly 2A4 (para 5-13c). Check tubes V6, V7, and V1 through V4 in afc assembly 2A4.
	49	T-893(P) GRC	Adjust AFC TUNE control slightly for peak indication on multimeter.	Peak indication is obtained on multimeter.	
	50	T-893(P) GRC	Set AFC TUNE-ODD-EVEN switch to ODD if selected channel is odd numbered, or to EVEN if selected channel is even-numbered. Rotate AFC CORRECTION control 30° to the right from its original setting. <i>Note:</i> Due to the time delay in afc circuit, wait until AFC meter indication has returned to its normal indication before proceeding.	AFC meter indication moves off center then slowly returns to center; simultaneously <b>AFC CORRECTION</b> control returns to original setting.	Check tubes V8 and V9 of assembly 2A4.
	51	T-893(P) GRC	Rotate AFC CORRECTION control 30° to the left from its original setting.	Same as step 50	Same as step 50. Adjust R42 on afc assembly to center AFC meter indication.
	52	T-893(P) GRC	Set multimeter selector switch to PWR OUT. Adjust <b>POWER OUT</b> control to reduce DA-189 GRC indication as follows: With AM-1957 GRC, reduce power to 11 watts; with AM-1958(*) GRC, reduce power to 5 watts. Adjust <b>ALARM ADJ</b> control until <b>LOW POWER</b> indicator lights and buzzer sounds. Depress <b>BUZZ OFF</b> pushbutton to silence buzzer. Readjust <b>POWER OUT</b> control to obtain original maximum indi-	<b>LOW POWER</b> indicator lights and buzzer sounds.  <b>LOW POWER</b> indicator extinguishes and buzzer sounds.	Replace indicator lamp. Check V1 on T-893(P)/GRC main frame.

Unit VI, Lesson 3  
Review Exercise

Troubleshooting charts are tables that list symptoms, their possible causes, and corrective measures. Usually, a symptom can have several causes, and each cause has its own corrective measure. The possible causes of a symptom are numbered a, b, etc., and so are the corrective measures.

A troubleshooting chart is on the next page. Let us use it to answer the following questions. Look at the table while you read the questions and answers below.

1. Question: What is the second possible cause of Symptom No. 1?  
Answer: In this chart, the column heading "Possible trouble" means "Possible cause." There are three possible troubles listed for the first symptom (Item No. 1). The second possible trouble is the one numbered b. It is: Defective TD-202/U.
  
2. Question: What is the corrective measure for this possible cause?  
Answer: The corrective measure for possible trouble 1b is the one directly across from it, marked b, in the "Corrective measure" column. Corrective measure 1b is Troubleshoot TD-202/U(app.A).

EXERCISE 2

*b. Cable-Radio Conversion Troubleshooting Chart.*

Item No.	Symptom	Possible trouble	Corrective measure
1	Radio link order wire noisy; all other indications in TD-202/U, TD-204/U, and AN/GRC-50A(V) are normal.	a. Defective CX-7872/TCC between TD-202/U and R-1331(P)/GRC. b. Defective TD-202/U ----- c. Defective R-1331(P)/GRC -----	a. Check CX-7872/TCC and replace as required. b. Troubleshoot TD-202/U (app. A). c. Troubleshoot R-1331(P)/GRC (app. A).
2	TD-204/U ALARMS TRAFFIC indicator lights, buzzer sounds; all other indications are normal.	a. Defective pcm component at distant cable terminal or repeater. b. Defective TD-206/G in cable link (incoming line). c. Defective TD-204/U -----	a. Request troubleshooting at distant terminal or repeater. b. Request cable link troubleshooting from distant terminal or repeater. c. Troubleshoot TD-204/U (app. A).
3	TD-202/U ALARMS TRAFFIC indicator lights, buzzer sounds; R-1331(P)/GRC multimeter indication normal with multimeter selector switch at PCM OUT.	a. Defective TD-202/U ----- b. Defective pcm component at distant radio terminal or repeater.	a. Troubleshoot TD-202/U (app. A). b. Request pcm troubleshooting at distant radio terminal or repeater.

USE THE TROUBLESHOOTING CHART ABOVE TO ANSWER THE FOLLOWING QUESTIONS:

1. What is the third possible cause of the symptom in Item No. 2?  
\_\_\_\_\_
2. What is the corrective measure for the possible trouble in Item No. 3b.  
\_\_\_\_\_
3. One of the corrective measures is "Request cable link troubleshooting from distant terminal or repeater." What is the possible trouble associated with this corrective measure?  
\_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 11.

Maintenance tables tell you how to perform various maintenance operations and when to perform them. Information about when is usually listed in a column called Interval. The Interval column has several subheadings, usually labeled by letters, like B, D, A, etc. The meanings of the letters are given in a key above the table. Find the Interval column and its subheadings in the table on the next two pages. Then find the key.

Let us use this table to answer some questions. Look at the table while you read the following questions and answers.

1. Question: When should you inspect the frame (Item No. 2)?

Answer: The frame is the item to be inspected. Go down the Item to be Inspected column at Item No. 2 until you come to Frame. To find out when the frame is to be inspected, you must look in the Interval columns. Frame has a dot beside it under A. The key tells you that A means "After operation." The answer is: The frame must be inspected after operation.

2. Question: In Item No. 2, the grounding is not ready/available if:

---

ANSWER: To find out how to complete the sentence, look in the last column of the table across from "Grounding" in Item No. 2. The last column says that the grounding is not ready/available if: Unable to ground properly.

3. Question: What procedure should you carry out on the suspension system?

ANSWER: To find the procedure for the suspension system, you must first find "Suspension system" in the Item to be inspected column. It is the last item in Item No. 3. The procedure beside it is: c. Inspect suspension system and associated mounting parts for damage.

4. Question: What items should be inspected after operation?

ANSWER: You must find the items with a dot in the A column. They are: Operating faults and suspension system.

Table 4-1. Operator/Crew Preventive Maintenance Checks and Services

NOTE:

The checks in the "interval" column are to be performed in the order listed

B—Before operation D—During operation A—After operation W—Weekly

Item No.	Interval				Item to be Inspected	Procedures Check and have repaired or adjusted as necessary	For readiness reporting equipment is not ready/available if
	B	D	A	W			
1				•	AN/TRC-145	Check for completeness of the AN/TRC-145.	Upon completion of PMCS checks, available equipment is insufficient to support the unit mission.
2				•	Generator Set	<p><b>WARNING</b></p> <p>Wheels must be blocked, brakes set, and leg support down in support position before attempting to roll up the tarpaulin and before starting to assemble or set up the equipment for operation</p> <p>a. Inspect unit for oil leaks and broken or missing parts.</p> <p>b. Periodically monitor the engine oil pressure gage for low or fluctuating reading.</p>	b. Excessive loss of oil due to burn or leakage.
				•	Lubrication	<p><b>CAUTION</b></p> <p>There must be free circulation of air around the generator sets at all times during operation. Inadequate ventilation is a major cause of damage to the equipment. Never operate the generator in enclosed area unless the exhaust gases are vented to the outside.</p> <p><b>WARNING</b></p> <p>Inhalation of exhaust fumes may result in serious illness or death.</p> <p>c. Start unit and check for correct operation.</p>	
3				•	Controls and instruments	d. Inspect for cracks and bends. Check for chipped paint and spot paint where required.	c. Neither power unit operates properly.  e. Unable to ground properly
				•	Frame	e. Check grounding system for proper installation. Inspect the ground stud threads, bonding straps, and shock mounts. Tighten loose ground connections.	
				•	Generator trailer	<p><b>CAUTION</b></p> <p>Place all tags describing condition of the trailer in a conspicuous location so that they will not be overlooked.</p> <p>a. Be alert for unusual noises or improper operation</p>	
				•	General	b. Investigate and correct or report any faults noted during operation.	
4				•	Operating faults	c. Inspect suspension system and associated mounting parts for damage.	a. Excessive moisture enters the shelter causing a potential shock hazard b. Ground system connections cannot be properly tightened
				•	Suspension system	a. Check for skinpunctures, cracks, or open seams that could permit moisture to enter the shelter	
				•	<i>OUTSIDE</i> Shelter	b. Check grounding to see that it is properly installed. Tighten loose ground connections	
				•	Grounding	c. Tighten loose connections and adjust cable grips so that they relieve the connector of weight of cable	
				•	Power and signal cables	d. Be sure the exhaust blower vent covers are open and the airflow is not obstructed.	
				•	Exhaust blower vent covers	e. Be sure the entrance door air filter vent cover is open and unobstructed.	
			•	Doors air filter cover	f. <b>PROCEED WITH CAUTION.</b> Check each guy for proper tension. Check each guy anchor for looseness and possible shifting.	f. Guys are loose or guy anchors have shifted	
			•	Antennas			

Table 4-1. Operator/Crew Preventive Maintenance Checks and Services—Continued  
 B—Before operation D—During operation A—After operation W—Weekly

Item No	Interval				Item to be Inspected	Procedures Check and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W			
5		*		*	<i>INTERIOR</i> Walls, ceilings, and floors	Check for holes, open seams, or signs of water seepage or leaks that may present a shock hazard.	A shock hazard exists
6	*	*		*	POWER INDICATOR neon lamp and AC VOLTS METER on POWER DISTRIBUTION PANEL	Apply power to the assemblage by starting generator set or turning on central power source. POWER INDICATOR neon lamp lights and AC VOLTS meter on POWER DISTRIBUTION PANEL indicates 115 vac. No less than 109 volts nor more than 121 volts.	Voltage is less than 109 volts or more than 121 volts
7	*			*	POWER DISTRIBUTION PANEL	a. Operate MAIN circuit breaker to ON; AMPERES AC meter indicates zero. b. Sequentially operate each circuit breaker to ON, the associated indicator should light. <b>CAUTION</b> Under blackout conditions this check may be made only if the curtains are closed. After testing, operate the BYPASS BLACKOUT switch to the BLACKOUT position.	a. High current reading is noted
8				*	Door microswitch	Operate the BYPASS BLACKOUT switch to BLACKOUT and open the door. Ceiling lights should go out.	Lights do not go out when the door is open.
9		*		*	BYPASS BLACKOUT switch	Operate the switch to the BYPASS position with the door open. Ceiling lights should light.	
10		*		*	Exhaust blowers	Operate BLOWER switch associated with each exhaust blower to ON. Exhaust blower should operate.	
11		*		*	Heater	a. Operate HEAT-OFF-FAN switch to HEAT, operate TEMPERATURE control and note that warm air blows from the front of the heater. b. Operate HEAT-OFF-FAN switch to FAN; fan blows air and heating element ceases to glow. c. Operate HEAT-OFF-FAN switch to OFF; fan should stop. <b>NOTE</b> Perform the following items on each system. If the AN/TRC-145 is in continuous use, perform only those items that do not interfere with the operation of the equipment.	a. Heater fails to heat, fan does not blow, or excessive current causes circuit breaker to trip (if heater is mission essential)
12		*		*	Equipment ac power switches	Operate to ON; associated ac power indicators on each unit should light. Blowers should operate. TD-204/U ALARMS NO CABLE CURRENT indicator, or TD-754/G CABLE CUR should light. <b>RADIO TUNING CHECKS</b> <b>NOTES</b> Position each antenna assembly on the ground at least 30 feet apart facing in opposite directions. (This will allow transmission and reception from the weak back lobe radiation pattern on each antenna.) Connect each antenna to the SYSTEM antenna connector of the SIGNAL ENTRANCE BOX associated with the system to be checked.	One or more blowers fail to operate.

EXERCISE 3

USE THE MAINTENANCE TABLE ON THE PREVIOUS TWO PAGES TO ANSWER THE FOLLOWING QUESTIONS.

1. When should the controls and instruments of the generator set (in Item No. 2) be inspected?

---

2. How often should you inspect the AN/TRC-145?

---

3. In Item No. 4, the antennas are not ready/available for use if:

---

4. What is the third procedure you should carry out on the Heater (Item No. 11)?

---

5. What items must be checked both before and during operation?

---

CHECK YOUR ANSWERS ON PAGE 12.

ANSWER KEYS TO EXERCISES IN UNIT VI, LESSON 3, REVIEW EXERCISE

Unit VI, Lesson 3  
Review Exercise

ANSWERS TO EXERCISE 1

1. T-893(P)/GRC.  
Explanation: This is the place where the Unit column and Step 51 meet.
2. Rotate AFC CORRECTION control 30° to the left from its original setting.  
Explanation: What the operator must do is in the Action column. Find the place where the Action column and Step 51 meet.
3. Peak indication is obtained on multimeter.  
Explanation: What should happen if the equipment is working properly is in the Normal indication column. Find the place where the Normal indication column and Step 49 meet.

IF YOU DO NOT UNDERSTAND ANY OF THESE ANSWERS,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THESE ANSWERS,  
CONTINUE WITH THE REVIEW EXERCISE.

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ANSWERS TO EXERCISE 2

1. Defective TD-204/U.  
Explanation: Find Possible cause c across from Item No. 2.
2. Request pcm troubleshooting at distant radio terminal or repeater.  
Explanation: The answer is Corrective measure b in Item No. 3.
3. Defective TD-206/G in cable link (incoming line).  
Explanation: The corrective measure in this question is Corrective measure 2b. Its possible trouble is Possible trouble b in Item No 2.

IF YOU DO NOT UNDERSTAND ANY OF THESE ANSWERS,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THESE ANSWERS,  
CONTINUE WITH THE REVIEW EXERCISE.

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ANSWERS TO EXERCISE 3

1. During operation.  
Explanation: Under Interval, and in the row for Controls and instruments, there is a dot under D. The key tells you that D means During operation.
2. Weekly.  
Explanation: Under Interval, there is a dot under W by AN/TRC-145. The key tells you that W means Weekly.
3. Guys are loose or guy anchors have shifted.  
Explanation: Look in the last column across from Antennas to find the missing part of the sentence.
4. Operate HEAT-OFF-FAN switch to OFF: fan should stop.  
Explanation: Find Procedure c across from Heater in Item No. 11.

IF YOU DO NOT UNDERSTAND ANY OF THE MATERIAL IN THIS REVIEW EXERCISE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS REVIEW EXERCISE,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM B  
IN UNIT VI - LESSON 3.

ANSWERS TO EXERCISE 3

1. During operation.  
Explanation: Under Interval, and in the row for Controls and instruments, there is a dot under D. The key tells you that D means During operation.
2. Weekly.  
Explanation: Under Interval, there is a dot under W by AN/TRC-145. The key tells you that W means Weekly.
3. Guys are loose or guy anchors have shifted.  
Explanation: Look in the last column across from Antennas to find the missing part of the sentence.
4. Operate HEAT-OFF-FAN switch to OFF: fan should stop.  
Explanation: Find Procedure c across from Heater in Item No. 11.
5. Grounding, Antennas, POWER INDICATOR neon lamp and AC VOLTS METER on POWER DISTRIBUTION PANEL.  
Explanation: These are the only items that have dots beside them in both the B and D columns.

IF YOU DO NOT UNDERSTAND ANY OF THE MATERIAL IN THIS REVIEW EXERCISE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS REVIEW EXERCISE,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM B  
IN UNIT VI - LESSON 3.

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REVIEW EXERCISE

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UNIT VII. READING CABLING DIAGRAMS

Lesson 2. Identifying Connections in Simple and  
Complex Cabling Diagrams

In order to correctly identify cable connections, it is important that you know the following things:

1. The structure of cabling diagrams. Look over a cabling diagram until you know "what goes where." There are two levels of column headings. The top level column heading identifies the system. Directly below the system headings are the columns that name the components of the system. On the left side of the cabling diagram, you will find the row headings. The row headings name the connectors. (See Figure 1 below.)

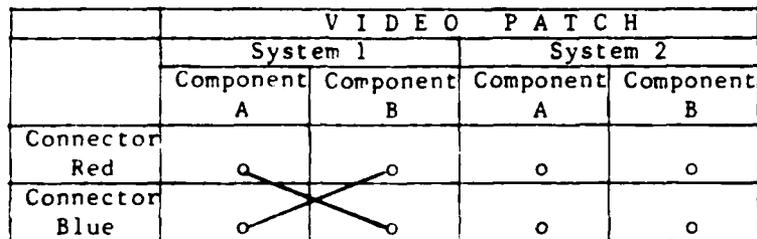


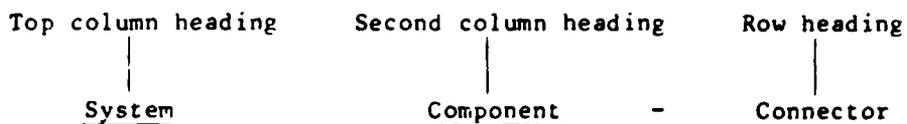
Figure 1. Structure of a Cabling Diagram.

The connectors are represented by circles, as shown in Figure 1 above. Attached to some of the circles you can see solid dark lines. The solid dark lines are the cables.

In review, the following parts of a cabling diagram are important to know:

- systems - top column heading
- components - second column heading
- connectors - row heading
- circles - represent the connectors
- solid dark lines - represent the cables

2. Know when a system is cabled. When a system is cabled, it is being used. You can know when a particular system is being used by looking at the columns (components) that are within the system. There are usually two or three columns (components) within each system that you must look over to see if there are any cable connections. If you see the solid dark lines (cables) attached to one or more of the circles, then you can identify that system as one that is being used. For example, In Figure 1 on the previous page, the solid dark lines (cables) that are attached to the circles (connectors) are found in System 1 only. You can then proceed to identify the connection(s).
  
3. The procedure for identifying a cable connection. First, use your column and row headings to identify one end of a connection. Identify the system (top column level), the component (second column level), and the connector (row heading) in the following way:



The next step is to follow the solid dark line (cable) to the other end of the connection. Then go ahead and identify this end in the same way as presented above:  
System, Component - Connector.

When you have identified both ends of a cable connection, you can name the entire connection in the following manner:

System, Component-Connection is connected to System,Component-Connection

For example, in Figure 1 on the previous page, we can identify one entire connection as:

System 1, A-Red is connected to System 1, B-Blue.

Since both ends of the connection are in the same system (System 1), we can shorten the statement:

For System 1, A-Red is connected to B-Blue.

or

A-Red is connected to B-Blue for System 1.

If a cable connection runs from one system to another system, it means the systems are interconnected. In such cases, it is important that both systems be identified. This can be done in the following way.

System 1, A-Red is connected to System 2, B-Blue.

or

A-Red for System 1 is connected to B-Blue for System 2.

### EXERCISE 1

VIDEO PATCH				
	System 1		System 2	
	J	K	J	K
I	o	o	o	o
II	o	o	o	o
III	o	o	o	o

1. In the cabling diagram above, the components are \_\_\_ and \_\_\_.  
The connectors are \_\_\_\_, \_\_\_\_, and \_\_\_\_.

2. The cable connection can be identified as:

For System \_\_\_\_, Component \_\_\_\_ - Connector \_\_\_\_ is connected  
to Component \_\_\_\_ - Connector \_\_\_\_.

VIDEO PATCH						
	System 1			System 2		
	J	K	L	J	K	L
I	o	o	o	o	o	o
II	o	o	o	o	o	o
III	o	o	o	o	o	o
IV	o	o	o	o	o	o

3. In the above diagram, Systems 1 and 2 are interconnected.

- a. True
- b. False

V I D E O P A T C H									
	System 1			System 2			System 3		
	X	Y	Z	X	Y	Z	X	Y	Z
R1	o	o	o	o	o	o	o	o	o
R2	o	o	o	o	o	o	o	o	o
R3	o	o	o	o	o	o	o	o	o
R4	o	o	o	o	o	o	o	o	o

4. Which statement is true concerning System 2 in the cabling diagram above?
- X-R2 is connected to Z-R3.
  - Y-R2 is connected to Z-R3.
  - X-R3 is connected to Z-R2.
  - Y-R3 is connected to Z-R4.
5. Below is a list of instructions for the cabling diagram below. Draw in the necessary connections.
- For System 3, connect one end of the cable to A-Blue.
  - Connect the other end of the same cable to B-Green.
  - For System 4, connect A-Blue to B-Red.
  - For System 2, connect A-Green to B-Red.
  - For System 1, Connect A-Green to B-Brown and A-Brown to B-Green.

V I D E O P A T C H								
	System 1		System 2		System 3		System 4	
	A	B	A	B	A	B	A	B
Red	o	o	o	o	o	o	o	o
Blue	o	o	o	o	o	o	o	o
Green	o	o	o	o	o	o	o	o
Brown	o	o	o	o	o	o	o	o

CHECK YOUR ANSWERS ON PAGE 6.

ANSWER KEY TO EXERCISE IN UNIT VII, LESSON 2, REVIEW EXERCISE

Unit VII, Lesson 2  
Review Exercise

ANSWERS TO EXERCISE 1

1. Components are J and K. Connectors are I, II, and III.
2. For System 2, Component J - Connector I is connected to Component K - Connector III.
3. True
4. c. X-R3 is connected to Z-R2.
- 5.

V I D E O P A T C H								
	System 1		System 2		System 3		System 4	
	A	B	A	B	A	B	A	B
Red	o	o	o	o	o	o	o	o
Blue	o	o	o	o	o	o	o	o
Green	o	o	o	o	o	o	o	o
Brown	o	o	o	o	o	o	o	o

IF YOU DO NOT UNDERSTAND ANY OF THESE ANSWERS,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS REVIEW EXERCISE,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM B  
IN UNIT VII - LESSON 2.

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REVIEW EXERCISE

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UNIT VIII. DIAGNOSING EQUIPMENT MALFUNCTIONS

Lesson 1. Deciding Whether an Indication is Normal

Reminder: Use the following procedure at each step to decide whether there is something wrong with your equipment:

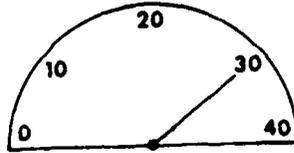
1. Read the normal indication in the checklist.
2. Compare the equipment indication with the checklist normal indication.
3. If the checklist normal indication and your equipment indication are the same, this means that nothing is wrong.
4. If the checklist normal indication and your equipment indication are different, this means that something is wrong.

Here is part of a checklist for troubleshooting radio equipment. Do not try to read it now, but use it to answer the following questions:

<u>Step</u>	<u>Action</u>	<u>Normal Indication</u>
1	Tune AFC LEVEL control for peak indication on multimeter.	Multimeter indicates 10 or more.
2	Rotate AFC correction control.	AFC meter needle moves back toward center and stops near center.
3	Press push-to-talk button on Handset H-156/U.	Side tone is heard in H-156/U receiver.
4	Adjust REC SIG-1 for maximum indication on receiver multimeter.	Multimeter indicates peak or off scale.
5	Detune REC SIG-1 control for minimum indication on multimeter.	Multimeter indicates minimum level.

EXERCISE 1

1. You do Action No. 1. Here is how the multimeter looks:



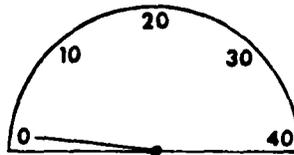
Is something wrong? \_\_\_\_\_

2. You do Action No. 2. The AFC meter moves from  to  and stays there. Is something wrong? \_\_\_\_\_

3. You do Action No. 3. You hear a side tone. Is something wrong?  
\_\_\_\_\_

4. You do Action No. 4. The multimeter has a peak reading. Is something wrong? \_\_\_\_\_

5. You do Action No. 5. Here is what the multimeter looks like:



Is something wrong? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 4.

ANSWER KEY TO EXERCISE IN UNIT VIII, LESSON 1, REVIEW EXERCISE

Unit VIII, Lesson 1  
Review Exercise

ANSWERS TO EXERCISE 1

1. No.  
Explanation: The multimeter reading is more than 10. This is the same as the normal indication. So nothing is wrong.
2. Yes.  
Explanation: On your equipment, the AFC meter moved from right of center to left of center and stayed there. It did not stop at the center as it should, according to the normal indication. This means that something is wrong.
3. No.  
Explanation: You heard a side tone. This is the same as the normal indication. This indicates that nothing is wrong.
4. No.  
Explanation: The normal indication is "Multimeter indicates peak or off scale." Either result is normal. Your equipment multimeter indicated peak. This means that nothing is wrong.
5. No.  
Explanation: The multimeter needle is at zero, the minimum level. This is the same as the normal indication. So nothing is wrong.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS REVIEW EXERCISE,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM B  
IN UNIT VIII - LESSON 1.

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REVIEW EXERCISE

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UNIT VIII. DIAGNOSING EQUIPMENT MALFUNCTIONS

Lesson 2. Deciding Whether Something is Wrong  
Based on Two or More Indicators

In this review exercise, there are additional questions to help you practice deciding whether something is wrong with your equipment. You should use the rules you already learned. These are:

1. Read the checklist normal indication. This tells you which equipment indications you should check.
2. Compare the equipment indications, one at a time, with the normal indication, to see whether they are the same or different.
3. If all the equipment indications are the same as the normal indication, this means that nothing is wrong.
4. If any (one or more) of the equipment indications are different from the normal indication, something is wrong with your equipment.

Here is part of a checklist for troubleshooting radio equipment. Do not try to read it now. Use it to answer the questions on the next page.

<u>Step</u>	<u>Action</u>	<u>Normal Indication</u>
1	Turn on central power source.	POWER INDICATOR lamp lights and AC VOLTS meter indicates between 110 and 120 volts.
2	Press BUZZER OFF switch.	POWER INDICATOR lights. Loud rushing noise is heard on handset.
3	Operate receiver AC POWER switch to ON.	AC POWER and ALARMS LOW SIGNAL indicators light. ALARMS SYNC indicator lights momentarily and buzzer sounds.

## EXERCISE 1

USE THE CHECKLIST ON THE PREVIOUS PAGE TO ANSWER THE FOLLOWING QUESTIONS:

1. You do Action No. 1. The POWER INDICATOR lamp does not light. The reading on the AC VOLTS meter is 112 volts.
  - a. Are all the equipment indications the same as the normal indication? \_\_\_\_\_
  - b. Does this mean that something is wrong with your equipment?  
\_\_\_\_\_
  
2. You do Action No. 1. The POWER INDICATOR lamp lights. The AC VOLTS meter registers 118 volts.
  - a. Are all the equipment indications the same as the normal indication? \_\_\_\_\_
  - b. Does this mean that something is wrong with your equipment?  
\_\_\_\_\_
  
3. You do Action No. 2. The POWER INDICATOR lights and you hear a loud rushing noise on the handset.
  - a. Are all the equipment indications the same as the normal indication? \_\_\_\_\_
  - b. Does this mean that something is wrong with your equipment?  
\_\_\_\_\_
  
4. You do Action No. 3. The AC POWER indicator lights. The ALARMS LOW SIGNAL indicator and the ALARMS SYNC indicator do not light. The buzzer sounds.
  - a. Are all the equipment indications the same as the normal indication? \_\_\_\_\_
  - b. Does this mean that something is wrong with your equipment?  
\_\_\_\_\_

5. You do Action No. 3. The AC POWER and ALARMS LOW SIGNAL indicators light. The ALARMS SYNC indicator goes on then off. The buzzer does not sound.
- a. Are all the equipment indications the same as the normal indication? \_\_\_\_\_
  - b. Does this mean that something is wrong with your equipment?  
\_\_\_\_\_
6. You do Action No. 3. The AC POWER indicator does not light. The ALARMS LOW SIGNAL indicator lights. The ALARMS SYNC indicator goes on then off. The buzzer sounds.
- a. Are all the equipment indications the same as the normal indication? \_\_\_\_\_
  - b. Does this mean that something is wrong with your equipment?  
\_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 5.

ANSWER KEY TO EXERCISE IN UNIT VIII, LESSON 2, REVIEW EXERCISE

Unit VIII, Lesson 2  
Review Exercise

4

## ANSWERS TO EXERCISE 1

1. a. No, the equipment indications are not all the same as the normal indication. The POWER INDICATOR light did not light. This is different from the normal indication.  
b. Yes, something is wrong.
2. a. Yes, all the equipment indications are the same as the normal indication. The POWER INDICATOR light lit. And the AC VOLTS meter reading of 118 volts is between 110 and 120 volts.  
b. No, nothing is wrong.
3. a. Yes, all the equipment indications are the same as the normal indication. Both the POWER INDICATOR light indication and the loud rushing noise on the handset are the same as the normal indication.  
b. No, nothing is wrong.
4. a. No, the equipment indications are not all the same as the normal indication. Two of the four equipment indications are different from the normal indication: the ALARMS LOW SIGNAL and the ALARMS SYNC indication.  
b. Yes, something is wrong.
5. a. No, the equipment indications are not all the same as the normal indication. The normal indication says that the buzzer should sound. However, the buzzer did not sound. This is different from the normal indication.  
b. Yes, something is wrong.
6. a. No, the equipment indications are not all the same as the normal indication. The AC POWER indicator did not light. This is different from the normal indication.  
b. Yes, something is wrong.

Notice that whenever your answer to a. is Yes (all indications the same), your answer to b. is No (nothing wrong). Whenever your answer to a. is No (all indications not the same), your answer to b. is Yes (something wrong).

IF YOU DO NOT UNDERSTAND ANY OF THE MATERIAL IN THIS REVIEW EXERCISE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS REVIEW EXERCISE,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM B  
IN UNIT VIII - LESSON 2.

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REVIEW EXERCISE

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UNIT VIII. DIAGNOSING EQUIPMENT MALFUNCTIONS

Lesson 3. Finding Descriptions of Symptoms: One Indicator

Review of Basic Ideas

Sometimes, when you are working with equipment, something happens that should not happen. This is called a symptom or malfunction. A symptom is a sign that something is wrong.

When you get a symptom, you must troubleshoot by using a table in the TM. In the table, you must find the symptom description that matches what happened on your equipment. This means that you must find the symptom description that includes:

- a. The same equipment component that you are working on.
- b. The same action that you performed on the equipment.
- c. The same symptom that you got.

Sometimes, the action is not included in the symptom description. In that case, you must find the description in the table that has the same equipment component and the same symptom.

For example, suppose you are working on a TD-204/U. You set the METER SELECT switch to SERV FAC and the SERV SEL switch to SUM +3. The TEST ALIGN meter shows no indication. Notice that the equipment component you are working on is a TD-204/U. The action you performed was set the METER SELECT switch to SERV FAC and the SERV SEL switch to SUM +3. The symptom you got is no indication on the TEST ALIGN meter. You must find the symptom description in the troubleshooting table that has:

- a. Equipment component: TD-204/U.
- b. Action: Set METER SELECT switch to SERV FAC and SERV SEL switch to SUM +3.
- c. Symptom: No indication on TEST ALIGN meter.

So you go to the troubleshooting checklist and look down the list of symptoms until you come to this one:

<u>Item No.</u>	<u>Symptom</u>
3	No indication on TD-204/U TEST ALIGN meter with METER SELECT switch at SERV FAC and SERV SEL switch at: a. -10. b. +10. c. SUM <u>+3</u> .

The symptom description in Item No. 3c has the same equipment component, action, and symptom as what happened on your equipment. So you have found the right symptom description.

The questions on the next page will give you a chance to practice matching symptom descriptions with equipment symptoms.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 1

Refer to the table on the next page to answer the following questions. Each question tells you something that happened while operating equipment. Look in the table for the symptom description that matches what happened on the equipment, and write its Item No. in the space provided.

- |  | <u>Item No.</u> |
|--|-----------------|
| 1. You are operating a T-983(P)/GRC-103(V). You set the meter selector switch at DOUBLE. The meter reading is below normal.    | _____           |
| 2. You are operating a TD-660(*)/G. You set selector switch I at -12, and get an incorrect indication on the TEST ALIGN meter. | _____           |
| 3. You are operating an R-1329(P)/GRC-103(V). You set the meter selector switch to +12 VDC. The meter indicates below normal.  | _____           |
| 4. You are operating a T-983(P)/GRC-103(V). You set the meter selector switch to PWR OUT. The meter reading is below normal.   | _____           |
| 5. You are checking out the assemblage. You set the BLOWER switch to ON, but the exhaust blower does not turn on.              | _____           |

CHECK YOUR ANSWERS ON PAGE 7.

List of Symptoms from a Troubleshooting Table

<u>Item No.</u>	<u>Malfunction (Symptom)</u>
1	AC VOLTS meter does not indicate when power is applied to assemblage.
2	Exhaust blower fails to operate when BLOWER switch is operated to ON.
3	No indication on TD-204/U TEST ALIGN meter with METER SELECT switch at SERV FAC and SERV SEL switch at: a. -10. b. +10. c. SUM <u>+3</u> .
4	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at DOUBLE.
5	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at MULT.
6	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at PWR OUT.
7	R-1329(P)/GRC-103(V) SYNC indicator does not extinguish within 10 seconds after AC POWER switch is operated to ON.
8	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at +12 VDC.

(continued on the next page)

- 9 R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at -12 VDC.
- 10 Incorrect indication on TD-660(\*)/G TEST ALIGN meter with selector switch 1 at:
- a. +12.
  - b. +4.
  - c. -12.
  - d. -6.
  - e. -4.

ANSWER KEY TO EXERCISE IN UNIT VIII, LESSON 3, REVIEW EXERCISE

Unit VIII, Lesson 3  
Review Exercise

ANSWERS TO EXERCISE 1

	<u>Item No.</u>
1.	4
2.	10c
3.	8
4.	6
5.	2

IF YOU DO NOT UNDERSTAND ANY OF THE MATERIAL IN THIS REVIEW EXERCISE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS REVIEW EXERCISE,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM B  
IN UNIT VIII - LESSON 3.

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REVIEW EXERCISE

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UNIT VIII. DIAGNOSING EQUIPMENT MALFUNCTIONS

Lesson 4. Finding Descriptions of Symptoms  
When There are Two or More Indicators

This review exercise will give you a little more practice in finding symptom descriptions that match equipment symptoms.

Remember: You must find the symptom description that is the same as what happened on your equipment in the following ways:

- a. It lists the equipment component or components that you are operating.
- b. It describes the action that you performed on the equipment, such as the switch that you set.
- c. It lists exactly the same indications that you got on the equipment - exactly the same lights, sounds, and meter readings.

When you think that you have found the right symptom description in a list, ask yourself:

- a. Does this symptom description include the same equipment component that I am operating?
- b. Is the operator action in the description the same as the one I just performed?
- c. Are all the indications the same as the ones I got on my equipment?

If your answer to all these questions is Yes, then you have found the symptom description that matches what happened on your equipment. But if the answer to any of these questions is No, you have not found the matching symptom description. And you must continue searching through the list until you find it.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 1

Each of the five questions below describes a symptom that appeared while operating equipment. Read each question. Then find the description that matches the equipment symptom in the table on the following page. Write its Item No. in the space provided.

Item No.

1. You are operating a T-983(P)/GRC-103(V). You set the meter selector switch at DOUBLER. The meter indication is normal. Then you set the meter selector switch to MULT. The meter indication is below normal. \_\_\_\_\_
  
2. You are operating a medium capacity radio system, consisting of a TD-352/U, a TD-202/U, and an AN/GRC-50A(V). You set the METER SELECT switch at FROM RADIO RCVR. The TEST METER reading is out of the green. The ALARMS FRAME indicator on the TD-352/U and the ALARMS TRAFFIC indicator on the TD-202/U light. There is no order wire. Other AN/GRC-50A(V) indications are normal. \_\_\_\_\_
  
3. You are operating a T-983(P)/GRC-103(V). You set the AC POWER switch to ON/RESET and the meter selector switch to 600 VDC. The meter indicates normal, but the LOW POWER indicator does not go out. \_\_\_\_\_
  
4. You are operating a TD-352/U. You set the METER SELECT switch at PCM IN, then at TIMING OUT. At both settings, the TEST ALIGN meter reading is in the green, but the ALARMS FRAME indicator lights and the buzzer sounds. \_\_\_\_\_
  
5. You are operating a T-983(P)/GRC-103(V). You set the meter selector switch at MULT. The meter reading is normal. Next, you set the meter selector switch at DRIVER. The meter reading is below normal. \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 5.

List of Symptom Descriptions from a Troubleshooting Table

<u>Item No.</u>	<u>Symptom</u>
1	T-983(P)/GRC-103(V) LOW POWER indicator does not extinguish within 60 seconds after AC POWER switch is operated to ON/RESET and meter indicates normal with meter selector switch at 600 VDC.
2	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at DOUBLER. Normal indication in OSC position.
3	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at MULT. Normal indication in DOUBLER position.
4	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at DRIVER. Normal indication in MULT position.
5	ALARMS FRAME indicator of TD-352/U lights, buzzer sounds, and TEST ALIGN meter indicates in green area with METER SELECT switch at PCM IN and TIMING IN.
6	ALARMS FRAME indicator of TD-352/U lights, buzzer sounds, and TEST ALIGN meter does not indicate in green area with METER SELECT switch at PCM IN and/or TIMING IN. TD-202/U and AN/GRC-50A(V) indicate normally.
7	ALARMS FRAME indicator of TD-352/U and ALARMS TRAFFIC indicator of TD-202/U light, buzzer sounds, TEST ALIGN meter of TD-202/U does not indicate in green area with METER SELECT switch at FROM RADIO RCVR. AN/GRC-50A(V) operates normally, order wire normal.
8	ALARMS FRAME indicator of TD-352/U and ALARMS TRAFFIC indicator of TD-202/U light and TEST METER does not indicate in green area with METER SELECT switch at FROM RADIO RCVR, all indications on AN/GRC-50A(V) are normal except for noisy or no order wire.

ANSWER KEY TO EXERCISE IN UNIT VIII, LESSON 4, REVIEW EXERCISE

Unit VIII, Lesson 4  
Review Exercise

4

ANSWERS TO EXERCISE 1

1. Item No. 3.

Explanation: Both the equipment symptom and Symptom Description No. 3 have:

- a. Equipment component: T-983(P)/GRC-103(V)
- b. Operator action: Set meter selector switch at DOUBLER.  
Set meter selector switch at MULT.
- c. Resulting symptom: (1) Meter indicates normal with meter selector switch at DOUBLER.  
(2) Meter indicates below normal with meter selector switch at MULT.

2. Item No. 8.

Explanation: Both the equipment symptom and Symptom Description No. 8 have:

- a. Equipment component: TD-352/U, TD-202/U, and AN/GRC-50A(V).
- b. Operator action: Set METER SELECT switch at FROM RADIO RCVR.
- c. Resulting symptom: (1) TEST METER indication is not in green area.  
(2) ALARMS FRAME indicator of TD-352/U lights.  
(3) ALARMS TRAFFIC indicator of TD-202/U lights.  
(4) Noisy or no order wire.  
(5) Other AN/GRC-50A(V) indications are normal.

3. Item No. 1

Explanation: Both the equipment symptom and Symptom Description No. 1 have:

- a. Equipment component: T-983(P)/GRC-103(V)
- b. Operator action: Set AC POWER switch to ON/RESET.  
Set meter selector switch at 600 VDC.
- c. Resulting symptom: (1) Meter indicates normal.  
(2) Low power indicator does not extinguish (go out) within 60 seconds.

4. Item No. 5.  
Explanation: Both the equipment symptom and Symptom Description No. 5 have:
- a. Equipment component: TD-352/U
  - b. Operator action: Set METER SELECT switch at PCM IN.  
Set METER SELECT switch at TIMING IN.
  - c. Resulting symptom: (1) TEST ALIGN meter indicates in green area.  
(2) ALARMS FRAME indicator lights.  
(3) Buzzer sounds.
5. Item No. 4.  
Explanation: Both the equipment symptom and Symptom Description No. 4 have:
- a. Equipment component: T-983(P)/GRC-103(V)
  - b. Operator action: Set meter selector switch at MULT.  
Set meter selector switch at DRIVER.
  - c. Resulting symptom: (1) Meter indicates normal with meter selector switch at MULT.  
(2) Meter indicates below normal with meter selector switch at DRIVER.

IF YOU DO NOT UNDERSTAND ANY OF THE MATERIAL IN THIS REVIEW EXERCISE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS REVIEW EXERCISE,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM B  
IN UNIT VIII - LESSON 4.

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REVIEW EXERCISE

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UNIT IX. SCALE READING

Lesson 1. Labeling Place Value

Here is some review for you.

In the number 483.2,

4 is in the hundreds place  
8 is in the tens place  
3 is in the ones place  
2 is in the tenths place

Because 4 8 3 . 2

H T O T  
U E N E  
N N E N  
D S S T  
R H  
E S  
D  
S

If given a digit and the place value of the digit, we can write the number as the following examples show:

EXAMPLE: 2 is in the tens place  
1 is in the hundreds place  
7 is in the ones place  
6 is in the tenths place

ANSWER: 1 2 7 . 6

H T O T  
U E N E  
N N E N  
D S S T  
R H  
E S  
D  
S

EXAMPLE: Write the number having:

- a. the digit 5 in the tens place
- b. the digit 5 in the ones place
- c. the digit 4 in the hundreds place
- d. the digit 1 in the tenths place

ANSWER: 455.1

This is correct because: 4 5 5 . 1

H	T	O	T
U	E	N	E
N	N	E	N
D	S	S	T
R			H
E			S
D			
S			

EXAMPLE: Put the place value in the blank.

1 2 3 . 4

|

ANSWER: 1 2 3 . 4

H  
U  
N  
D  
R  
E  
D  
S

EXERCISE 1

1. Write the number having:

- a. the digit 4 in the hundreds place
- b. the digit 7 in the tens place
- c. the digit 3 in the ones place
- d. the digit 5 in the tenths place

ANSWER: \_\_\_\_\_

2. Write the number having:

- a. the digit 6 in the tenths place
- b. the digit 2 in the ones place
- c. the digit 8 in the tens place
- d. the digit 1 in the hundreds place

ANSWER: \_\_\_\_\_

3. Write the number having:

- a. the digit 7 in the ones place
- b. the digit 0 in the tens place
- c. the digit 1 in the tenths place
- d. the digit 6 in the hundreds place.

ANSWER: \_\_\_\_\_

4. Write the number having:

- a. the digit 5 in the tens place
- b. the digit 5 in the hundreds place
- c. the digit 6 in the ones place
- d. the digit 2 in the tenths place.

ANSWER: \_\_\_\_\_

5. Put the place value in the blank.

1 2 3 . 4  
|

ANSWER KEY TO EXERCISE IN UNIT IX, LESSON 1, REVIEW EXERCISE

Unit IX, Lesson 1  
Review Exercise

4

ANSWERS TO EXERCISE 1

1. ANSWER: 423.5 because 4 2 3 . 5

H T O T  
U E N E  
N N E N  
D S S T  
R H  
E S  
D  
S

2. ANSWER: 182.6 because 1 8 2 . 6

H T O T  
U E N E  
N N E N  
D S S T  
R H  
E S  
D  
S

3. ANSWER: 607.1 because 6 0 7 . 1

H T O T  
U E N E  
N N E N  
D S S T  
R H  
E S  
D  
S

4. ANSWER: 556.2 because 5 5 6 . 2

H T O T  
U E N E  
N N E N  
D S S T  
R H  
E S  
D  
S

5. ANSWER: 1 2 3 . 4

T  
E  
N  
T  
H  
S

because 1 2 3 . 4

H T O T  
U E N E  
N N E N  
D S S T  
R H  
E S  
D  
S

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM B  
IN UNIT IX - LESSON 1.

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REVIEW EXERCISE

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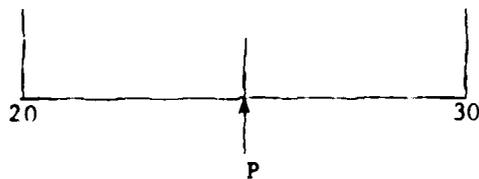
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UNIT IX. SCALE READING

Lesson 2. Numbering Scale Points

Here is a chance for you to practice some more. Look at the examples, then complete the exercises.

EXAMPLE: What number does the letter P stand for?



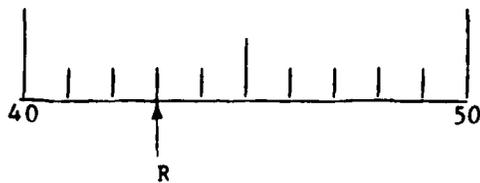
ANSWER: 25      Since P is in the middle of 20 and 30, P stands for 25.

EXAMPLE: What number does the letter O stand for?

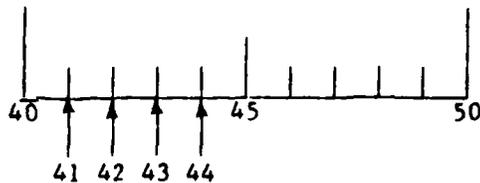


ANSWER: 85      Since O is in the middle of 80 and 90, O stands for 85.

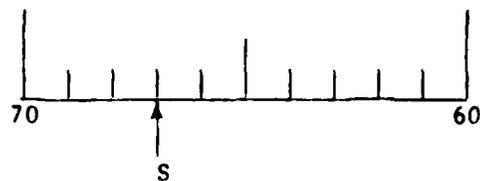
EXAMPLE: What number does the letter R stand for?



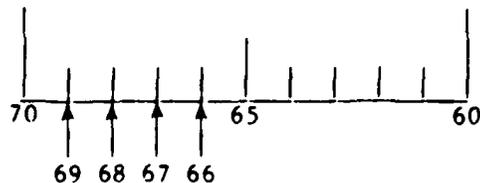
ANSWER: 43 Since each small line stands for a number, as shown here:



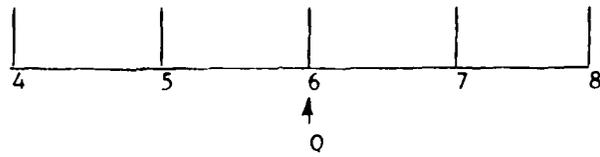
EXAMPLE: What number does the letter S stand for?



ANSWER: 67 Since each small line stands for a number, as shown here:



EXAMPLE: The scale below is a hundreds scale.  
What number does the letter O stand for?

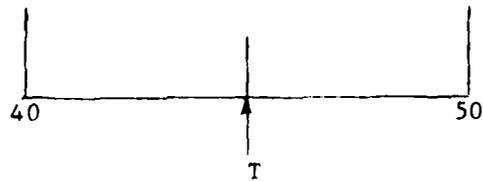


ANSWER: 600 Since each number measures hundreds as shown here:



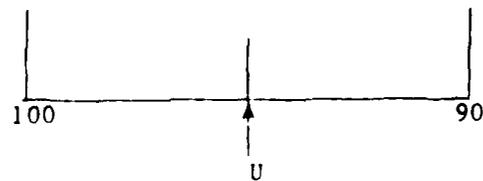
### EXERCISE 1

1. What number does the letter T stand for?



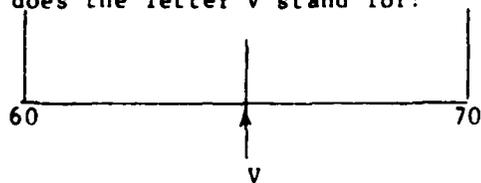
ANSWER: \_\_\_\_\_

2. What number does the letter U stand for?



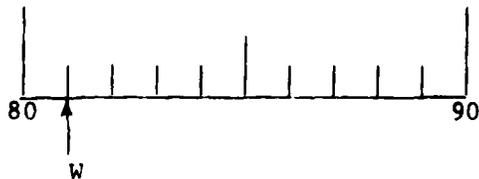
ANSWER: \_\_\_\_\_

3. What number does the letter V stand for?



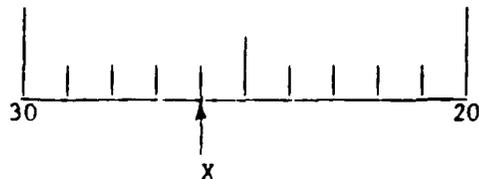
ANSWER: \_\_\_\_\_

4. What number does the letter W stand for?



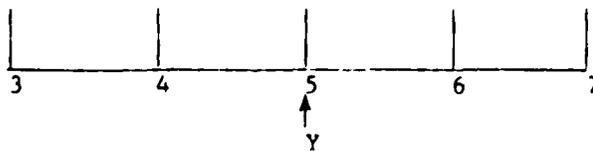
ANSWER: \_\_\_\_\_

5. What number does the letter X stand for?



ANSWER: \_\_\_\_\_

6. The scale below is a hundreds scale. What number does the letter Y stand for?



ANSWER: \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 6

ANSWER KEY TO EXERCISE IN UNIT IX, LESSON 2, REVIEW EXERCISE

Unit IX, Lesson 2  
Review Exercise

ANSWERS TO EXERCISE 1

1. 45 Since  $t$  is in the middle of 40 and 50.
2. 95 Since  $U$  is in the middle of 90 and 100.
3. 65 Since  $V$  is in the middle of 60 and 70.
4. 81 Since each small line stands for a number, as shown here:



5. 26 Since each small line stands for a number, as shown here:



6. 500 Since each line stands for 100 times that number.



IF YOU DO NOT UNDERSTAND ANY OF THESE ANSWERS,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM B  
IN UNIT IX - LESSON 2.

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REVIEW EXERCISE

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UNIT IX. SCALE READING

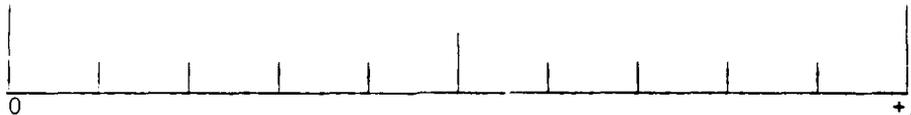
Lesson 3. Scales Divided into Tenths

In this worksheet, you will read some review material and complete some exercises.

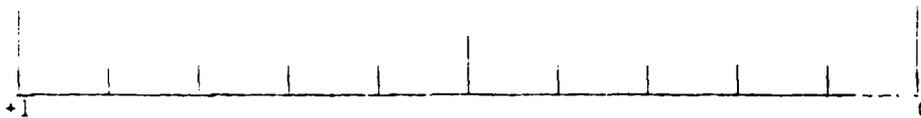
Decimal Scales

In the 31M course, you will work with two kinds of decimal scales. The scales will look like these shown here.

TYPE 1:

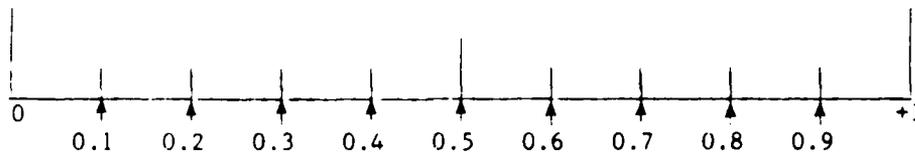


TYPE 2:

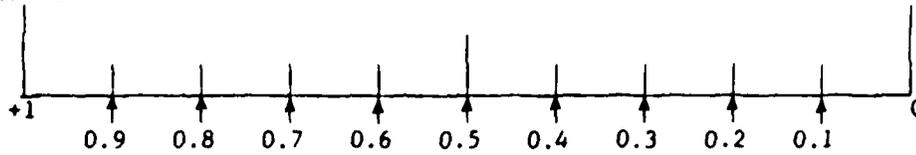


Each of the scales are divided into 10 equal parts by the unnumbered lines. The divisions are called tenths and can be labeled as shown here:

TYPE 1:



TYPE 2:



The scales on the previous page and above were used to find the answers to the examples which follow:

EXAMPLE A:

What number does the letter M stand for?



ANSWER: 0.4

EXAMPLE B:

What number does the letter N stand for?



ANSWER: 0.6

EXAMPLE C:

Three-tenths means what number?

ANSWER: 0.3

EXAMPLE D:

Write the name for the number 0.7.

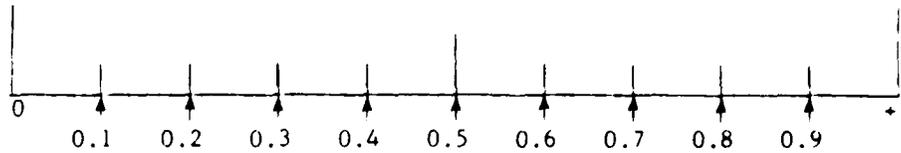
ANSWER: seven-tenths

ANSWER THE QUESTIONS ON THE NEXT PAGE.

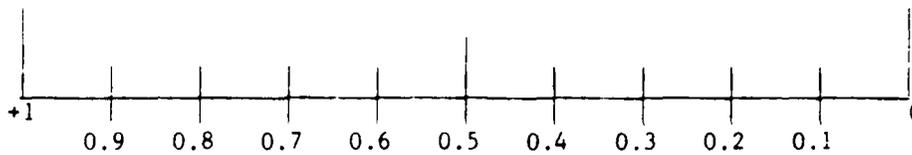
## EXERCISE 1

Use these scales to answer the following questions:

SCALE 1:

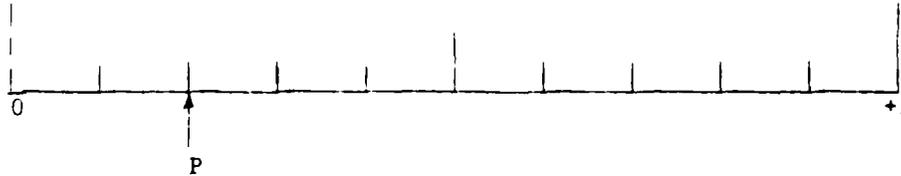


SCALE 2:



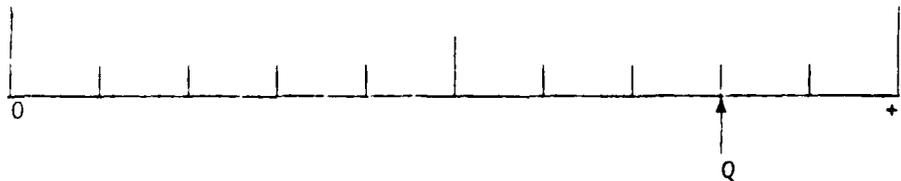
Remember that some scales are in the 0  $\rightarrow$  +1 direction and some are in the +1  $\leftarrow$  0 direction. You must look at the direction of the scale before you can answer the question correctly. Be careful.

1. What number does the letter P stand for?



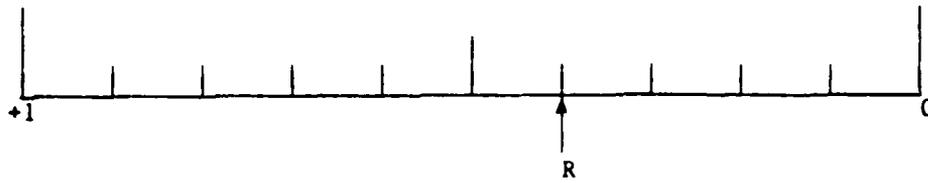
ANSWER: \_\_\_\_\_

2. What number does the letter Q stand for?



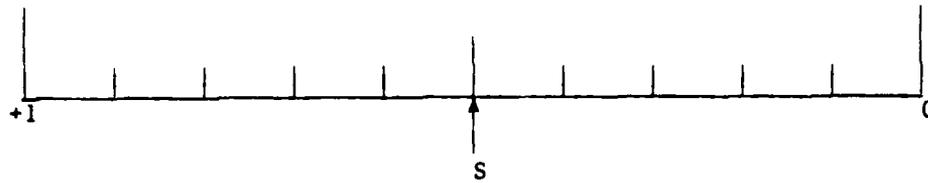
ANSWER: \_\_\_\_\_

3. What number does the letter R stand for?



ANSWER: \_\_\_\_\_

4. What number does the letter S stand for?



ANSWER: \_\_\_\_\_

5. Four-tenths means what number?

ANSWER: \_\_\_\_\_

6. Eight-tenths means what number?

ANSWER: \_\_\_\_\_

7. Write the name for the number 0.1.

ANSWER: \_\_\_\_\_

8. Write the name for the number 0.3.

ANSWER: \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 6.

ANSWER KEY TO EXERCISE IN UNIT IX, LESSON 3, REVIEW EXERCISE

Unit IX, Lesson 3  
Review Exercise

ANSWERS TO EXERCISE 1

1. 0.2
2. 0.8
3. 0.4
4. 0.5
5. 0.4
6. 0.8
7. one-tenth
8. three-tenths

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM B  
IN UNIT IX - LESSON 3.

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REVIEW EXERCISE

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UNIT IX. SCALE READING

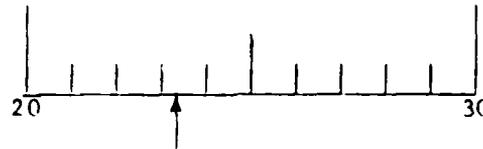
Lesson 4. Comparing Scale Settings

Here is some review for you.

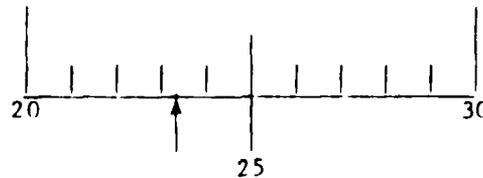
Sometimes in the 31M course, you will be asked if the reading on a scale is near to a certain number. You will usually be told that the reading should be within two or three marks from a given value.

For example:

Scale 0



If the reading on Scale 0 is indicated by the arrow, is the reading within two marks from the value 25?

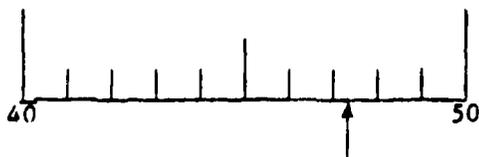


YES. By moving two marks from 25, we pass by the reading on the scale. Therefore, the reading is within two marks from the value 25.

Sometimes, you will be asked to do this for readings on meters and scales too.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

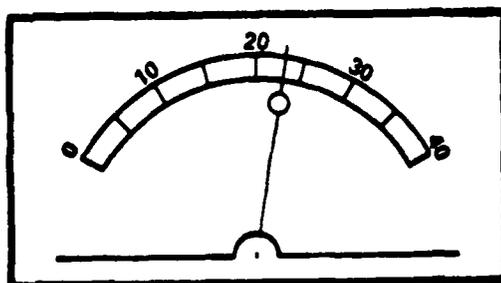
EXERCISE 1



1. Is the reading of the scale above within two marks from 45?

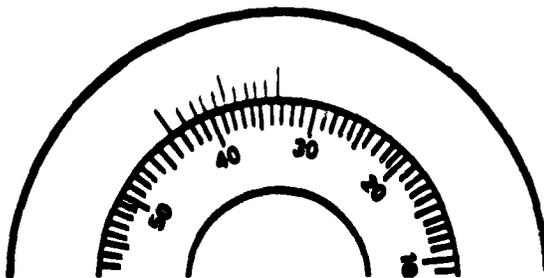
ANSWER: \_\_\_\_\_

2. Is the reading of the meter below within two marks from 15?



ANSWER: \_\_\_\_\_

3. Is the reading on the dial below within two marks from 31?



ANSWER: \_\_\_\_\_

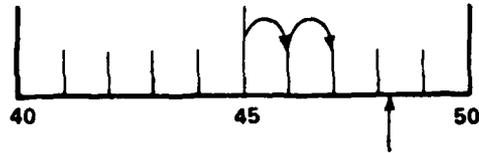
CHECK YOUR ANSWERS ON PAGE 3

ANSWER TO EXERCISE IN UNIT IX, LESSON 4, REVIEW EXERCISE

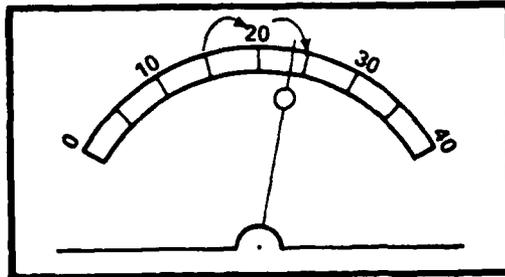
Unit IX, Lesson 4  
Review Exercise

ANSWERS TO EXERCISE 1

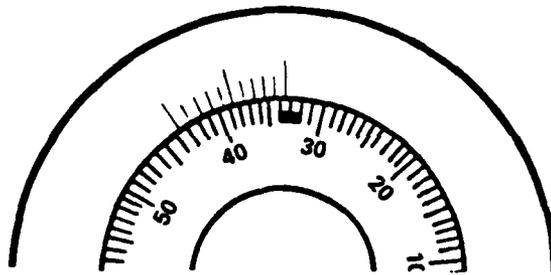
1. NO Because:



2. YES Because



3. YES Because



IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM B  
IN UNIT IX - LESSON 4.

Unit IX, Lesson 4  
Review Exercise

TRAINING MATERIALS -- CHECKPOINTS



Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 1, Form A

Directions: Put the letter of the correct definition for the word in the space provided.

- |                     |  |
|---------------------|--|
| ___ 1. appropriate  | a. a little bit at a time; moving slowly                       |
| ___ 2. component    | b. correct   |
| ___ 3. detect       | c. a particular way of doing something                         |
| ___ 4. distribution | d. part of a larger piece of equipment or system               |
| ___ 5. electronics  | e. highest possible level                                      |
| ___ 6. gradually    | f. lowest possible level                                       |
| ___ 7. insert       | g. to put in   |
| ___ 8. maximum      | h. suitable or right for a certain person or purpose           |
| ___ 9. minimum      | i. related to radios, transistors, and communication equipment |
| ___ 10. orient      | j. how far something can be transmitted                        |
| ___ 11. procedure   | k. type of countryside or land                                 |
| ___ 12. proper      | l. plants, trees, and other plant life                         |
| ___ 13. range       | m. something spread out over a large area                      |
| ___ 14. terrain     | n. to turn to the required position                            |
| ___ 15. vegetation  | o. to notice if something is there                             |

Unit I, Lesson 1  
Checkpoint 1, Form A

1

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 2, Form A

Directions: Put the letter of the correct definition for the word in the space provided.

NOTE: Two words have the same meaning. So one definition is used twice.

- |       |                     |  |
|-------|---------------------|--|
| _____ | 1. adequate         | a. to specify, name, or point out                            |
| _____ | 2. clockwise        | b. a defect or flaw; something wrong                         |
| _____ | 3. counterclockwise | c. the expected action of something; to carry on normal work |
| _____ | 4. depress          | d. enough for some purpose                                   |
| _____ | 5. designate        | e. straight up and down                                      |
| _____ | 6. energize         | f. level, like the horizon _____                             |
| _____ | 7. engage           | g. to push down  |
| _____ | 8. extend           | h. to stretch out to fullest length                          |
| _____ | 9. fault            | i. an electrical socket or outlet                            |
| _____ | 10. function        | j. a change in something                                     |
| _____ | 11. horizontal      | k. supply power for operation; start up                      |
| _____ | 12. indicate        | l. to put in gear; to use; to interlock                      |
| _____ | 13. modification    | m. in the opposite direction from the hands of a clock       |
| _____ | 14. receptacle      | n. in the direction that hands of a clock move               |
| _____ | 15. vertical        |  |

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 3, Form A

Directions: Put the letter of the correct definition for the word in the space provided.

- |       |                  |  |
|-------|------------------|--|
| _____ | 1. approximately | a. by sight; can be seen   |
| _____ | 2. automatically | b. to be greater than  |
| _____ | 3. cable         | c. an alphabetical list that helps in finding a certain part of a book       |
| _____ | 4. capacity      | d. lacking something; broken   |
| _____ | 5. character     | e. ability of equipment  |
| _____ | 6. defective     | f. to send a message   |
| _____ | 7. exceed        | g. cannot be made right  |
| _____ | 8. excess        | h. a collection of wires carrying electrical current; to hook up those wires |
| _____ | 9. index         |  |
| _____ | 10. insure       | i. too much of something   |
| _____ | 11. manually     | j. a car, truck, or van  |
| _____ | 12. monitor      | k. acting without help from anything else                                    |
| _____ | 13. standard     | l. a sign that something is wrong  |
| _____ | 14. symptom      | m. to check on the operation of equipment without disturbing it              |
| _____ | 15. technical    |  |

(continued on next page)

- |       |                   |  |
|-------|-------------------|--|
| _____ | 16. terminal      | n. an end-point along a communication system   |
| _____ | 17. transmit      | o. a letter or simple number   |
| _____ | 18. uncorrectable | p. a gauge or rule used in measuring something; a statement of how something is to be done |
| _____ | 19. vehicle       | q. to make certain   |
| _____ | 20. visual        | r. special knowledge about a mechanical subject  |
|       |                   | s. almost exactly  |
|       |                   | t. by hand   |

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 4, Form A

Directions: Put the letter of the correct definition for the word in the space provided.

- |     |                  |  |
|-----|------------------|--|
| ___ | 1. action        | a. carefulness; a warning to be careful                        |
| ___ | 2. adjust        | b. to make something unfit for use or impure                   |
| ___ | 3. applicable    | c. to lift up  |
| ___ | 4. cause         | d. a physical movement; a thing done                           |
| ___ | 5. caution       | e. a necessary part of a piece of equipment                    |
| ___ | 6. configuration | f. stopping something from happening                           |
| ___ | 7. contaminate   | g. grouping; outward shape, form, or figure                    |
| ___ | 8. deficiency    | h. a series of actions needed to complete some product or goal |
| ___ | 9. detach        | i. the purpose for which something is done                     |
| ___ | 10. effective    | j. to reposition parts of equipment (usually slowly)           |
| ___ | 11. element      | k. what is to be done first                                    |
| ___ | 12. elevate      | l. missing some necessary quality or activity                  |
| ___ | 13. exterior     | m. the condition of something                                  |
| ___ | 14. extinguish   | n. powerful; produces desired result                           |
| ___ | 15. meter        |  |
| ___ | 16. mission      |  |

(continued on the next page)

- |     |                 |   |
|-----|-----------------|---|
| ___ | 17. process     | o. to make something happen                                 |
| ___ | 18. preliminary | p. to go out, put out, or turn off                          |
| ___ | 19. preventive  | q. the outside  |
| ___ | 20. status      | r. an instrument used for measuring the amount of something |
|     |                 | s. to separate  |
|     |                 | t. suitable to use  |

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 5, Form A

Directions: Put the letter of the correct definition for the word in the space provided.

NOTE: Two words have the same meaning. So one definition is used twice.

- |       |                 |   |
|-------|-----------------|---|
| _____ | 1. assign       | a. for a short time                                 |
| _____ | 2. authorize    | b. give the power to do something                   |
| _____ | 3. auxiliary    | c. in the correct space or place                    |
| _____ | 4. establish    | d. tautness; stretched until tight                  |
| _____ | 5. interval     | e. failure to operate normally; something wrong     |
| _____ | 6. location     | f. to adjust again                                  |
| _____ | 7. maintenance  | g. to narrow down; to lessen                        |
| _____ | 8. malfunction  | h. appoint; give a task to do                       |
| _____ | 9. momentarily  | i. to fasten tightly                                |
| _____ | 10. obstruction | j. to turn around                                   |
| _____ | 11. operational | k. procedure for keeping equipment in working order |
| _____ | 12. preset      | l. in working order; ready to perform               |
| _____ | 13. proficient  | m. good at doing some task                          |
| _____ | 14. readjust    | n. blockage   |
| _____ | 15. reduce      |   |

(continued on the next page)

Unit I, Lesson 1  
Checkpoint 5, Form A

1

- |                       |   |
|-----------------------|---|
| ___ 16. reference     | o. a space into which something fits              |
| ___ 17. rotate        | p. appropriate or correct to use for some purpose |
| ___ 18. seated        | q. providing help; back-up                        |
| ___ 19. secure        | r. to set beforehand                              |
| ___ 20. select        | s. to choose                                      |
| ___ 21. sequence      | t. ordering of steps to do something              |
| ___ 22. serial number | u. where to find information                      |
| ___ 23. site          | v. identifying number                             |
| ___ 24. slot          | w. to prove beyond doubt                          |
| ___ 25. suitable      | x. time between                                   |
| ___ 26. tension       | y. a placement or position                        |

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 6, Form A

Directions: Choose the best definition for the underlined word.  
Put an "X" beside the correct answer.

1. Perform the tasks in this sequence.

- \_\_\_\_\_ a. number of steps
- \_\_\_\_\_ b. order of steps
- \_\_\_\_\_ c. amount of time
- \_\_\_\_\_ d. way

2. The minimum allowable level is 35.

- \_\_\_\_\_ a. best for the purpose
- \_\_\_\_\_ b. most flexible amount
- \_\_\_\_\_ c. highest possible level
- \_\_\_\_\_ d. lowest possible level

3. The standard is that the system must be operational in 30 minutes.

- \_\_\_\_\_ a. list of defects
- \_\_\_\_\_ b. proper way to do the task
- \_\_\_\_\_ c. reason for doing something
- \_\_\_\_\_ d. rule used in measuring

4. The standard is that the system must be operational in 30 minutes.

- \_\_\_\_\_ a. in working order
- \_\_\_\_\_ b. packed and ready to move
- \_\_\_\_\_ c. checked for defects
- \_\_\_\_\_ d. at full volume

5. The transmitter has the capacity to send the signal 50 miles.
- a. need
  - b. ability
  - c. room
  - d. defect
6. The signal has a distribution of 50 square miles.
- a. difficulty in transmission
  - b. spread out over a large area
  - c. interference at this point
  - d. reason for being there
7. Find the auxiliary equipment in the van.
- a. broken
  - b. suitable for greater range
  - c. generator
  - d. back-up
8. If the receiver is deficient, the troubleshooting table will help you to solve the problem.
- a. too heavy
  - b. having too many settings
  - c. missing some quality
  - d. too hot
9. Visually inspect the exterior of the generator.
- a. operation of
  - b. inside
  - c. outside
  - d. problem
10. The visual inspection can save you a lot of time.
- a. by sight
  - b. by hand
  - c. quick
  - d. nightly

11. Each component must work properly in order to receive the signal.

- a. person authorized to do the job
- b. gear
- c. part of a piece of equipment
- d. clock

12. Orient the antenna to 40° W.

- a. turn to the required position
- b. the East
- c. take it down
- d. repair

13. Put the plug into the receptacle.

- a. machine
- b. outlet
- c. wire
- d. ladder used in raising the antenna

14. The reading must not exceed 60 Hz.

- a. match
- b. be the same as
- c. be less than
- d. be greater than

15. In troubleshooting, you look for the fault.

- a. defect or flaw
- b. result
- c. telephone book
- d. sergeant

16. We take preventive measures to avoid problems later.

- a. doing something quick
- b. stopping something from happening
- c. easy
- d. hard

17. Use caution when working with electrical equipment.
- a. a buddy
  - b. carefulness
  - c. speed
  - d. a lot of light
18. The location of the receiving terminal is at Station 2.
- a. fault or defect
  - b. covering for
  - c. person who looks after something
  - d. placement or position
19. Traffic could not move because of the obstruction on the road.
- a. blockage
  - b. cat
  - c. hole
  - d. line
20. This section explains the procedure for preventive maintenance.
- a. disadvantages of
  - b. advantages of
  - c. troubleshooting manual
  - d. way to do something.
21. This section explains the procedure for preventive maintenance.
- a. health care
  - b. storing broken equipment in shelters
  - c. keeping equipment in working order
  - d. enemy attacks
22. Now is the time to conduct preliminary checks.
- a. to be done first
  - b. necessary
  - c. electrical
  - d. concerning faint signals

23. The needle is horizontal.

- a. level like the horizon
- b. straight up and down
- c. moving slightly
- d. moving quickly

24. Find a level site for the task.

- a. set of directions
- b. tree
- c. lid
- d. placement

25. Secure the cover on the vehicle.

- a. take it off
- b. fasten tightly
- c. spread it loosely
- d. double

26. Secure the cover on the vehicle.

- a. straight up and down
- b. plant life
- c. a car, truck, or van
- d. equipment

27. With practice you will become proficient at transmitting signals.

- a. bad at some task
- b. good at some task
- c. able to send louder
- d. able to send faster

28. With practice you will become proficient at transmitting signals.

- a. stopping
- b. changing
- c. sending
- d. understanding

29. You may need to clear the terrain if there is a lot of vegetation.

- a. type of land
- b. type of vehicle that runs on tracks
- c. a collection of wires
- d. radio equipment

30. You may need to clear the terrain if there is a lot of vegetation.

- a. insects
- b. hills
- c. mud
- d. plant life

WHEN YOU HAVE FINISHED WITH THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE,  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

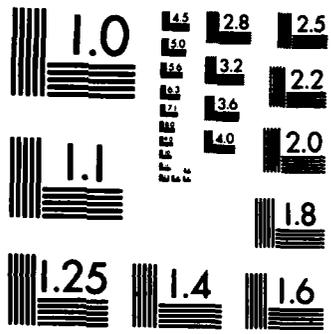
UNIT I - LESSON 1

Checkpoint 1, Form B

Directions: Put the letter of the correct definition for the word in the space provided.

- |                     |  |
|---------------------|--|
| ___ 1. appropriate  | a. to notice if something is there                             |
| ___ 2. component    | b. to turn to the required position                            |
| ___ 3. detect       | c. something spread out over a large area                      |
| ___ 4. distribution | d. plants, trees, and other plant life                         |
| ___ 5. electronics  | e. type of countryside or land                                 |
| ___ 6. gradually    | f. how far something can be transmitted                        |
| ___ 7. insert       | g. related to radios, transistors, and communication equipment |
| ___ 8. maximum      | h. suitable or right for a certain person or purpose           |
| ___ 9. minimum      | i. to put in   |
| ___ 10. orient      | j. lowest possible level                                       |
| ___ 11. procedure   | k. highest possible level                                      |
| ___ 12. proper      | l. part of a larger piece of equipment or system               |
| ___ 13. range       | m. a particular way of doing something                         |
| ___ 14. terrain     | n. a little bit at a time; moving slowly                       |
| ___ 15. vegetation  | o. correct   |





MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 2, Form B

Directions: Put the letter of the correct definition for the word in the space provided.

NOTE: Two words have the same meaning. So one definition is used twice.

- |       |                     |  |
|-------|---------------------|--|
| _____ | 1. adequate         | a. in the direction that hands of a clock move               |
| _____ | 2. clockwise        | b. in the opposite direction from the hands of a clock       |
| _____ | 3. counterclockwise | c. to put in gear; to use; to interlock                      |
| _____ | 4. depress          | d. supply power for operation; start up                      |
| _____ | 5. designate        | e. a change in something                                     |
| _____ | 6. energize         | f. an electrical socket or outlet                            |
| _____ | 7. engage           | g. to stretch out to fullest length                          |
| _____ | 8. extend           | h. to push down  |
| _____ | 9. fault            | i. level, like the horizon _____                             |
| _____ | 10. function        | j. straight up and down                                      |
| _____ | 11. horizontal      | k. enough for some purpose                                   |
| _____ | 12. indicate        | l. the expected action of something; to carry on normal work |
| _____ | 13. modification    | m. a defect or flaw; something wrong                         |
| _____ | 14. receptacle      | n. to specify, name, or point out                            |
| _____ | 15. vertical        |  |

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 3, Form B

Directions: Put the letter of the correct definition for the word in the space provided.

- |     |                  |  |
|-----|------------------|--|
| ___ | 1. approximately | a. by hand   |
| ___ | 2. automatically | b. almost exactly  |
| ___ | 3. cable         | c. special knowledge about a mechanical subject  |
| ___ | 4. capacity      | d. to make certain   |
| ___ | 5. character     | e. a gauge or rule used in measuring something; a statement of how something is to be done |
| ___ | 6. defective     | f. a letter or simple number   |
| ___ | 7. exceed        | g. an end-point along a communication system   |
| ___ | 8. excess        | h. to check on the operation of equipment without disturbing it                            |
| ___ | 9. index         | i. a sign that something is wrong  |
| ___ | 10. insure       | j. acting without help from anything else  |
| ___ | 11. manually     | k. a car, truck, or van  |
| ___ | 12. monitor      | l. too much of something   |
| ___ | 13. standard     |  |
| ___ | 14. symptom      |  |
| ___ | 15. technical    |  |

(continued on the next page)

Unit I, Lesson 1  
Checkpoint 3, Form B

- |     |                   |  |
|-----|-------------------|--|
| ___ | 16. terminal      | m. a collection of wires carrying electrical current; to hook up those wires |
| ___ | 17. transmit      |  |
| ___ | 18. uncorrectable | n. cannot be made right  |
| ___ | 19. vehicle       | o. to send a message   |
| ___ | 20. visual        | p. ability of equipment  |
|     |                   | q. lacking something; broken   |
|     |                   | r. an alphabetical list that helps in finding a certain part of a book       |
|     |                   | s. to be greater than  |
|     |                   | t. by sight; can be seen   |

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 4, Form B

Directions: Put the letter of the correct definition for the word in the space provided.

- |       |                  |  |
|-------|------------------|--|
| _____ | 1. action        | a. suitable to use   |
| _____ | 2. adjust        | b. to separate   |
| _____ | 3. applicable    | c. an instrument used for measuring the amount of something    |
| _____ | 4. cause         | d. the outside   |
| _____ | 5. caution       | e. to go out, put out, or turn off                             |
| _____ | 6. configuration | f. to make something happen                                    |
| _____ | 7. contaminate   | g. powerful; produces desired result                           |
| _____ | 8. deficiency    | h. the condition of something                                  |
| _____ | 9. detach        | i. missing some necessary quality or activity                  |
| _____ | 10. effective    | j. what is to be done first                                    |
| _____ | 11. element      | k. to reposition parts of equipment (usually slowly)           |
| _____ | 12. elevate      | l. the purpose for which something is done                     |
| _____ | 13. exterior     | m. a series of actions needed to complete some product or goal |
| _____ | 14. extinguish   |  |
| _____ | 15. meter        |  |

(continued on the next page)

Unit I, Lesson 1  
Checkpoint 1, Form B

1

- |                       |  |
|-----------------------|--|
| _____ 16. mission     | n. grouping; outward shape, form, or figure  |
| _____ 17. process     | o. stopping something from happening         |
| _____ 18. preliminary | p. a necessary part of a piece of equipment  |
| _____ 19. preventive  | q. a physical movement; a thing done         |
| _____ 20. status      | r. to lift up                                |
|                       | s. to make something unfit for use or impure |
|                       | t. carefulness; a warning to be careful      |

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 5, Form B

Directions: Put the letter of the correct definition for the word in the space provided.

NOTE: Two words have the same meaning. So one definition is used twice.

- |       |                 |   |
|-------|-----------------|---|
| _____ | 1. assign       | a. a placement or position                        |
| _____ | 2. authorize    | b. time between                                   |
| _____ | 3. auxiliary    | c. to prove beyond doubt                          |
| _____ | 4. establish    | d. identifying number                             |
| _____ | 5. interval     | e. where to find information                      |
| _____ | 6. location     | f. ordering of steps to do something              |
| _____ | 7. maintenance  | g. to choose                                      |
| _____ | 8. malfunction  | h. to set beforehand                              |
| _____ | 9. momentarily  | i. providing help; back-up                        |
| _____ | 10. obstruction | j. appropriate or correct to use for some purpose |
| _____ | 11. operational | k. a space into which something fits              |
| _____ | 12. preset      | l. blockage                                       |
| _____ | 13. proficient  | m. good at doing some task                        |
| _____ | 14. readjust    | n. in working order; ready to perform             |
| _____ | 15. reduce      |   |

Unit I, Lesson 1  
Checkpoint 5, Form B

- |                       |   |
|-----------------------|---|
| ___ 16. reference     | o. procedure for keeping equipment in working order |
| ___ 17. rotate        | p. to turn around                                   |
| ___ 18. seated        | q. to fasten tightly                                |
| ___ 19. secure        | r. appoint; give a task to do                       |
| ___ 20. select        | s. to narrow down; to lessen                        |
| ___ 21. sequence      | t. to adjust again                                  |
| ___ 22. serial number | u. failure to operate normally; something wrong     |
| ___ 23. site          | v. tautness; stretched until tight                  |
| ___ 24. slot          | w. in the correct space or place                    |
| ___ 25. suitable      | x. give the power to do something                   |
| ___ 26. tension       | y. for a short time                                 |

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 1

Checkpoint 6, Form B

Directions: Choose the best definition for the underlined word.  
Put an "X" beside the correct answer.

1. Designate one person to depress the button.

- a. change
- b. make certain
- c. cause
- d. name or specify

2. Designate one person to depress the button.

- a. press down
- b. pull up
- c. find the fault with
- d. do maintenance tasks

3. Turn the dial clockwise gradually.

- a. moving quickly
- b. moving slowly
- c. looking for problems
- d. straight up and down

4. Turn the dial clockwise gradually.

- a. moving quickly
- b. moving slowly
- c. in the direction that hands of a clock move
- d. in the opposite direction from the hands of a clock

5. The light will extinguish automatically.
- a. turn brighter
  - b. flash
  - c. come on
  - d. go out
6. The light will extinguish automatically.
- a. without help from anything else
  - b. with help from the operator
  - c. by hand
  - d. quickly
7. Insure that the guy wire does not have too much tension on it.
- a. sound waves
  - b. oil
  - c. tautness
  - d. paint
8. Insure that the guy wire does not have too much tension on it.
- a. troubleshoot
  - b. pay someone to see
  - c. make certain
  - d. guess whether
9. If the buzzer does not sound, that is a symptom.
- a. signal for lunch
  - b. question of the existence
  - c. sign that nothing is wrong
  - d. sign that something is wrong
10. This system will transmit the signal far.
- a. send a message
  - b. garble
  - c. interfere with
  - d. stop the message from going

11. The interval between beeps will be 15 seconds.

- a. time between
- b. loops
- c. ladder
- d. relationship between

12. Use your Soldier's Manual as a reference.

- a. shelf to store things on
- b. doorstop
- c. weight for holding down the tarpaulin
- d. where to find information

13. The wire will be under tension when you hang weights on it.

- a. agony
- b. stretched tight
- c. the roof of the shelter
- d. the ground

14. Use the jack to elevate the van.

- a. lift up
- b. hold tight
- c. push down
- d. turn around

15. The components will always be in this configuration.

- a. color
- b. grouping
- c. size
- d. housing

16. Troubleshooting is effective if you find the fault.

- a. easy enough to do by yourself
- b. big enough to cause problems
- c. produces the desired effect
- d. hectic

17. Refer to the index when looking for a certain topic.
- a. inside cover that lists the author, publisher, and date of publication
  - b. table of contents
  - c. binding that secures all of the pages together
  - d. alphabetical listing that helps in finding a certain part of a book
18. A loud hum was a symptom that something was malfunctioning.
- a. sign that something is wrong
  - b. high tone that is hard on the ears
  - c. a slow person
  - d. annoying
19. The receiver performs the function of receiving the sign
- a. the public debate
  - b. having a good time
  - c. critical analysis of
  - d. the expected action
20. This transmitter has a broadcast range of 10 miles.
- a. something to cook on
  - b. what usually sits beside a window
  - c. how far something can be transmitted
  - d. where cattle live
21. Insert the cable here.
- a. lengthen
  - b. turn sideways
  - c. take out
  - d. put in

22. Insert the cable here.
- a. bolt
  - b. a shallow waterway for boats to travel in
  - c. a collection of wires to carry electricity
  - d. rope
23. Use caution when working with electrical components.
- a. carefulness
  - b. proper tools
  - c. insulation
  - d. a team
24. Use caution when working with electrical components.
- a. wires
  - b. outlets
  - c. vans for carrying equipment
  - d. parts of a system
25. If you detect a malfunction, you must find what causes it.
- a. notice
  - b. correct
  - c. cannot correct
  - d. like
26. If you detect a malfunction, you must find what causes it.
- a. corrects it
  - b. makes it happen
  - c. does not correct it
  - d. makes it worse
27. Find the appropriate manual.
- a. most convenient
  - b. right
  - c. nearest
  - d. biggest

28. The reading should be approximately 150.

- a. almost exactly
- b. far from
- c. greater than
- d. less than

29. If the power is not adequate, the signal will be lost.

- a. enough
- b. loud
- c. monitored well
- d. checked often

30. This will explain the process used to extend the antenna.

- a. reference manuals
- b. weather condition
- c. series of actions
- d. tools

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE,  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 2

Checkpoint 1, Form A

In each question below, there is a sentence to read, followed by a question. Read the sentence carefully. Make sure you understand it. Then read the question carefully and answer it.

1. Tuning the receiver insures that radio waves of the desired frequency are amplified more than radio waves of other frequencies.

This sentence says that:

- a. In the receiver some radio waves are strengthened more than others.
- b. The receiver can be tuned to any frequency within the radio frequency range.
- c. Radio waves are amplified before they are received.

2. Multiplex equipment connected to a radio enables the radio to transmit and receive on several telephone channels simultaneously.

Which of the following sentences says the same thing?

- a. A radio cannot transmit and receive without multiplex equipment.
- b. The purpose of telephone channels is to enable the radio to use multiplex equipment simultaneously.
- c. If you want to transmit and receive on several telephone channels simultaneously, you must connect the radio to multiplex equipment.

3. The force of an electric current through a circuit is measured in volts, the volume of flow in amps, and the resistance of the circuit in ohms.

An ohmmeter measures:

- a. how much electricity is flowing through a circuit.
- b. how much resistance is in the circuit.
- c. the force of the current through the circuit.

4. The TT-4/TG is a lightweight, transportable unit.

According to the sentence, the TT-4/TG is:

- a. easy to move.
- b. heavy.
- c. hard to transport.
- d. a useful piece of equipment.

5. In amplitude modulation, the amplitude of the carrier wave is modified by incoming audio frequencies.

What do incoming audio frequencies do in amplitude modulation?

---

6. The useful operating distance between two radio sets is generally limited to between 30 and 40 miles.

This sentence says that:

- a. No radio set can transmit over 40 miles.
- b. Two radio sets, transmitting together, can transmit farther than one radio set.
- c. If you want to transmit from one radio set to another, make sure that they are at least 40 miles apart.
- d. If you want to transmit from one radio set to another, the radio sets should be within 30 or 40 miles of each other.

7. The air filter must be cleaned frequently, at least once a week, and also immediately after a sand or dust storm.

After a dust storm, you should clean the air filter:

- a. frequently.
- b. at the end of the week.
- c. immediately.

8. The use of separate antenna masts for transmitters and receivers at a station will reduce the transmitter-to-receiver interference at that station.

What should you do to decrease the amount of interference?

- a. Use different masts for transmitting to different stations.
- b. Use one mast for both transmitters and receivers.
- c. Use different masts for transmitters and receivers.
- d. Use the antenna for transmission and reception.

Use this short passage to answer questions 9 and 10:

In the receiver, intelligence is extracted from the carrier wave through the process of demodulation. The intelligence is converted from electric energy to sound by a speaker.

9. What does demodulation do?
- a. It extracts the radio wave from the process.
  - b. It converts electric energy to sound energy.
  - c. It processes the carrier wave of the intelligence.
  - d. It separates the message from the carrier wave.
10. The speaker changes \_\_\_\_\_ to \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 2

Checkpoint 2, Form A

Here are conditions and standards for installing a 10 KW Generator Set. Read them carefully. Then answer questions 1 to 5. Refer back to the Conditions and Standards whenever you need to.

CONDITIONS

This task is performed under all weather conditions in a field or a garrison location. You will need a 10 KW Generator Set, TM 5-6115-275-14, 5-pound sledge hammer, ground rod, ground strap, 8-inch flat tip screwdriver, 8-inch adjustable wrench, and standard pliers.

STANDARDS

This task has been performed correctly when, in 10 minutes, the generator set has been sited, grounded, power cable connected, fuel supply determined and connected without causing damage to any connectors or the generator set, and the generator is ready to be operated.

1. List all the equipment and tools needed for this task.

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2. What reference is needed for this task? \_\_\_\_\_

3. Cpl. Mary Jones has sited her generator set, grounded it, and attached the power cable. What does she still have to do to meet the standards?

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4. Cpl. Jones began installation at 0845. She must be finished no later than \_\_\_\_\_.

5. According to the Standards, the generator set must be sited. This means (Choose one):

- a. It must be visible.
- b. It must be clean and well lubricated.
- c. It must be inspected before proceeding.
- d. It must be located in an appropriate place.

Read the following performance step:

Check for indication in green band on TEST ALIGN meter.

For sentences 6 to 8 below, write S if the sentence says the same thing as the performance step. Write D if it says something different.

\_\_\_\_\_ 6. Monitor the TEST ALIGN meter for indication in the green band.

\_\_\_\_\_ 7. Operate the TEST ALIGN meter to obtain an indication in the green band.

\_\_\_\_\_ 8. Insure that TEST ALIGN meter reading is in green band.

Read the following performance step:

Set selector switch to OSC and MX sequentially.

For sentences 9 and 10, write S if the sentence says the same thing as the performance step and D if it does not.

\_\_\_\_\_ 9. Operate selector switch to OSC. Then operate selector switch to MX.

\_\_\_\_\_ 10. Adjust selector switch until meter reads OSC, then MX.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 2

Checkpoint 1, Form B

In each question below, there is a sentence to read, followed by a question. Read the sentence carefully. Make sure you understand it. Then read the question carefully and answer it.

1. When transmitting over distances of 40 miles or less, the antenna radiates ground waves, which follow the curvature of the earth.

Ground waves can be used for sending messages up to \_\_\_\_\_

2. Two radio terminals more than 40 miles apart can communicate if there is a repeater station between them.

Which of the following sentences says the same thing?

- a. A repeater makes it possible to increase the range of radio transmission over 40 miles.
- b. Repeater stations are necessary for communication.
- c. If two radio terminals are more than 80 miles apart, they cannot communicate.

3. The force of an electric current through a circuit is measured in volts, the volume of flow in amps, and the resistance of the circuit in ohms.

A voltmeter measures:

- a. how much electricity is flowing through a circuit.
- b. how much resistance is in the current.
- c. the force of the current through the circuit.

4. A radio terminal in a field location requires a transmitter, a receiver, modulating equipment, a generator, and an antenna.

Sgt. Sue Williams is setting up a field radio terminal. She has an antenna, a transmitter, a receiver, and modulating equipment. What else does she need? \_\_\_\_\_

5. The switches for regulating the output of the generator are located in the control box.

In the control box, you will find:

- a. outputs.
- b. regulatings.
- c. generators.
- d. switches.

6. The use of multiplex equipment enables a radio to accommodate many telephone channels.

Many telephone channels can go through the same radio if the radio terminal contains \_\_\_\_\_

Use the following sentence to answer questions 7 and 8:

The receiver intercepts RF waves of the appropriate frequency, extracts the message from the carrier wave, and converts the message from electric energy to sound energy.

7. After the receiver has completed its work, the message is in the form of:

- a. electric energy.
- b. sound waves.
- c. radio waves.

8. The sentence above says that:

- a. The message is separated from the carrier wave in the receiver.
- b. The receiver picks up RF waves of all frequencies.
- c. The carrier wave generates both electric energy and sound energy.

Use the following sentence to answer questions 9 and 10.

In amplitude modulation, audio frequencies change the strength of radio waves produced by the oscillator.

9. The process of changing the strength of radio waves is called

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10. The oscillator:

- a. modulates radio waves.
- b. produces sounds.
- c. generates radio waves.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 2

Checkpoint 2, Form B

Here are conditions and standards for system alignment of a repeater radio called the AN/MRC-54(V). Read them. Then answer questions 1 to 5. Refer back to the Conditions and Standards whenever you need to.

CONDITIONS

This task may be performed in a tactical situation. To accomplish this task, you will need an operable AN/MRC-54(V) to include associated TMs, basic issue tools, and safety equipment. You will be provided with a multichannel systems diagram. There is an operable radio terminal at the distant station (ALFA). You will perform the system alignment under the direction of ALFA terminal.

STANDARDS

Standards are met when the system is in operation and all 12 channels are aligned and capable of passing traffic within 30 minutes.

1. Who directs your performance of the system alignment?

\_\_\_\_\_

2. Besides the AN/MRC-54(V) and the radio terminal at the distant station, what kinds of equipment or tools do you need?

\_\_\_\_\_

3. What references are needed for this task? \_\_\_\_\_

4. In the Standards, the term "passing traffic" probably means:

- a. transmitting and receiving.
- b. exceeding the speed of other vehicles.
- c. following the directions of the other station.

5. How much time do you have to complete this task? \_\_\_\_\_

Read the following performance step:

Momentarily operate MANUAL-AUTOMATIC switch to MANUAL.

Now read each of the two sentences below. If a sentence means the same thing as the performance step, write S. If it does not, write D.

\_\_\_\_\_ 6. Operate the MANUAL-AUTOMATIC switch to MANUAL sequentially.

\_\_\_\_\_ 7. Set the MANUAL-AUTOMATIC switch to MANUAL for a short time.

Read the following performance step; then answer questions 8 to 10.

Adjust LEVEL control until receiver meter reads in green area of scale.

8. Adjust means the same thing as (Choose one):

- a. Rotate fast.
- b. Press.
- c. Turn slowly.
- d. Fix.

9. What indicator do you need to watch while you are adjusting the LEVEL control? \_\_\_\_\_

10. When should you stop moving the LEVEL control? \_\_\_\_\_

---

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Unit I, Lesson 2  
Checkpoint 2, Form B

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 3

Checkpoint 1, Form A

In each question, read the performance step. Then answer the question which follows.

1. If the engine has not reached operating temperature in 5 minutes, check the current level.

Suppose that the operating temperature is 185°. At the end of 5 minutes, the engine temperature is 150°. What should you do?

---

2. Insure that distance between A and B is not greater than 10 feet.

The distance between A and B should be:

- a. exactly 10 feet.
- b. more than 10 feet.
- c. 10 feet or less.
- d. 10 feet or more.

3. Failure to adjust control results in not receiving signal.

Sgt. Smith did not adjust the control. What will happen?

---

4. Repairs that cannot be completed within 15 minutes must be reported to the field officer.

A certain repair will require 30 minutes. Should it be reported to the field officer? \_\_\_\_\_

5. Do not allow engine oil pressure to exceed 60 psi.

Which of the following oil pressures are all right?

- a. Pressures that exceed 60 psi.
- b. Pressures up to 60 psi.
- c. Pressures more than 60 psi.
- d. Pressures of 60 psi or more.

6. No control should be adjusted to more than 80%.

All controls should be adjusted to:

- a. 80% or less.
- b. exactly 80%.
- c. more than 80%.
- d. 80% or more.

7. Dig a hole no wider or deeper than necessary.

The hole should be:

- a. wide and deep.
- b. wide and shallow.
- c. narrow and deep.
- d. narrow and shallow.

8. Press FIELD FLASH switch only if voltage fails to build up automatically.

The voltage has reached a high level. Should you press the FIELD FLASH switch? \_\_\_\_\_

9. Meter reading should not exceed 75%.

The meter should read:

- a. 75% or less.
- b. at least 75%.
- c. 75% or more.
- d. more than 75%.

10. Check gage to insure no operation in excess of 50.

This means that all operations should be \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 3

Checkpoint 1, Form B

In each question, read the performance step. Then answer the question which follows.

1. Failure to install the cables results in not receiving PCM signals.

If you do not install the cables, you will \_\_\_\_\_

2. Multimeter should not exceed 40 with meter select switch at XYZ.

The meter select switch is at XYZ. What should the multimeter reading be? \_\_\_\_\_

3. Insure that field wire is not longer than 50 feet.

The field wire should be:

- a. exactly 50 feet long.
- b. more than 50 feet long.
- c. 50 feet long or more.
- d. 50 feet long or less.

4. No control should be adjusted to more than 30° from the vertical.

All the controls are adjusted to 0° to 20° from the vertical. Is that all right? \_\_\_\_\_

5. Corrective actions that cannot be performed by replacing panels must be referred to a higher level of maintenance.

Which corrective actions must be reported to a higher level of maintenance?

- a. Any corrective actions.
- b. Those which require replacing panels.
- c. Those which do not require replacing panels.

Unit I, Lesson 3  
Checkpoint 1, Form B

1

6. Do not allow operating temperature to exceed 185°.

The operating temperature should be:

- a. 185° or less.
- b. 185° or more.
- c. more than 185°.
- d. exactly 185°.

7. If the signal lamp is not lit, push the POWER button.

You should push the POWER button if:

- a. the signal lamp is on.
- b. the signal lamp is off.
- c. the power is too low.
- d. the power is too high.

8. Check meter at all settings of selector switch to insure no reading in excess of 100%.

The meter should show:

- a. no reading under 100%.
- b. all readings over 100%.
- c. all readings 100% or less.

9. Hold the switch in the GO position no longer than necessary.

You should hold the switch in GO:

- a. for a short time.
- b. for a long time.

10. Open air vent if engine fails to cool down by itself.

The engine is too hot. What should you do? \_\_\_\_\_

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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 4

Checkpoint 1, Form A

In this checkpoint, you will find sentences to read. Each sentence is followed by two questions. Read each sentence carefully before answering the questions.

Raise the mast section in the launcher by pumping the jacking lever until the automatic stop prevents further motion.

1. What does pumping the jacking lever do?
  - a. It stops automatically.
  - b. It raises the mast section.
  - c. It prevents further motion.
  
2. What does the operator have to do to prevent further motion?
  - a. Place the mast section in the launcher.
  - b. Pump the jacking lever.
  - c. Nothing. Motion stops automatically.

Place air intake shutter in the summer position when temperature is above 32°F (0°C) and winter position when temperature is below 32°F (0°C).

3. The correct position for the intake shutter depends upon the \_\_\_\_\_
  
4. If the temperature is 40°F, what position should you put the air intake shutter in? \_\_\_\_\_

Stop operation immediately if a deficiency is noted during operation that would damage the equipment.

5. Which of the following says the same thing?
- a. If you see something wrong that could cause damage while you are operating the equipment, turn the equipment off right away.
  - b. Stop operation right away if damage to the equipment occurs.
  - c. Damage to the equipment during operation will stop operation immediately.
  - d. Stopping the operation immediately if a deficiency is noted during operation will damage the equipment.
6. You notice a bare wire which could cause a short circuit inside the equipment. What should you do right away?
- a. Tell the team chief.
  - b. Repair the wire.
  - c. Shut down the equipment.

If high reflected power is indicated on the receiver meter, the transmitter meter, or both, and adjustment of the control does not bring the meter indications within prescribed tolerances, check the entire system for poor connections, broken cables, and similar defects.

7. In this sentence, "bring the meter indications within prescribed tolerances" probably means:
- a. reduce the meter indications.
  - b. raise the meter indications.
  - c. adjust the control.
8. According to the sentence, what kinds of defects can cause high reflected power?
-

Meter should indicate 400 Hz or 60 Hz, depending on which machine is being operated.

9. Which of the following says the same thing?
- a. If you are operating one machine, the meter reading should be 400 Hz. On the other machine, the meter reading should be 60 Hz
  - b. Set the meter to 400 Hz or 60 Hz, depending on which machine you are operating.
  - c. If you are operating a machine, the meter should read 400 Hz and 60 Hz.
10. The correct meter reading depends on \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 4

Checkpoint 1, Form B

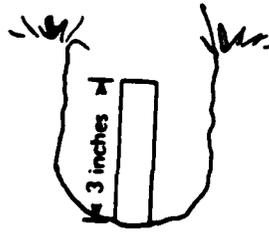
In this checkpoint, you will find sentences to read. Each sentence is followed by two questions. Read each sentence carefully before answering the questions.

Place the circuit breaker in the OFF position and turn variable resistor knob counterclockwise until it stops.

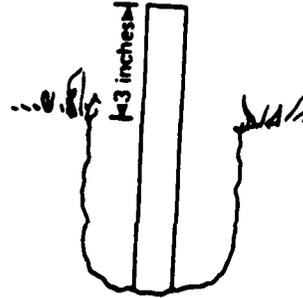
1. The two things you must do are:
  - a. place and turn off the circuit breaker.
  - b. place the circuit breaker to OFF and turn variable resistor knob.
  - c. place the OFF switch and turn variable resistor knob.
  - d. place circuit breaker to OFF and stop the variable resistor knob.
  
2. How long should you turn the variable resistor knob?
  - a. Until it is in the OFF position.
  - b. Until it is counterclockwise.
  - c. Until it stops.

Drive the sections of the ground rod (one at a time) into the hole until the top of the complete rod is about 3 inches above the bottom of the hole.

3. Which picture below shows the correct position of the ground rod?



a.



b.

4. Does the ground rod come in one section or several sections?

---

If the circuit breaker will not stay closed, it is defective and must be referred to organizational maintenance.

5. What should you do with a circuit breaker that will not stay closed?

- a. Defect it.
- b. Close it.
- c. Refer it to organizational maintenance.

6. There is something wrong with the circuit breaker if it

---

Defects that cannot be repaired or are beyond the scope of operator maintenance must be recorded on Form ABC.

7. Something is wrong with your equipment. It cannot be fixed. What should you do? \_\_\_\_\_

8. The sentence above says that:

- a. uncorrectable defects should be recorded on Form ABC.
- b. defects that are beyond the scope of operator maintenance cannot be repaired.
- c. defects on Form ABC cannot be repaired.

If the frequency reading is incorrect, the engine governor must be adjusted.

9. This sentence says:

- a. The frequency reading will be incorrect unless the engine governor is adjusted.
- b. Adjusting the engine governor is necessary if you get a wrong frequency reading.
- c. Read the frequency wrong, then adjust the engine governor.

10. "The frequency reading is incorrect" probably means:

- a. the indicator on the frequency meter is not what it should be.
- b. the operator makes a mistake reading the frequency.
- c. the meter is not reading the frequency correctly.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 5

Checkpoint 1, Form A

Directions: Read the statement below and answer the questions that follow.

Readjust the variable resistor before placing the circuit breaker in the OFF position.

1. What happens first in the above statement?
  - a. Readjust the variable resistor.
  - b. Readjust the circuit breaker.
  - c. Place the circuit breaker in the OFF position.
  - d. Place the readjustment in the variable resistor.
  
2. What happens second in the above statement?
  - a. Readjust the variable resistor.
  - b. Readjust the circuit breaker.
  - c. Place the circuit breaker in the OFF position.
  - d. Place the readjustment in the variable resistor.
  
3. Which of the following describes the tasks in the same order?
  - a. After readjusting the variable resistor, place the circuit breaker in the OFF position.
  - b. After placing the circuit breaker in the OFF position, readjust the variable resistor.
  - c. Before readjusting the variable resistor, place the circuit breaker in the OFF position.
  - d. Place the circuit breaker in the OFF position, then readjust the variable resistor.

Before setting the ON/OFF switch to ON, determine the current draw on each terminal and then stop the generator set.

4. What happens first in the above statement?

- a. Set the ON/OFF switch to ON.
- b. Determine the current draw.
- c. Stop the generator set.
- d. Set the current draw to ON.

5. What happens second in the above statement?

- a. Set the ON/OFF switch to ON.
- b. Determine the current draw.
- c. Stop the generator set.
- d. Set the current draw to ON.

6. What happens third in the above statement?

- a. Set the ON/OFF switch to ON.
- b. Determine the current draw.
- c. Stop the generator set.
- d. Set the current draw to ON.

7. Which of the following describes the tasks in the same order?

- a. Stop the generator set and determine the current draw on each terminal before setting the ON/OFF switch to ON.
- b. Set the ON/OFF switch to ON before determining the current draw. Then stop the generator set.
- c. Determine the current draw before setting the ON/OFF switch to ON. Then stop the generator set.
- d. Determine the current draw before stopping the generator set. Then set the ON/OFF switch to ON.

Continue operating procedures after positioning the Transfer Box Switch and turning the circuit breaker switch to ON.

8. Which of the following lists the tasks as they should be performed?
- a. Continue operating procedures. Position Transfer Box Switch. Turn circuit breaker to ON.
  - b. Position Transfer Box Switch. Turn circuit breaker to ON. Continue operating procedures.
  - c. Turn circuit breaker to ON. Continue operating procedures. Position Transfer Box Switch.
  - d. Turn circuit breaker to ON. Position Transfer Box Switch. Continue operating procedures.
9. Which of the following describes the tasks in the same order?
- a. Before continuing operating procedures, position the Transfer Box Switch and then turn the circuit breaker switch to ON.
  - b. Before positioning the Transfer Box Switch, turn the circuit breaker switch to ON and then continue operating procedures.
  - c. Before turning the circuit breaker switch to ON, continue operating procedures and then position the Transfer Box Switch.
  - d. Turn the circuit breaker switch to ON and then continue operating procedures and position the Transfer Box Switch.

Dismantle the shelter after disconnecting the cables and destroying the equipment.

10. Which of the following lists the tasks as they should be performed?

- a. Dismantle shelter. Disconnect cables. Destroy equipment.
- b. Disconnect cables. Destroy equipment. Dismantle shelter.
- c. Destroy equipment. Disconnect cables. Dismantle shelter.
- d. Destroy equipment. Dismantle shelter. Disconnect cables.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 5

Checkpoint 1, Form B

Directions: Read the statement below and answer the questions which follow.

Select test channels and then connect BQ-894 to transmitter.

1. Which of the tasks listed below is to be done first?
  - a. Select test channels.
  - b. Select BQ-894.
  - c. Connect BQ-894 to transmitter.
  - d. Connect BQ-894 to cable.
  
2. Which of the tasks listed below is to be done second?
  - a. Select test channels.
  - b. Select BQ-894.
  - c. Connect BQ-894 to transmitter.
  - d. Connect BQ-894 to cable.
  
3. Which of the following directions means the same thing?
  - a. Select test channels after connecting BQ-894 to transmitter.
  - b. Connect BQ-894 to transmitter and then select test channels.
  - c. Connect BQ-894 to transmitter before selecting test channels.
  - d. Select test channels before connecting BQ-894 to transmitter.

Read the statement below and answer the questions which follow.

Depress the handset switch after lifting the handset from the bracket, then wait for the order wire message.

4. Which of the tasks listed below is to be done first?
- a. Depress handset switch.
  - b. Wait for the order wire message.
  - c. Lift the handset from the bracket.
  - d. Depress the order wire.
5. Which of the tasks listed below is to be done second?
- a. Depress handset switch.
  - b. Wait for the order wire message.
  - c. Lift the handset from the bracket.
  - d. Depress the order wire.
6. Which of the tasks listed below is to be done third?
- a. Depress the handset switch.
  - b. Wait for the order wire message.
  - c. Lift the handset from the bracket.
  - d. Depress the order wire.
7. Which of the following directions means the same thing?
- a. After waiting for the order wire message, depress the handset switch and then lift the handset from the bracket.
  - b. After waiting for the order wire message, lift the handset from the bracket and then depress the handset switch.
  - c. Before depressing the handset switch, lift the handset from the bracket. Then wait for the order wire message.
  - d. Lift the handset from the bracket before waiting for the order wire message and then depress the handset switch.

Read the statement below and answer the question which follows.

Before setting the multimeter switch to 1 KC IN, request a test signal. Then adjust the FDM LEVELS.

8. Which of the following lists the tasks in the order they are to be performed?

- a. Set multimeter switch. Request test signal. Adjust FDM LEVELS.
- b. Adjust FDM LEVELS. Request test signal. Set multimeter switch.
- c. Request test signal. Set multimeter switch. Adjust FDM LEVELS.
- d. Set multimeter switch. Adjust FDM LEVELS. Request test signal.

Read the statement below and answer the questions which follow.

Set the transmitter multimeter selector switch to PCM IN after setting the TEST TONE switch to ON.

9. Which of the tasks listed below is to be done first?

- a. Set transmitter multimeter switch.
- b. Set the TEST TONE switch to ON.
- c. Set the PCM to IN.
- d. Set the TEST to TONE.

10. Which of the following means the same thing?

- a. Set the transmitter multimeter selector switch to PCM IN before setting the TEST TONE switch to ON.
- b. Set the TEST TONE switch to ON after setting the transmitter multimeter selector switch to PCM IN.
- c. Set the TEST TONE switch to ON before setting the transmitter multimeter selector switch to PCM IN.
- d. Set the transmitter multimeter selector switch to PCM IN and then set the TEST TONE switch to ON.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 6

Checkpoint 1, Form A

Read the following directions.

Turn on the XY-777 and wait several seconds. Then operate the switch to TALK and turn on the receiver.

1. Which of the following tasks happens first?
  - a. Wait several seconds.
  - b. Turn on the receiver.
  - c. Turn on the XY-777.
  - d. Operate the switch to TALK.
  
2. Which of the following tasks happens second?
  - a. Wait several seconds.
  - b. Turn on the receiver.
  - c. Turn on the XY-777.
  - d. Operate the switch to TALK.
  
3. Which of the following tasks happens third?
  - a. Wait several seconds.
  - b. Turn on the receiver.
  - c. Turn on the XY-777.
  - d. Operate the switch to TALK.
  
4. Which of the following tasks happens fourth?
  - a. Wait several seconds.
  - b. Turn on the receiver.
  - c. Turn on the XY-777.
  - d. Operate the switch to TALK.

Unit I, Lesson 6  
Checkpoint 1, Form A

1

5. Which of the following summarizes the directions best?
- a. Wait. Turn on receiver. Turn switch to TALK. Turn on XY-777.
  - b. Turn switch to TALK. Turn on XY-777. Wait. Turn on receiver.
  - c. Turn on receiver. Turn switch to TALK. Wait. Turn on XY-777.
  - d. Turn on XY-777. Wait. Turn switch to TALK. Turn on receiver.

Read the following directions:

Remove the tire assembly. Loosen the anchor pin lock nuts and align the anchor pins. Turn brake shoe adjusting pins and then insert a gauge through the inspection hole.

6. Which task is to be done just before turning the brake shoe adjusting pins?
- a. Remove the tire assembly.
  - b. Loosen the anchor pin lock nuts.
  - c. Align the anchor pins.
  - d. Insert a gauge through the inspection hole.
7. Which task is to be done just after turning the brake shoe adjusting pins?
- a. Remove the tire assembly.
  - b. Loosen the anchor pin lock nuts.
  - c. Align the anchor pins.
  - d. Insert a gauge through the inspection hole.
8. Which task is to be done just after removing the tire assembly?
- a. Loosen the anchor pin lock nuts.
  - b. Align the anchor pins.
  - c. Turn brake shoe adjusting pins.
  - d. Insert a gauge through the inspection hole.

9. Which task is to be done just before loosening anchor pin lock nuts?
- a. Remove the tire assembly.
  - b. Align the anchor pins.
  - c. turn brake shoe adjusting pins.
  - d. Insert a gauge through the inspection hole.
10. Which of the following summarizes the directions best?
- a. Insert gauge. Turn adjusting pins. Align anchor pins. Loosen nuts. Remove tire.
  - b. Loosen nuts. Turn adjusting pins. Align anchor pins. Remove tire. Insert gauge.
  - c. Turn adjusting pin. Remove tire. Align anchor pins. Insert gauge. Loosen nuts.
  - d. Remove tire. Loosen nuts. Align anchor pins. Turn adjusting pins. Insert gauge.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 6

Checkpoint 1, Form B

Read the following directions.

Operate the POWER switch to OFF. Send a line person out and then give instructions to connect into the cable link. Give instructions to perform the loopback check.

1. Which task is to be performed first?
  - a. Send line person out.
  - b. Give instructions to connect into cable link.
  - c. Give instructions to perform loopback check.
  - d. Operate the POWER switch to OFF.
  
2. Which task is to be performed second?
  - a. Send line person out.
  - b. Give instructions to connect into cable link.
  - c. Give instructions to perform loopback check.
  - d. Operate the POWER switch to OFF.
  
3. Which task is to be done just after sending a line person out?
  - a. Send line person out.
  - b. Give instructions to connect into cable link.
  - c. Give instructions to perform loopback check.
  - d. Operate the POWER switch to OFF.
  
4. Which task is to be done just before sending a line person out?
  - a. Send line person out.
  - b. Give instructions to connect into cable link.
  - c. Give instruction to perform loopback check.
  - d. Operate the POWER switch to OFF.

5. Which of the following summarizes the directions best?
- Tell him to connect into cable link. Tell him to operate switch to OFF. Send out line person. Do loopback check.
  - Operate switch to OFF. Send out line person. Tell him to connect into cable link. Tell him to do loopback check.
  - Send out line person. Operate switch to OFF. Tell him to connect into cable link. Tell him to do loopback check.
  - Tell him to do loopback check. Operate switch to OFF. Tell him to connect into cable link. Send out line person.

Read the following directions and answer the questions.

Recheck the area for loose items and then secure the power cable reel. Make sure that the drain plug is tightly closed. Close and lock the door.

6. Which task is to be done second?
- Recheck area for items.
  - Secure the power cable reel.
  - Close the door.
  - Lock the door.
7. Which task is to be done fifth?
- Recheck area for items.
  - Secure the power cable reel.
  - Close the door.
  - Lock the door.
8. Which of the following is to be done just before securing the power cable reel?
- Lock door.
  - Recheck area for loose items.
  - Close door.
  - Make sure drain plug is tightly closed.

9. Which of the following is to be done just after securing the power cable?
- a. Lock door.
  - b. Recheck area for loose items.
  - c. Close door.
  - d. Make sure drain plug is tightly closed.
10. Which of the following summarizes the directions best?
- a. Secure power cable reel. Close door. Lock door. Check drain plug. Recheck area.
  - b. Close door. Lock door. Recheck area. Secure power cable reel. Check drain plug.
  - c. Recheck area. Secure power cable reel. Check drain plug. Close door. Lock door.
  - d. Check drain plug. Secure power cable reel. Recheck area. Close door. Lock door.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 7

Checkpoint 1, Form A

Use the lists below to answer questions 1 through 5.

STANDARDS

1. Insure that the counseling site is private and free from distractions.
2. Give the soldier advance notice of the counseling session.
3. Give specific reasons for believing that the soldier has a problem.
4. Use active listening by making statements indicating your respect for, sensitivity to, and understanding of the soldier's comments.
5. Eliminate or modify working conditions that cause the soldier problems.

PERFORMANCE MEASURES

1. Select and schedule a site for the counseling session.
2. Notify the soldier of the time, place, and purpose of the counseling session.
3. Gather facts about the soldier's performance.
4. Determine whether or not a problem exists.
5. Write down suggestions and plans that will help the soldier.

1. Which of the following is exactly the same as point 4 of Standards?
  - a. Insure that the counseling site is private and free from distractions.
  - b. Notify the soldier of the time, place, and purpose of the counseling session.
  - c. Determine whether or not a problem exists.
  - d. Use active listening by making statements indicating your respect for, sensitivity to, and understanding of the soldier's comments.
  
2. Which of the following is exactly the same as point 3 of Performance Measures?
  - a. Give the soldier advance notice of the counseling session.
  - b. Gather facts about the soldier's performance.
  - c. Write down suggestions and plans that will help the soldier.
  - d. Eliminate or modify working conditions that cause the soldier problems.
  
3. Which of the following means the same thing as point 2 of Performance Measures?
  - a. Tell the soldier the when, where, and why of the counseling session.
  - b. List reasons of why the soldier has a problem.
  - c. Pick and reserve a location for the counseling session.
  - d. Working conditions that cause problems should be changed or eliminated.
  
4. Does point 1 of Standards tell you how large the counseling site should be?
  - a. Yes
  - b. No
  
5. Does point 5 of Standards tell you what to do to working conditions that cause problems for the soldier?
  - a. Yes
  - b. No

For questions 6 through 8, refer to Paragraph A.

#### PARAGRAPH A

This task may be performed in a tactical situation. To accomplish this task, you will need an operable AN/MRC-54(V) to include associated TMs, basic issue tools, and safety equipment. The antennas and generator set have been installed and the shelter equipment has been loopback tested in accordance with task 113-593-2017. You will be provided with a multichannel systems diagram. There are operable radio terminals at the distant end, one of which is the control terminal (ALFA terminal). You will perform the system alignment under the direction of the ALFA terminal.

6. Which one of the following is mentioned in Paragraph A?
- a. You will work in a team with four other soldiers.
  - b. You need an operable AB/CDE-100(T).
  - c. You will have a multichannel systems diagram.
  - d. You will be directing ALPHA terminal.
7. Which one of the following is not mentioned in Paragraph A?
- a. The generator set and antenna should already be installed.
  - b. Loopback testing will have been done in accordance with task 113-593-2017.
  - c. Do the task in a tactical situation.
  - d. You will have one hour to complete the task.

PARAGRAPH B

Do this task in a tactical situation. You will need an AN/MRC-54(V) in working order, associated TMs, basic issue tools, and safety equipment. The generator set and antennas have all been installed and the shelter equipment has been tested according to task 113-593-2017. There are operating radio terminals at the distant end. One of those terminals is ALFA terminal which is the control terminal that will direct the system alignment that you will do.

8. Which of the following needs to be added to Paragraph B to make it match Paragraph A?
- You will work in a team with four other soldiers.
  - ALFA terminal will be directed by you.
  - A multichannel system diagram will also be provided to you.
  - You will have one hour to complete the task.

For questions 9 and 10, refer to Paragraph C.

PARAGRAPH C

To check the cables, you must first locate the cable connections in the box. Refer to CABLE-123 to determine which cables you are using and how tight they should be. Check your cables for the proper connections and tightness.

9. Which one of the following is mentioned in Paragraph C?
- CABLE-123 will identify the cables and tell you how tight they should be.
  - You should first disconnect all of the cables.
  - The power should be turned off.
  - This task should be done weekly.

10. Which one of the following is not mentioned in Paragraph C?
- a. CABLE-123 will identify the cables and tell you how tight they should be.
  - b. First find the cable connections.
  - c. The power should be turned off.
  - d. Your job is to check the correctness and tightness of the cables.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT I - LESSON 7

Checkpoint 1, Form B

Use the lists below to answer questions 1 through 6.

STANDARDS

1. Insure that the counseling site is private and free from distractions.
2. Give the soldier advance notice of the counseling session.
3. Give specific reasons for believing that the soldier has a problem.
4. Use active listening by making statements indicating your respect for, sensitivity to, and understanding of the soldier's comments.
5. Eliminate or modify working conditions that cause the soldier problems.

PERFORMANCE MEASURES

1. Select and schedule a site for the counseling session.
2. Notify the soldier of the time, place, and purpose of the counseling session.
3. Gather facts about the soldier's performance.
4. Determine whether or not a problem exists.
5. Write down suggestions and plans that will help the soldier.

1. Which of the following is exactly the same as point 3 of Standards?
  - a. Give specific reasons for believing that the soldier has a problem.
  - b. Gather facts about the soldier's performance.
  - c. Eliminate or modify working conditions that cause the soldier problems.
  - d. Determine whether or not a problem exists.
  
2. Which of the following is exactly the same as point 4 of Performance Measures?
  - a. Give specific reasons for believing that the soldier has a problem.
  - b. Gather facts about the soldier's performance.
  - c. Eliminate or modify working conditions that cause the soldier problems.
  - d. Determine whether or not a problem exists.
  
3. Which of the following means the same thing as point 1 of Standards?
  - a. Be sure to get authorization to use the room you choose.
  - b. Be sure that the location you choose gives privacy and is one where you will not be bothered.
  - c. Counseling should be done at lunch-time so others will not bother you.
  - d. Have a pad and pencil nearby to jot down ideas.
  
4. Which of the following means the same thing as point 4 of Performance Measures?
  - a. Make statements showing that you respect, are sensitive to, and understand the soldier's comments.
  - b. You must list reasons for the problem.
  - c. You must determine if the site is appropriate or not.
  - d. You must decide if there is a problem or not.

5. Does point 2 of Standards say to tell the soldier of the time of, the place of, and the reason for the counseling session?
  - a. Yes
  - b. No
  
6. Does point 3 of Performance Measures tell you what form to use to gather facts?
  - a. Yes
  - b. No

For questions 7 through 10, refer to Paragraph A.

#### PARAGRAPH A

Your task is to complete the installation of the AN/MRC-54(V) as a radio repeater in accordance with RADIO-LINK. The equipment circuit breaker will remain in the OFF position during this task. And in order to allow easy access to the shelter during this task, secure the vehicle tailgate in the horizontal position and install the boarding ladder.

7. Which one of the following is mentioned in Paragraph A?
  - a. You must have basic tools and safety equipment before beginning.
  - b. Refer to RADIO-LINK when installing the AN/MRC-54(V) as a radio repeater.
  - c. The task can be performed in a tactical situation.
  - d. Antennas should be extended before you begin.
  
8. Which of the following is not mentioned in Paragraph A?
  - a. The circuit breaker will be at OFF during the entire task.
  - b. You will install the AN/MRC-54(V) as a radio repeater.
  - c. You must install a boarding ladder.
  - d. The generator set will be installed before you begin.

9. Which of the following is not mentioned in Paragraph A.
- a. Fasten the tailgate in a horizontal position.
  - b. Standards are met when the radio receiver works.
  - c. You will complete the installation of AN/MRC-54(V)
  - d. To access the shelter, install a boarding ladder.

PARAGRAPH B

You will install the AN/MRC-54(V) as a radio repeater (refer to RADIO-LINK). While doing this, have the circuit breaker at OFF. To access the shelter more easily, lower the tailgate to the horizontal.

10. Which of the following needs to be added to Paragraph B to make it match Paragraph A?
- a. Do this in a tactical situation.
  - b. Put a ladder from the tailgate to the shelter.
  - c. You will need to refer to issued TMs.
  - d. You will need safety equipment.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT II - LESSON 1

Checkpoint 1, Form A

The Table of Contents below doesn't look like any you will ever see. But it works the same way as any other Table of Contents. Look it over very quickly. Then use it to answer the questions on the next page.

	Page
INDIA	1-1
Kilo	1-2
Victor	1-7
Zulu	1-10
ECHO TASKS	2-1
Papa List	2-1
Golf Level	2-43
Sierra Level	2-106
DELTA TASKS	3-1
Papa List	3-1
Yankee Level	3-25
Quebec Level	3-79
Zulu Level	3-157
QUEBEC TASKS	4-1
Papa List	4-1
Golf Level	4-14
Tango Level	4-85
Yankee Level	4-193
Delta Level	4-205
UNIFORM TASKS	5-1
Papa List	5-1
Sierra Level	5-38
Tango Level	5-100
Zulu Level	5-211

1. How many chapters are in this Table of Contents? \_\_\_\_\_
2. How many sections are in the chapter DELTA TASKS? \_\_\_\_\_
3. You are told to look up Papa List. What other information must you be told before you can do that?  
\_\_\_\_\_
4. On what page will you find Zulu? (Give both parts of the page number.) \_\_\_\_\_
5. What is the title of the section in Chapter 4 on page 85?  
\_\_\_\_\_
6. What is the title of the section on page 43 of Chapter 2?  
\_\_\_\_\_
7. On what page will you find ECHO TASKS, Sierra Level? (Give both parts of the page number.) \_\_\_\_\_
8. On what page will you find Tango Level, UNIFORM TASKS? (Give both parts of the page number.) \_\_\_\_\_
9. You need to read about Quebec Level, DELTA TASKS. What page should you turn to? (Give both parts of the page number.) \_\_\_\_\_
10. You must look up QUEBEC TASKS, Tango Level. What page should you turn to? (Give both parts of the page number.) \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT II - LESSON 1

Checkpoint 1, Form B

The Table of Contents below doesn't look like any you will ever see. But it works the same way as any other Table of Contents. Look it over very quickly. Then use it to answer the questions on the next page.

	Page
UNIFORM	1-1
Golf	1-3
Sierra	1-5
India	1-11
HOTEL TASKS	2-1
Romeo List	2-1
Delta Level	2-34
Papa Level	2-98
ALFA TASKS	3-1
Romeo List	3-1
Tango Level	3-37
Golf Level	3-68
Papa Level	3-125
Yankee Level	3-207
ZULU TASKS	4-1
Romeo List	4-1
Oscar Level	4-41
Papa Level	4-97
Tango Level	4-257
TANGO TASKS	5-1
Romeo List	5-1
Charlie Level	5-83
Alfa Level	5-165
Delta Level	5-280
Quebec Level	5-347

NOTE: When a page number is asked for, give both parts.

1. You must look up ZULU TASKS, Papa Level. What page should you turn to? \_\_\_\_\_
2. You need to read about Charlie Level, TANGO TASKS. What page should you turn to? \_\_\_\_\_
3. On what page will you find Papa Level, HOTEL TASKS? \_\_\_\_\_
4. On what page will you find ALFA TASKS, Yankee Level? \_\_\_\_\_
5. What is the title of the section on page 68 of Chapter 3?  
\_\_\_\_\_
6. What is the title of the section in Chapter 2 on page 98?  
\_\_\_\_\_
7. How many sections are in the Chapter UNIFORM? \_\_\_\_\_
8. You are told to look up Romeo List. What else must you be told to before you can do that?  
\_\_\_\_\_
9. How many chapters are in this Table of Contents? \_\_\_\_\_
10. On what page will you find Golf? (Note: just Golf, not Golf Level.) \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT II - LESSON 2

Checkpoint 1, Form A

Directions: You will need to look in both Chapter 2 and Chapter 3 Task Lists to answer the following questions.

1. You are told to look up Task 031-503-1010. Where would you have to look? Check the correct answer.  
 a. Chapter 2 Task List only  
 b. Chapter 3 Task List only  
 c. Both Chapter 2 and Chapter 3 Task Lists
2. To find a Task Number quickly, this lesson teaches that you should look first at:  
 a. the whole number  
 b. the first section of the number  
 c. the middle section of the number  
 d. the last section of the number
3. Write the title of Task 081-851-1001.  
\_\_\_\_\_
4. What is the title of Task 071-327-0202?  
\_\_\_\_\_
5. What is the title of Task 113-593-2002?  
\_\_\_\_\_
6. Is Task 113-593-2002 in the Chapter 2 or Chapter 3 Task List?  
\_\_\_\_\_
7. What is the title of Task 113-593-7004?  
\_\_\_\_\_

8. Is Task 113-593-7004 in the Chapter 2 or Chapter 3 Task List?

---

NOTE: Use the Chapter 3 Task List to answer questions 9 and 10.

9. What is the Task Number for the Task on Troubleshooting a Repeater Set, Radio, AN/TRC-110(V)?

---

10. What is the Task Number for the Task on Installing the Terminal, Telegraph-Telephone AN/MCC-6?

---

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE.

GO ON TO THE NEXT PART OF THE LESSON.

---

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT II - LESSON 2

Checkpoint 2, Form A

Directions: You will need to look in both Chapter 2 and Chapter 3 Task Lists to answer the following questions. Give both parts of the page numbers.

1. The Task Description for Task 113-593-7004 is on what page?  
\_\_\_\_\_
2. Information on Task No. 081-851-1001 is on what page? \_\_\_\_\_
3. If you want to read about Task 113-593-2002, you must go to what page? \_\_\_\_\_
4. Information on Task 071-327-0202 is on what page? \_\_\_\_\_
5. The Task Description for Task No. 113-593-1005 is on what page?  
\_\_\_\_\_

Directions: Use only the Chapter 3 Task List to answer the following questions.

6. If you want to read how to Troubleshoot a Repeater Set, AN/TRC-110(V), what page should you go to? \_\_\_\_\_
7. What is the page number for the task on Installing the AN/TRC-24 Antenna System? \_\_\_\_\_
8. If you want to Perform System Alignment of a Radio Terminal in the AN/TRC-145(V), what page would you go to? \_\_\_\_\_
9. You want to Troubleshoot a Repeater Set, AN/MRC-54(V). What page should you turn to? \_\_\_\_\_
10. What is the page number for the task that is called "Performing System Alignment on a 12-Channel Radio Terminal in the AN/MRC-69(V) or AN/MRC-73(V)"? \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT II - LESSON 2

Checkpoint 1, Form B

Directions: Turn to the first page of the Chapter 3 Task List in your Soldier's Manual. You can use the Table of Contents to find the page number if you need to.

1. Write the task number of the second task in the list, "Install the AN/GRC-103(V) Antenna System." \_\_\_\_\_

Directions: You will need to look in both Chapter 2 and Chapter 3 Task Lists to answer the following questions.

2. Write the Title of Task 113-593-2007.  
\_\_\_\_\_

3. What is the title of Task 113-573-4001?  
\_\_\_\_\_

4. Write the title of Task 113-593-2013.  
\_\_\_\_\_

5. What is the title of Task 081-831-1006?  
\_\_\_\_\_

Directions: Use only the Chapter 3 Task List to answer the following questions.

6. Write the Task Number for the Task on Installing a Terminal Set, Telephone, AN/TCC-61. \_\_\_\_\_
7. What is the Task Number for the task on Operating Terminal Set, Telephone, AN/TCC-60 or AN/TCC-69? \_\_\_\_\_
8. What is the Task Number for the task on Performing Monthly Preventive Maintenance on a Telephone Terminal Set, AN/TCC-73?  
\_\_\_\_\_
9. What is the Task Number for the task on Operating a Radio Terminal Set, AN/TRC-145(V)? \_\_\_\_\_
10. What is the title of Task 113-593-4002?  
\_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE.  
GO ON TO REVIEW EXERCISE 2.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT II - LESSON 2

Checkpoint 2, Form B

Directions: Use only the Chapter 3 Task List to answer these questions.

1. What is the page number for Task 113-593-2014? \_\_\_\_\_
2. You need to read about Task 113-593-2015. What page does the task description start on. \_\_\_\_\_
3. The task description for Task 113-593-4005 is on what page?  
\_\_\_\_\_
4. What is the page number for Task 113-593-3027? \_\_\_\_\_
5. If you want to read about Task 113-593-3042, what page must you turn to? \_\_\_\_\_
6. What is the page number for the task description on Troubleshooting Radio Terminal Set AN/TRC-145? \_\_\_\_\_
7. You want to Operate the Radio Repeater Set AN/TRC-113(V). What page should you turn to? \_\_\_\_\_
8. If you want to read how to Perform Monthly Preventive Maintenance on a Terminal Telephone Set, AN/TCC-61, what page should you go to? \_\_\_\_\_
9. What is the page number for the task description on Performing Operator's Daily Preventive Maintenance on the Repeater Set, Radio, AN/TRC-110(V)? \_\_\_\_\_
10. What is the page number of the task description on Installing the AN/GRC-50 Antenna System? \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

### UNIT II - LESSON 3

#### Checkpoint 1, Form A

The Table of Contents below is from a TM. Look it over very quickly. Then use it to answer the questions on the following page.

CHAPTER Section		Paragraph	Page
	<b>1. INTRODUCTION</b>		
	<b>I. General</b>		
	Scope .....	1-1	1-1
	Indexes of publications .....	1-2	1-1
	Forms and records.....	1-3	1-1
	<b>II. Description and Data</b>		
	Purpose and use .....	1-4	1-1
	Technical characteristics .....	1-5	1-3
	Components comprising the operable end item .....	1-6	1-9
	Description .....	1-7	1-9
	Additional equipment required .....	1-8	1-9
	Administrative storage .....	1-9	1-9
	<b>2. INSTALLATION</b>		
	<b>I. Service Upon Receipt of Equipment</b>		
	Unpacking .....	2-1	2-1
	Checking unpacked equipment .....	2-2	2-1
	<b>II. Installation</b>		
	Siting .....	2-3	2-1
	Installing .....	2-4	2-2
	Connecting .....	2-5	2-2
	Preliminary operation of controls .....	2-6	2-2
	Preliminary checks and adjustments .....	2-7	2-2
	<b>III. System Lineup</b>		
	Adjusting order-wire level .....	2-8	2-15
	Adjusting video level .....	2-9	2-16
	Adjusting channel gain .....	2-10	2-17
	<b>3. OPERATING INSTRUCTIONS</b>		
	<b>I. Controls, Indicators and Connectors</b>		
	Multiplexer TD-202/U or TD-203/U .....	3-1	3-1
	Multiplexer TD-204/U .....	3-2	3-7
	Multiplexer TD-352/U or TD-353/U .....	3-3	3-13
	Converter, Telephone Signal CV-1548.G .....	3-4	3-22
	<b>II. Operating Procedures</b>		
	Starting procedure .....	3-5	3-26
	Operating order wire .....	3-6	3-27
	Monitoring channels of TD-352/U or TD-353/U .....	3-7	3-27
	Stopping procedure .....	3-8	3-28
	Operation under unusual conditions .....	3-9	3-28

(Continued on the next page.)

Unit II, Lesson 3  
Checkpoint 1, Form A

		Paragraph	Page
CHAPTER 4	<b>MAINTENANCE</b>		
Section I.	Preventive Maintenance		
	Scope of maintenance .....	4-1	4-1
	Operator's daily preventive maintenance checks and services .....	4-2	4-2
	Operator's weekly preventive maintenance checks and services .....	4-4	4-5
	Organizational monthly preventive maintenance checks and services .....	4-3	4-4
II.	Troubleshooting		
	System troubleshooting .....	4-5	4-8
	Cable link troubleshooting .....	4-6	4-18
	Component troubleshooting .....	4-7	4-20
III.	Repairs and Adjustments		
	Replacement of plug-in panels .....	4-8	4-26
	Replacement of power supply assemblies .....	4-9	4-26
	Replacement of lightning arresters (TD-204 U) .....	4-10	4-26
	Servicing air filters .....	4-11	4-27
	TD-204 U overcurrent dropout adjustment .....	4-12	4-27
CHAPTER 5.	<b>BASIC PULSE CODE MODULATION THEORY</b>		
Section I	Introduction		
	General .....	5-1	5-1
	Principles of multiplexing .....	5-2	5-1
II	Principles of Pulse Code Modulation		
	General .....	5-3	5-2
	Voice transmission by pulse code modulation .....	5-4	5-2
	Pulse code modulation TD-352 U and TD-353 U .....	5-5	5-3
CHAPTER 6	<b>SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE</b>		
Section I	Shipment and Limited Storage		
	Disassembly .....	6-1	6-1
	Repackaging .....	6-2	6-1
II	Demolition of Material to Prevent Enemy Use		
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	Methods of destruction .....	6-4	6-1

ANSWER THE FOLLOWING QUESTIONS:

1. On what page will you find "Principles of multiplexing"? \_\_\_\_\_
2. What is the paragraph number of the paragraph called "Stopping procedure"? \_\_\_\_\_
3. On what page does paragraph 4-8 start? \_\_\_\_\_
4. What is the title of paragraph 2-2?  
\_\_\_\_\_
5. On what page will you find "Voice transmission by pulse code modulation"? \_\_\_\_\_
6. What is the paragraph number of the paragraph called "Purpose and Use"? \_\_\_\_\_
7. On what page does paragraph 3-7 start? \_\_\_\_\_
8. What is the title of paragraph 4-5?  
\_\_\_\_\_
9. On what page will you find "Authority for demolition"? \_\_\_\_\_
10. What is the paragraph number of the paragraph called "Connecting"?  
\_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT II - LESSON 3

Checkpoint 1, Form B

The Table of Contents below is from a TM. Look it over very quickly. Then use it to answer the questions on the page following the Table of Contents.

	Paragraph	Page
<b>CHAPTER 1. INTRODUCTION</b>		
General		
Scope .....	1-1	1-1
Indexes of publications .....	1-2	1-1
Forms and records .....	1-3	1-1
II. Description and data		
Purpose and use .....	1-4	1-2
Technical characteristics .....	1-5	1-2
Components of radio sets .....	1-6	1-4
Description of radio set .....	1-7	1-4.6
Transmitting equipment .....	1-8	1-4.6
Receiving equipment .....	1-9	1-4.7
Antenna components .....	1-10	1-6.1
Regulator, Voltage CN-514/GRC .....	1-11	1-7
Minor components .....	1-12	1-8
Additional equipment required .....	1-13	1-10
Differences in models and configurations .....	1-14	1-10
III. System application		
General .....	1-15	1-20
Two-terminal system .....	1-16	1-20
Repeater station system .....	1-17	1-20
Interoperation with Radio Set AN/TRC-24 Configurations, fdm operation only ..	1-18	1-21
<b>CHAPTER 2. INSTALLATION</b>		
Section I. Service upon receipt of equipment		
Unpacking .....	2-1	2-1
Checking unpacked equipment .....	2-2	2-2
II. Installation		
Preliminary installation data .....	2-3	2-4
Shelter requirements .....	2-4	2-40
Tools required for installation .....	2-5	2-40
Antenna site .....	2-6	2-40
Antenna AT-903/G adjustment .....	2-7	2-40
Cable connections and grounding .....	2-8	2-41
Wavemeter vernier scale interpretation .....	2-9	2-41

(Continued on the next page.)

	Paragraph	Page
<b>CHAPTER 3. OPERATING INSTRUCTIONS</b>		
Section I. Operator's controls and indicators		
Transmitter controls and indicators	3-1	3-1
Receiver controls and indicators	3-2	3-3
Regulator, Voltage CN-514/GRC controls and indicators	3-3	3-4
II. Tuning procedures		
General	3-4	3-13
Installation of tuning units	3-5	3-14
Determination of channel frequency	3-6	3-14
Preliminary starting procedures	3-7	3-14
Receiver tuning procedures	3-8	3-15
Transmitter tuning requirements	3-9	3-19
Transmitter tuning procedures	3-10	3-21
Single stack loop-back operational tests	3-11	3-27
III. System lineup procedures		
General	3-12	3-30
Fdm system lineup	3-13	3-31
Pcm system lineup	3-14	3-32
System checks and adjustments	3-15	3-33
Multiplex terminal adjustments	3-16	3-34
IV. Routine operating procedures		
General	3-17	3-34
Order wire operation	3-18	3-34
Monitoring equipment	3-19	3-35
Stopping procedure	3-20	3-36
<b>CHAPTER 4. OPERATOR'S MAINTENANCE</b>		
Scope of operator's maintenance	4-1	4-1
Operator's preventive maintenance	4-2	4-1
Preventive maintenance checks and services periods	4-3	4-1
Daily preventive maintenance checks and services chart	4-4	4-2
Weekly preventive maintenance checks and services chart	4-5	4-2
Cleaning	4-6	4-3
Visual inspection	4-7	4-3
Operational checklist	4-8	4-3
Replacement of indicator lamps	4-9	4-5
Replacement of fuses	4-10	4-5
Replacement of aid filter	4-11	4-6

1. What is the paragraph number of the paragraph in Chapter 2, called "Antenna Site"? \_\_\_\_\_
2. On what page will you find information on "Components of radio sets"? \_\_\_\_\_
3. What is the title of paragraph 3-13?  
\_\_\_\_\_
4. On what page does paragraph 1-4 start? \_\_\_\_\_
5. What is the paragraph number of the paragraph titled "Transmitter tuning procedures"? \_\_\_\_\_
6. On what page will you find information on "Order wire operation"?  
\_\_\_\_\_
7. What is the title of paragraph 1-8?  
\_\_\_\_\_
8. On what page does paragraph 4-8 start? \_\_\_\_\_
9. What is the paragraph number of the paragraph titled "Cleaning"?  
\_\_\_\_\_
10. On what page will you find information on "Replacement of fuses"?  
\_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT III - LESSON 1

Checkpoint 1, Form A/B

Directions:

NOTE: Do not look at the questions until after you are done listening to the tape.

1. Listen to the first short lecture on the audiotape that goes with this checkpoint.
2. Stop the tape when you are directed to do so.
3. Do not take notes.
4. You may replay the tape, but do not look at the questions beforehand. After you stop the tape, answer questions 1 through 6.

START THE TAPE NOW.

1. How many major points were covered in the lecture?
  - a. 5
  - b. 2
  - c. 3
  - d. 7
2. The second major point discussed was:
  - a. advantages of night river crossing.
  - b. lighting under blackout conditions.
  - c. disadvantages of night river crossing.
  - d. weighing advantages and disadvantages.
3. The best natural lighting condition for a night river crossing is:
  - a. a quarter moon behind you.
  - b. a half moon behind you.
  - c. a quarter moon in front of you.
  - d. a full moon in front of you.

Unit III, Lesson 1  
Checkpoint 1, Form A/B

1

4. Look at each of the statements below.

1. Keep an attack going
2. Enemy air superiority over crossing area
3. Assembling of rafts requires more time
4. Surprise the enemy

Which of the above were mentioned as advantages of crossing a river at night?

- a. 1, 2, and 3
- b. 2, 3, and 4
- c. 1, 2, and 4
- d. All of the above

5. Look at each of the statements below.

1. Open land by the river
2. More confusion
3. Extra measures needed to prevent vehicle accidents
4. Need for artificial lighting

Which of the above were mentioned as disadvantages of crossing a river at night?

- a. 1, 2, 3
- b. 3 and 4
- c. 1 and 4
- d. 2 and 3

6. Look at each of the items below.

1. Infrared binoculars
2. Flashlights
3. Vehicle lights
4. Starlight scopes

Which of the above were mentioned as night vision devices?

- a. 2 and 3
- b. 1 and 4
- c. 1 and 3
- d. All of the above

Directions:

NOTE: Do not look at the questions until after you hear the tape.

1. Listen to the second short lecture on the audiotape.
2. Stop the tape when you are directed to do so.
3. Do not take notes.
4. After you stop the tape, answer questions 7 through 10.
5. After finishing the checkpoint, rewind the tape.

START THE TAPE NOW.

7. The purpose of the procedure described was:
- a. presetting the PQT-37 Telephone Terminal.
  - b. adjusting the Transmitter Amplifier Gain.
  - c. aligning the Modem 2.
  - d. checking the Receiver Amplifier.

8. Three panels were mentioned in the lecture. They were:
- a. Measure Select Panel, Test Panel, Adjust Gain Panel.
  - b. Adjust Gain Panel, Subgroup Panel, Test Panel.
  - c. Transmitter Panel, Amplifier Panel, Modem 2.
  - d. Test Panel, Subgroup Panel, Modem 2.
9. The Fine Tune control and Measure Select switch are located on the:
- a. Power Supply.
  - b. Receiver.
  - c. Test Panel.
  - d. Modem 2.
10. The Transmitter Amplifier Gain control is located on the:
- a. Subgroup Panel.
  - b. Adjust Gain Panel.
  - c. Transmitter Panel.
  - d. Test Panel.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

REWIND THE AUDIOTAPE TO THE BEGINNING  
SO IT WILL BE READY FOR THE NEXT STUDENT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT III - LESSON 2

Checkpoint 1, Form A/B

Directions:

NOTE: Do not look at the questions until after you are done viewing the tape.

1. Watch the tape all the way through to the end.
2. Do not take notes.
3. You may replay the tape but do not look at the questions beforehand.
4. After you stop the tape, answer the questions below.
5. When you have finished the checkpoint, rewind the tape.

1. What was the demonstration about?
  - a. Presetting parts of the AN/TCC-7 Telephone Terminal
  - b. Adjusting the Orderwire of the AN/TCC-7 Telephone Terminal
  - c. Tuning the Transmitter of the AN/TRC-24 Radio
  - d. Presetting the PP-827 power supply
  
2. These two switches are located next to each other: 68 KC Alarm Cutoff, 120 KC Alarm Cutoff. Which statement below describes how they should be adjusted?
  - a. Both should be switched to ON.
  - b. The first one should be OFF, the second one ON.
  - c. Both should be switched to OFF.
  - d. The first one should be ON, the second one OFF.

3. Here is a statement from the demonstration: "Set this control three quarters of a turn from the full counterclockwise position." Which of the following says the same thing?
  - a. Turn it fully clockwise, then stop.
  - b. Turn it three quarters counterclockwise, then stop.
  - c. Turn it three quarters clockwise, then one quarter counterclockwise.
  - d. Turn it fully counterclockwise, then three quarters back to clockwise.
  
4. Which of the following statements gives the correct order for doing the preset on the Test Panel?
  - a. Adjust the 65 KC control, the High Frequency control, the 1 KC control.
  - b. Adjust the High Frequency control, the 65 KC control, the 1 KC control.
  - c. Adjust the 1 KC control, the High Frequency control, the 65 KC control.
  - d. Adjust the High Frequency control, the 1 KC control, the 65 KC control.
  
5. Where is the 65 kilocycle (or KC) Transmit Control located?
  - a. Upper right front of the Carrier Supply panel
  - b. Middle of the Test Panel front
  - c. Lower right front of the Power Supply
  - d. Inside the Test Panel
  
6. Some of the controls must be adjusted with a screwdriver. How should they be turned?
  - a. Three quarters from counterclockwise.
  - b. Fully clockwise
  - c. Fully counterclockwise
  - d. Half-way from clockwise.

7. Two units or pieces of equipment were used in the demonstration. They were:
  - a. Transmitter and Test Panel.
  - b. Test Panel and Power Supply.
  - c. Test Panel and Carrier Supply Panel.
  - d. Carrier Supply Panel and Transmitter.
  
8. One step was to plug a cord into a jack. What was the name of the jack?
  - a. Channel In
  - b. Channel Out
  - c. 68 kilocycle
  - d. Measure Out
  
9. Which of the following needs to be adjusted with a screwdriver?
  - a. 68 KC Alarm Cutoff switch
  - b. Carrier Sync switch
  - c. 12 and 28 Send switch
  - d. 65 kilocycle Transmit Control
  
10. Some of the controls are adjusted with a screwdriver. Which of the statements below correctly describes how those controls are adjusted?
  - a. Each is adjusted in its own different way.
  - b. All are adjusted in the same way.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT III - LESSON 3

Checkpoint 1, Form A/B

- Directions:
1. Watch the first short demonstration on the videotape that goes with this checkpoint.
  2. Stop the tape when you are directed to do so.
  3. Do not take notes.
  4. You may replay the tape but do not look at the questions beforehand.
  5. After you stop the tape, answer questions 1 and 2.
  6. After you have finished the whole checkpoint, rewind the tape.

NOTE: Do not look at the questions until after you are done viewing the taped demonstration.

1. Which of the following pieces of information was not included in Demonstration 1?
  - a. Where to set the Measure Switch
  - b. When to stop adjusting the Mod Adjust control.
  - c. Which direction to turn the Mod Trim control.
  - d. All of the above were included in the demonstration.
  
2. Which of the following statements was not made in Demonstration 1?
  - a. You need a screwdriver to adjust the Mod Adjust control.
  - b. Put the Meter Sensitivity switch in the Increase position.
  - c. Turn the Mod Trim control till you get a maximum reading on the Measure Meter.
  - d. All of the above were included in the demonstration.

Now start the tape and watch Demonstration 2. You will be told when to turn off the tape. Afterwards, answer the next two questions.

3. Which of the following pieces of information was not included in Demonstration 2?
  - a. What this demonstration is about.
  - b. What to do with the 150 Volt control.
  - c. What position to set the 750 Volt DC switch.
  - d. All of the above statements were included in the demonstration.
  
4. Which of the following statements was not included in Demonstration 2?
  - a. The 750 Volt Adjust switch should be set at Position 1.
  - b. The 150 Volt DC switch should be in the OFF position.
  - c. You need a screwdriver for the 150 Volt Adjust control.
  - d. All of the above statements were included in the demonstration.

Now start the tape and watch Demonstration 3. You will be told when to turn off the tape. Afterwards, answer the next two questions.

5. Which of the following pieces of information was not included in Demonstration 3?
  - a. What you should do with the RF Channel Tune control.
  - b. What the decade channel is in this case.
  - c. Usually the index pointer will not point exactly to the decade channel.
  - d. All of the above were included in the demonstration.
  
6. Which of the following pieces of information was not included in Demonstration 3?
  - a. What the reading should be on the Measure Meter.
  - b. What you should do with the Indicator control.
  - c. What to do if the Frequency Drift meter has drifted from zero.
  - d. All of the above were included in the demonstration.

Now start the tape and watch Demonstration 4. You will be told when to turn off the tape. Afterwards, answer the next two questions.

7. Which of the following pieces of information was not included in Demonstration 4?
  - a. What the reading should be on the DC Volt meter.
  - b. What position to put the 750 Volt DC switch in.
  - c. The purpose of the demonstration.
  - d. All of the above were included in the demonstration.
  
8. Which of the following statements was not included in Demonstration 4?
  - a. Set the 750 Volt Adjust switch to Position 1.
  - b. Set the DC Test switch to 750 Volt Lower Scale position.
  - c. Turn the 750 Volt DC switch to the ON position.
  - d. All of the above were included in the demonstration.

Now watch Demonstration 5. You will be told when to turn off the tape. Afterward answer the next two questions.

9. Which of the following pieces of information was not included in Demonstration 5?
  - a. The name of the control you must adjust.
  - b. The name of the meter you must look at.
  - c. The name of the piece of equipment you are working on.
  - d. All of the above were included in the demonstration.
  
10. Which of the following statements was not included in Demonstration 5?
  - a. Turn the AFC switch to ON.
  - b. Turn the AFC control to the +4 mark.
  - c. When you release the AFC control, it automatically returns to zero.
  - d. All of the above were included in the demonstration.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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AND TELL YOU WHAT TO DO NEXT.

INSTRUCTIONS FOR STUDENT - TO BE HANDED WITH VIDEOTAPE

Name \_\_\_\_\_

Date \_\_\_\_\_

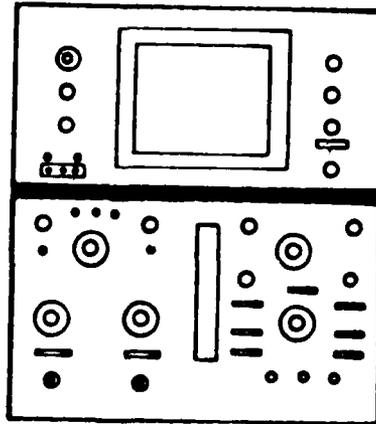
UNIT IV - LESSON 1

Checkpoint 1, Form A/B

To complete this checkpoint,

- . Insert the videotape on the machine and watch the demonstration on the presets for the AN/USM-281A Oscilloscope. Take notes on a separate sheet of paper. Use the drawing below to label the controls.
- . If necessary, rewind the tape and watch the demonstration again.
- . When you are satisfied that your notes are complete, return the tape to the instructor. He will assign you to some other activity for half an hour. Then he will give you a set of questions to answer.

DO NOT LOSE YOUR NOTES.



Unit IV, Lesson 1  
Checkpoint 1, Form A/B

INSTRUCTIONS

TO BE HANDED OUT AFTER VIDEOTAPE HAS BEEN RETURNED.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 1

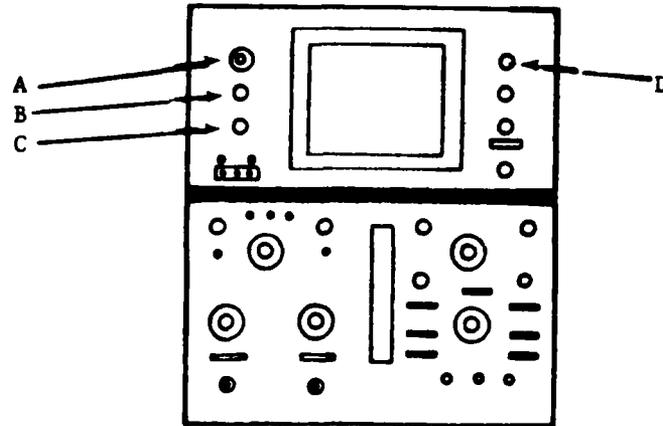
Checkpoint 1, Form A

Use your notes to answer the questions below. Check the one correct answer for each question.

1. The tables in the front of TM 9-6625-2362-12 will tell you:
  - \_\_\_\_\_ a. the steps in using the AN/USM-281A oscilloscope for troubleshooting.
  - \_\_\_\_\_ b. where to find additional reference materials on the AN/USM-281A.
  - \_\_\_\_\_ c. the description and function of each control on the control panel.
  - \_\_\_\_\_ d. how to locate each procedure in the manual.
  
2. The vertical function controls are located in the \_\_\_\_\_ quarter of the oscilloscope.
  - \_\_\_\_\_ a. upper left
  - \_\_\_\_\_ b. lower left
  - \_\_\_\_\_ c. upper right
  - \_\_\_\_\_ d. lower right
  
3. The AN/USM-281A cannot be used as:
  - \_\_\_\_\_ a. an AC voltmeter.
  - \_\_\_\_\_ b. a DC voltmeter
  - \_\_\_\_\_ c. a peak-to-peak voltmeter.
  - \_\_\_\_\_ d. a frequency meter.

4. The BEAM FINDER button is located in the middle of:
- a. the SCALE ILLUMINATION control.
  - b. the HORIZONTAL POSITIONING control.
  - c. the INTENSITY control.
  - d. the FOCUS control.
5. If the controls are set properly but there is no display on the CRT you would:
- a. adjust the SCALE ILLUMINATION control.
  - b. turn the HORIZONTAL POSITIONING control.
  - c. turn the FOCUS control counterclockwise.
  - d. press the BEAM FINDER button.
6. When the POWER OFF/ON switch is turned to ON, what indication do you get?
- a. A buzzer sounds
  - b. A pilot light comes on
  - c. The CRT lights up
  - d. No indication
7. Suppose the trace shows up near the bottom of the CRT. What control would you use to move it to where it should be?
- a. The HORIZONTAL POSITIONING control
  - b. The VERTICAL POSITIONING control
  - c. The BEAM FINDER button
  - d. The SCALE ILLUMINATION control

For the next three questions, refer to the drawing below.



8. If you wanted to move the trace to the left or right, you would use the control marked:

a. A  
 b. B  
 c. C  
 d. D

9. To light up the up and down lines on the face of the CRT, you would use the control marked:

a. A  
 b. B  
 c. C  
 d. D

10. To make the CRT beam brighter, you would turn the outer rim of the control marked:

a. A  
 b. B  
 c. C  
 d. D

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

TO BE HANDED OUT AFTER VIDEOTAPE HAS BEEN RETURNED.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 1

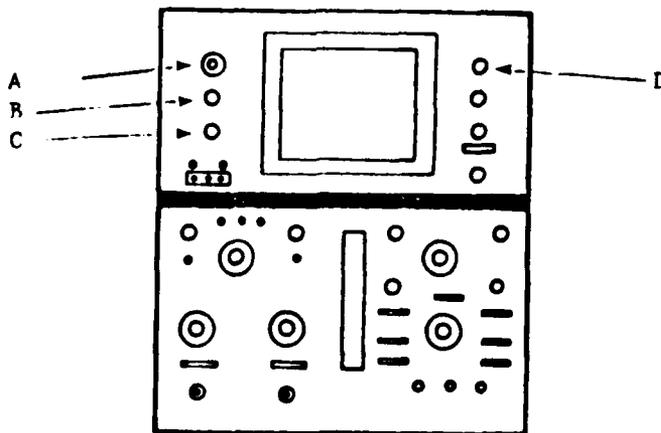
Checkpoint 1, Form B

1. The horizontal function controls are located in the \_\_\_\_\_ quarter of the oscilloscope.
  - a. upper right
  - b. lower left
  - c. upper right
  - d. lower right
  
2. The AN/USM-281A is used for troubleshooting using the \_\_\_\_\_ method.
  - a. peak-to-peak
  - b. signal tracing
  - c. horizontal positioning
  - d. trial and error
  
3. To find the description and function of each control on the AN/USM-281A, you would look:
  - a. on the back panel of the oscilloscope.
  - b. in the Soldier's Manual (FM 11-31M 1/2)
  - c. in the front of TM 9-6625-2362-12.
  - d. in the Appendix to TM 9-6625-2362-12.
  
4. The up-and-downlines on the CRT are used for:
  - a. locating the beam.
  - b. horizontal positioning.
  - c. measuring peak-to-peak voltage.
  - d. measuring DC voltage.

Unit IV, Lesson 1  
Checkpoint 1, Form B

5. The BEAM FINDER button is used to:
  - a. locate the trace when there is no display.
  - b. move the trace up and down.
  - c. move the trace to left or right.
  - d. control the intensity of the CRT beam.
  
6. The outer rim of the BEAM FINDER button is called the:
  - a. HORIZONTAL POSITIONING control.
  - b. INTENSITY control.
  - c. FOCUS control.
  - d. SCALE illumination control.
  
7. Suppose the trace shows up near the top of the CRT. What control would you use to move it to where it should be?
  - a. The SCALE ILLUMINATION control
  - b. The BEAM FINDER control
  - c. The HORIZONTAL POSITIONING control
  - d. The VERTICAL POSITIONING control

For the next three questions, refer to the drawing below.



8. The control labeled "D" is used to:
  - a. move the trace to the left or right.
  - b. move the trace up and down.
  - c. make the CRT beam brighter.
  - d. light up the up-and-down lines on the CRT.
  
9. The control labeled "B" is used to:
  - a. bring the display into focus.
  - b. locate the beam when there is no display
  - c. turn the power on and off.
  - d. move the trace to the left or right.
  
10. The control labeled "C" is used to:
  - a. turn the power on and off.
  - b. move the trace up and down.
  - c. light up the up-and-down lines on the CRT.
  - d. make the CRT beam brighter.

INSTRUCTIONS FOR STUDENT - TO BE HANDED OUT WITH VIDEOTAPE

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 2

Checkpoint 1, Form A/B

To complete this checkpoint,

- . Insert the videotape in the machine and watch the demonstration of how to count a frequency on the AN/TSM 16 Frequency Meter. Take notes on a separate sheet of paper.
- . If necessary, rewind the tape and watch the demonstration again.
- . When you are satisfied that your notes are complete, return the tape to the instructor. He will assign you to some other activity for half an hour. Then he will give you a set of questions to answer.

DO NOT LOSE YOUR NOTES.

TO BE HANDED OUT AFTER VIDEOTAPE HAS BEEN RETURNED

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 2

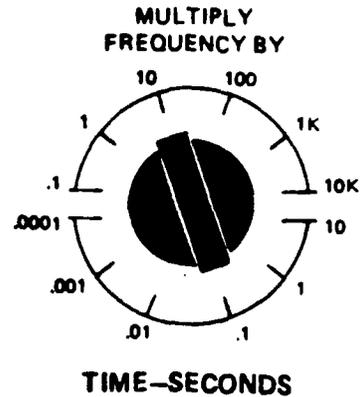
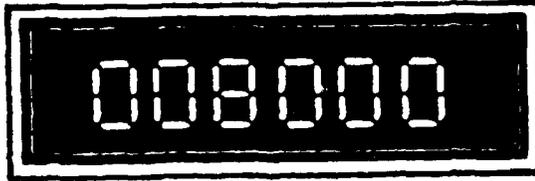
Checkpoint 1, Form A

Use your notes to answer the questions below. Check the one correct answer for each question.

1. Before coupling the frequency to be measured to the COUNTER INPUT receptacle, you should:
  - a. set the FUNCTION switch to FREQUENCY position.
  - b. rotate the SENSITIVITY control clockwise.
  - c. adjust the DISPLAY TIME control.
  - d. translate the reading into cycles per second.
  
2. After you rotate the TIME SECONDS switch to the desired time sampling period, the next step is to:
  - a. translate the reading into cycles per second.
  - b. rotate the SENSITIVITY control clockwise.
  - c. adjust the DISPLAY TIME control.
  - d. set the FUNCTION switch to the FREQUENCY position.
  
3. How should the INPUT LEVEL meter look after you adjust the SENSITIVITY control?
  - a. There should be a maximum right-hand deflection.
  - b. There should be a maximum left-hand deflection.
  - c. The indicator needle should be at zero.
  - d. The indicator needle should be within the green area.

4. Several of the steps in counting a frequency involve operating controls and switches. Which of the following shows the correct sequence for operating three of the controls?
- \_\_\_\_\_ a. FUNCTION  
TIME-SECONDS  
SENSITIVITY
- \_\_\_\_\_ b. FUNCTION  
SENSITIVITY  
TIME-SECONDS
- \_\_\_\_\_ c. SENSITIVITY  
FUNCTION  
TIME-SECONDS
- \_\_\_\_\_ d. TIME-SECONDS  
DISPLAY TIME  
SENSITIVITY
5. Of these four steps, which one would you do first?
- \_\_\_\_\_ a. Adjust the DISPLAY TIME control.
- \_\_\_\_\_ b. Adjust the SENSITIVITY control.
- \_\_\_\_\_ c. Rotate the TIME-SECONDS switch to the desired time sampling period.
- \_\_\_\_\_ d. Couple frequency to be measured to the COUNTER INPUT receptacle.
6. Of these four steps, which one do you do last?
- \_\_\_\_\_ a. Translate reading on frequency counter into cycles per second.
- \_\_\_\_\_ b. Set FUNCTION switch to FREQ COUNT position.
- \_\_\_\_\_ c. Adjust SENSITIVITY control.
- \_\_\_\_\_ d. Adjust DISPLAY TIME control.
7. After adjusting the DISPLAY TIME control, you should:
- \_\_\_\_\_ a. set the FUNCTION switch to the FREQ COUNT position.
- \_\_\_\_\_ b. adjust the SENSITIVITY control.
- \_\_\_\_\_ c. translate the reading on the frequency counter into cycles per second.
- \_\_\_\_\_ d. rotate the TIME-SECONDS switch to the desired time sampling period.

8. The drawing below shows the display on the counter and the setting of the TIME-SECOND switch. How would you translate the count into cycles per second?

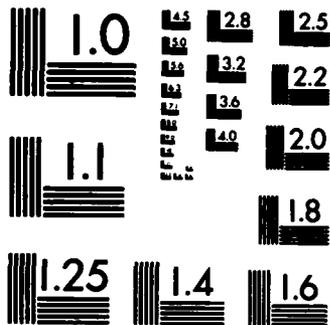


- a. Multiply 8000 times .1  
 b. Multiply 8000 times 10  
 c. Divide 8000 by .1  
 d. Divide 8000 by 10
9. How do you adjust the sensitivity control?
- a. Slide it up  
 b. Rotate it counterclockwise  
 c. Slide it down  
 d. Rotate it clockwise
10. Of these four steps, which one do you do first?
- a. Adjust the DISPLAY TIME control.  
 b. Set the FUNCTION switch to the FREQ COUNT position.  
 c. Adjust the SENSITIVITY control.  
 d. Couple the frequency to be measured to the COUNTER INPUT receptacle.

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MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

TO BE HANDED OUT AFTER VIDEOTAPE HAS BEEN RETURNED

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 2

Checkpoint 1, Form B

Use your notes to answer the questions below. Check the one correct answer for each question.

1. After coupling the frequency to be measured to the COUNTER INPUT receptacle, you should:

- a. set the FUNCTION switch to FREQUENCY position.
- b. rotate the SENSITIVITY control clockwise.
- c. adjust the DISPLAY TIME control.
- d. translate the reading into cycles per second.

2. Before you rotate the TIME SECONDS switch, you should:

- a. translate the reading into cycles per second.
- b. rotate the SENSITIVITY control clockwise.
- c. adjust the DISPLAY TIME control.
- d. set the FUNCTION switch to the FREQUENCY position.

3. What control do you use to change the indication on the INPUT LEVEL meter?

- a. FUNCTION switch
- b. DISPLAY TIME switch
- c. TIME-SECONDS switch
- d. SENSITIVITY control

4. Several of the steps in counting a frequency involve operating controls and switches. Which of the following shows the correct sequence for operating three of the controls?

\_\_\_\_\_ a. SENSITIVITY  
TIME-SECONDS  
DISPLAY TIME

\_\_\_\_\_ b. FUNCTION  
TIME-SECONDS  
SENSITIVITY

\_\_\_\_\_ c. DISPLAY TIME  
TIME-SECONDS  
FUNCTION

\_\_\_\_\_ d. TIME-SECONDS  
DISPLAY TIME  
FUNCTION

5. Of these four steps, which one would you do last?

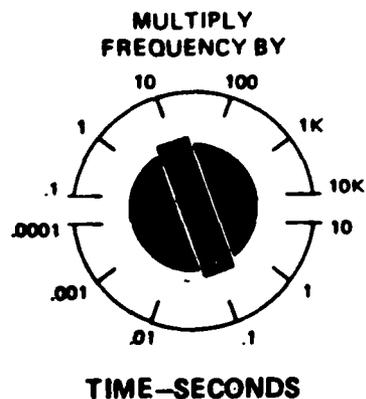
\_\_\_\_\_ a. Adjust the DISPLAY TIME control.

\_\_\_\_\_ b. Adjust the SENSITIVITY control.

\_\_\_\_\_ c. Rotate the TIME-SECONDS switch to the desired time sampling period.

\_\_\_\_\_ d. Couple frequency to be measured to the COUNTER INPUT receptacle.

6. The drawing below shows the display on the counter and the setting of the TIME-SECOND switch. How would you translate the count into cycles per second?



- a. .01  
 b. .1  
 c. 1  
 d. 10
7. After these four steps, which one do you do first?
- a. Rotate TIME-SECONDS switch to desired time sampling period  
 b. Translate reading into cycles per second  
 c. Couple frequency to be measured to COUNTER INPUT receptacle  
 d. Adjust DISPLAY TIME control
8. After these four steps, which would you do last?
- a. Rotate TIME-SECONDS switch to desired time sampling period  
 b. Translate reading into cycles per second  
 c. Couple frequency to be measured to COUNTER INPUT receptacle  
 d. Adjust DISPLAY TIME control

9. After rotating the SENSITIVITY control, you should:
- a. Couple frequency to be measured to COUNTER INPUT receptacle.
  - b. Set FUNCTION switch to FREQ COUNT position.
  - c. Rotate TIME-SECONDS switch to desired time sampling period.
  - d. Adjust DISPLAY TIME control.
10. What indication should you get on the INPUT LEVEL meter?
- a. Needle within the green area
  - b. Needle at zero
  - c. Needle all the way to the left
  - d. Needle all the way to the right

INSTRUCTIONS FOR STUDENT - TO BE HANDED OUT WITH VIDEOTAPE

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 3

Checkpoint 1, Form A/B

To complete this checkpoint,

- . Insert the videotape on the machine and watch the demonstration on the presets for the AN/TRC-24 radio set. Take notes on a separate sheet of paper.
- . If necessary, rewind the tape and watch the demonstration again.
- . When you are satisfied that your notes are complete, return the tape to the instructor. He will assign you to some other activity for half an hour. Then he will give you a set of questions to answer.

DO NOT LOSE YOUR NOTES.

Unit IV, Lesson 3  
Checkpoint 1, Form A/B

INSTRUCTIONS

TO BE HANDED OUT AFTER VIDEOTAPE HAS BEEN RETURNED

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 3

Checkpoint 1, Form A

Use your notes to answer the questions below. Check the one correct answer for each question.

1. What are the three major parts of this demonstration?
  - a. COARSE TUNE adjustment, FINE TUNE adjustment, and RF AMP adjustment
  - b. Receiver presets, transmitter presets, and power supply presets
  - c. Receiver presets, RF CHANNEL TUNE adjustment, and 150 V adjustment
  - d. COARSE TUNE adjustment, DRIVER TUNE adjustment, and power supply presets
  
2. Which of these steps are part of the transmitter presets?
  - a. Adjust COARSE TUNE control and adjust FINE TUNE control
  - b. Adjust RF AMP control and turn INDEX knob
  - c. Set AFC control at zero and adjust DRIVER TUNE control
  - d. Preset 750 ADJ control and 150 V ADJ control
  
3. How many steps are there in the receiver presets?
  - a. Two
  - b. Three
  - c. Four
  - d. Five

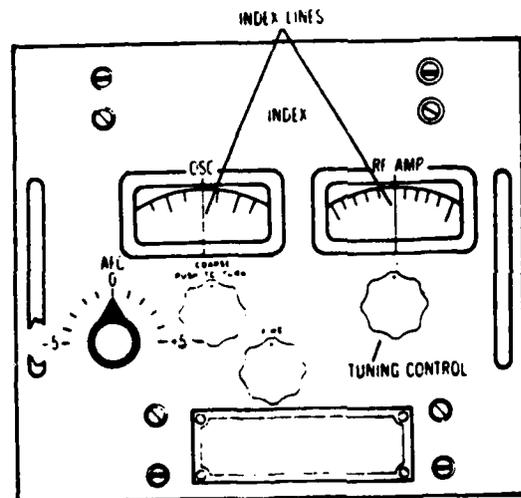
Unit IV, Lesson 3  
Checkpoint 1, Form A

4. Setting the PULSED OSCILLATOR control for ODD or EVEN channels is the first step in:

- \_\_\_\_\_ a. Receiver presets.
- \_\_\_\_\_ b. Transmitter presets.
- \_\_\_\_\_ c. Power supply presets.
- \_\_\_\_\_ d. Connecting the power supply.

5. Look at the controls shown in the drawing below, and compare the terms with your notes. This is a drawing of the:

- \_\_\_\_\_ a. Power supply.
- \_\_\_\_\_ b. Transmitter - upper panel.
- \_\_\_\_\_ c. Receiver.
- \_\_\_\_\_ d. Transmitter - lower panel.



6. The last step in the receiver presets is:

- \_\_\_\_\_ a. adjust the RF CHANNEL TUNE control.
- \_\_\_\_\_ b. adjust the DRIVER TUNE control.
- \_\_\_\_\_ c. adjust the RF AMP TUNE control.
- \_\_\_\_\_ d. adjust the FINE TUNE control.

7. The assigned channel number should appear at the center of a window:

- a. on both the transmitter and receiver.
- b. on the receiver only.
- c. on both the transmitter and the power supply.
- d. on the transmitter only.

8. The last step in the transmitter presets is:

- a. adjust the RF AMP tune control.
- b. adjust the AFC control.
- c. connect the ground wires to the ground binding post.
- d. adjust the DRIVER TUNE control.

9. The first step in the power supply presets is:

- a. adjust the COARSE TUNE control.
- b. set the ODD/EVEN CHANNEL control.
- c. set the 750 V ADJ control.
- d. set the DC test switch.

10. A screwdriver is used to perform one of the steps in the:

- a. Receiver presets.
- b. Transmitter presets.
- c. Power supply presets.
- d. COARSE TUNE adjustment.

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TO BE HANDED OUT AFTER VIDEOTAPE HAS BEEN RETURNED

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IV - LESSON 3

Checkpoint 1, Form B

Use your notes to answer the questions below. Check the one correct answer for each question.

1. Which major part of the procedure has steps performed on more than one panel?

- a. Receiver Presets  
 b. Transmitter Presets  
 c. Power Supply Presets

2. Which of these steps are part of the transmitter presets?

- a. Adjust COARSE TUNE control and adjust FINE TUNE control  
 b. Adjust RF AMP control and turn INDEX knob  
 c. Set AFC control at zero and adjust DRIVER TUNE control  
 d. Preset 750 ADJ control and 150 V ADJ control

3. How many steps are there in the receiver presets?

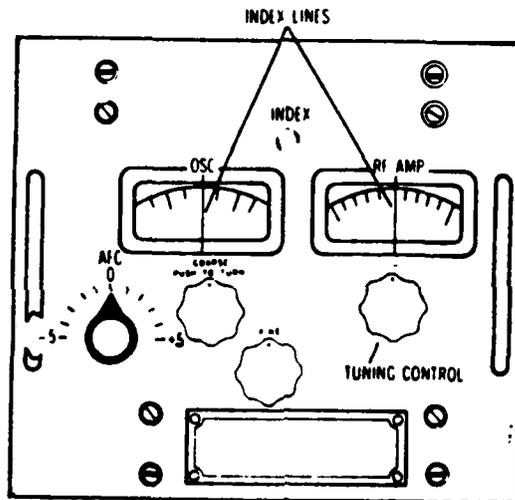
- a. Two  
 b. Three  
 c. Four  
 d. Five

4. Adapting the DRIVER TUNE control is the last step in:

- a. Receiver presets.
- b. Transmitter presets.
- c. Power supply presets.
- d. Connecting the power supply.

5. Look at the controls shown in the drawing below. Which of these controls do you use in the receiver preset procedures?

- a. AFC control, RF AMP tune control, and COARSE TUNE control
- b. AFC control, COARSE TUNE control, and FINE TUNE control
- c. COARSE TUNE control, FINE TUNE control, and RF AMP tune control
- d. FINE TUNE control, RF AMP tune control, and AFC control



6. After you preset the 750 V ADJ control, what do you do next?

- a. Adjust the DRIVER TUNE control.
- b. Connect the ground wires to the binding post.
- c. Preset the 150 V ADJ control.
- d. Set the DC TEST switch.

7. You need to know the assigned channel in order to do the:
- a. Receiver and power supply presets.
  - b. Receiver presets only.
  - c. Receiver and transmitter presets
  - d. Transmitter presets only.
8. The last step in the receiver presets is:
- a. adjust the RF AMP tune control.
  - b. adjust the AFC control.
  - c. connect the ground wires to the ground binding post.
  - d. adjust the DRIVER TUNE control.
9. The first step in the transmitter presets is:
- a. set the PULSED OSCILLATOR control
  - b. preset the 750 V ADJ control.
  - c. adjust the COARSE TUNE control.
  - d. adjust the INDEX control.
10. The PULSED OSCILLATOR control is located on the:
- a. receiver.
  - b. upper pannel of the transmitter.
  - c. lower panel of the transmitter
  - d. power supply.

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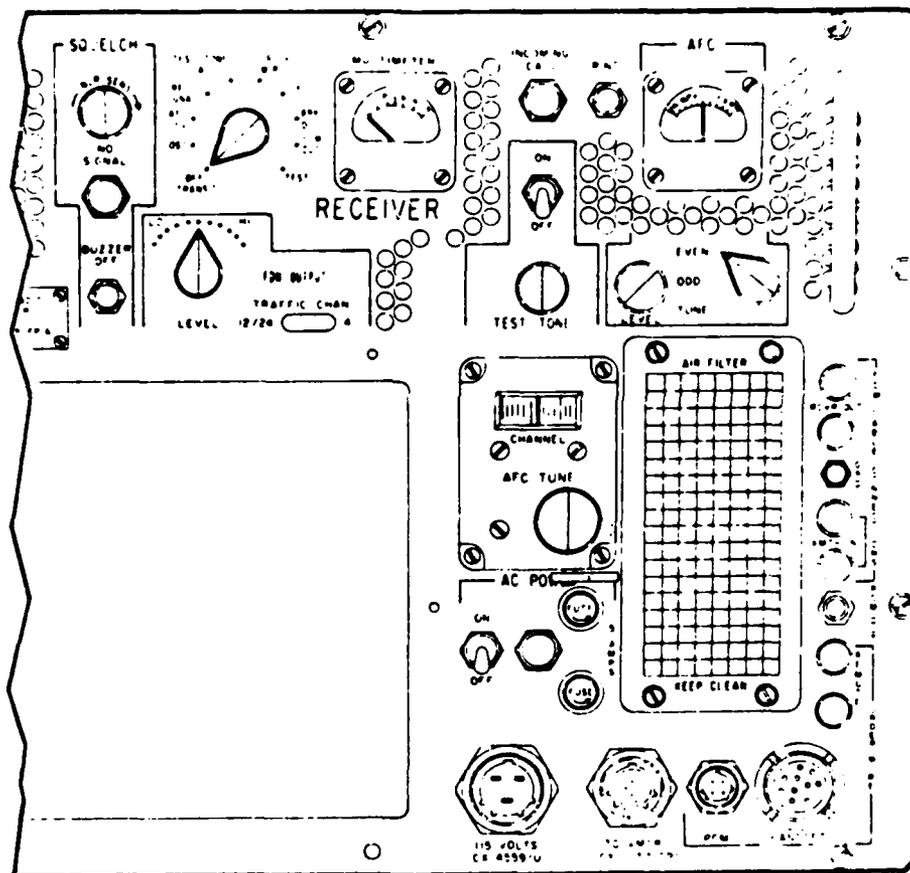
Name \_\_\_\_\_

Date \_\_\_\_\_

### UNIT V - LESSON 1

#### Checkpoint 1, Form A

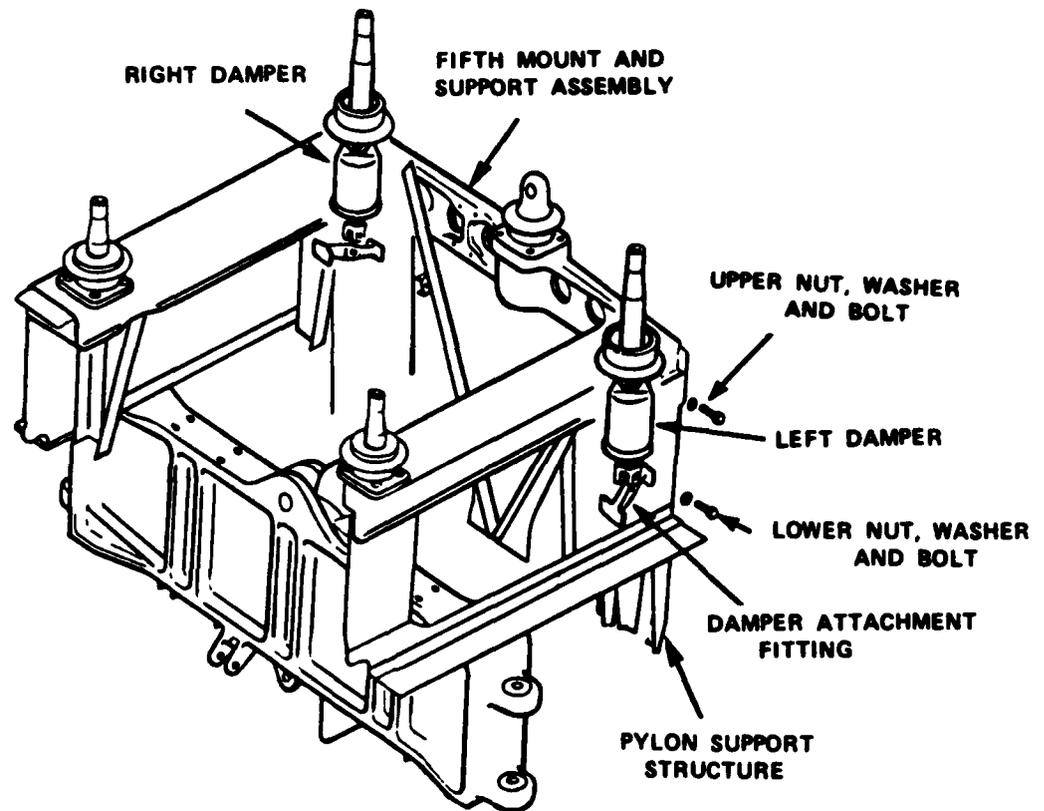
Below is a drawing of part of the front panel of a radio receiver. Look over the parts on this panel. Then answer the questions on the next page.



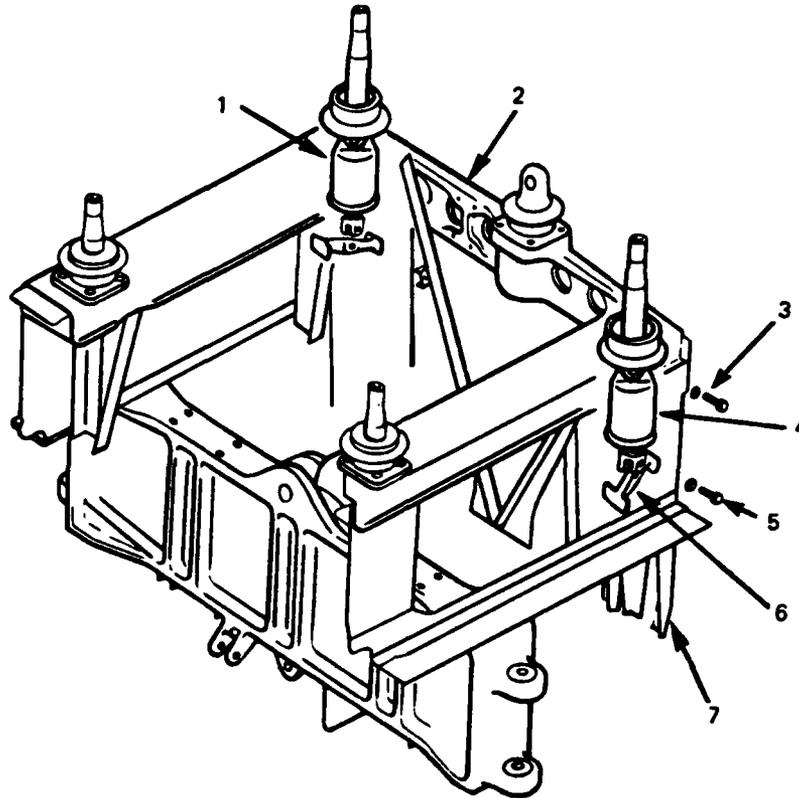
Unit V, Lesson 1  
Checkpoint 1, Form A

1. The RING label is located:
  - a. Below the part.
  - b. Above the part.
  - c. On the left side of the part.
  - d. On the right side of the part.
  
2. On the panel shown on the previous page, the best way to locate the TEST TONE control is by:
  - a. the shape.
  - b. the color.
  - c. the label.
  - d. the size.

Below is a diagram of a section of a helicopter. Look over the labeled parts. Then turn to the next page and answer the question about the diagram.



Unit V, Lesson 1  
Checkpoint 1, Form A

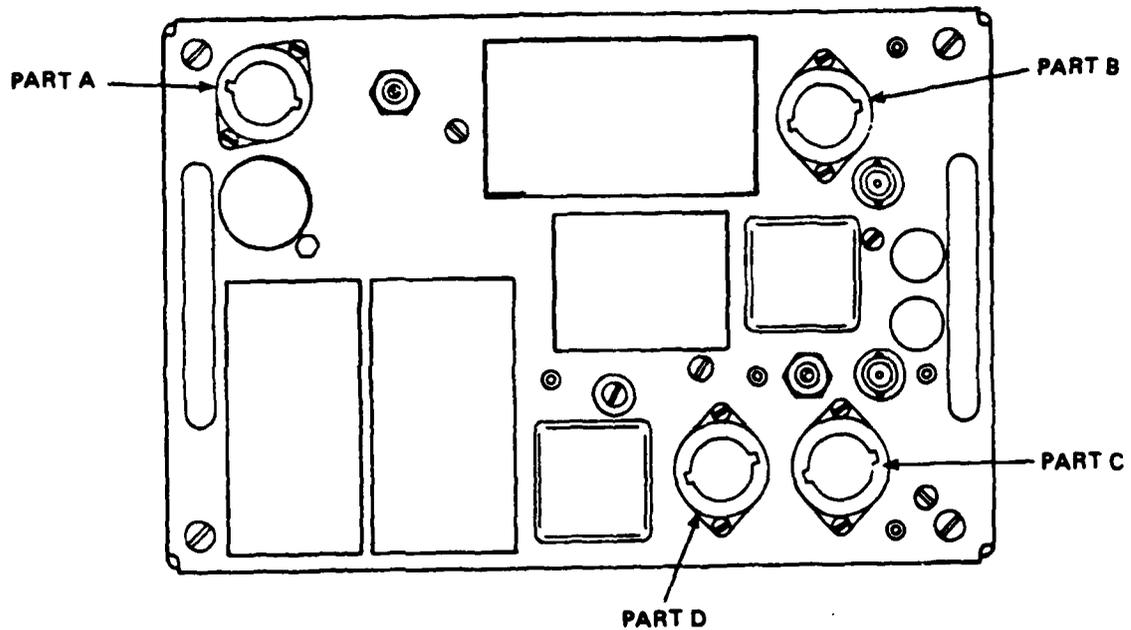


The following question refers to the above diagram. This diagram is identical to the one on the page before, except that the parts have numbers instead of labels. When answering the question, you may refer back to the diagram with the labeled parts.

3. The damper attachment fitting is part number:
- a. 1
  - b. 3
  - c. 5
  - d. 6

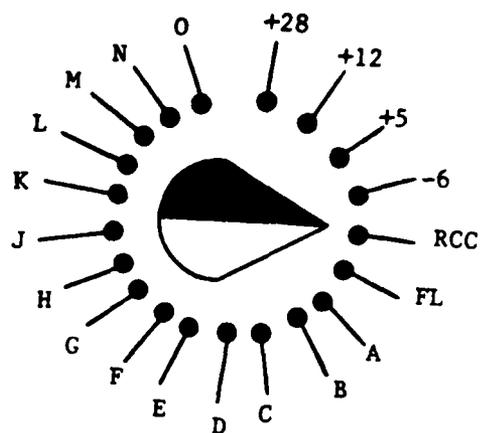
Unit V, Lesson 1  
Checkpoint 1, Form A

Below is a drawing of a baseband assembly. Pay attention to how the various parts are arranged. Then answer the question that follows the drawing.

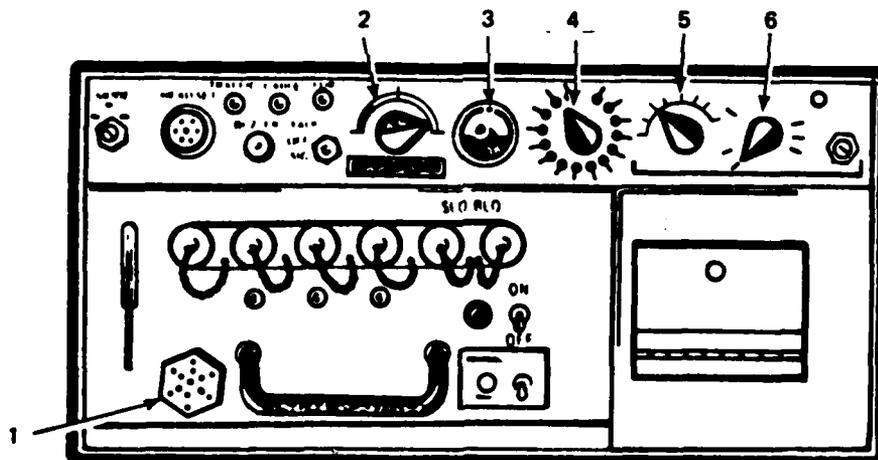


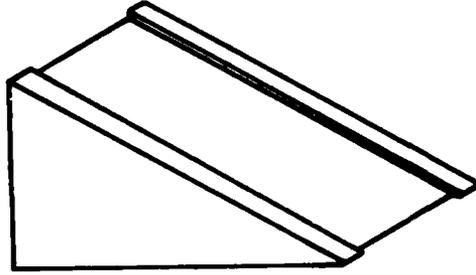
4. Which feature of Part B makes it different from Part D?
- a. The shape.
  - b. The size.
  - c. The location.
  - d. The color.

On the right is a drawing of a SERV SEL switch.



5. On the piece of equipment shown below, which of the numbered parts is the SERV SEL switch?
- a. 2
  - b. 3
  - c. 4
  - d. 5

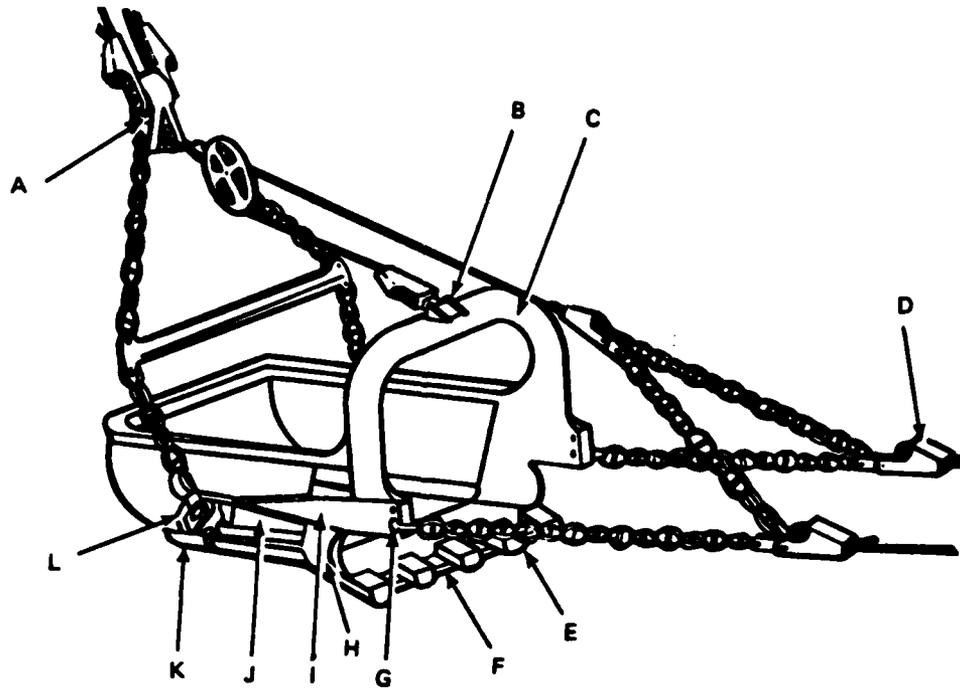




On the left is part of a dragline bucket system called an anchor.

6. Below is a drawing of a dragline bucket system. Which of the lettered parts is the anchor?

- a. A
- b. B
- c. C
- d. D



Unit V, Lesson 1  
Checkpoint 1, Form A



PART A



PART B



PART C



PART D



PART E

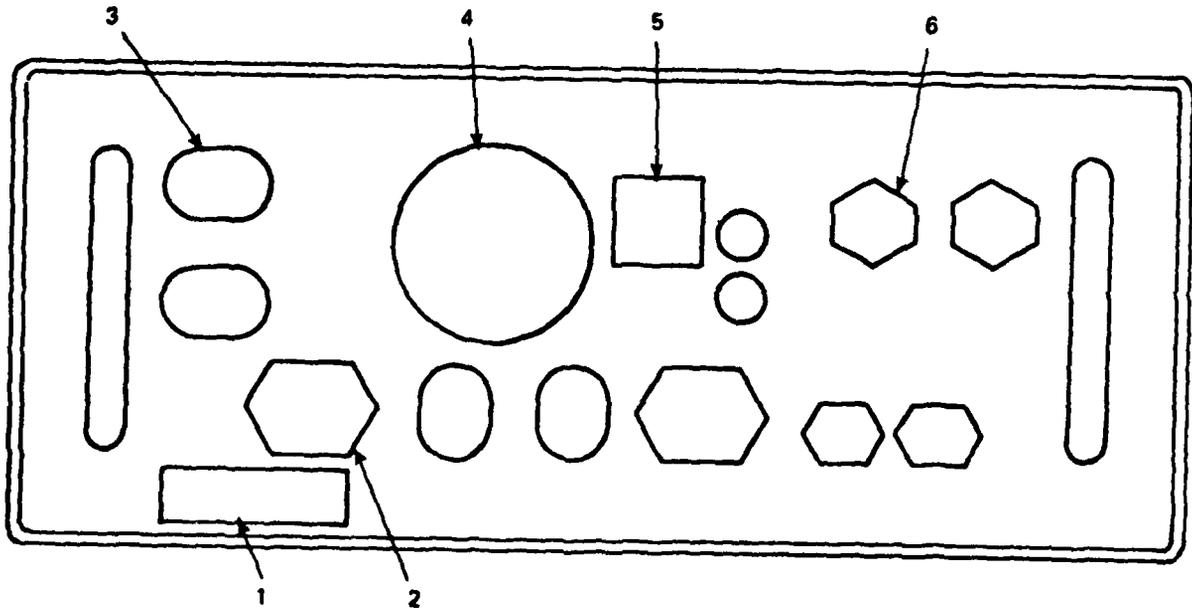
Above are five parts of a whole piece of equipment. Look over each of the parts, then answer the following two questions.

7. On the piece of equipment shown below, Part C is number:

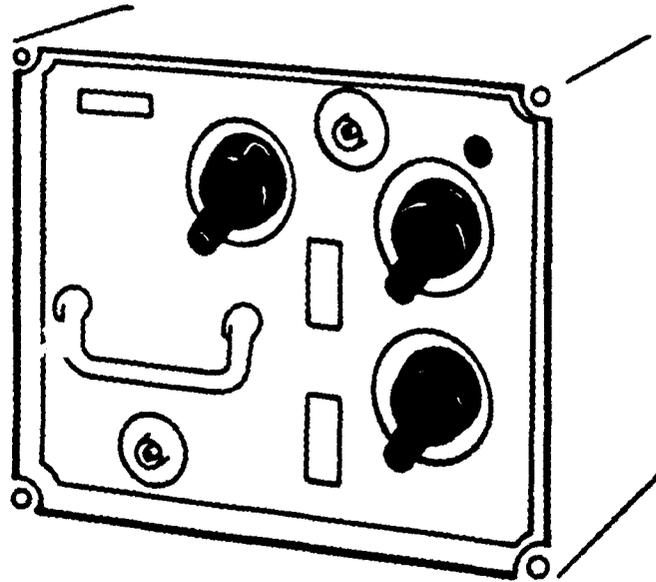
- a. 1
- b. 3
- c. 4
- d. 5

8. Which of the numbered parts matches Part A above?

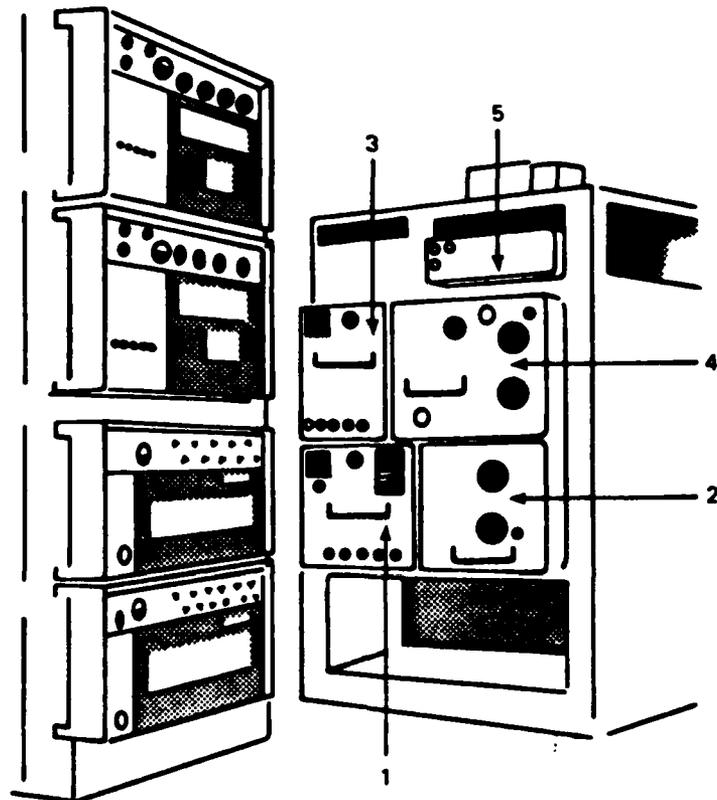
- a. 1
- b. 3
- c. 4
- d. 6



Below is a diagram of an amplifier-converter.



9. In the drawing on the next page, which of the numbered parts is the amplifier-converter?
- a. 3
  - b. 5
  - c. 6
  - d. 7
10. The amplifier-converter can best be recognized by:
- a. the shape of the controls and indicators.
  - b. the presence of air vents and handles.
  - c. the size and color of the equipment.
  - d. the number of large controls.



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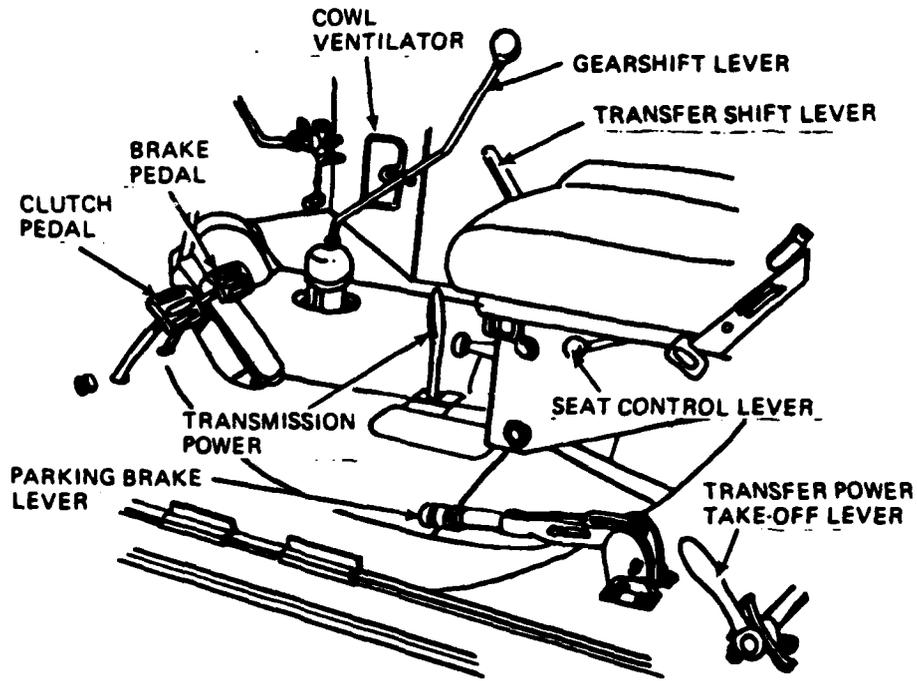
Name \_\_\_\_\_

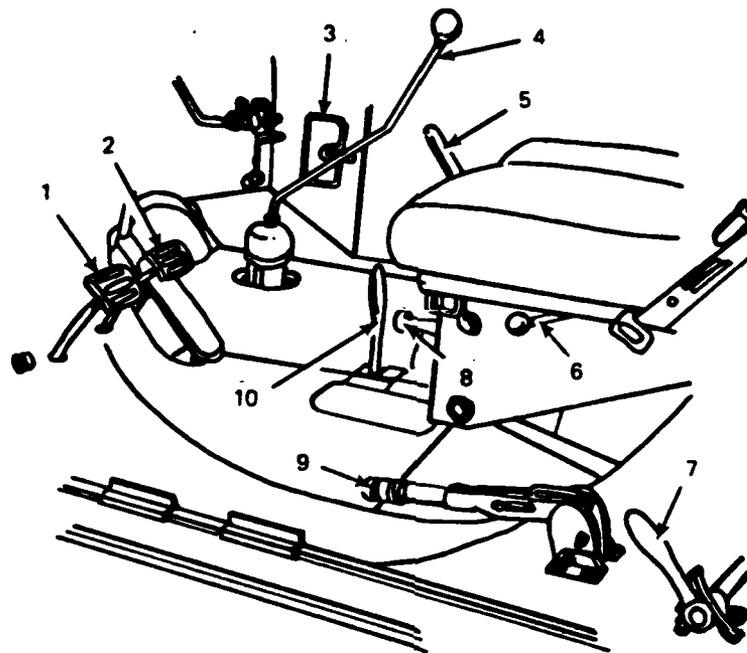
Date \_\_\_\_\_

UNIT V - LESSON 1

Checkpoint 1, Form B

Below is a drawing of the interior of an Army truck. Many of the parts are chassis controls. Look over all the labeled parts, then turn to the next page and answer the question concerning the diagram.

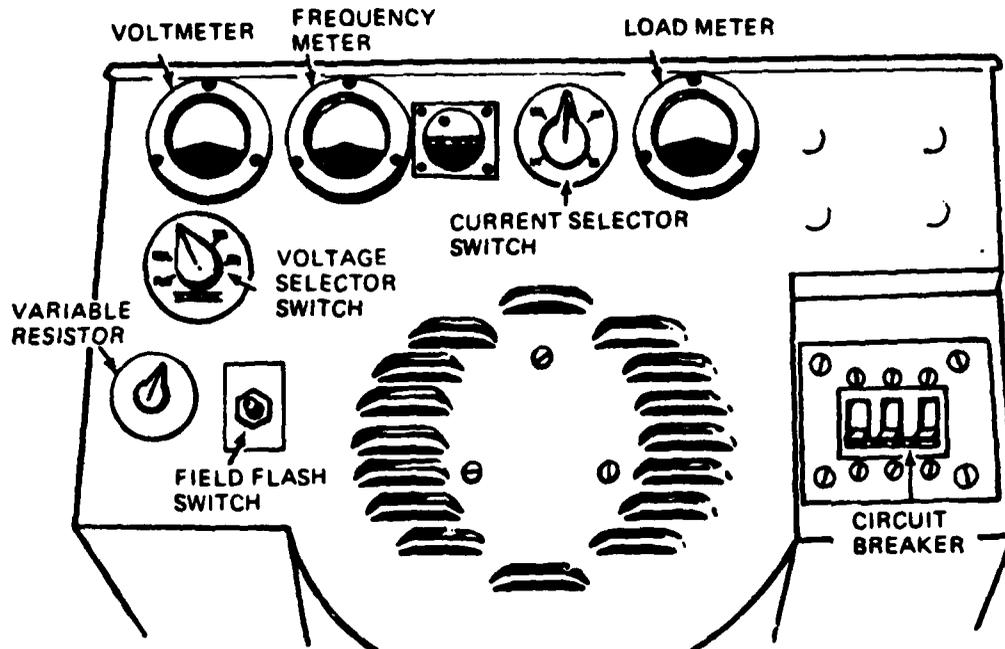




The following question refers to the above diagram. The diagram is identical to the one on the page before, except that the parts have numbers instead of labels. When answering the question, you may refer back to the diagram with the labeled parts.

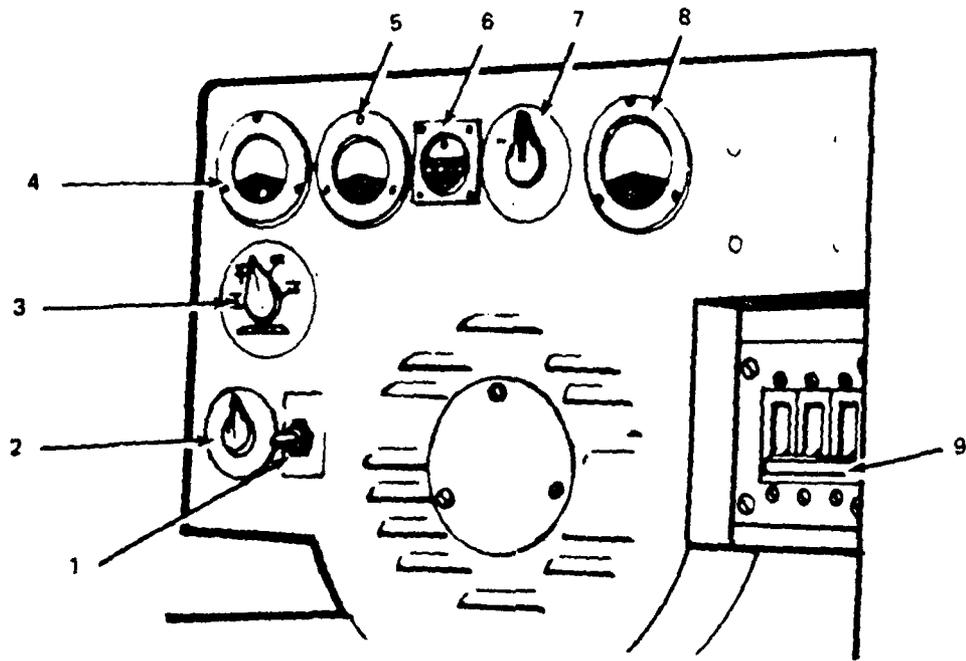
1. Which of the numbered parts is the transmission power?
  - a. 4
  - b. 5
  - c. 8
  - d. 10

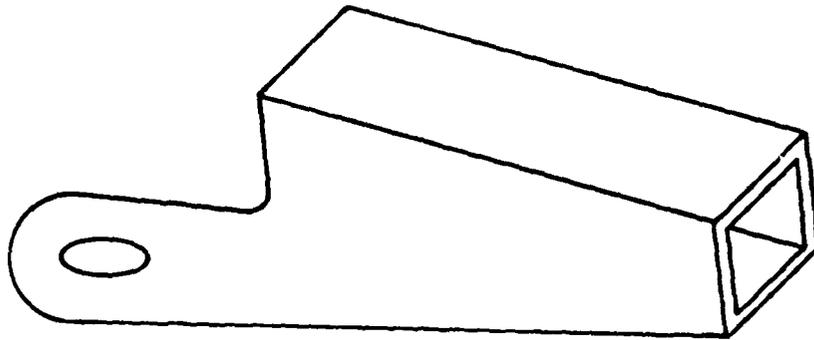
Below is a drawing of a generator panel. Pay attention to how the meters and switches are arranged. Then answer the questions that follow.



On the following page is a drawing of the same generator panel shown above. Use the drawing to answer the next two questions. You may refer back to the drawing above to help you answer the questions.

2. On the drawing on the next page, which numbered part is the LOAD METER?
  - a. 4
  - b. 5
  - c. 7
  - d. 8
  
3. The LOAD METER can best be recognized by its:
  - a. shape.
  - b. size.
  - c. location.
  - d. color.

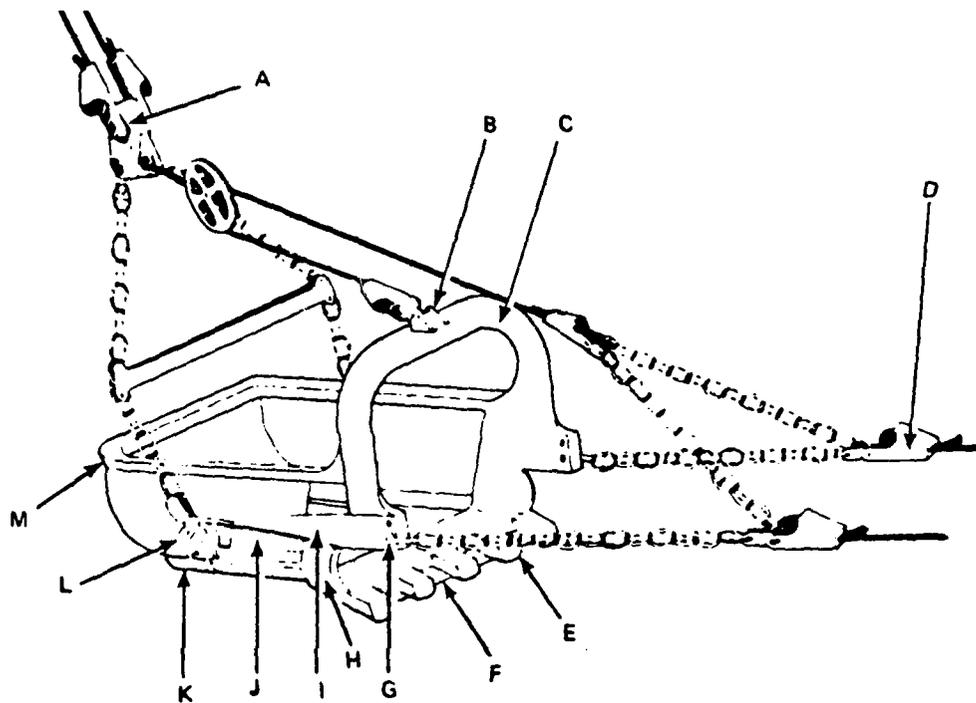




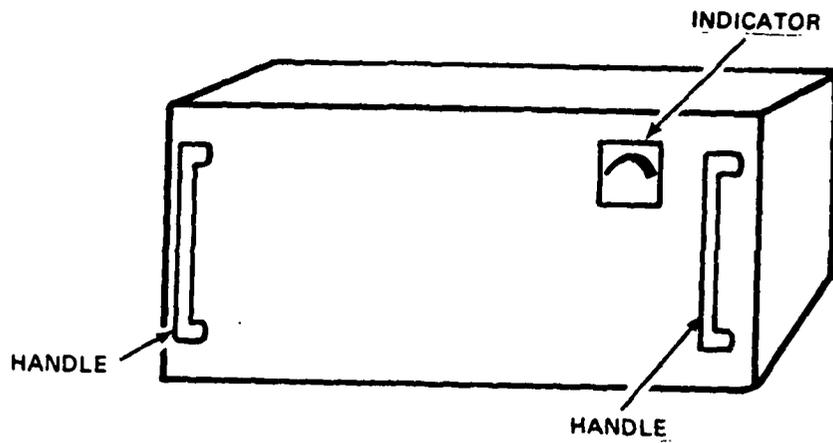
Above is a drawing of one part of a bucket rigging system. It is called a drag socket.

4. Below is a drawing of the entire bucket rigging system. Which of the parts is the drag socket?

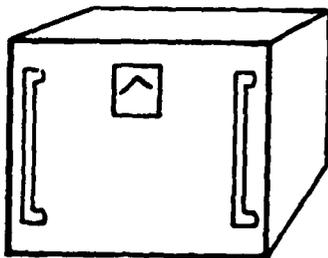
- a. A
- b. B
- c. C
- d. D



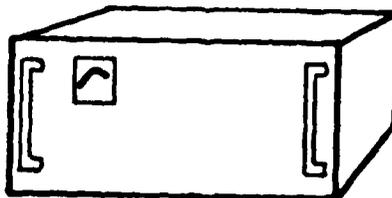
Unit V, Lesson 1  
 Checkpoint 1, Form B



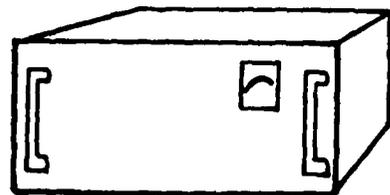
5. Below are drawings of three different multiplexes. Which one matches the drawing above?
- A
  - B
  - C
  - None of the above.
6. In what way are all three multiplexes shown below different?
- Size
  - Location of indicator
  - Presence of handles
  - Location of handles



A

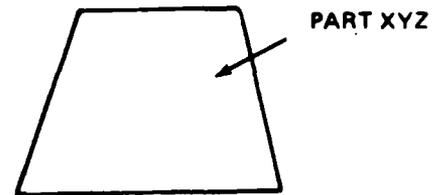
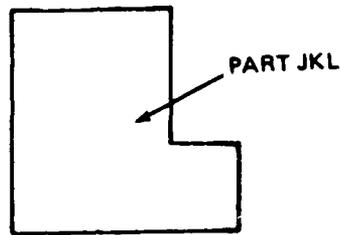
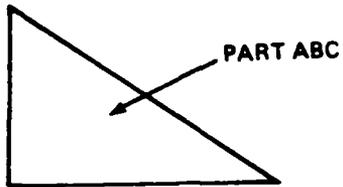


B

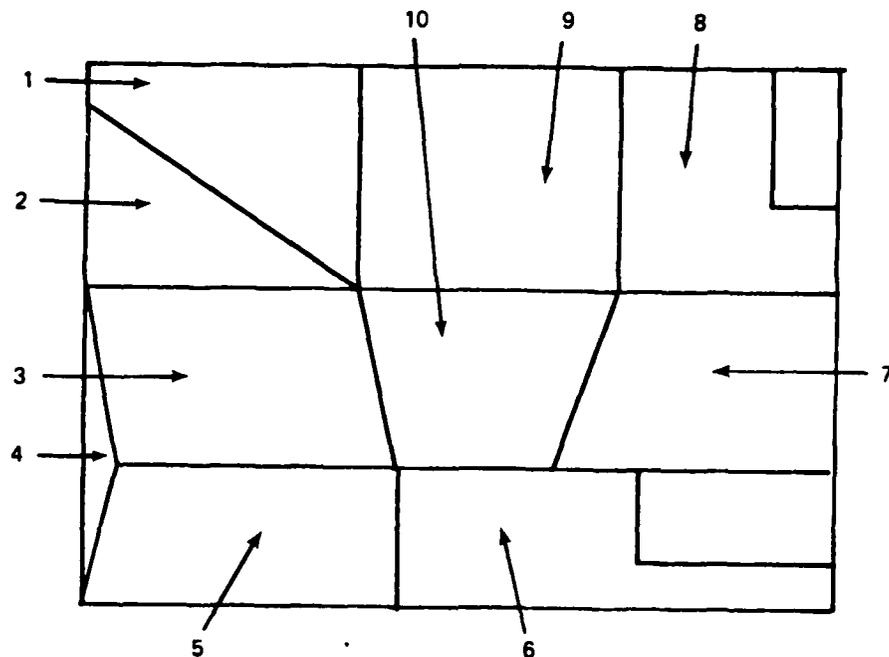


C

Directions: Below are drawings of three parts of a whole: Part ABC, Part JKL, and Part XYZ. Look over each part, then answer the question that follows. Then turn to the next page and answer some questions.



7. What feature makes the three parts different?
- a. The Size
  - b. The Shape
  - c. The Color
  - d. The Design



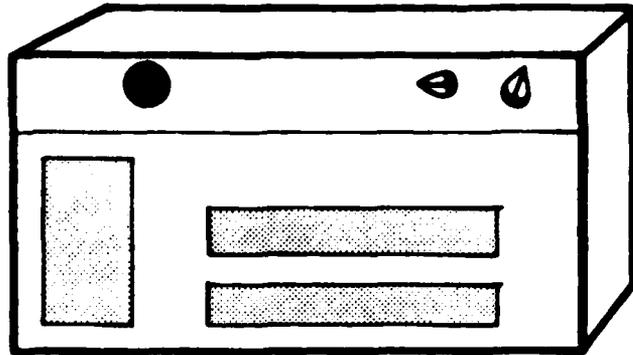
8. Where is Part JKL located in the drawing above?

- a. 1
- b. 6
- c. 8
- d. 10

9. In the drawing above, number 10 is:

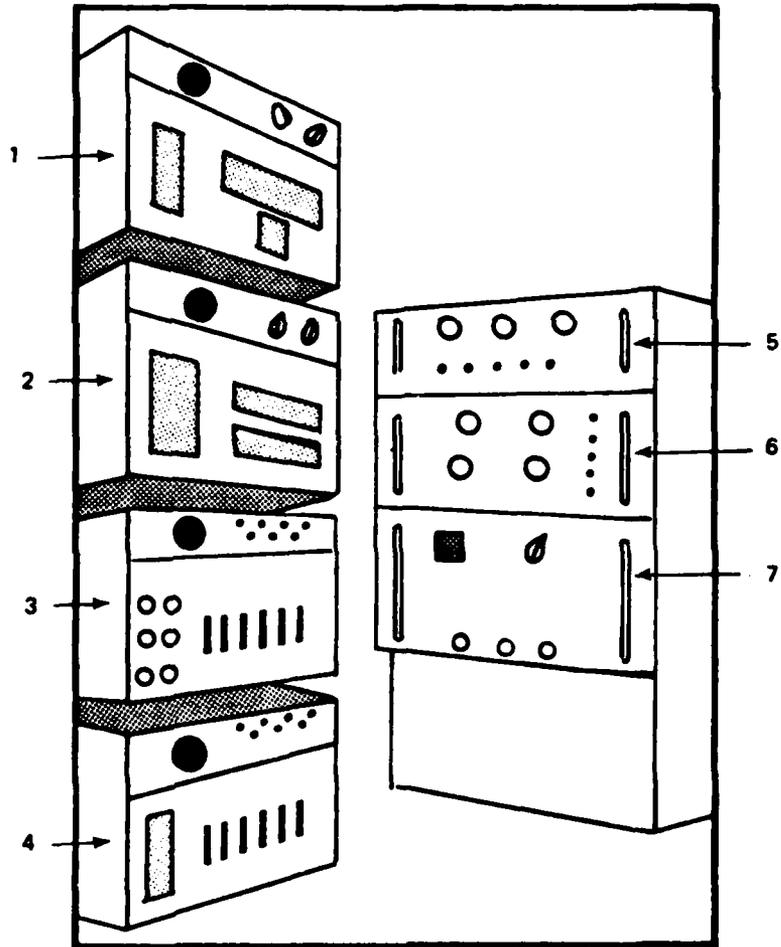
- a. Part ABC
- b. Part JKL
- c. Part XYZ
- d. None of the above parts.

On the right is a drawing of a particular piece of equipment.



10. In the drawing below, which of the numbered parts is the piece of equipment shown above?

- a. 1
- b. 2
- c. 3
- d. 4



Unit V, Lesson 1  
Checkpoint 1, Form B

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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VI - LESSON 1  
UNIT VII - LESSON 1

Checkpoint 1, Form A

Use the diagram below to answer questions 1 to 5.

	SYSTEM 1		SYSTEM 2	
	ABC	XYZ	ABC	XYZ
EAST	D	E	F	G
WEST	H	I	J	K
NORTH	L	M	N	O
SOUTH	P	Q	R	S

1. The letter in SYSTEM 2, ABC, NORTH is \_\_\_\_\_.
2. The letters F, J, N, and R (but not any others) are all in \_\_\_\_\_.
3. The letter in SYSTEM 1, XYZ, EAST is \_\_\_\_\_.
4. List all the letters in SYSTEM 1: \_\_\_\_\_.
5. The letters E, M, and K are all in \_\_\_\_\_.

Use the table below to answer questions 6 to 10.

Item No.	Unit	Procedure	Expected Result
1	Dial	a. Clean b. Check needle	a. No dirt. b. Needle moves.
2	Plug	a. Check cord	a. Tight
3	Case	a. Check lock b. Count items c. Check cover	a. Lock works. b. Nothing missing. c. Cover is tight.
4	Lens	a. Examine b. Turn	a. No cracks. b. Lens turns freely.

6. The procedure in Item No 3b is \_\_\_\_\_.
7. In Item No. 4, the procedure is \_\_\_\_\_.
8. In the table, "Cover is tight" is the \_\_\_\_\_  
in Item No. \_\_\_\_\_.
9. The expected result in Item No. 1b is \_\_\_\_\_.
10. The unit in Item No. 2 is \_\_\_\_\_.

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VI - LESSON 1  
UNIT VII - LESSON 1

Checkpoint 1, Form B

Use the table below to answer questions 1 to 5.

Item No.	Procedure	Malfunction
1	U	D
2	a. V	a. E
	b. W	b. F
3	a. X	a. G
	b. Y	b. H
	c. Z	c. I

1. How many procedures are there in Item No. 3? \_\_\_\_\_
2. E and F are both \_\_\_\_\_ in Item No. \_\_\_\_\_.
3. The malfunction in Item No. 1 is \_\_\_\_\_.
4. The procedure in Item No. 2a is \_\_\_\_\_.
5. The malfunction in Item No. 3b is \_\_\_\_\_.

Use the diagram below to answer questions 6 to 10.

	SYSTEM 1		SYSTEM 2		SYSTEM 3	
	JKL	MNO	JKL	MNO	JKL	MNO
RED	A	B				
GREEN		C	D	E		F
BLUE		G			H	
YELLOW		I				

6. The letters in MNO, GREEN are \_\_\_\_\_.
7. The letters in SYSTEM 1, MNO are \_\_\_\_\_.
8. The letters in SYSTEM 2, GREEN are \_\_\_\_\_.
9. The letter in SYSTEM 1, JKL, RED is \_\_\_\_\_.
10. The letter H is in \_\_\_\_\_.

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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VI - LESSON 2

Checkpoint 1, Form A

1. Here are the titles of four troubleshooting tables in a TM:

4-7b. TD-202/U and TD-203/U Troubleshooting Chart

4-7c. TD-204/U Troubleshooting Chart

4-7d. TD-352/U or TD-353/U Troubleshooting Chart

4-7e. CV-2548/G Troubleshooting Chart

Which table should you use for troubleshooting a TD-204/U?  
\_\_\_\_\_

Below are the column headings of an equipment performance checklist.  
Use them to answer questions 2 to 4.

Step	Unit	Action	Normal indication	Fault symptom	Corrective measure
------	------	--------	-------------------	---------------	--------------------

2. If something goes wrong, which column tells you how to fix it?  
\_\_\_\_\_

3. Which column tells you what should not happen if the equipment is operating properly? \_\_\_\_\_

4. The Action column tells the operator \_\_\_\_\_  
\_\_\_\_\_

Below are the column headings of a troubleshooting chart. Use them to answer questions 5 to 7.

Item No.	Malfunction	Probable cause	Suggested remedy
----------	-------------	----------------	------------------

5. Which column lists symptoms that may happen while you are operating equipment? \_\_\_\_\_
6. Something goes wrong while you are operating equipment. You want to know why. Which column will tell you? \_\_\_\_\_
7. Which column heading means the same thing as Corrective measures? \_\_\_\_\_

Below are the column headings of a maintenance table. Use them to answer questions 8 to 10.

M - Monthly    Q - Quarterly

Item No.	Interval		Item To Be Inspected	Procedure	Reference
	M	Q			

8. The column heading Q stands for \_\_\_\_\_.
9. If you need more information about a maintenance operation, which column should you look in? \_\_\_\_\_
10. Which column lists the equipment components that are being checked? \_\_\_\_\_

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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VI - LESSON 2

Checkpoint 1, Form B

1. Here are the titles of four tables for performing PMCS:

Table 4-2. Operator's Daily Preventive Maintenance Checks and Services

Table 4-3. Operator's Weekly Preventive Maintenance Checks and Services

Table 4-4. Organizational Monthly Preventive Maintenance Checks and Services

Table 4-5. Organizational Quarterly Preventive Maintenance Checks and Services

You are doing weekly maintenance. Which table should you use?

\_\_\_\_\_

Below are the column headings of an equipment performance checklist. Use them to answer questions 2 to 4.

Step	Unit	Action	Normal result	Corrective measures
------	------	--------	---------------	---------------------

2. Which column tells the operator what to do at each step?

\_\_\_\_\_

3. Which column describes the piece of equipment being checked?

\_\_\_\_\_

4. Which column tells what should happen if the equipment is working properly? \_\_\_\_\_

Unit VI, Lesson 2  
Checkpoint 1, Form B

Below are the column headings of a table used for troubleshooting. Use them to answer questions 5 to 7.

Item No.	Symptom	Possible trouble	Suggested remedy
----------	---------	------------------	------------------

5. Which column heading means the same thing as Probable cause?  
\_\_\_\_\_

6. Which column heading means the same thing as Malfunction?  
\_\_\_\_\_

7. Which column lists defects that can cause trouble?  
\_\_\_\_\_

Below are the column headings of a maintenance table. Use them to answer questions 8 to 10.

B-Before Operation    D-During Operation    A-After Operation    W-Weekly

Sequence No.	Interval				Item To Be Inspected	Procedure	Equipment is not ready/available if:
	B	D	A	W			

8. Which column lists symptoms? \_\_\_\_\_

9. Which column should you look in to find out what must be done after operation? \_\_\_\_\_

10. Which column heading means the same thing as Action?  
\_\_\_\_\_

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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VI - LESSON 3

Checkpoint 1, Form A

Part of an equipment performance checklist is on the next page. Use it to answer questions 1 to 3 below.

1. If the equipment is operating properly at Step 33, what should happen?

\_\_\_\_\_

2. In Step 36, if the HV indicator does not light, what is the Corrective measure?

\_\_\_\_\_

3. What should the operator do in Step 33?

\_\_\_\_\_

EQUIPMENT PERFORMANCE

Item	Unit	Action	Normal Indication	Corrective measures
31	CN-514/GRC	Set POWER circuit breaker to ON.	POWER ON indicator light.	Check power source output and power cable connections. Check fuse F2 (20 amp) (fig. 5-11). Check POWER ON indicator lamp.
32	CN-514/GRC	Set MANUAL RAISE-LOWER switch to RAISE then to LOWER.	MANUAL indicator lights. Meter indicates raise in voltage then decrease in voltage.	Check MANUAL indicator lamp. Check MOTOR 1 AMP fuse
33	CN-514/GRC	Set MANUAL-AUTOMATIC switch to AUTOMATIC.	Meter indicates 115 volts. MANUAL indicator goes out.	
34	CN-514/GRC	Set MANUAL-AUTOMATIC switch to MANUAL and MANUAL RAISE-LOWER switch to LOWER until meter indicates approximately 105 volts. Then set MANUAL-AUTOMATIC switch to AUTOMATIC. Repeat above except operate switch to RAISE until meter indicates approximately 120 volts.	Voltage indication on meter changes back to 115 volts in both operations.	Check V1 and V2. Replace plug-in regulator assembly.
35	PP-2054(*)/GRC	Set AC POWER circuit breaker to ON. Allow equipment to warm up for 5 minutes.	Blower motor operates. FIL indicator lights.	Check 5 AMP FIL fuse. Check FIL indicator lamp. Check silicon rectifiers in PP-2054 (*)/GRC. If they are blistered or discolored, higher maintenance services are required.
36	PP-2054 (*)/GRC	Set OPERATE-STANDBY switch to OPERATE.	Blower motor in T-893(P)/GRC operates. and TO PWR SUP on T-893(P)/GRC. The LV and HV indicators light. Target bolt (interlock switch (fig. 1-4)) is tight; also all bolts holding amplifier-oscillator are tight.	Check cable connection between TO XMTR on PP-2054 (*)/GRC and TO PWR SUP on T-893(P)/GRC. If LV indicator does not light, check 3 AMP LV fuse. Check LV lamp. If HV indicator does not light, check HV fuse. (This fuse, whether equipment is marked with 5 AMP or 3 AMP should be replaced with 3 amp, time-delay fuse in all equipments (para

Use the Radio Terminal Troubleshooting Chart on the next page to answer questions 4 to 6.

4. The second Probable cause in Item No. 3 is \_\_\_\_\_

\_\_\_\_\_

5. You get the symptom: Order wire very noisy or no reception, but all other indications on TD-660A/G and AN/GRC-103(V) are normal. What is the first Probable cause?

\_\_\_\_\_

6. In Item No. 7, what is the Corrective action for Probable cause e?

\_\_\_\_\_

Item No	Malfunction	Probable cause	Corrective action
1	FRAME ALARM indicator of TD-660A/G lights, buzzer sounds and TEST ALIGN meter indicates in green area with selector switch I at PCM IN or TIM IN	Defective TD-660A/G	Troubleshoot TD-660A/G (para 5-5)
2	FRAME ALARM indicator of TD-660A/G lights, buzzer sounds, and TEST ALIGN meter does not indicate in green area with selector switch I at PCM IN or TIM IN AN/GRC-103(V) operates normally Order wire normal	a. Defective cable between VIDEO patch panel PCM IN connector and TD-660A/G PCM IN connector, or between VIDEO patch panel PCM RCVR connector and R-1329(P)/GRC-103(V) PCM connector. b. Defective VIDEO patch panel cable between PCM IN and PCM RCVR connectors.	a. Check and replace if necessary b. Check and replace if necessary
3	FRAME ALARM indicator on TD-660A/G lights, buzzer sounds, R-1329(P)/GRC-103(V) ALARMS LOW SIGNAL indicator lights	a. Defective antenna cable or defective cable between VIDEO AND ANTENNA ENTRANCE BOX and ANT connector on R-1329(P)/GRC-103(V). b. Defective or misoriented antenna. c. Defective R-1329(P)/GRC-103(V) d. Defective T-983(P)/GRC-103(V) at distant terminal or repeater.	a. Check and replace if necessary b. Check and replace or reorient if necessary c. Troubleshoot R-1329(P)/GRC-103(V) (para 5-5) d. Keep R-1329(P)/GRC-103(V) operating on assigned frequency. Periodically try order wire and await response. Send person to distant terminal or repeater
4	FRAME ALARM indicator of TD-660A/G lights and buzzer sounds No indication on R-1329(P)/GRC-103(V) meter with selector switch at 12 CH PCM Order wire is normal	Defective pcm component at distant terminal	Request distant terminal troubleshooting
5	Order wire very noisy or no reception, but all other indications on TD-660A/G and AN/GRC-103(V) are normal	a. Defective order wire cable between RT-773/GRC-103(V) and R-1329(P)/GRC-103(V). b. Defective RT-773/GRC-103(V). c. Defective power supply in R-1329(P)/GRC-103(V).	a. Check and replace if necessary b. Troubleshoot RT-773/GRC-103(V) (para 5-5) c. Troubleshoot R-1329(P)/GRC-103(V) (para 5-5)
6	Switchboard operator reports high noise level or hum on all channels. All local indications are normal	a. Defective AN/GRC-103(V). b. Defective TD-660A/G.	a. Troubleshoot AN/GRC-103(V) (para 5-5) b. Troubleshoot TD-660A/G (para 5-5)
7	Switchboard operator reports loss of a specific channel or only one way communication on a specific channel. All local indications are normal	a. Defective TD-660A/G. b. Defective CV-1548(*)/G. c. Defective CX-7870/TCC between CV-1548(*)/G and TD-660A/G d. Defective field wire or 26-pair cable. e. Defective TD-660A/G or CV-1548(*)/G at distant terminal.	a. Troubleshoot TD-660A/G (para 5-5) b. Troubleshoot CV-1548(*)/G (para 5-5). c. Check and replace if necessary d. Check and repair if required e. Request distant terminal troubleshooting
8	Switchboard operator reports that no signaling is available on any 2-wire channel	Defective CV-1548(*)/G.	Troubleshoot CV-1548(*)/G (para 5-5).
9	Switchboard operator reports loss of one group of four channels. All local indications are normal	a. Defective CX-7870/TCC cable between TD-660A/G and CV-1548(*)/G. b. Defective interconnecting cable between CV-1548(*)/G and SIGNAL ENTRANCE panel c. Defective associated cable at distant terminal.	a. Check and replace if necessary. b. Check and replace if necessary. c. Request distant terminal troubleshooting

Unit VI, Lesson 3  
Checkpoint 1, Form A

Use the maintenance table on the next two pages to answer questions 7-10.

7. When should the METER SELECT switch (Item No. 14) be inspected?

---

8. List the items which should be inspected weekly: \_\_\_\_\_

---

9. What is the fourth procedure to be carried out on the radio set AN/GRC-103(V)?

---

10. In Item No. 14, the order wire circuit is not ready/available for use if \_\_\_\_\_

---

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AND TELL YOU WHAT TO DO NEXT.

B—Before operation D—During operation A—After operation W—Weekly

Item No	Interval				Item to be Inspected	Procedures Check and have repaired or adjusted as necessary	For readiness reporting equipment is not ready/available if
	B	D	A	W			
13	.	.	.	.	Radio Set AN/GRC-103(V)	<p>Set the transmitter of system 1 and receiver of system 2 to the same channel.</p> <p>Set the transmitter of system 2 and the receiver of system 1 to the same channel, but maintain a minimum of a 50-channel separation from that in 3 above.</p> <p><b>SYSTEM 1</b></p> <p>a. Adjust receiver RCVR CHANNEL, RCVR SIG, and XMTR DUPL controls for correct channel numbers on both RCVR CHANNEL and XMTR CHANNEL indicators.</p> <p>b. Adjust transmitter XMTR CHANNEL and XMTR TUNE controls for correct transmitting frequency.</p> <p>c. Operate transmitter AC POWER switch to ON/RESET.</p> <p>d. Operate receiver AC POWER switch to ON.</p> <p>e. Press BUZZER OFF switch to silence buzzer.</p> <p>f. Operate transmitter selector switch sequentially through 12 VDC, 28 VDC, and 600 VDC.</p> <p>g. Operate transmitter selector switch sequentially through OSC, DOUBLER, and MULT.</p> <p>h. Operate transmitter selector switch to DRIVER (no adjustment for bands II and III); push in PWR OUT PEAK knob and tune for maximum indication on meter.</p> <p>i. Operate transmitter selector switch to PWR OUT (no adjustment for band III); pull out PWR OUT PEAK knob and tune for maximum indication on meter. (Silence buzzer with BUZZER OFF switch upon completion of adjustment.)</p> <p>j. Operate transmitter selector switch to REFL PWR and tune receiver XMTR DUPL control for minimum indication on transmitter meter.</p> <p>k. Operate receiver selector switch to XMTR DUPL.</p> <p>l. Operate receiver selector switch to REFL PWR.</p> <p>m. Operate transmitter selector switch to 12 CH PCM and adjust INPUT control for green band indication on meter.</p>	<p>a. All controls do not adjust to correct channel.</p> <p>b. Both controls do not adjust to correct frequency.</p> <p>c. AC POWER and ALARMS LOW POWER indicator does not light, ALARMS SYNC indicator does not light momentarily, buzzer does not sound, and blower does not operate.</p> <p>d. AC POWER and ALARMS LOW SIGNAL indicator does not light, ALARMS SYNC indicator does not light momentarily and buzzer does not sound.</p> <p>e. POWER indicator on order wire unit does not light, and loud rushing noise is not heard in order wire handset.</p> <p>f. Meter does not indicate in green band for each switch position.</p> <p>g. Meter does not indicate between 25 and 90 percent of full scale.</p> <p>h. Meter does not indicate between 25 and 90 percent of full scale.</p> <p>i. Meter does not indicate between 25 and 90 percent of full scale, and LOW POWER indicator does not extinguish.</p> <p>j. XMTR CHANNEL indicator is not within 10 channels of correct frequency, and meter indicates greater than 20 percent of full scale.</p> <p>k. Meter does not indicate within 25 to 90 percent of full scale.</p> <p>l. Meter does not indicate less than 20 percent of full scale.</p> <p>m. No meter indication.</p>

Unit VI, Lesson 3  
Checkpoint 1, Form A

B—Before operation D—During operation A—After operation W—Weekly

Item No	Interval				Item to be Inspected	Procedures Check and have repaired or adjusted as necessary	For readiness reporting equipment is not ready/available if:												
	B	D	A	W															
14	*				Multiplexer TD-204/U  Order wire circuit  METER SELECT switch	<ol style="list-style-type: none"> <li>n. Operate receiver selector switch sequentially through +12 VDC and -12 VDC.</li> <li>o. Operate receiver selector switch sequentially through OSC and DOUBLER.</li> <li>p. Operate receiver selector switch to MULT and adjust MULT PEAK control for maximum indication on meter.</li> <li>q. Check for loud rushing noise in order wire handset when ALARM LOW SIGNAL indicator extinguishes, indicating a signal is being received.</li> <li>r. Operate receiver selector switch to RCVR SIG.</li> </ol> <p style="text-align: center;"><b>SYSTEM 2</b></p> <ol style="list-style-type: none"> <li>s. Repeat procedures a through r above for SYSTEM 2.</li> <li>a. Operate CABLE POWER switch to ON. ALARMS NO CABLE CURRENT indicator goes out.</li> <li>b. Operate TALK-OFF-SIG switch to SIG for 2 seconds or between SIG and OFF for called terminal identification.</li> <li>c. Operate TALK-OFF-SIG switch to TALK and talk with the called station.</li> <li>d. Request distant terminal to signal by order wire and operate TALK-OFF-SIG switch to OFF.</li> <li>e. When buzzer sounds and CALL indicator lights, operate TALK-OFF-SIG switch to TALK and answer the call.</li> <li>f. When the check is completed, set the TALK-OFF-SIG switch to OFF.</li> <li>g. Operate switch to the following positions and check for proper indication on TEST ALIGN meter.</li> </ol> <table style="width: 100%; border: none;"> <thead> <tr> <th style="text-align: left;">Position</th> <th style="text-align: left;">Indication</th> </tr> </thead> <tbody> <tr> <td>TIMING IN</td> <td>Green area</td> </tr> <tr> <td>PCM IN-1</td> <td>Green area</td> </tr> <tr> <td>PCM IN-2</td> <td>Green area</td> </tr> <tr> <td>CABLE I</td> <td>Yellow area</td> </tr> <tr> <td>CABLE V</td> <td>10.8 times number of TD-206/G's plus 13.</td> </tr> </tbody> </table> <p style="text-align: center;"><b>NOTE</b></p> <p>If CABLE V position is checked with loss of timing in signal, use 14.8 times number of TD-206/G's plus 13.</p> <ol style="list-style-type: none"> <li>h. Operate switch to SERV FAC.</li> </ol>	Position	Indication	TIMING IN	Green area	PCM IN-1	Green area	PCM IN-2	Green area	CABLE I	Yellow area	CABLE V	10.8 times number of TD-206/G's plus 13.	<ol style="list-style-type: none"> <li>n. Meter does not indicate in green band in either switch position.</li> <li>o. Meter does not indicate between 25 and 90 percent of full scale in either switch position.</li> <li>p. Meter does not indicate between 25 and 90 percent of full scale.</li> <li>q. Loud rushing noise is not heard.</li> <li>r. Meter does not indicate between 25 and 90 percent of full scale.</li> <li>s. Results are the same as a through r above.</li> <li>a. ALARMS NO CABLE CURRENT indicator fails to go out.</li> <li>b. Order wire fails to operate.</li> </ol>
	Position	Indication																	
	TIMING IN	Green area																	
	PCM IN-1	Green area																	
	PCM IN-2	Green area																	
	CABLE I	Yellow area																	
	CABLE V	10.8 times number of TD-206/G's plus 13.																	
	*																		
	*																		
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*	*	*																	
15					Multiplexer TD-754/G  PWR and CABLE CURRENT switches and cable current alarm circuit.  Traffic (pcm) alarm circuit	<ol style="list-style-type: none"> <li>a. Operate switch to SERV FAC.</li> </ol> <p style="text-align: center;"><b>NOTE</b></p> <p>Perform a and b below only when there is no traffic.</p> <ol style="list-style-type: none"> <li>a. Operate PWR switch to ON and observe that power and CABLE CUR indicators light. Operate CABLE CURRENT switch to ON and observe that the CABLE CUR indicator goes out.</li> <li>b. Notify operator at opposite end of cable link to momentarily operate POWER switch on TD-660/G to OFF. Observe that TRAFFIC</li> </ol>													

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VI - LESSON 3

Checkpoint 1, Form B

Use the equipment performance checklist on the next page to answer questions 1-3.

1. If the equipment is operating properly in Step 54, what should happen?

\_\_\_\_\_

2. What equipment component is being checked in Step 56?

\_\_\_\_\_

3. What should the operator do in Step 58?

\_\_\_\_\_

Step	Unit	Action	Normal indication	Corrective measures
		cation on DA-189/GRC.		
		Depress BUZZ OFF pushbutton to silence buzzer.		
53	R-1148(P)/GRC or R-1331(+)(P)/GRC.	Set AC POWER switch to ON. Allow 5-minute warmup.	AC POWER indicator lights. INCOMING CALL lamp lights momentarily. RING buzzer sounds momentarily. Blower motor operates.	Check silicon rectifiers on bottom of receiver for blistering or discoloration. If rectifiers are blistered or discolored, or show any signs of malfunction, higher category of maintenance is required.
54	R-1148(P)/GRC or R-1331(+)(P)/GRC.	Set multimeter selector switch to TEST TONE CAL. Set TEST TONE switch to ON and adjust TEST TONE control for indication in green area of receiver multimeter.	Multimeter indicates in green area of meter scale.	Check V2 in signaling unit 3A6.
55	T-893(P)/GRC	Set multimeter selector switch to 1 KC MOD.	Multimeter indicates in green area of meter scale.	Check V1, V2, and V4 on 2A3. Check V5 on afc assembly 2A4. Check all tubes in modulator 2A5.
56	AM-1955(*)/GRC or AM-1956(*)/GRC.	Set multimeter selector switch on R-1148(P)/GRC or R-1331(+)(P)GRC to OSC and adjust OSCILLATOR control for peak indication on multimeter.	Peak indication is obtained on multimeter.	Check WAVEMETER control for correct setting. Check diode CR2 in wavemeter.
57	R-1148(P)/GRC. (Omit this step when using AM-1955A/GRC or AM-1956A/GRC.)	Set multimeter selector switch to AFC LEV. Tune AFC LEVEL control for peak indication on multimeter.	Multimeter indicates 10 or more.	Check V1 through V7 on afc assembly 3A4.
58	R-1148(P)/GRC. (Omit this step when using AM-1955A/GRC or AM-1956A/GRC.)	Adjust AFC TUNE control for peak indication on multimeter.	Peak is indicated on multimeter.	
59	R-1148(P)/GRC. (Omit this step when using AM-1955A/GRC or AM-1956A/GRC.)	Set AFC TUNE-ODD-EVEN switch to ODD if receiver channel is odd-numbered, or to EVEN if receiver channel is even-numbered. Rotate AFC correction control on AM-1955/GRC or AM-1956/GRC until AFC meter indicates $\pm 40$ . After normal indica-	AFC meter needle moves back toward center and stops near center. AFC correction control on AM-1955/GRC or AM-1956/GRC moves away from center position and then returns to original setting.	Adjust R42 on afc assembly 3A4 to center AFC meter needle. Check V8 and V9 on afc assembly 3A4. If V8 is replaced, adjust R42 as required.

EQUIPMENT PERFORMANCE

Unit VI, Lesson 3  
Checkpoint 1, Form B

2

Use the troubleshooting chart on the next page to answer questions 4 to 6.

4. If you get Malfunction No. 53, what does the chart tell you to do to fix it?

---

5. What is the second probable cause of the malfunction in Item No. 61?

---

6. If the cause of the malfunction in Item No. 57 is a defective receiver head, what should the operator do to fix it?

---

Item No.	Malfunction	Probable cause	Corrective action
	dicator lights and all other indications are normal.		any airflow obstructions.
50	T-983(P)/GRC-103(V) meter has no indication for any position of meter selector switch. All other indications are normal.	b. Defective centrifugal fan 5A2B1. Defective meter 5TRA1M1 or meter switch 5TRA1S1.	b. Replace T-983(P)/GRC-103(V). Replace T-983(P)/GRC-103(V)
51	R-1329(P)/GRC-103(V) AC POWER and LOW SIGNAL indicators do not light, and buzzer is silent when AC POWER switch is operated to ON.	a. Defective power cable to R-1329(P)/GRC-103(V). b. Defective power supply 1RE1PS1. c. Defective switch 1RE1A1CB1.	a. Repair assigned to higher category of maintenance. b. Replace power supply (app A). c. Replace R-1329(P)/GRC-103(V). Replace lamp.
52	R-1329(P)/GRC-103(V) LOW SIGNAL indicator lights and buzzer sounds but AC POWER indicator does not light when AC POWER switch is operated to ON.	Defective AC POWER lamp.	Replace lamp.
53	R-1329(P)/GRC-103(V) AC POWER indicator lights and buzzer sounds but LOW SIGNAL indicator does not light when AC POWER switch is operated to ON.	Defective LOW SIGNAL lamp.	Replace lamp.
54	R-1329(P)/GRC-103(V) AC POWER and LOW SIGNAL indicators light but buzzer does not sound when AC POWER switch is operated to ON.	a. BUZ OFF/ALM NOR switch at incorrect setting. b. Defective BUZZER OFF switch or defective buzzer.	a. Check switch (inside of case at left-hand side, front upper corner of receiver head) and reset it if necessary. b. Replace R-1329(P)/GRC-103(V)
55	R-1329(P)/GRC-103(V) SYNC indicator does not extinguish within 10 seconds after AC POWER switch is operated to ON.	a. Defective power supply 1RE1A2. b. Defective electrical frequency synthesizer 1RE1A2.	a. Replace power supply (app A) b. Replace R-1329(P)/GRC-103(V).
56	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at +12 VDC.	a. Defective CX-10763/GRC-103(V) cable. b. Defective receiver head. c. Defective RT-773/GRC-103(V). d. Defective power supply 1RE1PS1.	a. Check and replace if necessary. b. Replace receiver head. c. Replace RT-773/GRC-103(V). d. Replace power supply (app A).
57	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at -12 VDC.	a. Defective power supply 1RE1PS1. b. Defective module in R-1329(P)/GRC-103(V). c. Defective receiver head.	a. Replace power supply (app A) b. Replace R-1329(P)/GRC-103(V). c. Replace receiver head.
58	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at XMTR DUPL. Meter indication normal with T-983(P)/GRC-103(V) meter selector switch at PWR OUT.	a. Incorrect XMTR DUPL control setting. b. Defective CG-3444/U cable. c. Defective duplexer 2A1A1 or power monitor 2A1A5.	a. Reset control. b. Check and replace if necessary. c. Replace R-1329(P)/GRC-103(V).
59	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at OSC.	a. Defective control-indicator 2A2. b. Defective electrical frequency synthesizer 1RE1A2.	a. Replace control-indicator (app A). b. Replace R-1329(P)/GRC-103(V).
60	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at DOUBLER. Normal indication in OSC position.	Defective amplifier-frequency multiplier 1RE1A5.	Replace amplifier-frequency multiplier (app A).
61	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at MULT. Normal indication in DOUBLER position.	a. Incorrect setting of RCVR SIG control. b. Incorrect tuning of MULT PEAK control. c. Defective control-indicator 2A2. d. Defective frequency multiplier 2A1A2A1 or electrical frequency synthesizer 1RE1A2.	a. Reset control. b. Retune control. c. Replace control-indicator (app A). d. Replace R-1329(P)/GRC-103(V).
62	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at RCVR SIG. Normal indication in MULT position but LOW SIGNAL indicator does not extinguish.	a. RCVR SIG or RCVR CHANNEL control incorrectly adjusted. b. Antenna facing wrong direction. c. Defective frequency mixer stage 2A1A2, radiofrequency amplifier 2A1A1 or low pass filter 2A1A1FL1. d. Defective T-983(P)/GRC-103(V) at distant terminal or repeater.	a. Adjust control. b. Check azimuth. c. Replace R-1329(P)/GRC-103(V). d. Request distant terminal or repeater troubleshooting.
63	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch	a. Defective intermediate frequency amplifier 1RE1AP2.	a. Replace intermediate frequency amplifier (app A).

Unit VI, Lesson 3  
Checkpoint 1, Form B

Use the maintenance table on the next page to answer questions 7 to 10.

7. The interior walls, ceilings, and floors (Item No. 5) are not ready/available for use if \_\_\_\_\_

\_\_\_\_\_

8. How often should the interior walls, ceilings, and floors be inspected? \_\_\_\_\_

9. What is the first procedure you should carry out on the POWER DISTRIBUTION PANEL (Item No. 7)?

\_\_\_\_\_

10. Which items should be inspected before operation?

\_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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AND TELL YOU WHAT TO DO NEXT.

B—Before operation    D—During operation    A—After operation    W—Weekly

Item No	Interval				Item to be Inspected	Procedures Check and have repaired or adjusted as necessary	For readiness reporting, equipment is not ready/available if
	B	D	A	W			
5		*			<i>INTERIOR</i> Walls, ceilings, and floors	Check for holes, open seams, or signs of water seepage or leaks that may present a shock hazard	A shock hazard exists
6	*	*			POWER INDICATOR neon lamp and AC VOLTS METER on POWER DISTRIBUTION PANEL	Apply power to the assemblage by starting generator set or turning on central power source. POWER INDICATOR neon lamp lights and AC VOLTS meter on POWER DISTRIBUTION PANEL indicates 115 vac. No less than 109 volts nor more than 121 volts	Voltage is less than 109 volts or more than 121 volts
7	*		*		POWER DISTRIBUTION PANEL	a. Operate MAIN circuit breaker to ON, AMPERES AC meter indicates zero. b. Sequentially operate each circuit breaker to ON, the associated indicator should light <b>CAUTION</b> Under blackout conditions this check may be made only if the curtains are closed. After testing, operate the BYPASS BLACKOUT switch to the BLACKOUT position.	a. High current reading is noted
8			*		Door microswitch	Operate the BYPASS BLACKOUT switch to BLACKOUT and open the door. Ceiling lights should go out	Lights do not go out when the door is open
9	*		*		BYPASS BLACKOUT switch	Operate the switch to the BYPASS position with the door open. Ceiling lights should light	
10	*		*		Exhaust blowers	Operate BLOWER switch associated with each exhaust blower to ON. Exhaust blower should operate	
11	*		*		Heater	a. Operate HEAT-OFF-FAN switch to HEAT, operate TEMPERATURE control and note that warm air blows from the front of the heater. b. Operate HEAT-OFF-FAN switch to FAN, fan blows air and heating element ceases to glow. c. Operate HEAT-OFF-FAN switch to OFF; fan should stop.	a. Heater fails to heat, fan does not blow, or excessive current causes circuit breaker to trip (If heater is mission essential)
12	*		*		Equipment ac power switches	Operate to ON; associated ac power indicators on each unit should light. Blowers should operate. TD-204/U ALARMS NO CABLE CURRENT indicator, or TD-754/G CABLE CUR should light. <b>RADIO TUNING CHECKS</b> <b>NOTES</b> Position each antenna assembly on the ground at least 30 feet apart facing in opposite directions. (This will allow transmission and reception from the weak back lobe radiation pattern on each antenna.) Connect each antenna to the SYSTEM antenna connector of the SIGNAL ENTRANCE BOX associated with the system to be checked.	One or more blowers fail to operate.

Unit VI, Lesson 3  
Checkpoint 1, Form B

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VII - LESSON 2

Checkpoint 1, Form A

VIDEO PATCH				
	System 1		System 2	
	A	B	A	B
Red	o	o	o	o
Blue	o	o	o	o
Green	o	o	o	o

1. For System 1, A-Blue is connected to:
- a. B-Blue
  - b. A-Red
  - c. B-Red
  - d. B-Green

VIDEO PATCH				
	System 1		System 2	
	M	N	M	N
R1	o	o	o	o
R2	o	o	o	o
R3	o	o	o	o

2. Using the above video patch diagram, locate the cable connecting M-R3 to N-R1. In which system is it located?
- a. System 1
  - b. System 2
  - c. Both System 1 and System 2
  - d. Neither System 1 nor System 2

3. Suppose you have been given the following instructions:

For System 2, connect TD-660-PCM IN to TD-204-TIM IN.

Which of the following four diagrams shows the result of your assigned task?

- a. Diagram 1
- b. Diagram 2
- c. Diagram 3
- d. Diagram 4

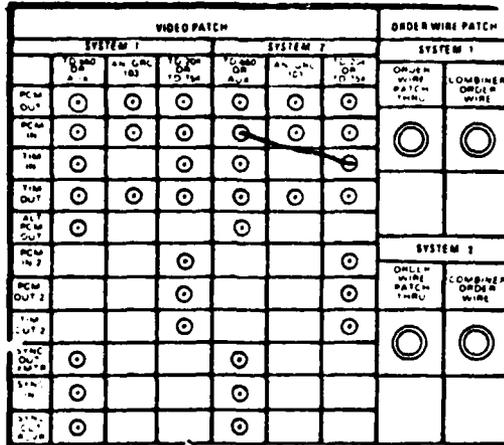


Diagram 1

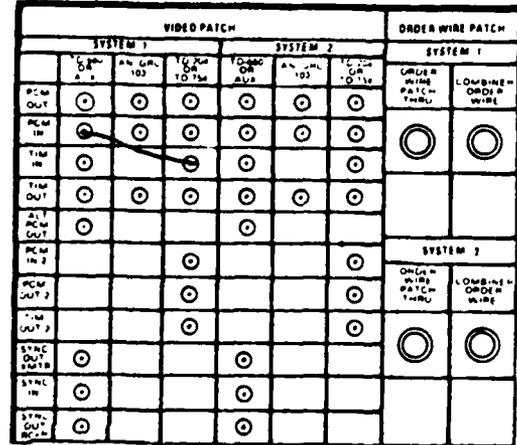


Diagram 2

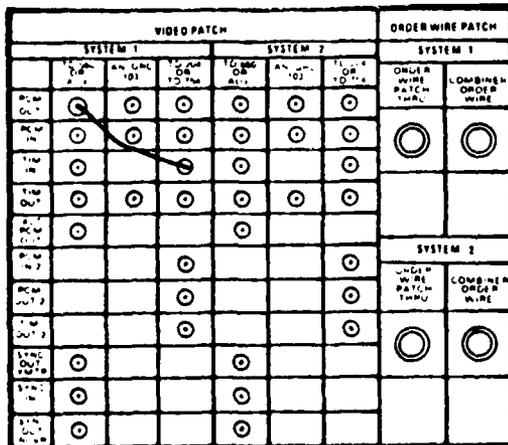


Diagram 3

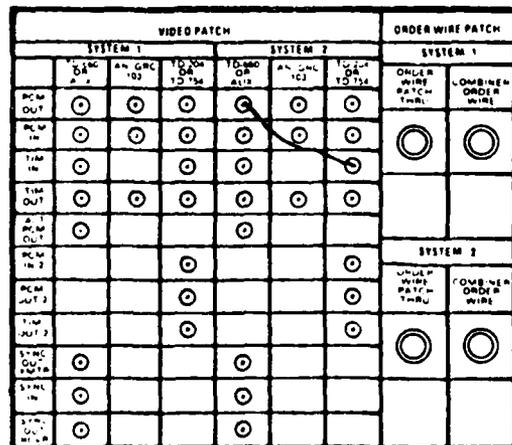


Diagram 4

4. Which of the following diagrams show Systems 1 and 2 interconnected?

- a. Diagrams 1 and 2
- b. Diagrams 1 and 3
- c. Diagrams 2 and 3
- d. Diagrams 2 and 4

VIDEO PATCH						
	System 1			System 2		
	X	Y	Z	X	Y	Z
Blue	o	o	o	o	o	o
White	o	o	o	o	o	o
Green	o	o	o	o	o	o

Diagram 1

VIDEO PATCH						
	System 1			System 2		
	X	Y	Z	X	Y	Z
Blue	o	o	o	o	o	o
White	o	o	o	o	o	o
Green	o	o	o	o	o	o

Diagram 2

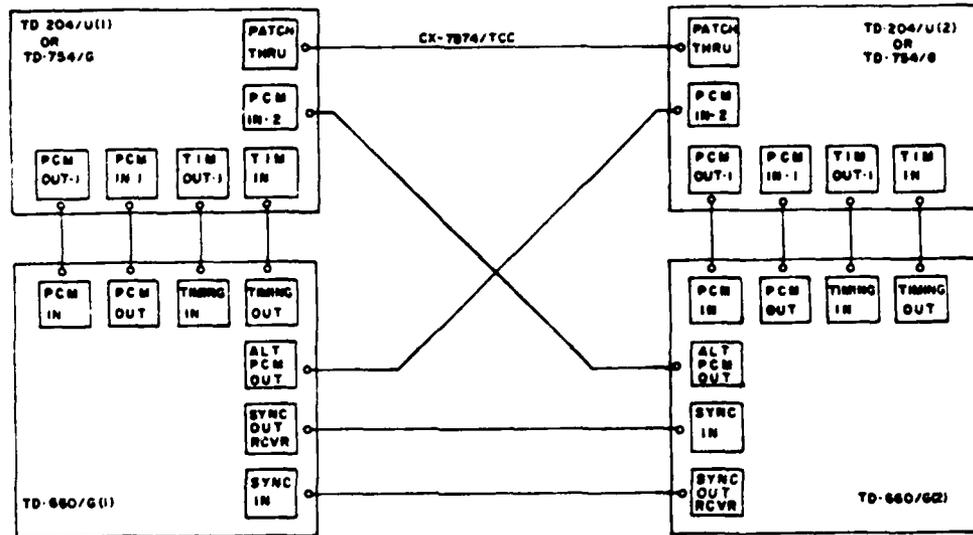
VIDEO PATCH						
	System 1			System 2		
	X	Y	Z	X	Y	Z
Blue	o	o	o	o	o	o
White	o	o	o	o	o	o
Green	o	o	o	o	o	o

Diagram 3

VIDEO PATCH						
	System 1			System 2		
	X	Y	Z	X	Y	Z
Blue	o	o	o	o	o	o
White	o	o	o	o	o	o
Green	o	o	o	o	o	o

Diagram 4

Below is a different kind of cabling diagram. It is called a block diagram. The larger boxes are the components, and the smaller boxes are the connectors. The cables are represented by the solid dark lines.



5. In the block diagram above, TD-204/U(1)-PCM IN-2 is connected to:
- a. TD-204/U(2)-PCM IN-2.
  - b. TD-660/G(1)-ALT PCM OUT.
  - c. TD-660/G(2)-ALT PCM OUT.
  - d. TD-204/U(2)-PCM OUT-1.

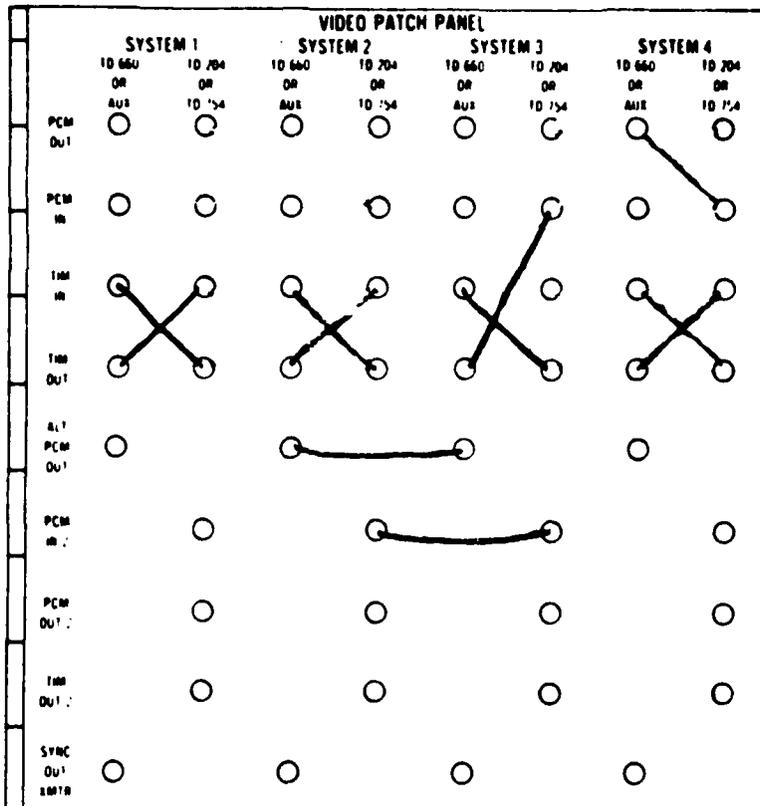
Look over the video patch diagram below. Then answer the two questions that follow the diagram.

V I D E O P A T C H								
	System 1		System 2		System 3		System 4	
	M	N	M	N	M	N	M	N
I	o	o	o	o	o	o	o	o
II	o	o	o	o	o	o	o	o
III	o	o	o	o	o	o	o	o
IV	o	o	o	o	o	o	o	o

6. In the above diagram, which systems are being used?
- Systems 1, 2, and 4
  - Systems 1, 2, and 3
  - Systems 1, 3, and 4
  - Systems 2, 3, and 4
7. In System 2:
- M-III is connected to N-I and M-I is connected to M-III.
  - M-II is connected to N-III and M-III is connected to N-I.
  - M-II is connected to N-I and M-IV is connected to N-IV.
  - M-I is connected to N-II and M-IV is connected to N-III.

VIDEO PATCH								
	System 1		System 2		System 3		System 4	
	A	B	A	B	A	B	A	B
I	o	o	o	o	o	o	o	o
II	o	o	o	o	o	o	o	o
III	o	o	o	o	o	o	o	o
IV	o	o	o	o	o	o	o	o

8. In the video patch above, which statement is true concerning System 3?
- B-II is connected to B-III; A-II is connected to B-I.
  - B-I is connected to B-III; A-II is connected to A-IV.
  - A-II is connected to B-IV; A-III is connected to B-IV.
  - B-II is connected to B-IV; A-III is connected to B-I.



On the left is a diagram of a video patch panel. Look closely over the diagram, then answer the following two questions.

9. Which of the following connections is shown in the diagram above?
- For System 1, TD-660 TIM IN is connected to TD-204 PCM IN.
  - For System 3, TD-660 TIM IN is connected to TD-204 PCM IN.
  - For System 4, TD-660 PCM OUT is connected to TD-204 PCM IN.
  - For System 2, TD-660 TIM OUT is connected to TD-204 PCM IN.
10. Which systems are interconnected in the above video patch?
- Systems 1 and 2
  - Systems 2 and 3
  - Systems 2 and 4
  - Systems 3 and 4

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Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VII - LESSON 2

Checkpoint 1, Form B

VIDEO PATCH				
	System 1		System 2	
	X	Y	X	Y
IN	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
OUT	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

1. In the video patch diagram above, which of the following statements accurately describes the cable connection for System 2.
- a. X-IN is connected to Y-IN.
  - b. X-IN is connected to Y-OUT.
  - c. X-OUT is connected to Y-IN.
  - d. X-OUT is connected to Y-OUT.

VIDEO PATCH				
	System 1		System 2	
	M	N	M	N
IN	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
OUT	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IN-1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
OUT-1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. In which system is the cable connector between N-IN and N-OUT-1 located?
- a. System 1
  - b. System 2
  - c. Both System 1 and System 2
  - d. Neither System 1 nor System 2

V I D E O P A T C H				
	System 1		System 2	
	A	B	A	B
Blue	o	o	o	o
Brown	o	o	o	o
Black	o	o	o	o

3. In the cabling diagram above, which statement accurately describes the cable connection for System 2?
- A-Black is connected to B-Brown.
  - A-Black is connected to B-Black.
  - A-Brown is connected to B-Black.
  - A-Blue is connected to B-Black.

V I D E O P A T C H						
	System 1			System 2		
	A	B	C	A	B	C
P OUT	o	o	o	o	o	o
P IN	o	o	o	o	o	o
T OUT	o	o	o	o	o	o

4. The diagram above shows the correct way for connecting cables for Systems 1 and 2 on the video patch. Which of the diagrams on the next page shows the correct way to connect the cables for System 1 only?
- Diagram 1
  - Diagram 2
  - Diagram 3
  - Diagram 4

VIDEO PATCH						
	System 1			System 2		
	A	B	C	A	B	C
P OUT	o	o	o	o	o	o
P IN	o	o	o	o	o	o
T OUT	o	o	o	o	o	o

Diagram 1

VIDEO PATCH						
	System 1			System 2		
	A	B	C	A	B	C
P OUT	o	o	o	o	o	o
P IN	o	o	o	o	o	o
T OUT	o	o	o	o	o	o

Diagram 2

VIDEO PATCH						
	System 1			System 2		
	A	B	C	A	B	C
P OUT	o	o	o	o	o	o
P IN	o	o	o	o	o	o
T OUT	o	o	o	o	o	o

Diagram 3

VIDEO PATCH						
	System 1			System 2		
	A	B	C	A	B	C
P OUT	o	o	o	o	o	o
P IN	o	o	o	o	o	o
T OUT	o	o	o	o	o	o

Diagram 4

VIDEO PATCH						
	System 1			System 2		
	X	Y	Z	X	Y	Z
I	o	o	o	o	o	o
II	o	o	o	o	o	o
III	o	o	o	o	o	o
IV	o	o	o	o	o	o
V	o	o	o	o	o	o

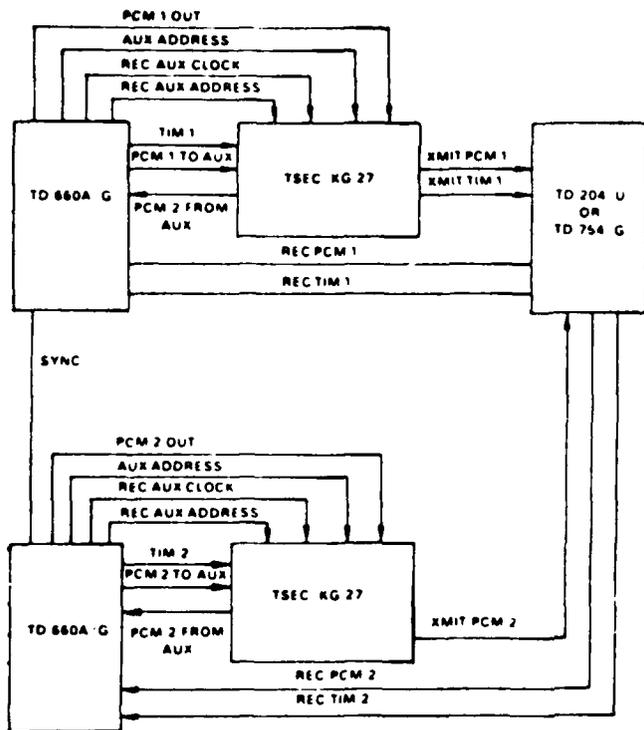
5. Which of the following statements is not true about the above video patch diagram?
- For System 1, Y-III is connected to Z-IV.
  - System 1 is connected to System 2.
  - For System 2, Y-I is connected to Z-II.
  - For System 2, Y-II is connected to Z-I.

Unit VII, Lesson 2  
 Checkpoint 1, Form B



VIDEO PATCH						
	System 1		System 2		System 3	
	A	B	A	B	A	B
I	o	o	o	o	o	o
II	o	o	o	o	o	o
III	o	o	o	o	o	o
IV	o	o	o	o	o	o

7. In the above video patch diagram, which system(s) is not being used?
- System 1
  - System 2
  - System 3
  - Systems 1 and 2



On the left is a different kind of cabling diagram. It is called a block diagram. The labels in the boxes identify the components. The solid dark lines are the cables. The labels directly above or below the lines identify the connectors.

8. In the block diagram above, TD-204/U - REC PCM 2 is connected to:
- TD-660A/G
  - TD-754/G
  - XMIT PCM 1
  - TSEC/KG-27

VIDEO PATCH									
	System 1			System 2			System 3		
	X	Y	Z	X	Y	Z	X	Y	Z
P OUT	o	o	o	o	o	o	o	o	o
P IN	o	o	o	o	o	o	o	o	o
T IN	o	o	o	o	o	o	o	o	o
T OUT	o	o	o	o	o	o	o	o	o

9. Which statement is true concerning the video patch above?
- For System 1, X - P IN is connected to Z - T IN.
  - For System 2, X - T OUT is connected to Z - P IN.
  - For System 2, X - P IN is connected to Z - T IN.
  - For System 3, X - T IN is connected to Z - P OUT.

VIDEO PATCH									
	System 1		System 2		System 3		System 4		
	A	B	A	B	A	B	A	B	
P OUT	o	o	o	o	o	o	o	o	
P IN	o	o	o	o	o	o	o	o	
T IN	o	o	o	o	o	o	o	o	
T OUT	o	o	o	o	o	o	o	o	
S IN	o	o	o	o	o	o	o	o	

10. Which of the following statements is true concerning the above video patch diagram?
- A - P OUT for System 1 is connected to A - T IN for System 3.
  - B - P OUT for System 2 is connected to A - P IN for System 4.
  - A - P IN for System 3 is connected to B - P IN for System 4.
  - B - P OUT for System 2 is connected to B - P IN for System 4.

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AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VIII - LESSON 1

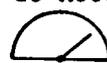
Checkpoint 1, Form A

Here is part of a troubleshooting checklist. Use it to answer the questions on the next page.

<u>Step</u>	<u>Action</u>	<u>Normal Indication</u>
1	Tune AFC LEVEL control for peak indication on multimeter.	Multimeter indicates 10 or more.
2	Rotate AFC correction control.	AFC meter needle moves back toward center and stops near center.
3	Press push-to-talk button on Handset H-156/U.	Side tone is heard in H-156/U receiver.
4	Adjust REC SIG-1 for maximum indication on receiver multimeter.	Multimeter indicates peak or off scale.
5	Detune REC SIG-1 control for minimum indication on multimeter.	Multimeter indicates minimum level.
6	Operate RING switch and listen on handset.	1,600-cps ringing tone should be heard.
7	Set AC POWER circuit breaker to ON.	Blower motor operates.
8	Adjust AFC CORRECTION through its range.	AFC CORRECTION control is not over 10° from midrange.
9	Readjust AMP control and rotate COUPLING control.	DA-189/U meter indicates more than 12 watts.
10	Set multimeter selector switch to PWR OUT.	Multimeter indication is 20 or more.

Questions:

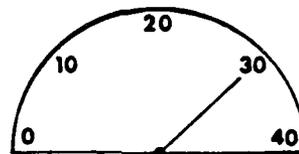
1. You do Action No. 1. The multimeter reading on your equipment is 9. Does this mean that there is something wrong? \_\_\_\_\_

2. You do Action No. 2. The AFC meter needle moves from  to  and stays there. Is something wrong? \_\_\_\_\_

3. You do Action No. 3. You hear a side tone in the H/156/U receiver. Is something wrong? \_\_\_\_\_

4. You do Action No. 4. The multimeter needle goes off the scale. Is something wrong? \_\_\_\_\_

5. You do Action No. 5. Here is what the multimeter looks like:



Is something wrong? \_\_\_\_\_

6. You do Action No. 6. You hear a faint buzz, but it is not a ringing tone. Is something wrong? \_\_\_\_\_

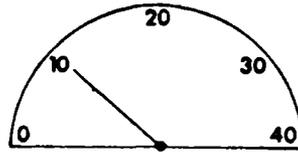
7. You do Action No. 7. You hear the blower motor go on. Is something wrong? \_\_\_\_\_

8. You do Action No. 8. The AFC CORRECTION control is about 30° from midrange. Is something wrong? \_\_\_\_\_

Unit VIII, Lesson 1  
Checkpoint 1, Form A

9. You do Action No. 9. The DA-189/GRC meter reads 15 watts. Is something wrong? \_\_\_\_\_

10. You do Action No. 10. The multimeter looks like this:



Is something wrong? \_\_\_\_\_

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AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VIII - LESSON 1

Checkpoint 1, Form B

Here is part of a troubleshooting checklist. Use it to answer the questions on the next page.

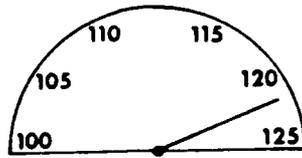
<u>Step</u>	<u>Action</u>	<u>Normal Indication</u>
1	Set POWER circuit breaker to ON.	POWER ON indicator lights.
2	Set MANUAL RAISE-LOWER switch to RAISE then LOWER.	Meter indicates raise in voltage, then decrease in voltage.
3	Set MANUAL-AUTOMATIC switch to AUTOMATIC.	Meter indicates 115 volts.
4	Rotate coupling control to obtain higher DA-189/GRC meter indication.	DA-189/GRC meter indicates more than 8 watts.
5	Set multimeter selector switch to 1 KC MOD.	Multimeter indicates in green area of meter scale.
6	Operate RING switch and listen on handset.	1,600-cps ringing tone should be heard.
7	Set AC POWER circuit breaker to ON.	Blower motor operates.
8	Adjust AFC CORRECTION through its range.	AFC CORRECTION control is not over 10° from midrange.
9	Readjust AMP control and rotate COUPLING control.	DA-189/U meter indicates more than 12 watts.
10	Set multimeter selector switch to PWR OUT.	Multimeter indication is 20 or more.

Unit VIII, Lesson 1  
Checkpoint 1, Form B

1

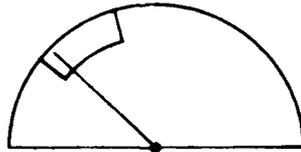
Questions:

1. You do Action No. 1. The POWER ON indicator stays unlit. Is something wrong? \_\_\_\_\_
2. You do Action No. 2. The meter goes from 30 to 50, then back to 30. Is something wrong? \_\_\_\_\_
3. You Do Action No. 3. Here is how the meter looks.



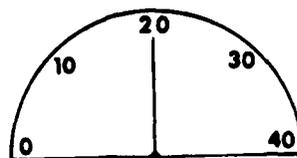
Is something wrong? \_\_\_\_\_

4. You do Action No. 4. The DA-189/GRC meter reads 5 watts. Is something wrong? \_\_\_\_\_
5. You do Action No. 5. Here is how the multimeter looks.



Is something wrong? \_\_\_\_\_

6. You do Action No. 6. There is no sound on the handset. Is something wrong? \_\_\_\_\_
7. You do Action No. 7. The blower motor does not go on. Is something wrong? \_\_\_\_\_
8. You do Action No. 8. The AFC CORRECTION control is about 5° from midrange. Is something wrong? \_\_\_\_\_
9. You do Action No. 9. The DA-189/GRC meter indicates 15 watts Is something wrong? \_\_\_\_\_
10. You do Action No. 10. Here is how the multimeter looks. \_\_\_\_\_



Is something wrong? \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VIII - LESSON 2

Checkpoint 1, Form A

Here is part of a troubleshooting checklist. Use it to answer the questions below.

<u>Step</u>	<u>Action</u>	<u>Normal Indication</u>
1	Set AC POWER circuit breaker to ON. Allow equipment to warm up for 5 minutes.	Blower motor operates. FIL indicator lights.
2	Set multimeter switch to AMP. Adjust AFC CORRECTION through its range for peak indication.	Indication on multimeter is more than 10. AFC CORRECTION control is not over 10° from midrange.
3	Set multimeter selector switch to PWR OUT.	Multimeter indication should be no less than 20. LOW POWER indicator should be extinguished.
4	Rotate AFC CORRECTION control 30° to the right from its original setting.	AFC meter indication moves off center then slowly returns to center. AFC CORRECTION control returns to original setting.

Use the checklist above to answer the following questions.

1. You do Action No. 1. The blower motor goes on, and the FIL indicator lights. Is something wrong? \_\_\_\_\_
2. You do Action No. 1. The blower motor goes on. The FIL indicator does not light. Is something wrong? \_\_\_\_\_

3. You do Action No. 2. The multimeter shows a reading of 20. The AFC CORRECTION control is about 15° from midrange. Is something wrong? \_\_\_\_\_
4. You do Action No. 2. The multimeter reading is 5. The AFC CORRECTION control is far to the left of midrange. Is something wrong? \_\_\_\_\_
5. You do Action No. 2. The multimeter reading is 9. The AFC CORRECTION control is at midrange. Is something wrong? \_\_\_\_\_
6. You do Action No. 3. The multimeter indication is 25. The LOW POWER indicator goes out. Is something wrong? \_\_\_\_\_
7. You do Action No. 3. The multimeter indication is 15. The LOW POWER indicator goes out. Is something wrong? \_\_\_\_\_
8. You do Action No. 3. The multimeter indication is 15. The LOW POWER indicator is lit. Is something wrong? \_\_\_\_\_
9. Before you do Action No. 4, the AFC CORRECTION control is at midrange. Now you do Action No. 4. The AFC meter needle moves to the right then back to the center. The AFC CORRECTION control returns to midrange. Is something wrong? \_\_\_\_\_
10. Before you do Action No. 4, The AFC CORRECTION control is at midrange. Now you do Action No. 4. The AFC meter needle moves to the right and stays there. The AFC CORRECTION control returns to midrange. Is something wrong? \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
TAKE IT TO YOUR INSTRUCTOR FOR SCORING.

YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VIII - LESSON 2

Checkpoint 1, Form B

Here is part of a checklist for troubleshooting radio equipment. Do not try to read it now, but use it to answer the questions on the next page.

<u>Step</u>	<u>Action</u>	<u>Normal Indication</u>
1	Press BUZZER OFF switch.	POWER INDICATOR lights. Loud rushing noise is heard on handset.
2	Set AC POWER circuit breaker to ON.	Blower motor operates. Overhead fan starts. FIL indicator lights.
3	Set multimeter selector switch to PWR OUT. Set multimeter switch to AMP.	Multimeter indicates no more than 20. LOW POWER indicator goes out.
4	Adjust AFC CORRECTION through its range for peak indication.	Indication on multimeter is more than 10. AFC CORRECTION control is not over 10° from midrange.
5	Rotate AFC CORRECTION control 30° to the right from its midrange setting.	AFC meter indication moves off center then slowly returns to center. AFC CORRECTION control returns to midrange.

USE THE TABLE ON THE PREVIOUS PAGE TO ANSWER THE FOLLOWING QUESTIONS:

1. You do Action No. 1. The POWER INDICATOR lights. You hear a crackling sound on the handset. Is something wrong? \_\_\_\_\_
2. You do Action No. 1. The POWER INDICATOR remains off. There is no sound on the handset. Is something wrong? \_\_\_\_\_
3. You do Action No. 2. The blower motor operates. The overhead fan does not move. The FIL indicator lights. Is something wrong? \_\_\_\_\_
4. You do Action No. 2. The blower motor and the overhead fan start running. The FIL indicator lights. Is something wrong? \_\_\_\_\_
5. You do Action No. 3. The multimeter registers 18. The LOW POWER indicator stays on. Is something wrong? \_\_\_\_\_
6. You do Action No. 3. The multimeter registers 25. The LOW POWER indicator goes out. Is something wrong? \_\_\_\_\_
7. You do Action No. 4. There is no indication on the multimeter. The AFC CORRECTION control is about 40° from midrange. Is something wrong? \_\_\_\_\_
8. You do Action No. 4. The multimeter indicates 20. The AFC CORRECTION control is about 5° from midrange. Is something wrong? \_\_\_\_\_
9. You do Action No. 5. The AFC meter needle moves to the right then returns to the center. The AFC CORRECTION control goes back to midrange. Is something wrong? \_\_\_\_\_
10. You do Action No. 5. The AFC meter needle moves to the right then returns to the center. The AFC CORRECTION control remains in a setting 30° to the right of midrange. Is something wrong? \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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AND TELL YOU WHAT TO DO NEXT.

Unit VIII, Lesson 2  
Checkpoint 1, Form B

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VIII - LESSON 3

Checkpoint 1, Form A

Each question below tells you something that happened while operating equipment. Look in the table on the following pages for the symptom description that matches what happened on the equipment, and write its Item No. in the space provided.

- |  | <u>Item No.</u> |
|--|-----------------|
| 1. You are operating a TD-660(*)/G. You set selector switch III at OSC. The TEST ALIGN meter indicates outside the green area.                           | _____           |
| 2. You are operating a T-983(P)/GRC-103(V). You set the meter selector switch at 12 VDC. The meter reads below normal.                                   | _____           |
| 3. You are operating a TD-660(*)/G. You set selector switch I at SW II and selector switch II at A. The TEST ALIGN meter registers zero.                 | _____           |
| 4. You are operating an R-1329(P)/GRC-103(V). You set the meter selector switch at DOUBLER. The meter reading is below normal.                           | _____           |
| 5. You are operating a TD-660(*)/G. You set the POWER switch at ON, but the indicator lamp does not go on.   | _____           |
| 6. You are operating a TD-204/U. You set the METER SELECT switch at SERV FAC and the SERV SEL switch at D. The TEST ALIGN meter indication is incorrect. | _____           |
| 7. You are operating a TD-660(*)/G. You set selector switch I at NOISE GEN. The TEST ALIGN meter needle is not in the yellow.                            | _____           |
| 8. You are operating an R-1329(P)/GRC-103(V). You set the meter selector switch at MULT. The meter reading is below normal.                              | _____           |

Item No.

9. You are operating a TD-204/U. You set the METER SELECT switch at SERV FAC and the SERV SEL switch at -10. The TEST ALIGN meter gives an incorrect indication. \_\_\_\_\_
10. You are operating an R-1329(P)/GRC-103(V). You set the meter selector switch to OSC. The meter reading is below normal. \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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List of Symptoms from a Troubleshooting Table.

<u>Item No.</u>	<u>Malfunction (Symptom)</u>
1	Incorrect indication on TD-204/U TEST ALIGN meter with METER SELECT switch at SERV FAC and SERV SEL switch at: a. -10. b. +10 c. SUM + 3. d. BAL.
2	Incorrect indication on TD-204/U TEST ALIGN meter with METER SELECT switch at SERV FAC and SERV SEL switch at: a. A b. B c. C d. D e. E
3	T-983(P)/GRC-103(V) OVERHEAT indicator lights when AC POWER switch is operated to ON/RESET.
4	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at 12 VDC or 28 VDC.
5	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at PWR OUT.
6	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at OSC.
7	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at DOUBLER.

(continued on the next page)

<u>Item No.</u>	<u>Malfunction (Symptom)</u>
8	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at MULT.
9	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at RCVR SIG.
10	TD-660(*)/G indicator lamp does not light when POWER switch is operated to ON.
11	Incorrect indication on TD-660(*)/G TEST ALIGN meter with selector switch I at; <ul style="list-style-type: none"> <li>a. +12</li> <li>b. +4</li> <li>c. -12</li> <li>d. -6</li> <li>e. -4</li> </ul>
12	TEST ALIGN meter fails to indicate yellow when selector switch I is at +7 on TD-660(*)/G.
13	TEST ALIGN meter fails to indicate yellow when selector switch I of TD-660(*)/G is at NOISE GEN.
14	TEST ALIGN meter of TD-660(*)/G fails to indicate green with selector switch I at SW II and selector switch II at: <ul style="list-style-type: none"> <li>a. A</li> <li>b. B</li> <li>c. C</li> <li>d. D</li> </ul>
15	TEST ALIGN meter of TD-660(*)/G does not indicate in green area with selector switch III at OSC.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VIII - LESSON 3

Checkpoint 1, Form B

Each question below tells about a symptom that occurred while operating equipment. Find the symptom description that matches the symptom, using the table on the two pages following the questions. Then write its Item No. in the space provided.

- |  | <u>Item No.</u> |
|--|-----------------|
| 1. You are operating a TD-660(*)/G. You set selector switch I at -6. The TEST ALIGN meter indicates incorrectly.   | _____           |
| 2. You are operating a TD-204/U. You set the METER SELECT switch at SERV FAC and the SERV SEL switch at +10. The TEST ALIGN meter shows an incorrect indication. | _____           |
| 3. You are operating a TD-660(*). You set selector switch I at SW II and selector switch II at D. The needle on the TEST ALIGN meter is out of the green area.   | _____           |
| 4. You are operating a T-983(P)/GRC-103(V). You set the meter selector switch at PWR OUT. The meter reading is below normal.                                     | _____           |
| 5. You are operating a TD-660(*)/G. You set selector switch I to NOISE GEN. The TEST ALIGN meter indication is not in the yellow.                                | _____           |
| 6. You are operating an R-1329(P)/GRC-103(V). You set the meter selector switch to RCVR SIG. The meter indicates below normal.                                   | _____           |
| 7. You are operating a T-983(P)/GRC-103(V). You set the AC POWER switch to ON/RESET. The OVERHEAT indicator lights.  | _____           |
| 8. You are operating a TD-660(*)/G. You set selector switch I at +4. The TEST ALIGN meter shows an incorrect indication.   | _____           |

9. You are operating a T-983(P)/GRC-103(V). You set the meter selector switch at 28 VDC. The meter reading is below normal. \_\_\_\_\_
10. You are operating a TD-660(\*)/G. You set selector switch I to +7. the TEST ALIGN meter needle is not in the yellow area. \_\_\_\_\_

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List of Symptoms from a Troubleshooting Table.

<u>Item</u> <u>No.</u>	<u>Malfunction (Symptom)</u>
1	Incorrect indication on TD-204/U TEST ALIGN meter with METER SELECT switch at SERV FAC and SERV SEL switch at: a. -10. b. +10 c. SUM + 3. d. BAL.
2	Incorrect indication on TD-204/U TEST ALIGN meter with METER SELECT switch at SERV FAC and SERV SEL switch at: a. A b. B c. C d. D e. E
3	T-983(P)/GRC-103(V) OVERHEAT indicator lights when AC POWER switch is operated to ON/RESET.
4	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at 12 VDC or 28 VDC.
5	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at PWR OUT.
6	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at OSC.
7	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at DOUBLER.

(continued on the next page)

<u>Item No.</u>	<u>Malfunction (Symptom)</u>
8	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at MULT.
9	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at RCVR SIG.
10	TD-660(*)/G indicator lamp does not light when POWER switch is operated to ON.
11	Incorrect indication on TD-660(*)/G TEST ALIGN meter with selector switch I at; <ul style="list-style-type: none"> <li>a. +12</li> <li>b. +4</li> <li>c. -12</li> <li>d. -6</li> <li>e. -4</li> </ul>
12	TEST ALIGN meter fails to indicate yellow when selector switch I is at +7 on TD-660(*)/G.
13	TEST ALIGN meter fails to indicate yellow when selector switch I of TD-660(*)/G is at NOISE GEN.
14	TEST ALIGN meter of TD-660(*)/G fails to indicate green with selector switch I at SW II and selector switch II at: <ul style="list-style-type: none"> <li>a. A</li> <li>b. B</li> <li>c. C</li> <li>d. D</li> </ul>
15	TEST ALIGN meter of TD-660(*)/G does not indicate in green area with selector switch III at OSC.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VIII - LESSON 4

Checkpoint 1, Form A

Each of the ten questions below describes an equipment symptom. On the following two pages, you will find a list of symptoms from a troubleshooting table. Read each question. Then find the matching symptom description in the table, and write its Item No. in the space provided.

Item No.

1. You are operating a T-983(P)/GRC-103(V). You set the AC POWER switch to ON/RESET. The AC POWER indicator lights. The LOW POWER indicator lights. The buzzer sounds. The blower does not go on. \_\_\_\_\_
2. You are checking out an RT-773/GRC-103(V). An order wire signal is coming in. The buzzer sounds, but the CALL indicator does not light. \_\_\_\_\_
3. You are working with a medium capacity system including a TD-352/U, TD-202/U, and AN/GRC-50A(V). You set the METER SELECT switch of the TD-202/U at FROM RADIO RCVR. The TD-202/U TEST ALIGN meter does not indicate in the green area, and the ALARMS TRAFFIC indicator lights. The TD-352/U ALARMS FRAME indicator also lights, and the buzzer sounds. The AN/GRC-50A(V) and order wire are operating normally. \_\_\_\_\_
4. You are operating a T-983(P)/GRC-103(V). You set the AC POWER switch to ON/RESET. The AC POWER indicator does not light, but the LOW POWER indicator lights, the buzzer sounds, and the blower goes on. \_\_\_\_\_
5. You are operating an R-1329(P)/GRC-103(V). You set the AC POWER switch to ON. The AC POWER indicator does not light. The LOW SIGNAL indicator does not light. The buzzer does not sound. \_\_\_\_\_

Item No.

6. You are operating an R-1329(P)/GRC-103(V). You set the AC POWER switch to ON. The LOW SIGNAL indicator does not light, but the AC POWER indicator lights and the buzzer sounds. \_\_\_\_\_
7. You are operating an R-1329(P)/GRC-103(V). You set the AC POWER switch to ON. The POWER indicator on the RT-773/GRC-103(V) does not light, but all other indications are normal. \_\_\_\_\_
8. You are operating a T-983(P)/GRC-103(V). You set the AC POWER switch to ON/RESET and the meter selector switch to 600 VDC. The LOW POWER indicator stays on, and the meter indicates below normal. \_\_\_\_\_
9. You are operating an R-1329(P)/GRC-103(V). You set the AC POWER switch to ON. The AC POWER indicator does not light, but the LOW SIGNAL indicator lights and the buzzer sounds. \_\_\_\_\_
10. You are operating an R-1329(P)/GRC-103(V). You set the AC POWER switch to ON. The buzzer does not sound, but both the AC POWER and the LOW SIGNAL indicators light. \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT  
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List of Symptom Descriptions from a Troubleshooting Table

<u>Item No.</u>	<u>Symptom</u>
1	T-983(P)/GRC-103(V) LOW POWER indicator does not extinguish within 60 seconds after AC POWER switch is operated to ON/RESET and meter indication is below normal with meter selector switch at 600 VDC.
2	T-983(P)/GRC-103(V) AC POWER and LOW POWER indicators do not light, buzzer is silent, and blower does not operate when AC POWER switch is operated to ON/RESET.
3	T-983(P)/GRC-103(V) AC POWER and LOW POWER indicators light, buzzer sounds, but blower does not operate when AC POWER switch is operated to ON/RESET.
4	T-983(P)/GRC-103(V) LOW POWER indicator lights, buzzer sounds, and blower operates, but AC POWER indicator does not light when AC POWER switch is operated to ON/RESET.
5	R-1329(P)/GRC-103(V) AC POWER and LOW SIGNAL indicators do not light, and buzzer is silent when AC POWER switch is operated to ON.
6	R-1329(P)/GRC-103(V) LOW SIGNAL indicator lights and buzzer sounds but AC POWER indicator does not light when AC POWER switch is operated to ON.
7	R-1329(P)/GRC-103(V) AC POWER indicator lights and buzzer sounds but LOW SIGNAL indicator does not light when AC POWER switch is operated to ON.
8	R-1329(P)/GRC-103(V) AC POWER and LOW SIGNAL indicators light but buzzer does not sound when AC POWER switch is operated to ON.
9	RT-773/GRC-103(V) POWER indicator does not light when R-1329(P)/GRC-103(V) AC POWER switch is operated to ON and there is no order wire communications.

(continued on the next page)

<u>Item No.</u>	<u>Symptom</u>
10	RT-773/GRC-103(V) POWER indicator does not light when R-1329(P)/GRC-103(V) AC POWER switch is operated to ON. All other indications are normal.
11	RT-773/GRC-103(V) CALL indicator does not light when order wire signal is received, but buzzer sounds.
12	RT-773/GRC-103(V) CALL indicator lights, but buzzer does not sound when order wire signal is received.
13	ALARMS FRAME indicator of TD-352/U lights, buzzer sounds, and TEST ALIGN meter indicates in green area with METER SELECT switch at PCM IN and TIMING IN.
14	ALARMS FRAME indicator of TD-352/U lights, buzzer sounds, and TEST ALIGN meter does not indicate in green area with METER SELECT switch at PCM IN and/or TIMING IN. TD-202/U and AN/GRC-50A(V) indicate normally.
15	ALARMS FRAME indicator of TD-352/U and ALARMS TRAFFIC indicator of TD-202/U light, buzzer sounds, TEST ALIGN meter of TD-202/U does not indicate in green area with METER SELECT switch at FROM RADIO RCVR. AN/GRC-50A(V) operates normally, order wire normal.
16	ALARMS FRAME indicator of TD-352/U and ALARMS TRAFFIC indicator of TD-202/U light and TEST METER does not indicate in green area with METER SELECT switch at FROM RADIO RCVR, all indications on AN/GRC-50A(V) are normal except for noisy or no order wire.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT VIII - LESSON 4

Checkpoint 1, Form B

Each of the ten questions below describes an equipment symptom. Read each question. Then go to the table following the questions and find the symptom description which matches the equipment symptom. Write its Item No. in the space provided.

Item No.

1. You are operating a T-983(P)/GRC-103(V). You set the AC POWER switch to ON/RESET. The AC POWER indicator lights. The LOW POWER indicator lights. The buzzer sounds. The blower does not go on. \_\_\_\_\_
  
2. You are operating an R-1329(P)/GRC-103(V). You set the AC POWER switch to ON. The indicators on the R-1329 are normal, but the RT-773/GRC-103(V) POWER indicator does not light. \_\_\_\_\_
  
3. You are operating an R-1329(P)/GRC-103(V). You set the AC POWER switch to ON. The AC POWER indicator lights and the buzzer sounds, but the LOW SIGNAL indicator does not light. \_\_\_\_\_
  
4. You are operating a T-983(P)/GRC-103(V). You set the meter selector switch at DRIVER. The meter reading is normal. Next, you set the meter selector switch at PWR OUT. The meter indicates below normal. You set the meter selector switch of the R-1329(P)/GRC-103(V) at XMTR DUPL. The R-1329 meter indicates below normal. \_\_\_\_\_
  
5. You receive an order wire signal. The buzzer sounds, but the CALL indicator on the RT-773/GRC-103(V) does not light. \_\_\_\_\_

Item No.

6. You are operating a T-983(P)/GRC-103(V). You set the meter selector switch at REFL PWR. The meter reading is above normal. You set the meter selector switch of the R-1329(P)/GRC-103(V) at REFL PWR. The R-1329 meter also indicates above normal. \_\_\_\_\_
7. You are operating an R-1329(P)/GRC-103(V). You set the AC POWER switch to ON. The AC POWER indicator does not light. The LOW SIGNAL indicator does not light. The buzzer does not sound. \_\_\_\_\_
8. You are operating a T-983(P)/GRC-103(V). You set the AC POWER switch to ON/RESET and the meter selector switch to 600 VDC. The LOW POWER indicator goes on and stays on. The meter indication is below normal. \_\_\_\_\_
9. You are operating a T-983(P)/GRC-103(V). You set the meter selector switch at DRIVER. The meter indication is normal. You set the meter selector switch at PWR OUT. The meter reads below normal. You set the meter selector switch of the R-1329(P)/GRC-103(V) at XMTR DUPL. The R-1329 meter indication is normal. \_\_\_\_\_
10. You are operating a T-983(P)/GRC-103(V). You set the AC POWER switch to ON/RESET. The AC POWER indicator does not light. The LOW POWER indicator does not light. The buzzer does not sound. \_\_\_\_\_

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Unit VIII, Lesson 4  
Checkpoint 1, Form B

2

List of Symptom Descriptions from a Troubleshooting Table

<u>Item No.</u>	<u>Symptom</u>
1	T-983(P)/GRC-103(V) LOW POWER indicator does not extinguish within 60 seconds after AC POWER switch is operated to ON/RESET and meter indication is below normal with meter selector switch at 600 VDC.
2	T-983(P)/GRC-103(V) AC POWER and LOW POWER indicators do not light, buzzer is silent, and blower does not operate when AC POWER switch is operated to ON/RESET.
3	T-983(P)/GRC-103(V) AC POWER and LOW POWER indicators light, buzzer sounds, but blower does not operate when AC POWER switch is operated to ON/RESET.
4	T-983(P)/GRC-103(V) LOW POWER indicator lights, buzzer sounds, and blower operates, but AC POWER indicator does not light when AC POWER switch is operated to ON/RESET.
5	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at PWR OUT. Normal indication in DRIVER position, but R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at XMTR DUPL.
6	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at PWR OUT. Normal indication in DRIVER position, and R-1329(P)/GRC-103(V) meter indicates normal with meter selector switch at XMTR DUPL.
7	T-983(P)/GRC-103(V) LOW POWER indicator does not extinguish, but meter indication is normal with meter selector switch at PWR OUT.
8	T-983(P)/GRC-103(V) meter indicates above normal with meter selector switch at REFL PWR. R-1329(P)/GRC-103(V) meter indicates above normal with meter selector switch at REFL PWR.

(continued on the next page)

<u>Item No.</u>	<u>Symptom</u>
9	R-1329(P)/GRC-103(V) AC POWER and LOW SIGNAL indicators do not light, and buzzer is silent when AC POWER switch is operated to ON.
10	R-1329(P)/GRC-103(V) LOW SIGNAL indicator lights and buzzer sounds but AC POWER indicator does not light when AC POWER switch is operated to ON.
11	R-1329(P)/GRC-103(V) AC POWER indicator lights and buzzer sounds but LOW SIGNAL indicator does not light when AC POWER switch is operated to ON.
12	R-1329(P)/GRC-103(V) AC POWER and LOW SIGNAL indicators light but buzzer does not sound when AC POWER switch is operated to ON.
13	RT-773/GRC-103(V) POWER indicator does not light when R-1329(P)/GRC-103(V) AC POWER switch is operated to ON and there is no order wire communications.
14	RT-773/GRC-103(V) POWER indicator does not light when R-1329(P)/GRC-103(V) AC POWER switch is operated to ON. All other indications are normal.
15	RT-773/GRC-103(V) CALL indicator does not light when order wire signal is received, but buzzer sounds.
16	RT-773/GRC-103(V) CALL indicator lights, but buzzer does not sound when order wire signal is received.

Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IX - LESSON 1

Checkpoint 1, Form A

1. Write the number having:
- a. 1 in the tenths place
  - b. 2 in the ones place
  - c. 3 in the tens place
  - d. 3 in the hundreds place

ANSWER: \_\_\_\_\_

2. Write the number having:
- a. 6 in the hundreds place
  - b. 3 in the tens place
  - c. 1 in the ones place
  - d. 7 in the tenths place

ANSWER: \_\_\_\_\_

3. Write the number having:
- a. 2 in the ones place
  - b. 7 in the hundreds place
  - c. 5 in the tenths place
  - d. 5 in the tens place

ANSWER: \_\_\_\_\_

4. Write the number having:
- a. 9 in the hundreds place
  - b. 3 in the ones place
  - c. 0 in the tens place
  - d. 6 in the tenths place

ANSWER: \_\_\_\_\_

5. Write the number having:
- a. 8 in the ones place
  - b. 7 in the hundreds place
  - c. 3 in the tens place
  - d. 9 in the tenths place

ANSWER: \_\_\_\_\_

6. Write the number having:
- a. 5 in the tenths place
  - b. 6 in the ones place
  - c. 2 in the tens place
  - d. 8 in the hundreds place

ANSWER: \_\_\_\_\_

7. Write the number having:
- a. 2 in the tenths place
  - b. 2 in the ones place
  - c. 2 in the tens place
  - d. 2 in the hundreds place

ANSWER: \_\_\_\_\_

8. Write the number having:
- a. 7 in the tens place
  - b. 0 in the ones place
  - c. 1 in the hundreds place
  - d. 6 in the tenths place

ANSWER: \_\_\_\_\_

Put the place value in the blank for the number below.

9. 3 0 3 . 0

|

ANSWER: \_\_\_\_\_

10. 2 1 6 . 7

|

ANSWER: \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKLIST,  
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YOUR INSTRUCTOR WILL GIVE YOU YOUR SCORE  
AND TELL YOU WHAT TO DO NEXT.

Name \_\_\_\_\_

Date \_\_\_\_\_

## UNIT IX - LESSON 1

## Checkpoint 1, Form B

1. Write the number having:
- a. 6 in the hundreds place
  - b. 8 in the tens place
  - c. 9 in the ones place
  - d. 2 in the tenths place

ANSWER: \_\_\_\_\_

2. Write the number having:
- a. 7 in the tenths place
  - b. 2 in the ones place
  - c. 1 in the tens place
  - d. 9 in the hundreds place

ANSWER: \_\_\_\_\_

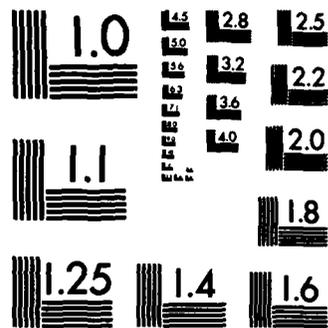
3. Write the number having:
- a. 3 in the ones place
  - b. 7 in the hundreds place
  - c. 5 in the tenths place
  - d. 6 in the tens place

ANSWER: \_\_\_\_\_

4. Write the number having:
- a. 0 in the ones place
  - b. 1 in the tens place
  - c. 2 in the tenths place
  - d. 3 in the hundreds place

ANSWER: \_\_\_\_\_





MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

5. Write the number having:

- a. 5 in the hundreds place
- b. 2 in the tens place
- c. 1 in the ones place
- d. 3 in the tenths place

ANSWER: \_\_\_\_\_

6. Write the number having:

- a. 6 in the tenths place
- b. 8 in the ones place
- c. 9 in the tens place
- d. 5 in the hundreds place

ANSWER: \_\_\_\_\_

7. Write the number having:

- a. 4 in the tens place
- b. 7 in the ones place
- c. 4 in the tenths place
- d. 2 in the hundreds place

ANSWER: \_\_\_\_\_

8. Write the number having:

- a. 3 in the hundreds place
- b. 8 in the ones place
- c. 7 in the tenths place
- d. 1 in the tens place

ANSWER: \_\_\_\_\_

Put the place value in the blanks for the numbers below.

9. 4 9 0 . 3

|

ANSWER: \_\_\_\_\_

10. 1 2 0 . 3

|

ANSWER: \_\_\_\_\_

WHEN YOU HAVE FINISHED THIS CHECKPOINT,  
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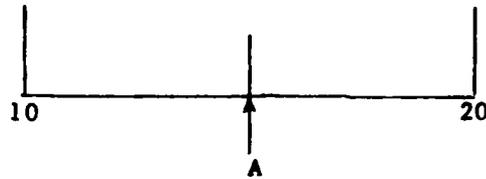
Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IX - LESSON 2

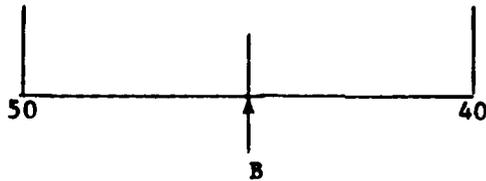
Checkpoint 1, Form A

1. What number does A stand for?



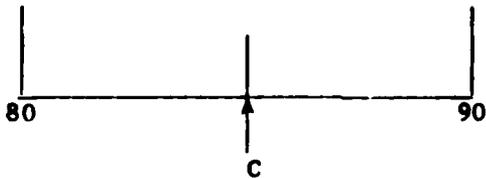
ANSWER: \_\_\_\_\_

2. What number does B stand for?



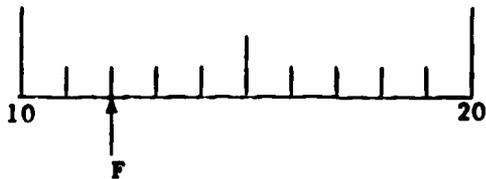
ANSWER: \_\_\_\_\_

3. What number does C stand for?



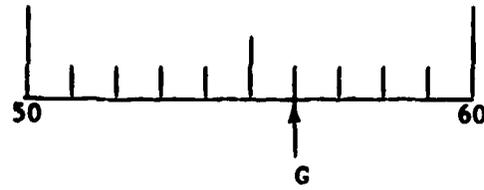
ANSWER: \_\_\_\_\_

4. What number does F stand for?



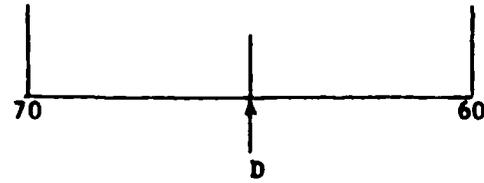
ANSWER: \_\_\_\_\_

5. What number does G stand for?



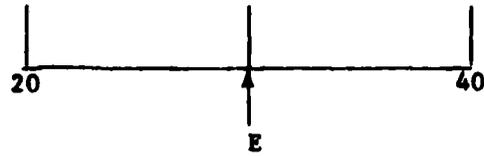
ANSWER: \_\_\_\_\_

6. What number does D stand for?



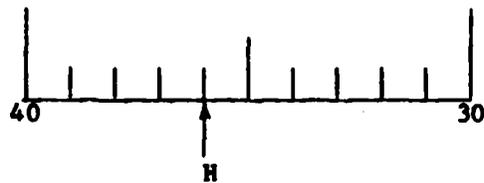
ANSWER: \_\_\_\_\_

7. What number does E stand for?



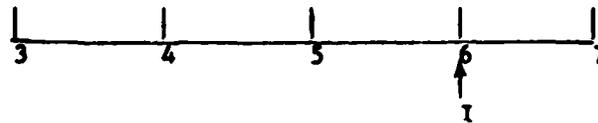
ANSWER: \_\_\_\_\_

8. What number does H stand for?



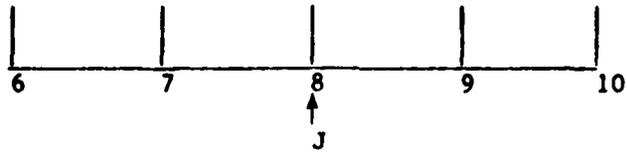
ANSWER: \_\_\_\_\_

9. The scale below is a hundreds scale.  
What number does the letter I stand for?



ANSWER: \_\_\_\_\_

10. The scale below is a hundreds scale.  
What number does the letter J stand for?



ANSWER: \_\_\_\_\_

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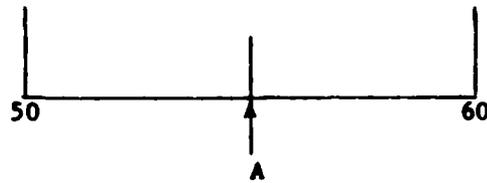
Name \_\_\_\_\_

Date \_\_\_\_\_

UNIT IX - LESSON 2

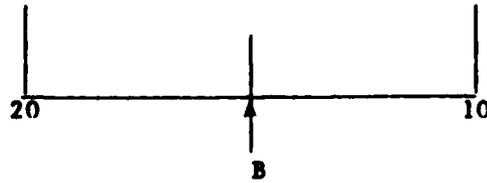
Checkpoint 1, Form B

1. What number does A stand for?



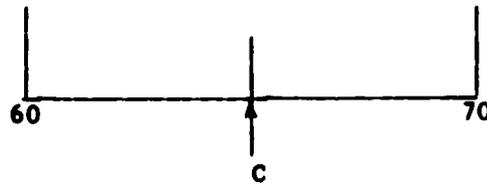
ANSWER: \_\_\_\_\_

2. What number does B stand for?



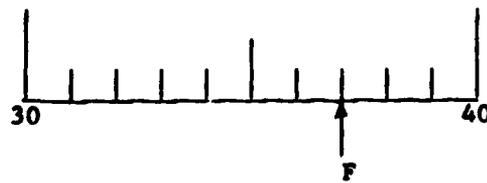
ANSWER: \_\_\_\_\_

3. What number does C stand for?



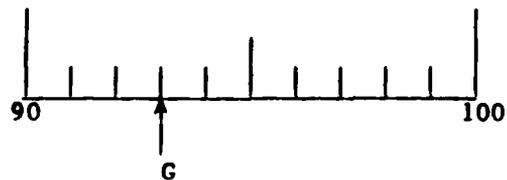
ANSWER: \_\_\_\_\_

4. What number does F stand for?



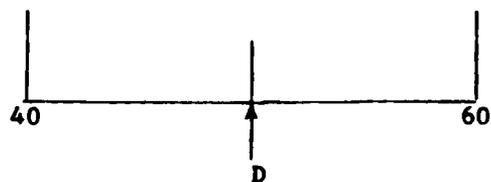
ANSWER: \_\_\_\_\_

5. What number does G stand for?



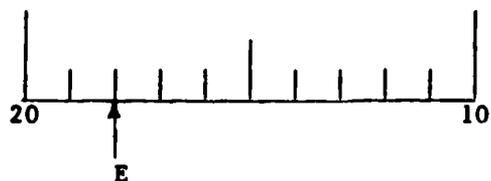
ANSWER: \_\_\_\_\_

6. What number does D stand for?



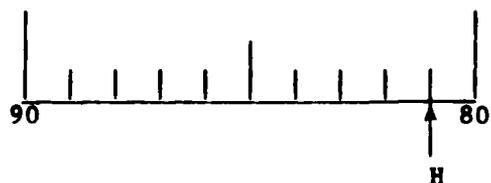
ANSWER: \_\_\_\_\_

7. What number does E stand for?



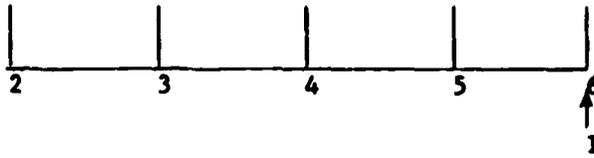
ANSWER: \_\_\_\_\_

8. What number does H stand for?



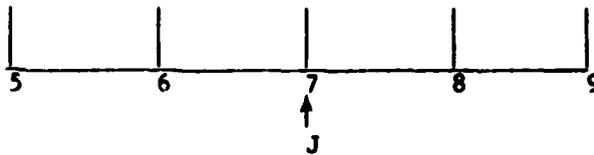
ANSWER: \_\_\_\_\_

9. The scale below is a hundreds scale? What does the letter I stand for?



ANSWER: \_\_\_\_\_

10. The scale below is a hundreds scale. What does the letter J stand for?



ANSWER: \_\_\_\_\_

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Name \_\_\_\_\_

Date \_\_\_\_\_

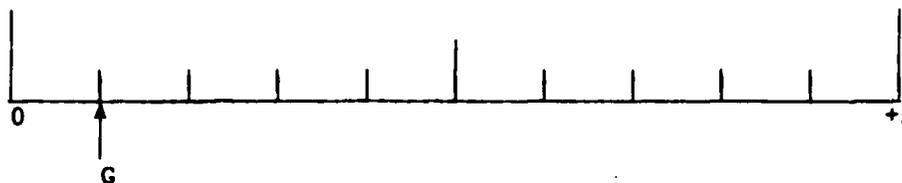
UNIT IX - LESSON 3

Checkpoint 1, Form A

Read the directions and answer the questions.

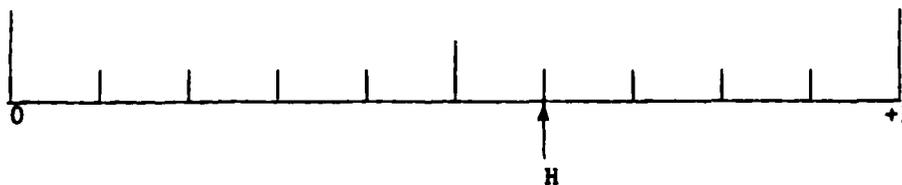
Put an "X" beside the best answer for the following questions:

1. What number does the letter G stand for?



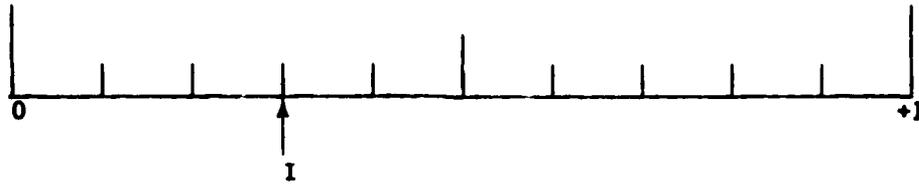
- \_\_\_\_\_ a. .01  
\_\_\_\_\_ b. 0.1  
\_\_\_\_\_ c. 0.9  
\_\_\_\_\_ d. one-ninth

2. What number does the letter H stand for?



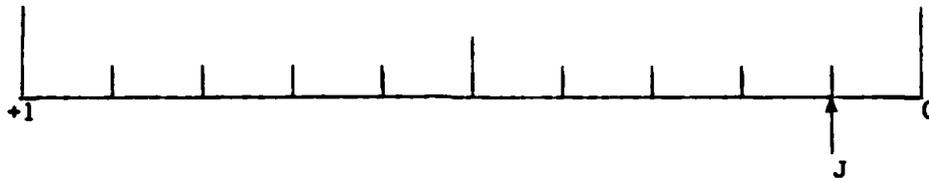
- \_\_\_\_\_ a. 0.6  
\_\_\_\_\_ b. 6.0  
\_\_\_\_\_ c. one-sixth  
\_\_\_\_\_ d. one-tenth

3. What number does the letter I stand for?



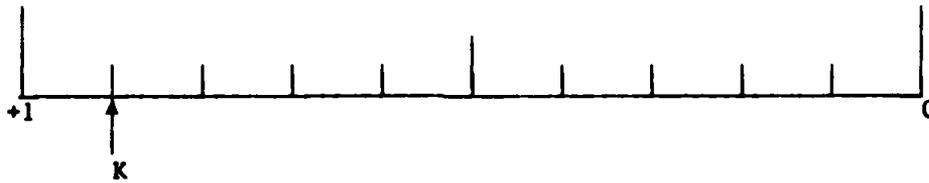
- a. 0.7
- b. 0.4
- c. .04
- d. 0.3

4. What number does the letter J stand for?



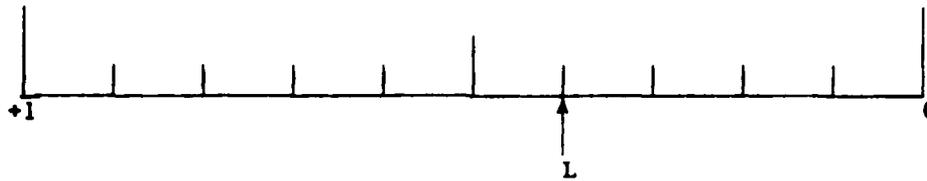
- a. 0.9
- b. .01
- c. one-tenth
- d. one-ninth

5. What number does the letter K stand for?



- a. 0.9
- b. .01
- c. one-tenth
- d. one-ninth

6. What number does the letter L stand for?



- \_\_\_\_\_ a. four-tenths
- \_\_\_\_\_ b. one-tenth
- \_\_\_\_\_ c. one-sixth
- \_\_\_\_\_ d. 0.6

Supply the answers for the following questions.

7. Nine-tenths means what number? ANSWER: \_\_\_\_\_

8. Five-tenths means what number? ANSWER: \_\_\_\_\_

9. Write the name for the number 0.3. ANSWER: \_\_\_\_\_

10. Write the name for the number 0.8. ANSWER: \_\_\_\_\_

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Name \_\_\_\_\_

Date \_\_\_\_\_

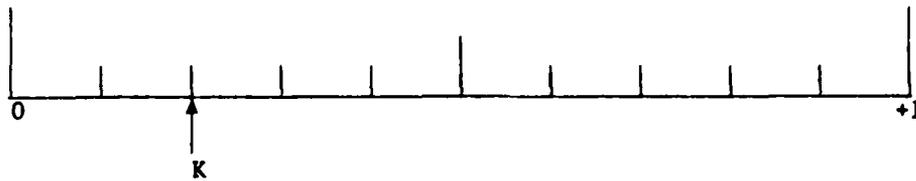
UNIT IX - LESSON 3

Checkpoint 1, Form B

Read the directions and answer the questions.

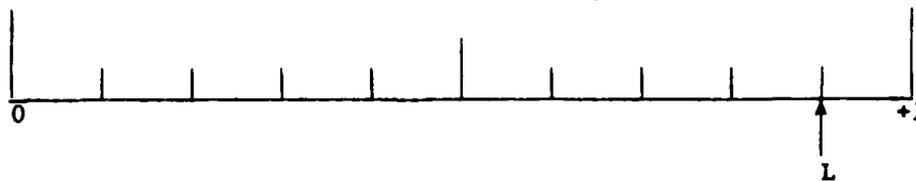
Put an "X" beside the best answer for the following questions:

1. What number does the letter K stand for?



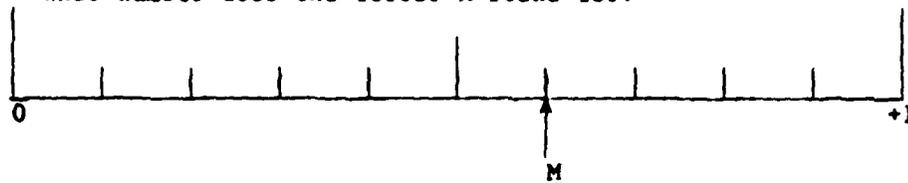
- \_\_\_\_\_ a. .02
- \_\_\_\_\_ b. 0.2
- \_\_\_\_\_ c. 0.8
- \_\_\_\_\_ d. .08

2. What number does the letter L stand for?



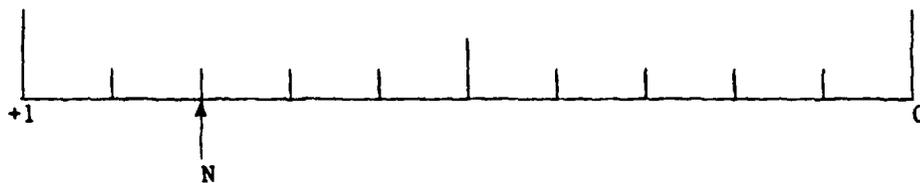
- \_\_\_\_\_ a. one-ninth
- \_\_\_\_\_ b. nine-tenths
- \_\_\_\_\_ c. one-tenth
- \_\_\_\_\_ d. .09

3. What number does the letter M stand for?



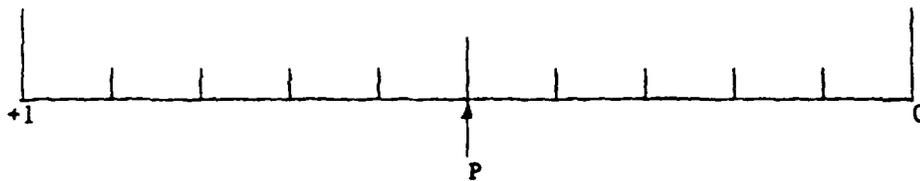
- a. one-tenth
- b. 0.4
- c. one-sixth
- d. 0.6

4. What number does the letter J stand for?



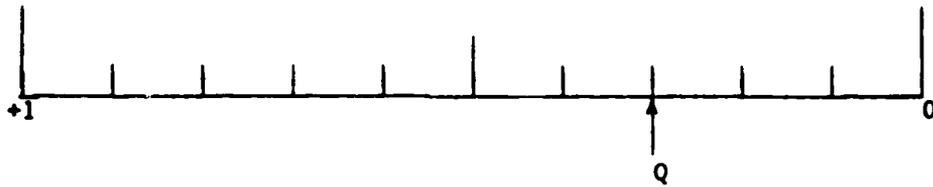
- a. 0.8
- b. 0.2
- c. 0.8
- d. 0.2

5. What number does the letter P stand for?



- a. one-fifth
- b. 5.0
- c. five-tenths
- d. .05

6. What number does the letter Q stand for?



- \_\_\_\_\_ a. 0.7
- \_\_\_\_\_ b. 0.4
- \_\_\_\_\_ c. one-third
- \_\_\_\_\_ d. 0.3

Supply the answers for the following questions.

- 7. Six-tenths means what number? ANSWER: \_\_\_\_\_
- 8. Seven-tenths means what number? ANSWER: \_\_\_\_\_
- 9. Write the name for the number 0.4. ANSWER: \_\_\_\_\_
- 10. Write the name for the number 0.2. ANSWER: \_\_\_\_\_

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Name \_\_\_\_\_

Date \_\_\_\_\_

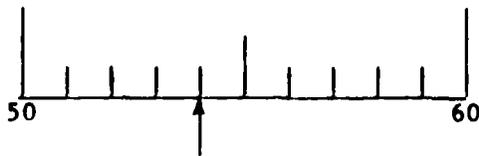
UNIT IX - LESSON 4

Checkpoint 1, Form A

Read the directions and answer the questions.

Look at the straight line scale. Note the reading on the scale.

Scale A.



1. On Scale A above, is the reading within two marks from the value of 59?

ANSWER: \_\_\_\_\_

2. On Scale A above, is the reading within three marks from the value of 52?

ANSWER: \_\_\_\_\_

Look at the straight line scale below. Note the reading on the scale.

Scale B.



3. On Scale B above, is the reading within two marks from the value of 29?

ANSWER: \_\_\_\_\_

4. On Scale B above, is the reading within two marks from the value of 24?

ANSWER: \_\_\_\_\_

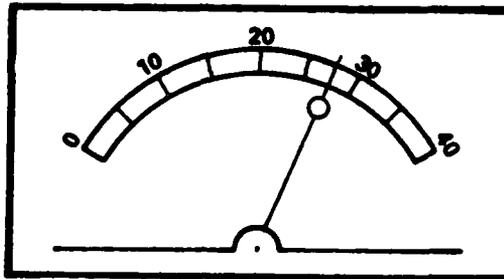
5. On Scale B above, is the reading within three marks from the value of 25?

ANSWER: \_\_\_\_\_

6. On Scale B above, is the reading within three marks from the value of 30?

ANSWER: \_\_\_\_\_

Look at the meter below. Note the reading on the scale.



Meter A

7. On Meter A above, is the reading within two marks from the value of 10?

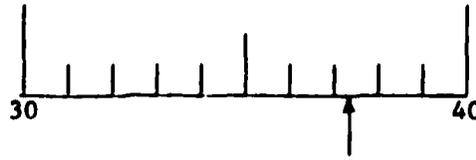
ANSWER: \_\_\_\_\_

8. On Meter A above, is the reading within two marks from the value of 40?

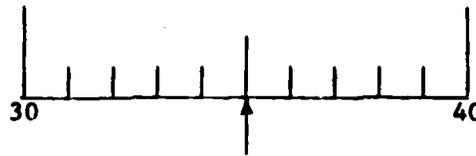
ANSWER: \_\_\_\_\_

Look at the straight line scale below. Note the reading on the scale.

Scale C

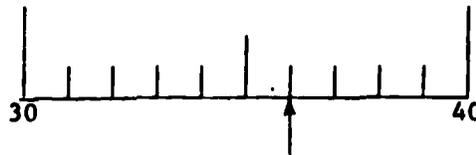


9. Is the reading on this scale within two marks from the reading on Scale C?



ANSWER: \_\_\_\_\_

10. Is the reading on this scale within two marks from the reading on Scale C?



ANSWER: \_\_\_\_\_

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Name \_\_\_\_\_

Date \_\_\_\_\_

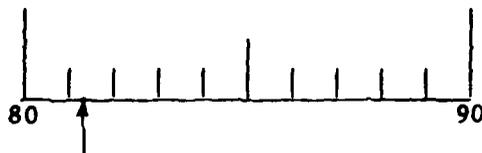
UNIT IX - LESSON 4

Checkpoint 1, Form B

Read the directions and answer the questions. Mark your answers on the answer sheet.

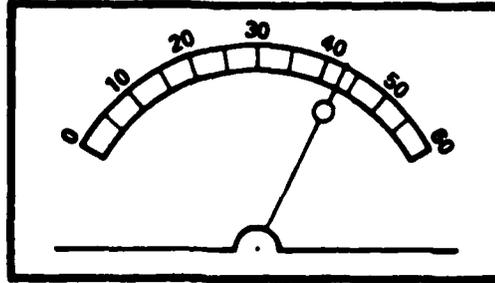
Look at the straight line scale. Note the reading on the scale.

Scale 0



1. On Scale 0 above, is the reading within two marks from the value of 85?
  - a. Yes
  - b. No
  
2. On Scale 0 above, is the reading within two marks from the value of 80?
  - a. Yes
  - b. No
  
3. On Scale 0 above, is the reading within three marks from the value of 90?
  - a. Yes
  - b. No
  
4. On Scale 0 above, is the reading within three marks from the value of 80?
  - a. Yes
  - b. No

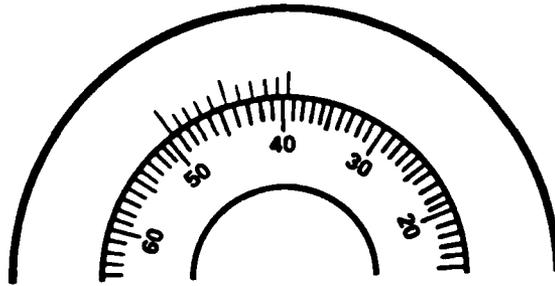
Look at Meter D shown below. Note the reading on the scale of the meter.



Meter D

5. On Meter D above, is the reading within two marks from the value of 50?
- a. Yes
  - b. No
6. On Meter D above, is the reading within two marks from the value of 30?
- a. Yes
  - b. No

Look at part of a Dial Z shown below. Note the reading on the scale of the dial.



Dial Z

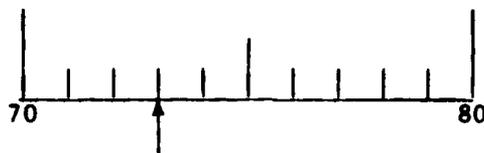
7. On Dial Z above, is the reading within two marks from the value of 38?
- a. Yes
  - b. No
8. On Dial Z above, is the reading within two marks from the value of 45?
- a. Yes
  - b. No

Look at the scale below. Note the reading on the scale.

Scale X

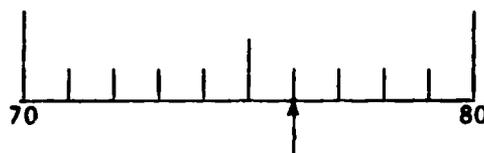


9. Is the reading on this scale within two marks from the reading on Scale X?



- a. Yes  
b. No

10. Is the reading on the scale below within two marks from the reading on Scale X?



- a. Yes  
b. No

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**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT I**  
**READING COMPREHENSION**

**LESSON 1**  
**VOCABULARY**

**PREREQUISITE: None**  
**MATERIALS REQUIRED: Audiotape**  
**TYPE OF LESSON: Self-Paced**

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STUDENT GUIDE

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UNIT I. READING COMPREHENSION

Lesson 1. Vocabulary

INTRODUCTION:

In the 31M course, you will read technical manuals and listen to lectures. In order to do well in the course, you will need to understand the meanings of words used in the manuals and the lectures.

In this lesson, you will learn the meanings of many words that are used in the 31M course.

LEARNING GOALS:

In this lesson, you will learn to:

- A - E. Define words used in 31M materials and identify sentences using the words correctly. (pp. 4, 15, 25, 36, 48)
- F. Recognize and use words with similar and opposite meanings. (p. 63)

On the pages that follow, you will find material to read and questions to answer. Most of the time, you will check your own answers to see how well you understand the material. The answers to exercises within this lesson are found at the end of the lesson in the part labeled Answers to Exercises in Unit I, Lesson 1. If you need help at any time, ask your instructor.

Throughout the lesson, there are checkpoints. Your instructor will give you these checkpoints. When you finish a checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

GO ON TO THE NEXT PAGE TO BEGIN THE LESSON.

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**

**MOS 31M10**  
**STUDENT GUIDE**



**INTRODUCTION**

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STUDENT GUIDE

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INTRODUCTION TO FBSEP FOR 31M10

You will soon begin the 31M10 AIT course where you will learn to be a Multichannel Communications Equipment Operator. In the 31M10 course, you will do many things. You will listen to lectures, watch demonstrations, read the 31M10 Soldier's Manual, read various technical manuals (TMs), fill out forms, and practice on equipment. In order to succeed in the 31M course, you must have good listening, reading, note-taking, and writing skills, as well as other skills. Many students lack some of these skills and such students are likely to have trouble in the course. FBSEP will help these students to master the important skills which they need.

Different soldiers have different learning needs. Some people need help with reading, others need to develop better listening skills, etc. Therefore, the lessons you need may be very different from the lessons other people need. Your FBSEP instruction has been designed for you, to help you develop the skills you need as quickly as possible.

The FBSEP areas where training may be needed have been broken up into general units and more specific lessons. Look at the list of FBSEP units and lessons in Table 1 on the next page. You can see that there are nine units as indicated by the Roman numerals I, II, III, IV, V, VI, VII, VIII, and IX. The name for each unit is listed under its number. For example, Unit I is called Reading Comprehension, and Unit II is called Using a Table of Contents. The nine units are the general training areas of FBSEP. You have been assigned to take lessons from one or more of these units. The units are broken into learning tasks called lessons.

The FBSEP lessons are also listed in Table 1. From that list you can see that the number of lessons within a unit changes from unit to unit. For example, Unit I is composed of 7 lessons while Unit II is composed of only 3 lessons. On the basis of your Diagnostic Test scores, you have been assigned to one or more lessons within a unit. You may have been assigned to all lessons within a unit or to only one lesson within the unit. The thing to remember is that the lessons that have been assigned to you have been chosen especially for you to help you gain the skills you need to be successful in the 31M course.

Table I

Units and Lessons

<u>Unit</u>	<u>Lesson</u>	<u>Title</u>
I Reading Comprehension	1	Vocabulary
	2	Strategies for Understanding Sentences
	3	Reading Negative Sentences
	4	Reading Sentences With Dependent Clauses
	5	Ordering One, Two, or Three Tasks
	6	Determining the Order of Steps: Multiple Actions
	7	Understanding Lists and Paragraphs
II Using a Table of Contents	1	Chapters and Sections
	2	Using a Task List to Find a Task Description
	3	Tables with Paragraph Numbers and Page Numbers
III Listening Skills	1	Remembering Information Heard in Lectures
	2	Remembering Information Seen in Demonstrations
	3	Recognizing When Important Information is Missing
IV Note-Taking for Demonstration	1	Basic Note-Taking Skills
	2	Taking Notes to Show Sequence
	3	Taking Notes to Show Relationships
V Recognizing a Part of a Whole	1	Recognizing a Part of a Whole
VI Locating Information in Tables	1	The Structure of Tables and Diagrams
	2	Interpreting Table Headings
	3	Locating Information in 31M Tables
VII Reading Cabling Diagrams	1	The Structure of Tables and Diagrams (Same as Unit VI, Lesson 1)
	2	Identifying Connections in Simple and Complex Cabling Diagrams

(continued on next page)

Table I (continued)

VIII Diagnosing Equipment Malfunctions	1	Deciding Whether an Indication Is Normal
	2	Deciding Whether There Is Something Wrong Based on 2 or More Indicators
	3	Finding Descriptions of Symptoms: One Indicator
	4	Finding Descriptions of Symptoms: Two or More Indicators
IX Scale Reading	1	Labeling Place Value
	2	Numbering Scale Points
	3	Scales Divided into Tenths
	4	Comparing Scale Settings

A FBSEP prescription has been designed for you. Your lesson prescription is based on your scores on the Diagnostic Tests that showed areas where you need more training before entering your AIT.

An example of a Prescription Sheet can be found on the following page. The example Prescription Sheet shows what lessons the student must complete and the order in which he/she will complete the lessons. From the example Prescription Sheet you can see that the first lesson that will be completed by that student is Unit III, Lesson 3, Recognizing When Important Information is Missing. The second lesson to be completed is Unit IV, Lesson 1, and so forth.

The left-hand column of the FBSEP Prescription Sheet tells you the sequence of the lessons in relation to the AIT course. Most of the FBSEP lessons occur before the AIT course, so Pre-AIT is entered in that column. However, Unit VIII lessons are done just before entry into the fifth week of the AIT course. Notice that the Sequence column on the example FBSEP Prescription Sheet indicates that the Unit VIII lessons are to be done before the fifth week of the course.

Time estimates are given in the fifth column of the FBSEP Prescription Sheet. These time estimates are taken from a master list of the average time it takes a student to complete each lesson. Some students take much more time than that estimated, and others take much less time to complete the lessons. The time estimates are listed simply to give the instructor a general idea of how many days you will be in FBSEP. You may actually take much more or much less time. They are just rough estimates and you should not aim to match them. You will work through the lessons at your own pace.



Your own Prescription Sheet will tell you the lessons that you will be completing and the order in which you will complete them. Different students have different prescriptions. This means that different students will do different lessons.

Very soon, you will begin the first lesson in your prescription. But first, you need to know something about how FBSEP instruction works.

The lessons in FBSEP are probably not like any lessons you have done before. First of all, they are individualized. This means that students do not go through the lessons as a group with a teacher telling them what to do. Each student goes through the lessons by himself or herself. For each lesson, you will be given a Student Guide. The Student Guide will tell you what to learn and how to learn it. It will also give you exercises to do for practice. The Student Guide will do most of the teaching in the lesson. There will always be an instructor in the classroom to help you when you need help. But most of the learning you do will be by yourself from your Student Guide.

Second, the lessons are self-paced. This means that you will go through each lesson at a speed that is comfortable for you. You will not have to worry about going too fast or too slow. Some students take longer than others to get through each lesson. There is no right or wrong speed. Each student should take as long as he/she needs to master the material.

Third, most of the exercises in the lesson are self-correcting. This means that, most of the time, you will be checking your own answers to see if they are right. Sometimes, the Student Guide will tell you to have your instructor check something. But most of the time, you will find the right answers in the Student Guide, and you will correct your own work.

Different lessons teach different things. So, of course, the contents of the Student Guide differ from one lesson to another. However, all the Student Guides are organized pretty much the same way. Here is how they are organized.

Each Student Guide begins with an Introduction, which explains what the lesson is about and why it is important. Next, you will find a list of Learning Goals. Pay close attention to these. They tell you exactly what you will learn in the lesson.

After the Learning Goals, you will read some general instructions for the lessons. Then you will begin the lesson itself. The Student Guide will give you material to read, questions to answer, and answers to the questions.

Some lessons are divided into sections, while others are not. Each section will provide you with information and with practice in using the information.

At the end of the Student Guide for each lesson, you will find a sentence that tells you to go to your instructor and tell him/her that you are ready for a Checkpoint. Checkpoints are just like the exercises that you did in the lesson, except that the instructor corrects them instead of you. This gives the instructor a chance to see how well you are doing.

(Some long lessons have additional checkpoints before the end, but most lessons have only one checkpoint.)

If you go through your Student Guide for each lesson carefully, and if you do all the exercises and check your work, you will probably do well on the checkpoint. That will be the end of the lesson for you. Your instructor will tell you what to do next.

Sometimes, your checkpoint score may tell the instructor that you need some more practice. In that case, the instructor will help you with things you do not understand. Then he/she will give you a Review Exercise - a short review of the lesson with additional practice exercises. At the end of the Review Exercise, you will take another checkpoint covering the same material. The instructor will score the checkpoint and give you more help, if you need it.

As you go through FBSEP, your instructor will complete a Student Record Form for you. On this form your instructor will list the following items:

1. The unit and lesson numbers for those lessons you complete.
2. The date and time you started the lesson.
3. The date and time you finished the lesson.
4. The checkpoint scores.

The date and time are not recorded to see how long it takes you to complete the lesson (since the materials are individualized and students are expected to complete lessons in different amounts of time). The date and time are recorded so that instructors know what lesson you are working on at any particular time. An example of a Student Record Form is found on the next page.



Here are some guidelines you should follow in order to do well in FBSEP:

1. When you start a new lesson, read the Introduction and the Learning Goals carefully. They will tell you why the lesson is important and what you will be learning.
2. Read your Student Guide thoughtfully and carefully. Do not skip over anything.
3. Be sure to follow the instructions exactly. For example, if the Student Guide tells you to ask your instructor something, do so right away.
4. Do each exercise as soon as you come to it. Read the questions carefully. Then answer each question to the best of your ability.

Some of the questions require you to write an answer. If so, write your answer in the space provided.

Some of the questions are multiple-choice. If so, circle the answer you choose.

Answer all the questions in each exercise before checking your answers for the exercise.

5. When you have answered all the questions in an exercise, turn to the answer key at the back of the Student Guide to check your answers. Do the following for each question:
  - a. If your answer was correct, put a check mark (✓) beside it in the margin.
  - b. If your answer was wrong, put an X beside it in the margin. Do not change it to the right answer.

If your answer was wrong, read the correct answer carefully to make sure that you understand it.

IF YOU DO NOT UNDERSTAND WHY YOUR ANSWER WAS WRONG,  
ASK YOUR INSTRUCTOR.

Do not continue with the lesson until you understand all the answers.

6. Your instructor is there to help you. Ask for help whenever you do not understand something or if you have a question.

ASK FOR HELP if you do not understand material in the Student Guide.

ASK FOR HELP if you do not understand a question in an exercise.

ASK FOR HELP if you do not understand the answer to a question.

ASK FOR HELP if you do not know what you should do next.

Remember: It is not dumb to ask for help when you need it.  
It is smart.

SO ASK FOR HELP WHENEVER YOU NEED IT.

If you follow these guidelines, you will find your FBSEP experience both educational and rewarding. And you will increase your chances for success in the 31M course.

GOOD LUCK TO YOU, IN FBSEP, IN THE 31M COURSE  
AND IN THE 31M MOS.

## Introduction to Sections A, B, C, D, and E

### Words, Meanings, and Uses

For this lesson, 96 words have been chosen from the 31M course for you to learn. Some of these words may be defined in more than one way. The definitions (meanings) of the words used in this lesson are the meanings of the words as they are used in the 31M course. These are the definitions you should remember for work in the course.

The list of 96 words has been broken into five smaller Word Lists to make your job easier. Here are the number of words that are contained in each lesson.

Word List I	15 words
Word List II	15 words
Word List III	20 words
Word List IV	20 words
Word List V	26 words
	<hr/>
	96 words total

You probably already know the definitions of many of the words contained in the Word Lists. So, for each Word List in Section A through E you will complete the following activities:

Section A of the lesson deals with Word List I.  
Section B of the lesson deals with Word List II.  
Section C of the lesson deals with Word List III.  
Section D of the lesson deals with Word List IV.  
Section E of the lesson deals with Word List V.

1. You will take a vocabulary test to tell you what words you need to learn from that group of words.
2. You will complete an exercise (like a crossword puzzle) that makes you use the words and their definitions.
3. You will be given examples of each word used correctly in a sentence.
4. You will state whether or not each word is used correctly in statement given to you.
5. You will then take another test to see how many of the words you still need to learn.

You will set your own pace. Be sure you look up and study the meanings of the words you do not know. In this way, you will learn the words that are required for success in the 31M course.

On the next page begins the activities for Word List I.

SECTION A  
WORD LIST I  
ACTIVITIES

Unit I  
Lesson 1

4

On the next page is the vocabulary test for Word List I. You will match each word with the best definition you can find in the right-hand column. To help you complete the test for Word List I, you will now listen to the words and sentences using the words. Sometimes, hearing a word used in a sentence will help you to figure out the meaning of that word.

Find the cassette tape labeled UNIT I, LESSON 1. Put the tape into the cassette recorder. Be sure the tape is rewound to the beginning. On the tape, you will hear the words from WORD LIST I in the order they are given on the test. Look at each word on the test and listen to how it sounds and how it is used. If you want to hear the words again, simply stop and rewind the tape.

The tape will tell you when to stop it. After you stop it, complete test WORD LIST I found on the next page.

GO FIND THE TAPE AND CASSETTE RECORDER NOW.

LISTEN TO WORD LIST I WORDS ONLY.

TEST FOR WORD LIST I

Directions: Put the letter of the correct definition for the word in the space provided.

- |     |                 |  |
|-----|-----------------|--|
| ___ | 1. appropriate  | a. a little bit at a time; moving slowly                       |
| ___ | 2. component    | b. correct   |
| ___ | 3. detect       | c. a particular way of doing something                         |
| ___ | 4. distribution | d. part of a larger piece of equipment or system               |
| ___ | 5. electronics  | e. highest possible level                                      |
| ___ | 6. gradually    | f. lowest possible level                                       |
| ___ | 7. insert       | g. to put in   |
| ___ | 8. maximum      | h. suitable or right for a certain person or purpose           |
| ___ | 9. minimum      | i. related to radios, transistors, and communication equipment |
| ___ | 10. orient      | j. how far something can be transmitted                        |
| ___ | 11. procedure   | k. type of countryside or land                                 |
| ___ | 12. proper      | l. plants, trees, and other plant life                         |
| ___ | 13. range       | m. something spread out over a large area                      |
| ___ | 14. terrain     | n. to turn to the required position                            |
| ___ | 15. vegetation  | o. to notice if something is there                             |

S T O P !!!

DO NOT GO ON TO THE NEXT PAGE

TAKE TEST FOR WORD LIST I TO YOUR INSTRUCTOR TO BE MARKED.

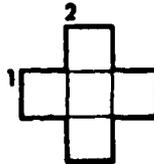
THEN STUDY THE WORDS THAT YOU MISSED AND THEIR DEFINITIONS  
BEFORE YOU CONTINUE WITH THE LESSON.

The corrected test for WORD LIST I gives the definitions of all the words you need for this exercise. Your instructor has underlined the ones you need to learn and you have studied them. The exercise that follows is to help you to learn those words that you need to know, and to remember those words that you already know. You may use the corrected WORD LIST I to help you do the exercise.

Exercise 1 is on the next page. It is a crossword puzzle using words and definitions from WORD LIST I.

Definitions of words going across are given in the ACROSS list. Definitions of words going down are given in the DOWN list. The numbers tell you where the words begin on the puzzle. Read the definitions. Decide which word on WORD LIST I is defined and write that word in the blocks.

EXAMPLE:



ACROSS

DOWN

1. a small furry animal  
that says, "Meow."

2. something you wear on  
your head

ANSWER:

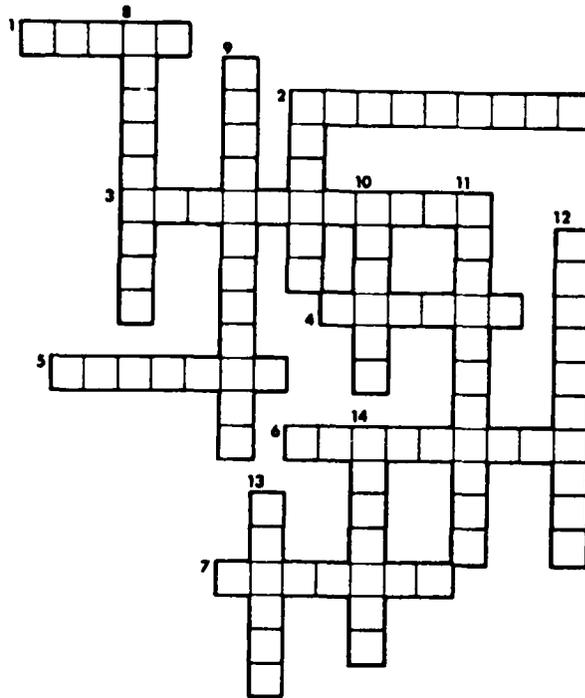


Unit I  
Lesson 1

8

### EXERCISE 1

This is a crossword puzzle using words and definitions from WORD LIST 1.



#### ACROSS

1. how far something can be transmitted
2. a particular way of doing something
3. suitable or right for a certain person or purpose
4. to notice if something is there
5. type of countryside or land
6. part of a larger piece of equipment or system
7. lowest possible level

#### DOWN

2. correct
8. a little bit at a time; moving slowly
9. something spread out over a large area
10. to put in
11. related to radio, transistors, and communications equipment
12. plants, trees, and other plant life
13. to turn to the required position
14. highest possible level

CHECK YOUR ANSWERS ON PAGE 74.

### Using Words Correctly

Now you can identify the meanings of the WORD LIST I words as they are used in the 31M course. In the course, you will be expected to understand these words when they are used in the lessons, lectures, and tests. They will be used along with other words in meaningful sentences. Also, you will need to know how to use the words correctly so that you can use them in sentences.

This section will show you how to use the words properly. On the following pages you will find each word from WORD LIST I, the definition of the word, and the word used correctly in a sentence. The sentences are examples of how the word will be used in the 31M course.

Read all of the words, definitions, and sentences.

WORD LIST I

1. appropriate - suitable or right for a certain person or purpose

Find the appropriate TM before going on.

2. component - part of a larger piece of equipment or system

Each component of the radio set must fit in a certain place in the van.

3. detect - to notice if something is there

If you detect a tone, increase the volume.

4. distribution - something spread out over a large area

In certain situations, you will need to have a wide distribution of the signal.

5. electronics - related to radios, transistors, and communication equipment

The shelf should contain only electronics equipment.

6. gradually - a little bit at a time; moving slowly

Turn the switch gradually to the left.

7. insert - to put in

Insert the cable into the connector.

8. maximum - highest possible level

The Q-123(W) meter registers at the maximum point.

9. minimum - lowest possible level

This is the minimum number of items required to place the AB-123 in working order.

10. orient - to turn to the required position

At this time, you must orient the antenna to the direction of the signal.

WORD LIST I (cont'd)

11. procedure - a particular way of doing something

This section describes the procedure to use when operating the DOG-324.

12. proper - correct

If you do not get the proper result, you must find the problem.

13. range - how far something can be transmitted

The range of the signal must be determined before sending the message.

14. terrain - type of countryside or land

The vans are designed to travel on most types of terrain.

15. vegetation - plants, trees, and other plant life

Vegetation will not stop the radio signal.

In the next exercise, you will choose which sentences use words from WORD TEST I correctly.

Put a Y (for Yes) beside the sentences which use the underlined word correctly, and put an N (for No) beside the sentences which do not use the underlined word correctly.

Example:

N A. You will appropriate the equipment to get a reading.

Y B. The voltage decreased gradually.

EXERCISE 2

- \_\_\_ 1. Turn the sound level down until it reaches maximum level.
- \_\_\_ 2. Proper up the antenna with your shoulder.
- \_\_\_ 3. The terrain was mountainous.
- \_\_\_ 4. The distribution of the signal was cold.
- \_\_\_ 5. Be sure you have all of the components necessary for the task.
- \_\_\_ 6. Turn up the volume on the vegetation.
- \_\_\_ 7. Place the range on the van after the radio set.

CHECK YOUR ANSWERS ON PAGE 75.

As before, in the next exercise, you will choose the sentences which use words from WORD TEST I correctly.

Put a Y beside the sentences which use the words correctly, and an N beside the sentences which do not use the words correctly.

EXERCISE 3

- \_\_\_ 1. Be sure the electronics are tightened.
- \_\_\_ 2. The voltage will increase gradually.
- \_\_\_ 3. You look for problems by inserting them.
- \_\_\_ 4. Detect the cable by pulling sharply.
- \_\_\_ 5. To get the job done quickly, use the minimum number of steps.
- \_\_\_ 6. You will haul the equipment in the orient.

CHECK YOUR ANSWERS ON PAGE 76.

SECTION B  
WORD LIST II  
ACTIVITIES

Unit I  
Lesson 1

On the next page is the vocabulary test for Word List II. As with Word List I, you will match each word with the best definition you can find in the right-hand column. To help you complete the test for Word List II, you will now listen to the words and sentences using the words.

Go to the cassette recorder and start the tape (labeled UNIT I, LESSON 1) where you finished listening to the words for WORD LIST I. On the tape you will hear each word from WORD LIST II in the order they are given on the test. Look at each word on the test and listen to how it sounds and how it is used. If you want to hear the words again, simply stop and rewind the tape.

The tape will tell you when to stop it. After you stop it, complete WORD LIST II found on the next page.

GO FIND THE TAPE AND CASSETTE RECORDER NOW.

LISTEN TO WORD LIST II WORDS ONLY.

TEST FOR WORD LIST II

Directions: Put the letter of the correct definition for the word in the space provided.

NOTE: Two words have the same meaning. So one definition is used twice.

- |     |                     |  |
|-----|---------------------|--|
| ___ | 1. adequate         | a. to specify, name, or point out                            |
| ___ | 2. clockwise        | b. a defect or flaw; something wrong                         |
| ___ | 3. counterclockwise | c. the expected action of something; to carry on normal work |
| ___ | 4. depress          | d. enough for some purpose                                   |
| ___ | 5. designate        | e. straight up and down                                      |
| ___ | 6. energize         | f. level, like the horizon                                   |
| ___ | 7. engage           | g. to push down  |
| ___ | 8. extend           | h. to stretch out to fullest length                          |
| ___ | 9. fault            | i. an electrical socket or outlet                            |
| ___ | 10. function        | j. a change in something                                     |
| ___ | 11. horizontal      | k. supply power for operation; start up                      |
| ___ | 12. indicate        | l. to put in gear; to use; to interlock                      |
| ___ | 13. modification    | m. in the opposite direction from the hands of a clock       |
| ___ | 14. receptacle      | n. in the direction that hands of a clock move               |
| ___ | 15. vertical        |  |

S T O P !!!

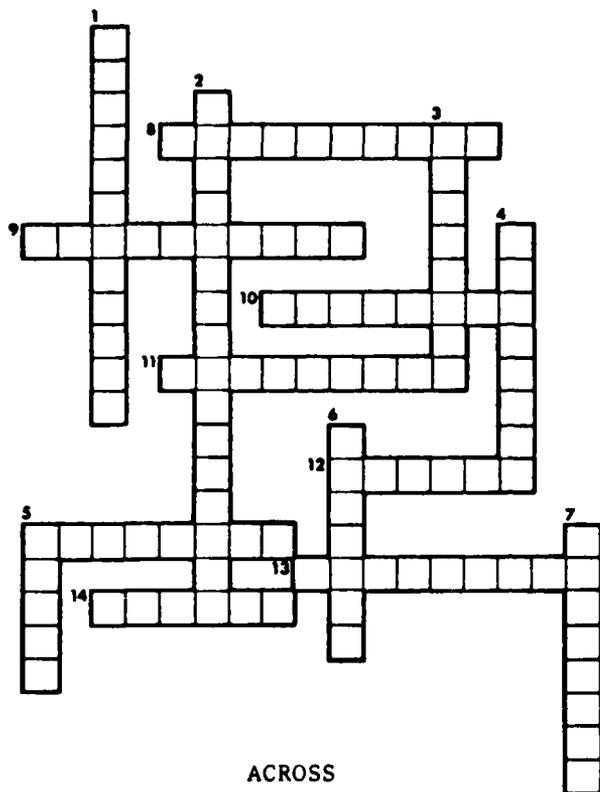
DO NOT GO ON TO THE NEXT PAGE

TAKE THE TEST FOR WORD LIST II TO YOUR INSTRUCTOR TO BE MARKED.

THEN STUDY THE WORDS THAT YOU MISSED AND THEIR DEFINITIONS  
BEFORE YOU CONTINUE WITH THE LESSON.

### EXERCISE 4

This is a crossword puzzle using words and definitions from WORD LIST II. You may use the corrected WORD LIST II test to help you do the exercise.



ACROSS

DOWN

- |   |  |
|---|--|
| <p>5. the expected action of something; to carry on normal work</p> <p>8. level like the horizon</p> <p>9. an electrical socket or outlet</p> <p>10. to specify, name, or point out</p> <p>11. in the direction that hands of a clock move</p> <p>12. to put in gear; to use; to interlock with</p> <p>13. to specify, name, or point out</p> <p>14. to stretch out to fullest length</p> | <p>1. a change in something</p> <p>2. in the opposite direction from the hands of a clock</p> <p>3. enough for some purpose</p> <p>4. supply power for operation; startup</p> <p>5. a defect or flaw; something is wrong</p> <p>6. to push down</p> <p>7. straight up and down</p> |
|---|--|

CHECK YOUR ANSWERS ON PAGE 77.

Using Words Correctly

Sentences using all 15 words from WORD LIST II are given on the following pages. The sentences are examples of how each word will be used in the 31M course.

Read all of the words, definitions, and sentences given on the following pages. Afterwards, you will complete an exercise wherein you tell when a word is used correctly and when it is not.

WORD LIST II

1. adequate - enough for some purpose  
Be sure you have an adequate amount of fuel for the trip.
2. clockwise - in the direction that hands of a clock move  
The switch will turn in a clockwise direction.
3. counterclockwise - in the opposite direction from the hands of a clock  
Turn the knob in a counterclockwise direction.
4. depress - to press down  
Depress the POWER button.
5. designate - to specify, name, or point out  
You will designate a captain for the team.
6. energize - supply power for operation; start-up  
Now you must energize the transmitting radio terminal.
7. engage - to put in gear; to use; to interface with  
Continue to shift up until you engage high gear.
8. extend - to stretch out to fullest length  
Extend the mast sections as far as possible.
9. fault - a defect or flaw; something wrong  
You must isolate the fault in order to fix it.
10. function - the expected action of something; to carry on normal work  
The function of the antenna is to help in the reception of the signal.

WORD LIST II (cont'd)

11. horizontal - level like the horizon

Be sure the rack support bar is in the horizontal position.

12. indicate - to specify, name, or point out

The multimeter may indicate a minimum level.

13. modification - a change in something

The manual describes the modifications which have been made to the equipment.

14. receptacle - an electrical socket or outlet

Be sure the wire is firmly in the receptacle.

15. vertical - straight up and down

The needle on the meter should be nearly vertical.

For each word in WORD LIST II, two sentences will be given. One sentence uses the word correctly and one sentence uses the word incorrectly. You must choose and identify the correct and incorrect sentences. Use Y for Yes if the sentence is correct, and N for No if it is not correct.

Example:

N A. Be sure you adequate the two numbers.

Y B. Check that the volume is adequate.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 5

1. clockwise

- \_\_\_ A. Turn it in a clockwise direction.  
\_\_\_ B. He was clever and very clockwise.

2. counterclockwise

- \_\_\_ A. Put the equipment on the counterclockwise.  
\_\_\_ B. Be sure the dial turns counterclockwise.

3. designate

- \_\_\_ A. The sergeant will designate which task will be done first.  
\_\_\_ B. Turn the designate to start the equipment.

4. energize

- \_\_\_ A. The energize will help you to complete the task quickly.  
\_\_\_ B. Be sure to energize the motor first.

5. engage

- \_\_\_ A. Engage the brake immediately.  
\_\_\_ B. Put the engage in place now.

6. fault

- \_\_\_ A. Open the fault and attach the cable.  
\_\_\_ B. The fault may be hard to find.

7. function

- \_\_\_ A. Perform checks to be sure the receivers function correctly.  
\_\_\_ B. Connect the function to the terminal.

8. horizontal

- A. Turn the horizontal to the correct reading.  
 B. The needle should be horizontal.

9. vertical

- A. Do not take the vertical over rough roads.  
 B. The antenna will be in a vertical position.

10. modification

- A. Adjust the modification to the correct level.  
 B. A modification in the arrangement may be needed.

11. depress

- A. Increase the depress now.  
 B. In the next step, depress the switch.

12. extend

- A. Look at the extend and check its parts.  
 B. Now you must extend the cable.

13. receptacle

- A. Now you must find a receptacle for the plug.  
 B. Your group should have a receptacle before proceeding.

14. indicate

- A. The reading will indicate that everything is in working order.  
 B. Take the indicate out of the van.

CHECK YOUR ANSWERS ON PAGE 78.

SECTION C  
WORD LIST III  
ACTIVITIES

Unit I  
Lesson 1

On the next two pages, is the vocabulary test for Word List III. As with the previous word tests, you will match each word with the best definition you can find in the right-hand column. To help you complete the test for Word List III, you will now listen to the words and sentences using the words.

Go to the cassette recorder and start the tape (labeled UNIT I, LESSON 1) where you finished listening the words from WORD LIST II. On the tape, you will hear each word from WORD LIST III in the order they are given on the test. Look at each word on the test and listen to how it sounds and how it is used. If you want to hear the words again, simply stop and rewind the tape.

The tape will tell you when to stop it. After you stop it, complete the test for WORD LIST III found on the following pages.

GO FIND THE TAPE AND CASSETTE RECORDER NOW.

LISTEN FOR WORD LIST III WORDS ONLY.

TEST FOR WORD LIST III

Directions: Put the letter of the correct definition for the word in the space provided.

- |     |                  |  |
|-----|------------------|--|
| ___ | 1. approximately | a. by sight; can be seen   |
| ___ | 2. automatically | b. to be greater than  |
| ___ | 3. cable         | c. an alphabetical list that helps in finding a certain part of a book       |
| ___ | 4. capacity      | d. lacking something; broken   |
| ___ | 5. character     | e. ability of equipment  |
| ___ | 6. defective     | f. to send a message   |
| ___ | 7. exceed        | g. cannot be made right  |
| ___ | 8. excess        | h. a collection of wires carrying electrical current; to hook up those wires |
| ___ | 9. index         | i. too much of something   |
| ___ | 10. insure       | j. a car, truck, or van  |
| ___ | 11. manually     | k. acting without help from anything else                                    |
| ___ | 12. monitor      | l. a sign that something is wrong  |
| ___ | 13. standard     | m. to check on the operation of equipment without disturbing it              |
| ___ | 14. symptom      |  |
| ___ | 15. technical    |  |

(continued on next page)

- |     |                   |  |
|-----|-------------------|--|
| ___ | 16. terminal      | n. an end-point along a communication system   |
| ___ | 17. transmit      | o. a letter or simple number   |
| ___ | 18. uncorrectable | p. a gauge or rule used in measuring something; a statement of how something is to be done |
| ___ | 19. vehicle       | q. to make certain   |
| ___ | 20. visual        | r. special knowledge about a mechanical subject  |
|     |                   | s. almost exactly  |
|     |                   | t. by hand   |

S T O P !!!

DO NOT GO ON TO THE NEXT PAGE

TAKE THE TEST FOR WORD LIST III TO YOUR INSTRUCTOR TO BE MARKED.

THEN STUDY THE WORDS THAT YOU MISSED AND THEIR DEFINITIONS  
BEFORE YOU CONTINUE WITH THE LESSON.



<u>Mixup</u>	<u>Word</u>	<u>Definition</u>
17. erusni	_____	_____
18. rectuncorrable	_____	_____
19. tompsyn	_____	_____

CHECK YOUR ANSWERS ON PAGE 79.

### Using Words Correctly

Sentences using all 20 words from WORD LIST III are given on the following pages. The sentences are examples of how each word will be used in the 31M course.

Read all of the words, definitions, and sentences given on the following pages. Afterwards, you will complete an exercise wherein you tell when a word is used correctly and when it is not.

WORD LIST III

1. approximately - almost exactly

The reading should be approximately 95.

2. automatically - acting without help from anything else

It will automatically snap into place.

3. cable - a collection of wires carrying electrical current; to hook up those wires

The cable must be attached at this point.

4. capacity - ability

The capacity of the equipment to send the signal can now be determined.

5. character - a letter or single number

The name CD-583 is made up of five characters.

6. defective - lacking something; broken

The problem may be caused by defective operation of switches and controls.

7. exceed - to be greater than

The reading should not exceed 100.

8. excess - too much of something

Check to see that there is not an excess amount of noise on the line.

9. index - an alphabetic list that helps in finding a certain part of a book

Use the index of the TM to find the appropriate page.

10. insure - to make certain

Insure the proper alignment is performed in the test.

WORD LIST III (ccnt'd)

11. manually - by hand

You should manually extend the antenna.

12. monitor - to check on the operation of equipment without disturbing it

You should monitor the system to be sure the transmission continues.

13. standard - a gauge or rule used in measuring something; a statement of how something is to be used

The standard is met when the system is in operation.

14. symptom - a sign that something is wrong

The buzzer sounding may be a symptom of something wrong.

15. technical - special knowledge about a mechanical subject

Use this manual to answer your technical questions about the equipment.

16. terminal - an end point along a communication system

The terminal will send the signal to the receiver.

17. transmit - to send a message

Stations transmit groups of frequencies.

18. uncorrectable - cannot be made right, cannot be fixed

Some problems may be uncorrectable.

19. vehicle - a car, truck, or van

Place the equipment in the transport vehicle.

20. visual - by sight; can be seen

The purpose of visual inspection is to locate faults without testing circuits.

EXERCISE 7

For each word in WORD TEST III a sentence will be given. You must identify the correct and incorrect sentences. Use Y for Yes if the sentence is correct and N for No if it is not correct.

- \_\_\_ 1. Find the approximately tool for the job.
- \_\_\_ 2. The signal will automatically increase.
- \_\_\_ 3. Be sure the cables are connected as shown.
- \_\_\_ 4. Notice the second character of the name.
- \_\_\_ 5. Turn the visual around carefully.
- \_\_\_ 6. You may feel like a defective when you are troubleshooting.
- \_\_\_ 7. Make sure you exceed the table correctly.
- \_\_\_ 8. The problem may be an excess of oil.
- \_\_\_ 9. Find the listing in the index.
- \_\_\_ 10. Take the capacity off to clean it.
- \_\_\_ 11. You must insure that the rod is tight.
- \_\_\_ 12. Turn the monitor to the left and see how it moves the needle.
- \_\_\_ 13. It was manually below the correct level.
- \_\_\_ 14. Standard it into the ground.
- \_\_\_ 15. Sometimes, you must look carefully to find the symptom.
- \_\_\_ 16. Attach the cable to the transmit.
- \_\_\_ 17. The terminal should now be operating correctly.
- \_\_\_ 18. Put the technical next to the receiver.
- \_\_\_ 19. A punctured tank is uncorrectable; get a new one.
- \_\_\_ 20. The vehicle should be parked on level ground.

CHECK YOUR ANSWERS ON PAGE 80.

SECTION D  
WORD LIST IV  
ACTIVITIES

Unit 1  
Lesson 1

36

On the next two pages, is the vocabulary test for Word List IV. As with the previous word tests, you will match each word with the best definition you can find in the right-hand column. To help you complete the test for Word List IV, you will now listen to the words and sentences using the words.

Go to the cassette recorder and start the tape (labeled UNIT I, LESSON 1) where you finished listening the words from WORD LIST III. On the tape, you will hear each word from WORD LIST IV in the order they are given on the test. Look at each word on the test and listen to how it sounds and how it is used. If you want to hear the words again, simply stop and rewind the tape.

The tape will tell you when to stop it. After you stop it, complete the test for WORD LIST IV found on the following pages.

GO FIND THE TAPE AND CASSETTE RECORDER NOW.

LISTEN FOR WORD LIST IV WORDS ONLY.

TEST FOR WORD LIST IV

- |     |                  |  |
|-----|------------------|--|
| ___ | 1. action        | a. carefulness; a warning to be careful                        |
| ___ | 2. adjust        | b. to make something unfit for use or impure                   |
| ___ | 3. applicable    | c. to lift up  |
| ___ | 4. cause         | d. a physical movement; a thing done                           |
| ___ | 5. caution       | e. a necessary part of a piece of equipment                    |
| ___ | 6. configuration | f. stopping something from happening                           |
| ___ | 7. contaminate   | g. grouping; outward shape, form, or figure                    |
| ___ | 8. deficiency    | h. a series of actions needed to complete some product or goal |
| ___ | 9. detach        | i. the purpose for which something is done                     |
| ___ | 10. effective    | j. to reposition parts of equipment (usually slowly)           |
| ___ | 11. element      | k. what is to be done first                                    |
| ___ | 12. elevate      | l. missing some necessary quality or activity                  |
| ___ | 13. exterior     | m. the condition of something                                  |
| ___ | 14. extinguish   | n. powerful; produces desired result                           |
| ___ | 15. meter        |  |
| ___ | 16. mission      |  |

(continued on the next page)

- |     |                 |   |
|-----|-----------------|---|
| ___ | 17. process     | o. to make something happen                                 |
| ___ | 18. preliminary | p. to go out, put out, or turn off                          |
| ___ | 19. preventive  | q. the outside  |
| ___ | 20. status      | r. an instrument used for measuring the amount of something |
|     |                 | s. to separate  |
|     |                 | t. suitable to use  |

S T O P !!!

DO NOT GO ON TO THE NEXT PAGE

TAKE THIS TEST FOR WORD LIST IV TO YOUR INSTRUCTOR TO BE MARKED.

THEN STUDY THE WORDS THAT YOU MISSED AND THEIR DEFINITIONS  
BEFORE YOU CONTINUE WITH THE LESSON.

Unit I  
Lesson 1

40

EXERCISE 8

Once again, you must unmix the words and write the definition. The words are from WORD LIST IV. You may use WORD LIST IV to help you.

	<u>Mixup</u>	<u>Word</u>	<u>Definition</u>
1.	esuac	_____	_____
2.	enticidef	_____	_____
3.	cableliapp	_____	_____
4.	ectiveeff	_____	_____
5.	ached	_____	_____
6.	simions	_____	_____
7.	justad	_____	_____
8.	exiorter	_____	_____
9.	suttas	_____	_____
10.	tingishuex	_____	_____
11.	esprocs	_____	_____
12.	miniprelary	_____	_____
13.	ionact	_____	_____
14.	ioncaut	_____	_____
15.	venpretive	_____	_____
16.	figurconation	_____	_____
17.	emelent	_____	_____
18.	treem	_____	_____
19.	etavele	_____	_____
20.	ataminacont	_____	_____

CHECK YOUR ANSWERS ON PAGE 81.

Using Words Correctly

Sentences using all 20 words from WORD LIST IV are given on the following pages. The sentences are examples of how each word will be used in the 31M course.

Read all of the words, definitions, and sentences given on the following pages. Afterwards, you will complete an exercise wherein you tell when a word is used correctly and when it is not.

WORD LIST IV

1. action - a physical movement; a thing done  
The TM tells you what action to take if there is no signal.
2. adjust - to reposition parts of equipment (usually slowly)  
You may need to adjust the dial to get the proper reading.
3. applicable - suitable to use  
These steps are applicable in all types of weather.
4. cause - to make something happen  
Troubleshooting will help you find the cause of the problem.
5. caution - carefulness; a warning to be careful  
Use caution when you are working with electricity.
6. configuration - grouping; outward shape, form, or figure  
The equipment should always be in this configuration.
7. contaminate - to make something unfit for use or impure  
If it runs roughly, water may contaminate the gasoline.
8. deficiency - missing some necessary quality or activity  
If there is a deficiency in the equipment, it will not work.
9. detach - to separate  
Detach the ropes from the pole.
10. effective - powerful; produces desired result  
In order to be an effective team, you must work together in a cooperative manner.
11. element - a necessary part of a piece of equipment  
Each element of the generator performs an important task.

WORD LIST IV (cont'd)

12. elevate - to lift up

Now you must elevate the antenna.

13. exterior - the outside

Connect the cable to the exterior of the case.

14. extinguish - to go out, put out, or turn off

The light should extinguish when the button is pushed.

15. meter - an instrument used for measuring the amount of something

If the needle on the meter moves, the circuits are shorted.

16. mission - the purpose for which a person is sent out

Your mission is to install and operate the radio.

17. process - a series of actions needed to complete some product or goal

This section describes the process of assembling the generator.

18. preliminary - what is to be done first

Here is a list of preliminary electrical checks you must complete.

19. preventive - stopping something from happening

In order to avoid problems in the future, you should complete the preventive maintenance tasks.

20. status - the condition of something

During this task, you must determine the status of the equipment.

For each word in WORD LIST IV, two sentences will be given. One sentence uses the word correctly and one sentence uses the word incorrectly. You must choose and identify the correct and incorrect sentences. Use Y for Yes if it is correct and N for No if it is not correct.

EXERCISE 9

1. action

- A. Your next action should be to disconnect the clamp.  
 B. Connect the action to the terminal.

2. adjust

- A. Adjust the voltage.  
 B. Turn the adjust to the right one notch.

3. applicable

- A. Find which manual is applicable for the task.  
 B. The applicable should be in the correct place now.

4. caution

- A. Attach the caution to the antenna.  
 B. You may have an accident if you do not use caution.

5. cause

- A. Turn the cause to the left.  
 B. You must find the cause of the power surge.

6. contaminate

- A. Slowly turn the contaminate to the correct position.  
 B. Do not contaminate the fuel.

7. deficient

- A. It may be a deficient piece of equipment.  
 B. Dis-assemble the deficient carefully.

8. configuration

- \_\_\_ A. If there are problems, repair the configuration.  
\_\_\_ B. Notice the configuration of the meter and switches.

9. element

- \_\_\_ A. Element the antenna to the highest position possible.  
\_\_\_ B. Check each element carefully.

10. exterior

- \_\_\_ A. The exterior of the shelter needs to be cleaned.  
\_\_\_ B. The sergeant has exterior motives.

11. effective

- \_\_\_ A. Set the effective in the green area.  
\_\_\_ B. Your troubleshooting will be more effective if you read carefully.

12. detach

- \_\_\_ A. We sent the detach to Alpha Company.  
\_\_\_ B. Detach the cables from the patch panel.

13. elevate

- \_\_\_ A. Turn the radio to elevate the communication.  
\_\_\_ B. Elevate the antenna to 45 feet.

14. meter

- \_\_\_ A. I told Mary I would meter on the corner.  
\_\_\_ B. Find the meter select switch.

15. mission

- A. The mission of the 31M course is to teach you to use communication equipment.
- B. Load your gun with mission.

16. extinguish

- A. The general is a very extinguish person.
- B. The lights extinguish when the buzzer sounds.

17. status

- A. Listen for status on the line.
- B. The status of the transmitter is non-operational.

18. process

- A. Setting up the antenna is a multi-step process.
- B. After you tune the radio, process to the next step.

19. preliminary

- A. Turn the preliminary to OFF.
- B. Preliminary line-up procedures are simple.

20. preventive

- A. Check your preventive for defects.
- B. Checking your equipment is a preventive procedure.

CHECK YOUR ANSWERS ON PAGE 82.

SECTION E  
WORD LIST V  
ACTIVITIES

Unit I  
Lesson 1

48

On the next two pages, is the vocabulary test for Word List V. As with the previous word tests, you will match each word with the best definition you can find in the right-hand column. To help you complete the test for Word List V, you will now listen to the words and sentences using the words.

Go to the cassette recorder and start the tape (labeled UNIT I, LESSON 1) where you finished listening the words from WORD LIST IV. On the tape, you will hear each word from WORD LIST V in the order they are given on the test. Look at each word on the test and listen to how it sounds and how it is used. If you want to hear the words again, simply stop and rewind the tape.

The tape will tell you when to stop it. After you stop it, complete the test for WORD LIST V found on the following pages.

GO FIND THE TAPE AND CASSETTE RECORDER NOW.

LISTEN FOR WORD LIST V WORDS ONLY.

TEST FOR WORD LIST V

NOTE: Two words have the same meaning. So one definition is used twice.

- |     |                 |   |
|-----|-----------------|---|
| ___ | 1. assign       | a. for a short time                                 |
| ___ | 2. authorize    | b. give the power to do something                   |
| ___ | 3. auxiliary    | c. in the correct space or place                    |
| ___ | 4. establish    | d. tautness; stretched until tight                  |
| ___ | 5. interval     | e. failure to operate normally; something wrong     |
| ___ | 6. location     | f. to adjust again                                  |
| ___ | 7. maintenance  | g. to narrow down; to lessen                        |
| ___ | 8. malfunction  | h. appoint; give a task to do                       |
| ___ | 9. momentarily  | i. to fasten tightly                                |
| ___ | 10. obstruction | j. to turn around                                   |
| ___ | 11. operational | k. procedure for keeping equipment in working order |
| ___ | 12. preset      | l. in working order; ready to perform               |
| ___ | 13. proficient  | m. good at doing some task                          |
| ___ | 14. readjust    | n. blockage   |
| ___ | 15. reduce      | o. a space into which something fits                |
| ___ | 16. reference   | p. appropriate or correct to use for some purpose   |
| ___ | 17. rotate      | q. providing help; back-up                          |
| ___ | 18. seated      | r. to set beforehand                                |
| ___ | 19. secure      | s. to choose  |
| ___ | 20. select      |   |

(continued on the next page)

- |     |                   |                                      |
|-----|-------------------|--------------------------------------|
| ___ | 21. sequence      | t. ordering of steps to do something |
| ___ | 22. serial number | u. where to find information         |
| ___ | 23. site          | v. identifying number                |
| ___ | 24. slot          | w. to prove beyond doubt             |
| ___ | 25. suitable      | x. time between                      |
| ___ | 26. tension       | y. a placement or position           |

S T O P !!!

DO NOT GO ON TO THE NEXT PAGE

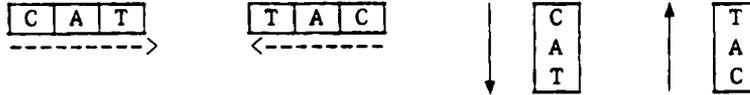
TAKE THE TEST FOR WORD LIST V TO YOUR INSTRUCTOR TO BE MARKED.

THEN STUDY THE WORDS THAT YOU MISSED AND THEIR DEFINITIONS  
BEFORE YOU CONTINUE WITH THE LESSON.

On the following pages is Exercise 10. This exercise will take time but should be fun. Take a quick look at the next page right now....

You will find all the words from WORD LIST V on that grid of letters.

Some words go across the page, in either direction. And some go up or down the page. So, if the word CAT is on the grid, you may find it written in one of four ways, as shown here:



You are to draw a circle around each of the words that you find. And you should find all 26 words from WORD LIST V. One word (SERIAL NUMBER) has been circled as an example.

To make your job a little easier, on the two pages that follow Exercise 10 are listed the definitions of the words going across and those going up and down. These lists will help you know where to look for words. Have fun!

EXERCISE 10

A T C I Y W A L N U T T N E I C I F O R P  
E C S E R I A L N U M B E R S M R A F T R  
L E S T A B L I S H A T S U I T A B L E E  
A L E O I T A R E Z I R O H T U A T A N S  
N E C L L C A T C H N R E D U C E A V S E  
O S N S I T E N O I T C N U F L A M R I T  
I A E P X D O N E S E Q U E N C E C E O S  
T M R R U Y M O M E N T A R I L Y A T N O  
A I E O A N G I S S A H E L L O Z T N H L  
R N F T M E R R Y T N O I T A C O L I I O  
E G E T A T O R S E C U R E T H I S I S N  
P U R E D A D E T A E S F U N E H E Y B G  
O B S T R U C T I O N T S U J D A E R O T

CHECK YOUR ANSWERS ON PAGE 83.

DEFINITIONS OF WORDS FOUND GOING ACROSS

to fasten tightly

blockage

to adjust again

in the correct space or place

a placement or position

appoint; give a task to

for a short time only

ordering of steps to do something

failure to operate normally; something wrong

a placement or position

to narrow down; to lessen

give the power to do something

to turn around

appropriate or correct to use for some purpose

to prove beyond doubt

identifying number

good at doing some task

DEFINITIONS OF WORDS FOUND GOING UP OR DOWN

a space into which something fits

to set before hand

tautness; stretched until tight

time between

procedure for keeping equipment in working order

providing help; back-up

where to find information

to choose

in working order; ready to perform

### Using Words Correctly

Sentences using all 26 words from WORD LIST V are given on the following pages. The sentences are examples of how each word will be used in the 31M course.

Read all of the words, definitions, and sentences given on the following pages. Afterwards, you will complete an exercise wherein you tell when a word is used correctly and when it is not.

WORD LIST V

1. assign - appoint; give a task to do

The sergeant will assign you to a work group.

2. authorize - give the power to do something

He will authorize the need for spare parts.

3. auxiliary - providing help; back-up

When you are out of gas, you must find the auxiliary fuel tank.

4. establish - to prove beyond doubt; to bring about

You must establish which part is causing the problem.

5. interval - time between

After an interval of 5 seconds, the light should come on.

6. location - a placement or position

Choose a location that is flat and sheltered.

7. maintenance - procedure for keeping equipment in working order

This section tells you how to perform general maintenance on the generator.

8. malfunction - failure to operate normally; something wrong

A malfunction can delay your transmission for long periods.

9. momentarily - for a short time only

The buzzer should sound momentarily.

10. obstruction - blockage

If fuel is not getting through, check for an obstruction in the hose.

WORD LIST V (cont'd)

11. operational - in working order; ready to perform

Check to see that all parts are operational.

12. preset - to set beforehand

Now you must preset the voltage on the 123-ABC.

13. proficient - good at doing some task

By practicing, you will become proficient in the use of the transmitter.

14. readjust - to adjust again

During the process, it may be necessary to readjust the voltage.

15. reduce - to narrow down; to lessen

In some situations, you may need to reduce the amount of power.

16. reference - where to find information

Sometimes, another manual will be given as a reference.

17. rotate - to turn around

Rotate the antenna until the signal is strong and clear.

18. seated - in the correct space or place

Be sure the bolt is well seated in place.

19. secure - to fasten tightly

Secure the base plate to the ground.

20. select - to choose

Select a location about 6 feet by 7 feet.

21. sequence - order of steps for doing something

Follow this sequence of steps to determine the problem.

WORD LIST V (cont'd)

22. serial number - identifying number

All of the components will have a serial number to help in identification.

23. site - a placement or position.

Your team must locate a level site.

24. slot - a space into which something fits.

The catch should fit neatly in the slot.

25. suitable - appropriate or correct to use for some purpose.

If the meter readings are suitable, no further maintenance is required.

26. tension - tautness; stretched until tight.

The guy wires will be under a great deal of tension when the process is complete.

For each word in Word List V a sentence will be given. You must identify the correct and incorrect sentences. Use Y for Yes if it is correct and N for No if it is not correct.

EXERCISE 11

- \_\_\_ 1. A zero reading is assign that equipment is not working.
- \_\_\_ 2. We do not carry auxiliary radio equipment in the vans.
- \_\_\_ 3. The sergeant is the authorize of our training manual.
- \_\_\_ 4. You must establish communication from point A to point B.
- \_\_\_ 5. My van is the maintenance of the communication system.
- \_\_\_ 6. Your power indicator should flash on momentarily.
- \_\_\_ 7. In order to establish communications, your equipment must malfunction.
- \_\_\_ 8. The operational sergeant was here today.
- \_\_\_ 9. The obstruction of the antenna takes at least two people.
- \_\_\_ 10. Visual inspection means to inspect by site.
- \_\_\_ 11. Before starting the generator you must preset the controls.
- \_\_\_ 12. You must become proficient at troubleshooting.
- \_\_\_ 13. A thunderstorm may cause some reference in your radio transmission.
- \_\_\_ 14. During transmission, you might have to readjust the volume.

- \_\_\_ 15. He reduced the voltage from 20 to 30.
- \_\_\_ 16. Rotate the dial until you get a clear signal.
- \_\_\_ 17. Now secure the guy wires to the stakes.
- \_\_\_ 18. A nail in the tire is a type of select.
- \_\_\_ 19. The bracket fits in the slot.
- \_\_\_ 20. Find the suitable manual before beginning.
- \_\_\_ 21. We use camouflage so we cannot be seated.
- \_\_\_ 22. Go interval and bring out the equipment.
- \_\_\_ 23. Look closely for the serial number.
- \_\_\_ 24. Do the steps in the correct sequence.
- \_\_\_ 25. The sergeant told us all to stand at a tension.
- \_\_\_ 26. Find your location on the map.

CHECK YOUR ANSWERS ON PAGE 84.

## Section F

### Similar and Opposite Meanings

Some of the words in the Word Lists have the same or similar meanings and others have opposing or opposite meanings. These similar/opposite groups will now be discussed.

#### Similar Words

Look at the words and definitions below:

Adequate - enough for some purpose

Appropriate - suitable or right for a certain person or process

Applicable - suitable to use

Proper - correct

Suitable - appropriate or correct for some purpose

You can see that the definitions of these words are similar to one another. In fact, some of these words are used in the definitions of others. These words are all used to describe something and can sometimes be substituted for one another. For example, if you are required to supply a certain amount of power to a system, all of the following sentences can be used:

Supply an adequate amount of power.

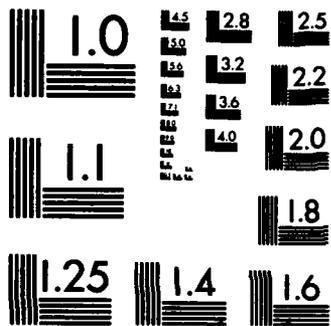
Supply the appropriate amount of power.

Supply the applicable amount of power.

Supply the proper amount of power.

Supply a suitable amount of power.





MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

Here are some other words which all have similar meanings.

Defective - lacking something; broken

Deficient - missing some necessary quality

Fault - a defect or flaw; something wrong.

Malfunction - failure to operate normally; something wrong.

Symptom - a sign that something is wrong.

Once again, you see that the definitions of these words are similar to one another. In fact, some of the words are used in the definitions of others. The words can all be used when there are problems with the communication system. Read the sentences below:

The transmitter is defective.

The signal is deficient.

The transmitter has a fault.

The transmitter is malfunctioning.

The transmitter has a symptom that something is wrong.

Each of these sentences is correct. You will find this group of words being used when you are troubleshooting equipment.

Here is another pair of similar words and sentences using the words.

Element - a necessary part of a piece of equipment.

Component - part of a larger piece of equipment or system.

The receiver is one element of the system.

The receiver is one component of the system.

Both sentences are correct. So, as you can see, sometimes either word can be used when talking about part of a system.

Another pair of similar words is listed below.

Distribution - something spread out over a large area.

Range - how far something can be transmitted.

Both of these words can be used when describing the broadcast signal.

The distribution of the signal can exceed 50 miles.

The range of the signal can exceed 50 miles.

Look at the words defined below:

Procedure - a particular way of doing something.

Process - a series of actions needed to complete some product or goal.

Sequence - ordering of steps to do something.

You can see that the definitions of these words are similar. They refer to how some task is performed.

Below is listed the procedure for dismantling the antenna.

Dismantling the antenna is a simple process.

Below is listed the sequence of actions needed to dismantle the antenna.

All of these words can be used when describing some task to be performed.

Here are some more words with similar meanings.

Assign - appoint; give a task to do.

Designate - to specify, name, or point out.

Indicate - to specify, name, or point out.

These words can sometimes be used interchangeably, as shown below:

The sergeant will assign you a task.

The sergeant will designate which task you should perform.

The sergeant will indicate which task you should perform.

All of these words refer to specifying something and you will often see them used in similar ways.

Here are some more pairs of related words:

Terrain - type of countryside or land.

Vegetation - plants, trees, and other plant life.

Although these words do not mean the same thing, they are related in that the terrain may be covered with vegetation. That is, the land may be covered with plants.

Adjust - to reposition parts of equipment.

Readjust - to adjust again.

These words are related because readjust means to adjust again. If you adjust a setting, you may need to readjust it later.

Energize - supply power for operation; start-up

Engage - to put in gear; to mesh; to interlock with.

These words refer to operating equipment. For example, you must energize the motor before engaging the clutch.

Exceed - to be greater than.

Excess - too much of something.

Exceed and excess are used when describing or discussing a great amount of something. they are similar and can sometimes be used interchangeably.

The voltage must not exceed 100.

You must not have voltage in excess of 100.

And another related pair of words:

Orient - to turn to the required position.

Rotate - to turn around.

This pair of words listed above are used in the 31M course when describing the positioning of the equipment.

You will orient the antenna so that it receives the signal clearly.

You will rotate the antenna until it receives the signal clearly.

Another related pair:

Location - a placement or position.

Site - a placement or position.

You can sometimes use these words interchangeably as shown below:

Find a level location.

Find a level site.

Here are some sentences for you to complete. These sentences can use more than one word, as the listing of similar words has shown. You need to list only one of the words that will correctly complete the sentence.

Example:

When the radio does not work it is \_\_\_\_\_.

Answer: defective, deficient, or malfunctioning could be used.  
(Note: You need to list only one word.)

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 12

1. The transmitter is one \_\_\_\_\_ of the communication system.
2. You must carefully follow the \_\_\_\_\_ for troubleshooting.
3. He will \_\_\_\_\_ one person to be team leader.
4. Be sure you have a(n) \_\_\_\_\_ amount of voltage.

CHECK YOUR ANSWERS ON PAGE 85.

## Opposite Words

Below are listed pairs of words which have opposite meanings:

Maximum - highest possible level.  
Minimum - lowest possible level

Horizontal - level like the horizon.  
Vertical - straight up and down.

Clockwise - in the direction that hands of a clock move.  
Counterclockwise - in the opposite direction from the hands of a clock.

Secure - to fasten tightly.  
Detach - to separate.

Energize - supply power for operation; start up.  
Extinguish - to go out, put out, or turn off.

Defective - lacking something; broken.  
Operational - in working order; ready to perform.

Here are examples of sentences having opposite meanings:

- A. Secure the guy wire.
- B. Detach the guy wire.

In sentence A, the wire is fastened.  
In sentence B, the wire is unfastened.

- A. Energize the motor.
- B. Extinguish the motor.

In sentence A, the motor is started.  
In sentence B, the motor is shut off.

- A. The radio is defective.
- B. The radio is operational.

In sentence A, the radio is not working.  
In sentence B, the radio is working.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 13

Here are some sentences for you to complete using words from this lesson.

1. The opposite of counterclockwise is \_\_\_\_\_.
2. The opposite of horizontal is \_\_\_\_\_.
3. The opposite of minimum is \_\_\_\_\_.
4. The opposite of detach is \_\_\_\_\_.
5. The opposite of defective is \_\_\_\_\_.
6. The opposite of vertical is \_\_\_\_\_.
7. The opposite of extinguish is \_\_\_\_\_.

CHECK YOUR ANSWERS ON PAGE 85.

### Different Forms of a Word

Some of the words in this lesson have more than one use or more than one form.

For example, caution can be an action (verb) or a thing (noun).

Action: We caution you to be careful.

Thing: Use caution when working with electricity.

But you can see that the meaning is similar. Both relate to being careful.

Also, there are many words that have many forms, but the forms still have similar meanings.

For example, you know that the word adjust means to reposition parts. You may also see the words adjustable and adjustment in the 31M course.

Here are the definitions for these words:

adjust - to reposition parts  
adjustable - has parts that can be repositioned  
adjustment - the act of repositioning parts

Another example follows:

deficient - missing some necessary part  
deficiency - when something or necessary part is missing

So, a deficient switch causes a deficiency. With words that have the same root, as do the ones discussed here, the words have similar meanings.

Example: Write the missing definition.

defective - lacking something; broken

defect - \_\_\_\_\_

ANSWER: what is lacking or broken

ANSWER THE QUESTIONS ON THE NEXT PAGE.

**EXERCISE 14**

Fill in the missing part of the definition.

1. obstruction - blockage

obstruct - to \_\_\_\_\_

2. rotate - to turn around

rotation - the act of \_\_\_\_\_

3. select - to choose

selection - the act of \_\_\_\_\_

selector - the person or thing that \_\_\_\_\_

**CHECK YOUR ANSWERS ON PAGE 86.**

Words you have learned in this lesson will be used in 31M lectures and manuals. You will need to know the meaning of those words in order to understand what is said or written.

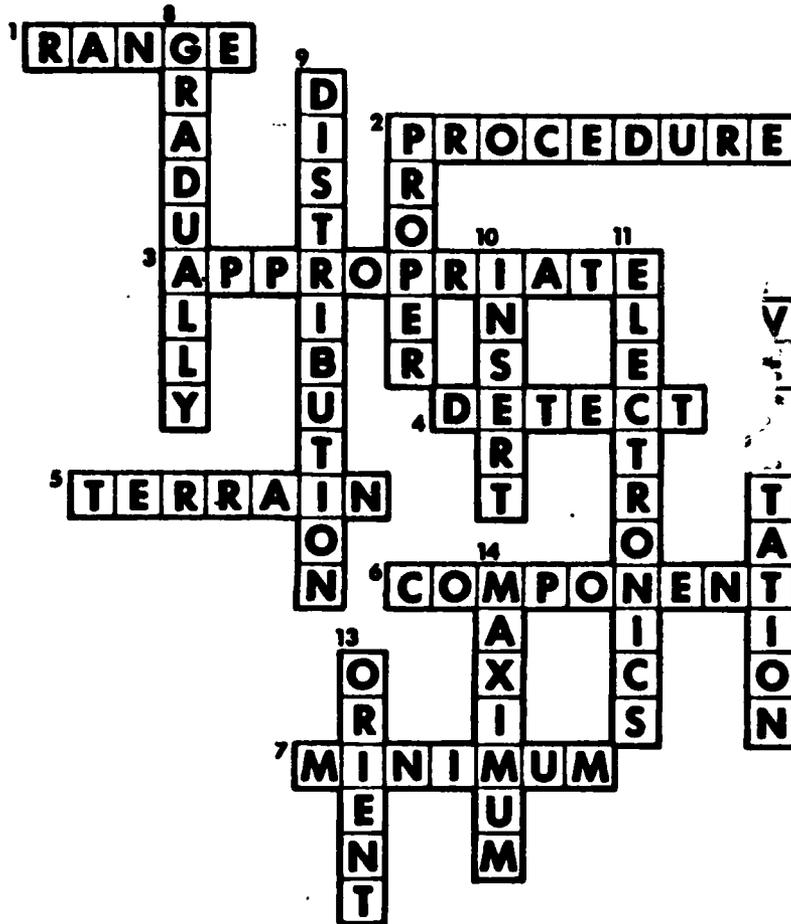
**IF YOU NEED SOME MORE PRACTICE WITH THESE WORDS AND THEIR USES,  
REVIEW THE LESSON NOW.**

**IF YOU UNDERSTAND EVERYTHING YOU HAVE HEARD AND READ IN THIS LESSON,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 6, FORM A  
IN UNIT I - LESSON 1.**

ANSWER KEYS TO EXERCISES IN UNIT I, LESSON 1

Unit I  
Lesson 1

ANSWERS TO EXERCISE 1



ANSWERS TO EXERCISE 2

1. N If you turn the sound down, it will reach the minimum level rather than the maximum level.
2. N Proper means correct.
3. Y
4. N A distribution cannot be cold.
5. Y
6. N Vegetation has no volume; it means plant life.
7. N Range means how far a signal can be transmitted, so it cannot be placed on a van.

IF YOU MISSED ANY OF THESE, GO BACK AND LOOK OVER THE DEFINITIONS AND SENTENCES GIVEN FOR THEM. IF YOU STILL HAVE QUESTIONS, PLEASE SEE YOUR INSTRUCTOR.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

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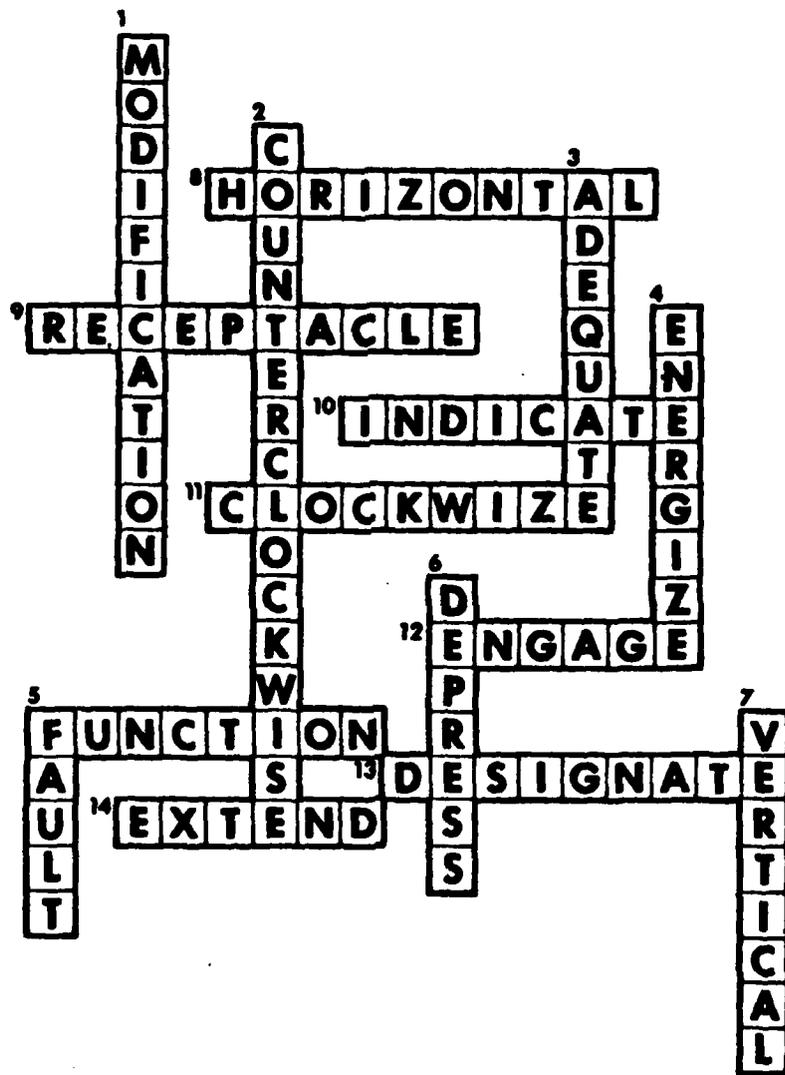
**ANSWERS TO EXERCISE 3**

1. N Electronics refers to communication equipment. It is not something that can be tightened.
2. Y Voltage can increase slowly.
3. N Insert means to put in and is not used correctly.
4. N Detect means to notice something and is not used correctly.
5. Y Minimum number of steps means the smallest number of steps.
6. N You cannot haul anything in an orient.

**IF YOU MISSED ANY OF THESE, GO BACK AND LOOK OVER THE DEFINITIONS AND SENTENCES GIVEN FOR THEM. IF YOU STILL HAVE QUESTIONS, PLEASE SEE YOUR INSTRUCTOR.**

**IF YOU UNDERSTAND ALL THE ANSWERS ABOVE, TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A IN UNIT I - LESSON 1.**

ANSWERS TO EXERCISE 4



**ANSWERS TO EXERCISE 5**

- |    |      |     |      |
|----|------|-----|------|
| 1. | A. Y | 8.  | A. N |
|    | B. N |     | B. Y |
| 2. | A. N | 9.  | A. N |
|    | B. Y |     | B. Y |
| 3. | A. Y | 10. | A. N |
|    | B. N |     | B. Y |
| 4. | A. N | 11. | A. N |
|    | B. Y |     | B. Y |
| 5. | A. Y | 12. | A. N |
|    | B. N |     | B. Y |
| 6. | A. N | 13. | A. Y |
|    | B. Y |     | B. N |
| 7. | A. Y | 14. | A. Y |
|    | B. N |     | B. N |

**IF YOU HAVE MISSED ANY OF THESE, LOOK OVER THE DEFINITIONS AND SENTENCES USING WORDS IN WORD LIST II. IF YOU STILL HAVE QUESTIONS, PLEASE SEE YOUR INSTRUCTOR.**

**IF YOU UNDERSTAND ALL THE ANSWERS ABOVE, TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 2, FORM A IN UNIT I - LESSON 1.**

## ANSWERS TO EXERCISE 6

1. standard - a gauge or rule used in measuring something; a statement of how something is to be done
2. cable - a collection of wires carrying electrical current; to hook up those wires
3. exceed - to be greater than
4. excess - too much of something
5. automatically - acting without help from anything else
6. manually - by hand
7. character - a letter or single number
8. defective - lacking something; broken
9. terminal - an end point along a communication system
10. approximately - almost exactly
11. technical - special knowledge about a mechanical subject
12. vehicle - a car, truck, or van
13. monitor - to check on the operation of equipment without disturbing it
14. capacity - ability
15. transmit - to send a message
16. index - an alphabetical list that helps in finding a certain part of a book
17. insure - to make certain
18. uncorrectable - cannot be made right
19. symptom - a sign that something is wrong

CORRECT YOUR ANSWERS.

**ANSWERS TO EXERCISE 7**

- |       |       |
|-------|-------|
| 1. N  | 11. Y |
| 2. Y  | 12. N |
| 3. Y  | 13. N |
| 4. Y  | 14. N |
| 5. N  | 15. Y |
| 6. N  | 16. N |
| 7. N  | 17. Y |
| 8. Y  | 18. N |
| 9. Y  | 19. Y |
| 10. N | 20. Y |

**IF YOU MISSED ANY OF THESE, LOOK OVER THE WORDS AND SENTENCES FROM WORD LIST III. IF YOU STILL HAVE QUESTIONS ABOUT ANY OF THESE, PLEASE SEE YOUR INSTRUCTOR.**

**IF YOU UNDERSTAND ALL THE QUESTIONS ABOVE, TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 3, FORM A IN UNIT I - LESSON 1.**

ANSWERS TO EXERCISE 8

1. cause - to make something happen
2. deficient - missing some necessary quality or activity
3. applicable - suitable to use
4. effective - powerful; produces desired result
5. detach - to separate
6. mission - the purpose for which a person is sent out
7. adjust - to reposition parts of equipment (usually slowly)
8. exterior - the outside
9. status - the condition of something
10. extinguish - to go out or put out
11. process - a series of actions needed to complete some product or good
12. preliminary - what is to be done first
13. action - a physical movement; a thing done
14. caution - carefulness; a warning to be careful
15. preventive - stopping something from happening
16. configuration - grouping; outward shape, form, or figure
17. element - a necessary part of a piece of equipment
18. meter - an instrument used for measuring the amount of something
19. elevate - to lift up
20. contaminate - to make something unfit for use or impure

CHECK YOUR ANSWERS.

ANSWERS TO EXERCISE 10

A T C I Y W A L N U T T N E I C I F O R P  
E C S E R I A L N U M B E R S M R A F T R  
L E S T A B L I S H A T S U I T A B L E E  
A L E O I T A R E Z I R O H T U A T A N S  
N E C L L C A T C H N R E D U C E A V S E  
O S N S I T E N O I T C N U F L A M R I T  
I A E P X D O N E S E Q U E N C E C E O S  
T M R R U Y M O M E N T A R I L Y A T N O  
A I E O A N G I S S A H E L L O Z T N H L  
R N F T M E R R Y T N O I T A C O L I I O  
E G E T A T O R S E C U R E T H I S I S N  
P U R E D A D E T A E S F U N E H E Y B G  
O B S T R U C T I O N T S U J D A E R O T

**ANSWERS TO EXERCISE 11**

- |       |       |
|-------|-------|
| 1. N  | 14. Y |
| 2. Y  | 15. N |
| 3. N  | 16. Y |
| 4. Y  | 17. Y |
| 5. N  | 18. N |
| 6. Y  | 19. Y |
| 7. N  | 20. Y |
| 8. N  | 21. N |
| 9. N  | 22. N |
| 10. N | 23. Y |
| 11. Y | 24. Y |
| 12. Y | 25. N |
| 13. N | 26. Y |

**IF YOU MISSED ANY OF THESE, LOOK OVER THE WORDS AND SENTENCES FROM WORD LIST V. IF YOU STILL HAVE QUESTIONS ABOUT ANY OF THESE, PLEASE SEE YOUR INSTRUCTOR.**

**IF YOU UNDERSTAND ALL THE ANSWERS ABOVE, TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 5, FORM A IN UNIT I - LESSON 1.**

**ANSWERS TO EXERCISE 12**

1. elements or components
2. procedure or process
3. assign, designate, or indicate
4. adequate, appropriate, applicable, proper, or suitable

**IF YOU MISSED ANY OF THESE, LOOK OVER THE SIMILAR WORDS  
AS LISTED PREVIOUSLY. IF YOU STILL HAVE QUESTIONS,  
PLEASE SEE YOUR INSTRUCTOR.**

**IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.**

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**ANSWERS TO EXERCISE 13**

1. clockwise
2. vertical
3. maximum
4. secure
5. operational
6. horizontal
7. energize

**IF YOU MISSED ANY OF THESE, READ THE PART ENTITLED OPPOSITE WORDS.  
IF YOU STILL HAVE QUESTIONS, SEE YOUR INSTRUCTOR.**

**IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.**

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**ANSWERS TO EXERCISE 14**

1. **obstruct - to block something**
2. **rotation - the act of turning something around**
3. **selection - the act of choosing something**  
**selector - the person or thing that chooses something**

**IF YOU NEED SOME MORE PRACTICE WITH THESE WORDS AND THEIR USES,  
REVIEW THE LESSON NOW.**

**IF YOU UNDERSTAND EVERYTHING YOU HAVE HEARD AND READ IN THIS LESSON,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR  
CHECKPOINT 6, FORM A IN UNIT I - LESSON 1.**

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT I**  
**READING COMPREHENSION**

**LESSON 2**  
**STRATEGIES FOR UNDERSTANDING SENTENCES**

**PREREQUISITE:** None  
**MATERIALS REQUIRED:** Dictionary  
**TYPE OF LESSON:** Self-Paced

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STUDENT GUIDE

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UNIT I. READING COMPREHENSION

Lesson 2. Strategies for Understanding Sentences

INTRODUCTION:

Soon, you will begin the 31M course, to learn to be a Multichannel Communications Equipment Operator. There are many ways of learning in the course. You will learn by listening to lectures, watching demonstrations, and practicing on equipment. In addition, you will learn by reading. You will read your Soldier's Manual and parts of various Technical Manuals (TMs). Your readings will help you learn how your equipment works and how to operate it.

Reading will be important to you after you finish the course, too. Sometimes, you will need to read instructions for operating new equipment. Sometimes, you will have to read orders. Sometimes, you will read something to "brush up" your skills or to prepare for a test.

Several things are important to being a good 31M reader:

1. Knowledge of the words and terms used in the reading materials.
2. Being able to figure out what each sentence tells you, that is, understanding the material.

This lesson will give you practice reading words and sentences like those in 31M materials.

LEARNING GOALS:

In this lesson, you will learn:

- A. The kinds of information in 31M reading materials (p. 2).
- B. How to read sentences about radios and radio equipment (p. 6).
- C. How to read sentences about task conditions and standards (p. 36).
- D. How to read sentences describing performance steps (p. 44).

On the pages that follow, you will find material to read and questions to answer. Most of the time, you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

After Section B and at the end of the lesson, there are checkpoints. In the lesson, you will be instructed when to ask for each checkpoint from your instructor. When you finish each checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

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BEGIN THE LESSON.

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Section A

Types of 31M Reading Material

Sometimes, in the 31M course, you will read descriptions of equipment. These will tell you things about the equipment, like its name, its parts or components, and what the equipment can do. Equipment descriptions will give you answers to questions like these:

What are the components of the equipment?

What is each component called?

What does this piece of equipment do?

What are the knobs and switches called? What do they do?

What are the dials and meters called? What do they do?

How much power does the equipment use?

Equipment descriptions are important because they give you information you must have in order to use the equipment correctly.

Sometimes, you will read sentences or paragraphs that describe tasks you will be performing. Sometimes, you will read conditions under which you must perform a task. The conditions for a task give you answers to questions like:

Is this task performed in a field location?

Can I have help performing this task?

What kinds of tools and references can I use?

Other reading materials will describe the standards you must meet in performing the task. Standard means how well you must perform the task. Standards give you answers to questions like:

How fast must I perform this task?

How many mistakes am I allowed to make?

How will my performance be scored?

Conditions and standards are important because they tell you where, with what aids, and how well you must do your job.

Most of the time, you will be reading performance steps. Performance steps are instructions that tell you how to carry out a task, step by step. The performance steps for a task will give you answers to questions like:

What should I do first?

What should I do second, third, etc.?

How should I set this switch? How should I adjust that control?

What should the reading on this meter be?

Performance steps are very important. If a task is not done just the way the performance steps say, the equipment will not operate properly.

As you can see, 31M reading materials of many kinds will help you to do your job well. Do the exercise on the next page to review the various types of 31M reading materials. You may look back at this section to find the answers to the questions.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 1

YOU MAY LOOK BACK OVER THE PREVIOUS PAGES TO HELP YOU ANSWER THE QUESTIONS.

1. List two kinds of information in descriptions of equipment:

1. \_\_\_\_\_

2. \_\_\_\_\_

2. List one kind of information in a task condition.

\_\_\_\_\_

3. List one kind of information in a task standard.

\_\_\_\_\_

4. Select the correct answer:

Another word for performance steps is:

- a. tests
- b. conditions
- c. instructions
- d. tasks

5. In the column on the left are questions a soldier might have about his job. On the right are four kinds of reading materials where information about a job can be found. They are numbered (1) to (4). Select the kind of reading material needed to answer each question, and put its number in the space provided.

- |   |   |
|---|---|
| <p>___ a. How many people perform this task together?</p> <p>___ b. How much time will I have to finish the job?</p> <p>___ c. How many parts are in this piece of equipment?</p> <p>___ d. What are they called?</p> <p>___ e. Can I use the Soldier's Manual to help me?</p> <p>___ f. What is the first step?</p> <p>___ g. Can this task be done in the rain?</p> <p>___ h. What is this knob called?</p> <p>___ i. How should I set this knob in the fifth step?</p> <p>___ j. How well must I do this task?</p> | <p>(1) Description of Equipment</p> <p>(2) Conditions</p> <p>(3) Standards</p> <p>(4) Performance Steps</p> |
|---|---|

CHECK YOUR ANSWERS ON PAGE 57.

## Section B

### Reading Descriptions of Equipment

In the 31M course, you will be using many different kinds of equipment. Each piece of equipment has a special purpose and use. Each has certain controls and indicators which you must understand in order to do your job effectively. Sometimes, you will be expected to learn about these things by reading material in your Soldier's Manual or a TM. This section will give you practice in reading sentences about radios and answering questions about them.

Here are some important guidelines for reading and understanding sentences. You will be using these guidelines in the rest of the lesson.

1. Pay close attention to underlined terms and their definitions.
2. If a sentence contains a term you do not understand, do not skip over it. Find out what it means. Some ways to find out are:
  - a. Ask your instructor.
  - b. Look up the term in a dictionary.
  - c. Figure the meaning out from the way it is used in the sentence. (But be careful. You may figure out the wrong meaning.)

Sometimes, you may know every word in a sentence, but the whole sentence still does not make sense to you. If you do not understand a sentence the first time you read it, here are some things you can do:

3. Read the sentence again, slowly and carefully. Sometimes, a sentence does not make sense because you read it too fast and read words wrong. If you read the sentence again, slowly, you will probably read the sentence correctly. Then the meaning of the sentence will be clear.
4. Read the sentence out loud. Sometimes, you can understand a sentence better if you hear it than if you read it quietly.
5. Form a picture in your mind of what the sentence says. A picture in your mind is called an image. Forming an image of what a sentence says sometimes makes the meaning clear.

Let us see how these guidelines work. We will use them to read this sentence about communication:

Communication means getting intelligence (information) from one person to another.

Let us apply the guidelines to this sentence about communication.

Guideline 1: Pay close attention to underlined terms and their definitions.

In the sentence above, two terms are underlined:

communication

intelligence

Both are defined in the sentence:

Communication means getting intelligence from one person to another.

Intelligence means information

The guideline tells you to pay close attention to these terms and their definitions.

Guideline 2: If a sentence contains a term you do not understand, do not skip over it. Find out what it means. :

One important word in the sentence is "information." You probably know what information means. But suppose you did not. If you did not understand this word, you would not understand the sentence. What could you do? The guideline tells you:

a. Ask your instructor.

GO TO YOUR INSTRUCTOR NOW, AND ASK WHAT "INFORMATION" MEANS.

Write your instructor's answer here:

Information means: \_\_\_\_\_

Sometimes your instructor will be busy. At other times, there will not be anyone you can ask. The guideline tells you that another way to find out the meaning of a term is:

- b. Look it up in a dictionary.

LOOK UP THE WORD "INFORMATION" IN A DICTIONARY.

Write the dictionary definition here:

---

---

A third way to find out the meaning of a term is:

- c. Figure the meaning out from the way the term is used in the sentence.

Since you already know the meaning of "Information," you do not need to use this guideline. But keep it in mind.

Here is the sentence about communication again:

Communication means getting intelligence (information) from one person to another.

Suppose that you know every word in the sentence about communication, but you still don't understand the whole sentence. Let us try Guidelines 3 to 5. These three guidelines tell you three things you can do to understand a sentence:

Guideline 3: Read the sentence again, slowly and carefully.

Sometimes, people read sentences too quickly and read some words wrong. For example, here is how one student read the sentence about communication:

"Communications means going intelligence (information) to one person another."

COMPARE THIS SENTENCE WITH THE CORRECT ONE.  
UNDERLINE THE WORDS THAT ARE WRONG.

As you can see, it is easy to make mistakes when you read too fast. If this happens, reading slowly a second time often makes the sentence clear.

Here is the sentence about communication again:

Communication means getting intelligence (information) from one person to another.

Another thing you can do to understand the sentence is:

Guideline 4: Read the sentence out loud.

READ THE SENTENCE ABOUT "COMMUNICATION" OUT LOUD  
AND LISTEN TO YOURSELF.

Do you notice how clear the sentence is when you hear it?  
Sometimes, just reading a difficult sentence out loud will help  
you to understand it.

Another thing you can do to help you understand a difficult sentence  
is:

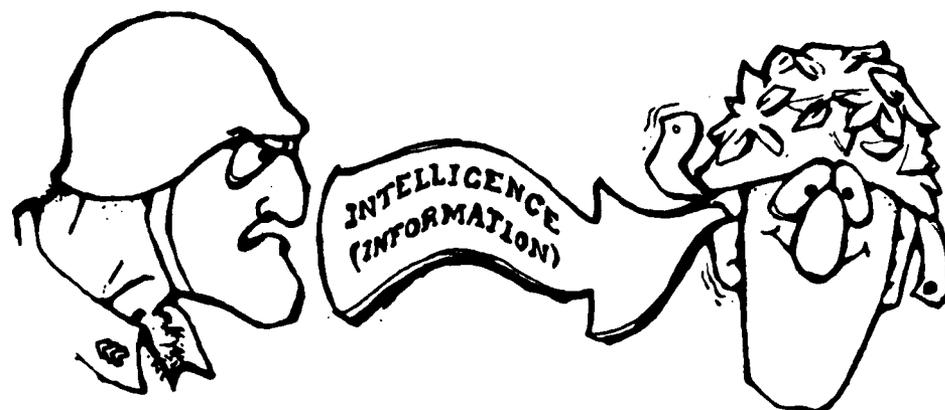
Guideline 5: Form a picture in your mind (an image) of what the  
sentence says.

TRY DOING THIS NOW WITH THE COMMUNICATION SENTENCE.

Close your eyes and form an image of what the communication  
sentence says. Do not turn the page until you have a sharp,  
clear image.

THEN TURN THE PAGE TO SEE WHAT MY IMAGE OF THE SENTENCE  
LOOKS LIKE.

## COMMUNICATION



Your image may look different from mine. That is O.K. The important thing is that forming an image of a sentence can help you understand the sentence.

If you understand sentences, you can answer questions about them. For example, here are two questions about the "Communication" sentence. See if you can answer them. (You are allowed to look back at the sentence if you want to.)

### EXERCISE 2

1. Another word for intelligence is:
  - a. information.
  - b. genius.
  - c. smartness.
  - d. radio transmission.
  
2. Getting intelligence from one person to another is called  
\_\_\_\_\_.

CHECK YOUR ANSWERS ON PAGE 58.

In the next part of this section, you will read sentences about radios and radio equipment. Then you will answer questions about the sentences. Make sure that you understand each sentence before you answer the questions. Use the guidelines to help you.

Read the following two sentences about communication without radio:

When you talk to another person, sound waves travel through the air from your mouth to the other person's ear. Another term for sound waves is audio frequency (AF).

Now let us apply the guidelines to these two sentences.

1. Write down the two terms that are underlined.

---

---

Now read the sentences again to be sure you know what the terms mean.

2. Are there any other words or terms in this sentence that you do not know? If there are, write them here (one per line):

---

---

---

Find out the meaning of each one, and write it beside the word.

Here are the sentences again:

When you talk to another person, sound waves travel through the air from your mouth to the other person's ear. Another term for sound waves is audio frequency (AF).

3. Read the sentences again, slowly. Be sure you are reading all the words correctly.
4. Read the sentences out loud. Listen to yourself as you read.

5. Form an image of what the sentences say. Draw a picture of your image here:

### EXERCISE 3

ANSWER THE FOLLOWING QUESTIONS ABOUT THE SENTENCES.

1. AF stands for:
  - a. Army frequency.
  - b. alternating frequency.
  - c. Air Force.
  - d. audio frequency.
  
2. Audio frequency means the same thing as \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 58.

Here is a sentence about audio frequency communication:

Sound waves are slow, and they cannot travel very far, even when they are amplified (increased).

Below are some questions about this sentence. But before you answer the questions, make sure that you understand what the sentence says. If you are not sure that you understand it, use the 5 guidelines.

If you are still not sure what the sentence means, ask your instructor for help.

WHEN YOU ARE SURE THAT YOU UNDERSTAND THE SENTENCE, ANSWER THE FOLLOWING QUESTIONS. YOU MAY LOOK BACK AT THE SENTENCE AS OFTEN AS YOU WISH.

#### EXERCISE 4

1. If sound waves are amplified, they:
  - a. travel very far.
  - b. still do not travel very far.
  - c. go faster.
  
2. Amplified means \_\_\_\_\_
  
3. What does the sentence say about amplification of radio waves?
  - a. It says that radio waves can be easily amplified.
  - b. It says that radio waves do not need to be amplified.
  - c. It says that radio waves travel far if they are amplified.
  - d. It does not say anything about amplification of radio waves.

CHECK YOUR ANSWERS ON PAGE 58.

Here are two sentences about communication by radio. Read them. Make sure that you understand them. Use the 5 guidelines to help you.

Radio frequency (RF) communication is faster and stronger than AF communication. Radio waves travel much faster than sound waves - 186,000 miles per second, and amplified radio waves can travel over great distances.

WHEN YOU ARE SURE THAT YOU UNDERSTAND THE SENTENCES, ANSWER THE FOLLOWING QUESTIONS:

#### EXERCISE 5

1. Light travels at 186,000 miles per second. This means that light travels:
  - a. more slowly than radio waves.
  - b. at the same speed as radio waves.
  - c. faster than radio waves.
  
2. Radio waves can travel over great distances if they are  

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3. The F in RF stands for:
  - a. frequency.
  - b. fast.
  - c. force.

CHECK YOUR ANSWERS ON PAGE 59.

Here are two sentences about radio equipment. Make sure that you understand them. Then answer the questions which follow.

The two basic equipment components required for radio communication are a transmitter and a receiver. The transmitter transmits (sends) RF waves, and the receiver receives them.

#### EXERCISE 6

1. If you want to send a message, what should you use?
    - a. Receiver
    - b. Transmitter
  
  2. On your radio at home, you can listen to many stations. Your radio is a:
    - a. receiver.
    - b. transmitter.
  
  3. Suppose that you have forgotten what RF stands for. What should you do?
- 

CHECK YOUR ANSWERS ON PAGE 59.

NOTE: Have you been using the 5 guidelines to help you understand the sentences? Here they are again, just as a reminder:

1. Pay close attention to underlined terms and their definitions.
2. If a sentence contains a term you do not understand, do not skip over it. Find out what it means.

If you do not understand a sentence the first time you read it:

3. Read the sentence again, slowly and carefully.
4. Read the sentence out loud.
5. Form an image of what the sentence says.

Here are a few sentences about radio communication. Read them. Understand them. Then answer the questions that follow.

By using radio waves, we can send messages rapidly over long distances. However, the human voice does not generate radio waves, and the human ear does not hear them. We must have a way of converting sound waves to radio waves on the transmission end. Then we must be able to convert the radio waves back to sound waves on the receiver end.

#### EXERCISE 7

1. The sentences above contain a few terms which not all 31M students know. They are listed below. Find each one in the sentences above. Then write a short definition of each one. If you don't know what they mean, find out from your instructor, or look them up in a dictionary.

generate \_\_\_\_\_

convert \_\_\_\_\_

2. The human ear does not hear:
  - a. sound waves.
  - b. radio waves.

CHECK YOUR ANSWERS ON PAGE 59.

Here is a sentence about modulation. Read it carefully. Make sure you understand it. Then answer the questions below.

The process of modifying radio waves so that they can carry messages is called modulation.

#### EXERCISE 8

1. You cannot understand this sentence unless you understand all the words in it. Here are two words from the sentence. Write their definitions in the space provided. If you do not know the words, ask your instructor, or look in a dictionary.

process \_\_\_\_\_

modify \_\_\_\_\_

2. The sentence says that:
  - a. Messages are modulated by radio waves to carry messages.
  - b. Radio waves are modulated in order to carry messages.

CHECK YOUR ANSWERS ON PAGE 60.

Here is some more information about modulation:

The equipment that converts sound waves to a form that can be carried by radio waves is called modulating equipment, and the radio waves carrying the message are modulated radio waves.

#### EXERCISE 9

Fill in the blanks below:

Modulating equipment changes \_\_\_\_\_ to a form that can be carried by \_\_\_\_\_. Modulated radio waves are radio waves which \_\_\_\_\_.

CHECK YOUR ANSWERS ON PAGE 60.

Here is some more information about modulation and modulating equipment:

At the receiver end, the message must be extracted from the radio waves and converted back into sound. The process of extracting the message and converting it to sound is called demodulation. Demodulation is also carried out by modulating equipment.

#### EXERCISE 10

1. Write the definition of extract here: \_\_\_\_\_
2. Demodulation occurs at the:
  - a. transmitter end.
  - b. receiver end.
3. At the receiver end, modulating equipment is used to \_\_\_\_\_  
the message from the \_\_\_\_\_ and convert it to  
\_\_\_\_\_.

CHECK YOUR ANSWERS ON PAGE 61.

Here are several sentences about modulation. Make sure you understand them. Then answer the following questions.

There are various methods of modulation. The kind used in most 31M equipment is called pulse code modulation or PCM. that is why the modulating equipment used in the 31M MOS is usually called PCM equipment. Modulating equipment is also called carrier equipment because it enables radio waves to carry messages.

#### EXERCISE 11

1. Find the following words in the sentences above. Then write a short definition of each one.

various \_\_\_\_\_

enable \_\_\_\_\_

2. PCM stands for:

- a. pulse coded messages.
- b. prime coding modulation.
- c. pulse carried modulation.
- d. pulse code modulation.

3. According to the passage, PCM is:

- a. the most common type of modulation in 31M equipment.
- b. the best type of modulation in 31M equipment.
- c. the only type of modulation in 31M equipment.

4. Which of the following is an example of carrier equipment?

- a. Transmitter
- b. Receiver
- c. Antenna
- d. PCM equipment

CHECK YOUR ANSWERS ON PAGE 61.

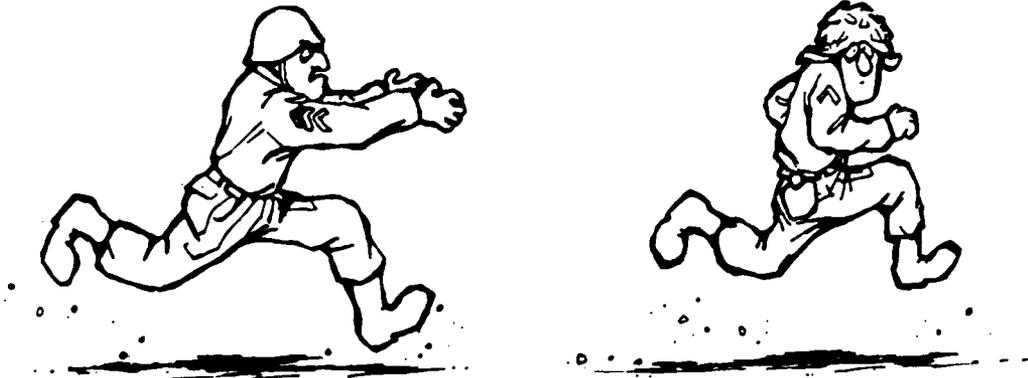
In the English language, there are usually several ways to say the same thing. Read the following sentence and make sure you understand it:

1. The sergeant chased the private.

Here is another sentence that says the same thing:

2. The private was chased by the sergeant.

The order of the words is changed in the second sentence, but it still has the same meaning as the first. Both of them mean this:



Now look at Sentences 3 and 4 below:

3. The sergeant ran after the private.
4. The private was pursued by the sergeant.

Both of these sentences mean the same thing as Sentences 1 and 2, even though they use different words. "Ran after" and "pursued" both mean the same thing as "chased."

If words with the same meaning are substituted in a sentence, the meaning of the sentence does not change.

But now look at Sentences 5, 6, and 7.

5. The private chased the sergeant.
6. The sergeant was chased by the private.
7. The sergeant carried the private.

Compare these sentences with Sentence 1.

Sentences 5 and 6 have the same words as Sentence 1, but they do not have the same meaning as Sentence 1.

Here is what Sentences 5 and 6 say:



Sentence 7 also says something different from Sentence 1. Here is what Sentence 7 says:



What is the point of all this? The point is that the most important thing about reading is understanding the meaning. When you read a sentence, the particular words and the word order are not as important as what the sentence means.

Sometimes, two sentences have different words but the same meaning.

Sometimes, two sentences have the same words but different meanings.

To decide whether two sentences mean the same thing or not, you must first read each sentence, carefully. Then you must figure out the meaning of each sentence by itself. And then you must compare the two meanings and decide whether they are the same.

A good way to practice reading for meaning is to compare sentences and decide whether they have the same meaning or not. The exercise on the next pages will give you practice with a few new sentences. Use the five guidelines to help you understand each sentence.

EXERCISE 12

Read the sentence below:

The fashionable Army uniforms are designed to fit all soldiers well.

Now read Sentences 1 through 4 below. Compare each one with the sentence above. If a sentence says the same thing as the sentence above, write S in the space provided. If it says something different, write D.

- \_\_\_\_\_ 1. Army uniforms are fashionable and well-fitting.
- \_\_\_\_\_ 2. Fashionable Army uniforms fit designers well.
- \_\_\_\_\_ 3. Army uniforms are stylish and fit all soldiers well.
- \_\_\_\_\_ 4. Even though they are inexpensive, Army uniforms fit well and are fashionable.

Here is another sentence:

If a car engine overheats, the engine must be turned off immediately.

Compare sentences 5 through 8 with the sentence above, and write S or D, like you did for Sentences 1 to 4.

- \_\_\_\_\_ 5. If a car engine is turned off, it will overheat immediately.
- \_\_\_\_\_ 6. A car engine should not be kept running if it gets too hot.
- \_\_\_\_\_ 7. Turn off the car's engine right away if it gets too hot.
- \_\_\_\_\_ 8. Turn the car engine off only if it overheats.

Here is another sentence.

The nutritious, appetizing food in the mess hall makes it the best place to take your date.

Write a sentence which uses different words or a different word order from the sentence above, but which has the same meaning.

9.

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CHECK YOUR ANSWERS ON PAGE 62.

Did you have trouble with any of the first eight questions in the last exercise? If you did, you probably did not understand the meaning of the sentences. Meaning is very important. If you do not understand the meaning of a sentence in a passage, you will probably not understand the rest of the passage. If you do not understand the meaning of an instruction, you will probably not carry out the instruction correctly. Remember and use the five guidelines for reading sentences. They are repeated on the next page.

#### Five Guidelines for Understanding Sentences

1. Pay close attention to new terms and their definitions.
2. Do not skip over terms you do not understand. Find out what they mean before you go on.

If you do not understand a sentence the first time you read it, do the following:

3. Read the sentence again, slowly and carefully.
  4. Read the sentence out loud.
  5. Form an image (a picture in your mind) of what the sentence says.
- 

Now let us get back to radios and radio equipment. Sentences about radios also can be changed in various ways without changing their meaning. For example, here is a sentence about the transmitter.

1. Radio waves are generated by the component in the transmitter called the oscillator.

Read Sentence 1 carefully. Make sure you understand it.

In the next three sentences, the word order is different from Sentence 1. But they all say the same thing as Sentence 1. Read them carefully, and compare each one with Sentence 1.

2. The oscillator is the component of the transmitter which generates radio waves.
3. One component of the transmitter, which is called the oscillator, generates radio waves.
4. The component of the transmitter which generates radio waves is called the oscillator.

Even though the words in Sentences 2, 3, and 4 are in a different order than Sentence 1, the meaning of all four sentences is the same.

Another way to change a sentence without changing its meaning is to use different words that mean the same thing. Sentence 5 below uses some words that are different from Sentence 1, but the sentence still has the same meaning.

5. Radio waves are produced by that part of the transmitter called the oscillator.

Notice that the word produced was substituted for generated, and part was substituted for component. "Produce" means the same thing as "generate," and "part" means the same thing as "component." So the meaning of the whole sentence stays the same.

By changing both words and sentence order, we can produce still more sentences that mean the same thing as Sentence 1, like Sentences 6 and 7 below.

6. The part of the transmitter which produces radio waves is the oscillator.
7. Part of the transmitter produces radio waves; it is called the oscillator.

Before you go on to the next page, be sure that you understand why Sentences 1 to 7 all say the same thing.

However, some kinds of changes do change the meaning of a sentence.

Here is Sentence 1 again.

Radio waves are generated by the component in the transmitter called the oscillator.

Sentences 8 and 9 below use the same words as Sentence 1, but they do not have the same meaning as Sentence 1. Compare each one with Sentence 1.

8. Radio waves are generated by part of the oscillator called the transmitter.

(Sentence 1 says that the oscillator is part of the transmitter. Sentence 8 says that the transmitter is part of the oscillator, which is not correct.)

9. Radio waves generate to the oscillator in the transmitter.

(Sentence 1 says that radio waves are generated by the oscillator. "Generate to" is not the same thing as "generated by.")

10. Radio waves are gathered by the oscillator in the transmitter.

("Gathered" does not mean the same thing as "generated." So the meaning of the whole sentence is changed.)

The next exercise asks you to compare sentences about radios and decide whether their meanings are the same or different. Remember the five guidelines and use them whenever you need them to help you understand the sentences.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 13

Here is a sample sentence about radio equipment. Read it carefully and make sure you understand it. Below it are three sentences. Read each one carefully. Then write S in the blank space if its meaning is the same as the sample sentence, and write D if its meaning is different.

Sample sentence: Most of the modulating equipment used in the 31M course is PCM equipment.

- \_\_\_\_\_ 1. The 31M course uses only PCM modulating equipment.
- \_\_\_\_\_ 2. The 31M course uses PCM equipment more than any other kind of modulating equipment.
- \_\_\_\_\_ 3. Modulating equipment is used in the 31M course, and most of it is PCM.

Do the same thing with the following sample sentence and Sentences 4 to 8 which follow it.

Sample sentence: Radio waves generated by the oscillator are amplified before being transmitted to a distant receiver.

- \_\_\_\_\_ 4. After the RF waves are produced by the oscillator, they are amplified before being transmitted to a distant receiver.
- \_\_\_\_\_ 5. Before RF waves, produced by the oscillator, are sent out to a distant receiver, their strength is increased.
- \_\_\_\_\_ 6. Radio waves are generated by the oscillator, sent to a distant receiver, then amplified.
- \_\_\_\_\_ 7. The oscillator amplifies radio waves after generating them and before transmitting them to a distant receiver.
- \_\_\_\_\_ 8. RF waves are produced by the oscillator, then strengthened, then sent to a distant receiver.

Here is another sample sentence. Write another sentence in the space provided, which is different from the sample sentence but has the same meaning.

Sample sentence: The radio waves generated by the transmitter go to a transmitting antenna, which radiates them toward the receiver.

9.

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CHECK YOUR ANSWERS TO QUESTIONS 1 TO 8 ON PAGE 63.

HAVE YOUR INSTRUCTOR READ YOUR SENTENCE IN NO. 9  
AND TELL YOU IF IT IS O.K.

In this section, you have read many sentences about radios and radio equipment. Sometimes, you read short passages containing two or three sentences. If you understood each sentence, you understood the passage.

The rest of Section B gives you a longer passage to read about antennas. Even though the passage contains many sentences, you will understand the whole passage if you understand each sentence in it. Read the passage, sentence by sentence. Make sure you understand each sentence before you go to the next one. If you are not sure about a sentence, use the five guidelines. Here they are again:

#### Five Guidelines for Understanding Sentences

1. Pay close attention to new terms and their definitions.
2. If a sentence contains a term you do not understand, do not skip over it. Find out what it means.

If you are not sure about the meaning of a sentence, do the following:

3. Read the sentence again, slowly and carefully.
4. Read the sentence out loud.
5. Form an image of what the sentence says.

READ THE FOLLOWING PASSAGE ABOUT ANTENNAS:

The RF waves generated by the oscillator in the transmitter must be radiated toward the distant receiver. This is the function of the transmitter antenna. The antenna radiates signals into space. Without an antenna, it would be impossible to send messages very far.

The antennas used with 3M equipment are usually placed at the top of very tall masts that look something like flagpoles. A mast may be as high as 75 or 100 feet. It is very important to make sure that the antenna mast is vertical. A non-vertical antenna could be easily damaged.

It is also important that the antenna is oriented or aligned toward the distant receiver. Otherwise, the radio signals will not go in the correct direction. The location of the transmitter antenna is also important. If it is sited in a valley between high hills or near power lines, the signal will not go where it is supposed to go.

The receiver also has an antenna to intercept (pick up) the signals from the transmitter. Like the transmitter antenna, the receiver antenna must be vertical, oriented toward the transmitter, and located on a high, clear site.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 14

YOU MAY REFER TO THE PASSAGE WHENEVER YOU NEED TO.

1. Fill in the blanks below:

The function of the transmitter antenna is to \_\_\_\_\_  
signals into space toward the distant \_\_\_\_\_.  
At the receiver, another \_\_\_\_\_ picks up or  
\_\_\_\_\_ the signal.

2. If you are installing an antenna, what three things are very important?

(1) \_\_\_\_\_  
(2) \_\_\_\_\_  
(3) \_\_\_\_\_

3. According to the passage:

a. all masts are 75 to 100 feet tall.  
b. masts lower than 75 feet cannot receive or send clear signals.  
c. some masts are 75 to 100 feet tall.  
d. flagpoles are used as masts for antennas.

4. In the sentence, "If it is sited in a valley between high hills or near power lines, the signal will not go where it is supposed to go," the word sited means:

a. located.  
b. sighted.  
c. seen.

5. If a transmitter antenna is not properly oriented, what will happen?

a. The RF waves will not radiate into space.  
b. The RF waves will not travel toward the receiver.  
c. High winds may cause the antenna to fall down.

CHECK YOUR ANSWERS ON PAGE 64.

S T O P !!!

DO NOT GO ON TO SECTION C.

TELL YOUR INSTRUCTOR THAT YOU ARE READY  
FOR CHECKPOINT 1, FORM A IN  
UNIT I - LESSON 2.

## Section C

### Reading Task Conditions and Standards

In the 31M10 course and on your job, you will perform many tasks, such as raising an antenna, starting a generator, and operating a cable terminal. Each task is performed under certain conditions. For example, some tasks are performed in a fixed location and others in a mobile location. Some are done by just one person and others by two or more persons. Some can be carried out only when it is not too windy or not too cold, while others can be done in all weather conditions. Descriptions of conditions for various tasks are usually found in the Soldier's Manual or in TMs. It is important to be able to read task conditions, so that you will know what kinds of factors influence your job.

Every task you do will also have certain standards. This means that the task must be done in a certain way or within a certain time. You will often need to read descriptions of task standards. They will tell you how well and how fast you must do each task. This section of the lesson is about reading sentences about task conditions and standards.

In Section B of this lesson, you learned five guidelines for reading and understanding sentences. You used the guidelines to read sentences about radios and radio equipment. The guidelines can also be used for reading sentences about task conditions, standards, and performance steps. Use them whenever they will help you to figure out the meanings of sentences in this section.

#### Reading Task Conditions

Statements of task conditions will give you information such as:

- the kind of environment (location, weather) the task is performed in.
- the pieces of equipment and tools that you will need.
- the references (such as TMs) that are needed.
- the forms that must be filled out (if any).

As you can see, task conditions refer to things you will need to know or need to have before you begin the job.

Let us look at some examples of task conditions. Here are the task conditions for troubleshooting a telephone terminal set called the AN/TCC-73. Read it carefully.

This task may be performed in a garrison or tactical environment. You will need:

1. TM 11-5805-585-14-2
2. Terminal Set, Telephone, AN/TCC-73
3. TM 38-750
4. DA Form 2404

This description gives you information about:

- location or environment: garrison or tactical environment
- equipment and tools: Terminal Set, Telephone, AN/TCC-73
- references: TM 11-5805-585-14-2 and TM 38-750
- forms: DA Form 2404

Here are the task conditions for maintaining a radio repeater set called the AN/TRC-110(V). Read it carefully.

This task may be performed in a tactical situation. To accomplish this task, you will need an operable AN/TRC-110(V) with associated TMs and basic issue tools, DA Form 2404, clean lint-free cloth, brushes, cleaning solution, compressed air, and safety equipment.

The task conditions above tell you:

- location or environment: tactical situation
- equipment and tools: operable AN/TRC-110(V), basic issue tools, clean lint-free cloth, brushes, cleaning solution, compressed air, safety equipment
- references: associated TMs
- forms: DA Form 2404

ANSWER THE QUESTIONS ON THE NEXT PAGE.

## EXERCISE 15

Here are the task conditions for operating a radio called the AN/TRC-113(V). Read the conditions, then answer the following questions:

This task may be performed in a tactical situation. To accomplish this task, you will need an operable AN/TRC-113(V), TM 11-5820-562-14, basic issue tools, test equipment, and safety equipment. You will be provided with a multichannel systems diagram.

1. What equipment and tools do you need to perform this task?

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2. What TM should you have? \_\_\_\_\_

3. What environment is the task performed in?

---

4. What else must you have before you begin this task?

---

5. Suppose you have been given the following: an operable AN/TRC-113(V), basic issue tools, a multichannel systems diagram, safety equipment, and TM 11-5820-562-14. What else do you need?

---

Here are the conditions for driving a vehicle in a convoy:

Task will normally be performed in a field condition or garrison, under the control of a convoy commander, and under all weather conditions, day or night. Necessary items of equipment are a vehicle and a flashlight.

6. Cpl. Miller is being checked out on his ability to drive a vehicle in a convoy at night. What item of equipment must he bring along?
- 

7. There are 8 inches of snow on the ground. Should Cpl. Miller be expected to drive under these conditions? \_\_\_\_\_

8. Who will tell Cpl. Miller exactly what to do?
- 

CHECK YOUR ANSWERS ON PAGE 65.

### Reading Task Standards

Task standards are very important, because they tell you how well and how fast you must perform the task. If your performance matches the standards, you have completed the task successfully. If it does not, you need additional training and practice.

Here are standards for a system alignment:

Standards are met when the system is in operation and the terminals are ready to align channels within 30 minutes.

This looks very simple. But actually, it includes three parts:

1. The system must be in operation. That means it must be working.
2. The terminals must be ready to align channels.
3. All of the alignment procedures must be completed within 30 minutes.

If any of the three parts is not done successfully, the standard is not met. For example, if it takes Pvt. John Jones 40 minutes to align the system, he has not met the standard. He must practice until he can do the task within 30 minutes. If Pvt. Jane Smith has the system working within 30 minutes but the terminals are not quite ready to align channels, she has not met the standard either.

Here are the standards for installing a telephone terminal. Read them, then answer the questions below.

### EXERCISE 16

Job standards are met when installation is completed within 1 hour.

1. Pvt. Arthur Green finished all the procedures for installation in 55 minutes. Did he meet the standards? \_\_\_\_\_
2. Pvt. Alice Brown thought she was finished in 30 minutes. But she left out one step in the procedure. Did she meet the standards?

---

CHECK YOUR ANSWERS ON PAGE 65.

Sometimes, sentences describing task standards are long. But they still contain the same kind of information: how well and how fast you must do the job. Here are the standards for performing maintenance on a radio repeater:

Standards are met when you have performed all checks and services in accordance with TM 11-5820-535-15, paragraph 4-2, corrected all faults authorized, and recorded all faults, corrected or uncorrected, on DA Form 2404 within 60 minutes.

These standards say that the task has been successfully completed when:

1. All the checks and services listed in TM 11-5820-535-13, paragraph 4-2, have been done.
2. All the authorized faults have been corrected.
3. All corrected faults have been recorded on DA Form 2404.
4. All uncorrected faults have been recorded on DA Form 2404.
5. All of the above have been completed within 60 minutes.

If any of the five parts is not done correctly, the standards are not met.

#### EXERCISE 17

ANSWER THE FOLLOWING QUESTIONS, BASED ON THE STANDARDS LISTED ABOVE. YOU SHOULD LOOK BACK AT THE STANDARDS WHENEVER YOU NEED TO.

1. What kind of faults should be recorded on DA Form 2404?  
\_\_\_\_\_
2. Pvt. Ruth Williams did all the checks and services listed in TM 11-5820-535-13, paragraph 4-2. She found several faults. She corrected the faults she was authorized to correct. Then she recorded all the uncorrected faults (but not the corrected ones) on DA Form 2404. She was finished 45 minutes after she started. Did she meet the standards or not? \_\_\_\_\_
3. Pvt. James Johnson did all the checks and services listed in TM 11-5820-535-13, paragraph 4-2. He found three faults and recorded them on DA Form 2404. Then he told his sergeant that he was finished. Thirty minutes had passed. Did he meet the standards or not? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 66.

The following exercise will give you practice reading task standards. In each case, read the standards, then answer the questions which follow.

### EXERCISE 18

Here are the standards for raising an antenna:

The antenna system is to be installed to a height of 35 feet within 30 minutes. The antenna mast will be straight and vertical, all cables attached, all guy anchors intalled, guys attached and snug, and antenna oriented within 5° of published azimuth.

1. How much time do you have for raising the antenna? \_\_\_\_\_
2. If an antenna is oriented about 7° from its published azimuth, are the standards met? \_\_\_\_\_
3. When installation is complete, the antenna should be \_\_\_\_\_ high, and the mast should be \_\_\_\_\_

Here are standards for installing a radio terminal:

Standards are met when you have grounded the assemblage and connected all power and signal cables for a 12- or 24-channel nonsecure radio terminal within 30 minutes.

4. What kind of radio terminal must you install? \_\_\_\_\_  
\_\_\_\_\_
5. How much time do you have? \_\_\_\_\_
6. What must you do to the assemblage? \_\_\_\_\_

Here are standards for measuring distances on a map:

Determine the straight-line distance, in meters, from point A to point B within 50 meters in 3 minutes. Determine the road (curved-line) distance from point C to point D within 100 meters in 3 minutes.

7. Pvt. Driver measured the distance from point A to point B. It was  $3 \frac{1}{2}$  kilometers, which is the same as 35,000 meters or 21,875 miles. Which of these should he report? \_\_\_\_\_
  
8. Pvt. Kelly measured the road distance from point C to point D within 3 minutes. The measurement he got was 8520 meters. The actual distance was 8608 meters. Did Pvt. Kelly meet the standard?  
\_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 66.

## Section D

### Reading Performance Steps

In the 31M course and on the job, you will often need to read instructions that tell you how to do a task, step by step. The steps are called performance steps.

Reading performance steps is very important. If you misread the instructions for one step, you will not perform that step correctly. And then your equipment will not work. This section tells you about different kinds of performance steps and what they tell you. Remember to use the five guidelines for understanding sentences whenever they will help you to figure out performance steps.

Radio equipment has many switches and controls. Each one has a label or name. Each also has two or more positions it can be set to.

We will start with performance steps for switches.

Directions for working with switches always tell you which switch to operate and what position to place the switch in. Here is a performance step for operating a radio:

Set ON-OFF switch to ON.

Notice that this performance step tells you two things:

- It tells you which switch to set: the ON-OFF switch.
- It tells you what position to set the switch to: ON.

Notice also that the name of the switch and the name of the position are in capital letters. Usually (but not always) names and positions of switches, controls, and meters are printed in capital letters. This will make it easier for you to read performance steps for operating switches and controls.

In performance steps for switches, the words operate and set mean the same thing. So the following two performance steps are the same:

- (1) Set ON-OFF switch to ON.
- (2) Operate ON-OFF switch to ON.

Both tell you to place the same switch (ON-OFF) in the same position (ON).

But the following two performance steps are not the same:

- (1) Set ON-OFF switch to OFF.
- (2) Operate ON-OFF switch to ON.

Both tell you to set (operate) the same switch. But performance step (1) tells you to place the switch at OFF, while performance step (2) tells you to place it at ON. This difference is very important. If you set a switch at the wrong position, the equipment will not work.

#### EXERCISE 19

EACH ITEM BELOW GIVES A PERFORMANCE STEP AND ASKS A QUESTION ABOUT IT. READ EACH PERFORMANCE STEP. THEN ANSWER THE QUESTION.

1. Performance step: Set MULTIMETER SELECTOR switch to AMP.
  - a. Which switch should you set? \_\_\_\_\_
  - B. What position should you set it to? \_\_\_\_\_
  
2. Performance step: Operate the CABLE CURRENT switch to ON.
  - a. Which switch should you set? \_\_\_\_\_
  - b. What position should you set it to? \_\_\_\_\_

3. Here are three performance steps: Step (1) Set POWER switch to ON.

Step (2) Set TALK-OFF-SIG switch to TALK.

Step (3) Set TALK-OFF-SIG switch to OFF.

- a. Which step tells you to operate the POWER switch? \_\_\_\_\_
- b. Step (2) tells you to set the \_\_\_\_\_ switch to \_\_\_\_\_.
- c. Is Step (2) the same as Step (3)? \_\_\_\_\_
- d. Pvt. Jones' instructor told him to do Step (2). Pvt. Jones set the TALK-OFF-SIG switch to TALK. Did he follow the instructions correctly? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 67.

Sometimes a switch or control must be operated for only a very short time. For example, you might have to push a switch or button, then let it go immediately. Another word for "let it go" is release. Here is a performance step of this kind:

Set the XYZ switch to GO and then release.

Another way to say the same thing is:

Set the XYZ switch to GO momentarily.

OR

Momentarily set the XYZ switch to GO.

Both of these mean the same thing as "Set the XYZ switch to GO and then release." You will often read performance steps with the word momentarily. Remember that momentarily means "for a short time."

Sometimes a performance step tells you to set a switch to one position, then to another. For example, you might have to set the PQR switch to position A, then to position B. The performance step may look like this:

Set PQR switch to A and B sequentially.

Sequentially means one after the other. So the performance step above says: Set PQR switch first to A, then to B.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 20

Each item below gives a performance step. Below it are three sentences. Read each sentence and decide whether it says the same thing as the performance step. If it says the same thing, write S in the space provided. If it says something different, write D.

1. Performance step: Operate the meter selector switch to OSC and DOUBLER sequentially.  
 a. Set the meter selector switch to OSC and DOUBLER at the same time.  
 b. Set the meter selector switch first to OSC. Then set the switch to DOUBLER.  
 c. Operate the meter selector switch to OSC and DOUBLER, then release.
  
2. Performance step: Momentarily operate the TALK-OFF-SIG switch to SIG.  
 a. Set the TALK-OFF-SIG switch to SIG, then release.  
 b. Operate the TALK-OFF-SIG switch to SIG sequentially.  
 c. Operate the TALK-OFF-SIG switch to SIG for a short time.

CHECK YOUR ANSWERS ON PAGE 67.

Now we will talk about controls like the volume control on your radio at home. When you listen to your radio, you turn the volume control until the sound level is just right. The volume control is not like a switch. It has more than just two, three or four positions. You just keep on turning it until you get the sound you want.

The equipment you use as a 31M also has controls which can be turned until a certain indication is obtained. Instructions for operating these controls usually tell you to adjust them until something happens. Adjust means move slowly (gradually).

For example, here is a performance step which tells you what to do with a control called an INPUT control:

Adjust INPUT control until transmitter meter reads in green band.

This performance step tells you to turn the INPUT control slowly and watch the transmitter meter at the same time. Keep turning the control until the meter needle is in the green band. When the meter needle is in the green band, stop turning the INPUT control.

So you see that adjusting a control always involves watching something (like a meter) at the same time. This means that you must pay attention to two things while making an adjustment. You must pay attention to the control, and you must pay attention to the meter (or indicator).

Here is a performance step that tells you what to do with a control called the CRL control:

Adjust the CRL control for a center hairline indication on the TEST ALIGN meter.

Here are some questions and answers about this performance step. Study them and make sure you understand them.

What control must you adjust? CRL control

Another term that means the same thing as adjust is turn slowly (or turn gradually)

What indicator do you have to watch while you are adjusting the control? the TEST ALIGN meter

How long do you have to keep on turning the control?  
Until the TEST ALIGN meter shows a center hairline indication

EXERCISE 21

1. Performance step: Adjust VOLTAGE control for maximum VOLTMETER reading.
  - a. What is the name of the control? \_\_\_\_\_
  - b. What indicator do you have to watch while you are turning the control? \_\_\_\_\_
  - c. When should you stop turning the control? \_\_\_\_\_  
\_\_\_\_\_
  
2. Performance step: Adjust AFC CORRECTION control through its range to obtain peak indication on multimeter.
  - a. What is the name of the control? \_\_\_\_\_
  - b. What indicator do you have to watch while you are turning the control? \_\_\_\_\_
  - c. When should you stop turning the control? \_\_\_\_\_  
\_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 68.

Another kind of performance step tells you to check the condition of a piece of equipment or indicator. Here is an example:

Check cables for cracks and breaks.

This performance step does not tell you to set a switch or adjust a control. It tells you to examine something (cables) to see what condition they are in. Check means examine. Here is another performance step about checking something:

Check to see that the meter reading is between 10 and 20.

This tells you to examine the meter and see whether the meter reading is between 10 and 20.

Another term that means about the same thing as "check to see" is insure. Sometimes, you will read a performance step like:

Insure that all wires are tight.

This means the same thing as:

Check to see that all wires are tight.

Another word that is very similar to check is monitor. Monitor means check or watch the operation of a piece of equipment without disturbing it. Here is an example of a performance step using the word "monitor":

Monitor all 12 channels to insure that the audio signals are clear.

Here are two other sentences which say the same thing:

Check all 12 channels to insure that the audio signals are clear.

Insure that the audio signals are clear on all 12 channels.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

## EXERCISE 22

Each item below has a performance step, followed by some sentences. Some of the sentences mean the same thing as the performance step. Some do not. For each one, write S if it says the same thing and D if it says something different.

1. Performance step: Check to see that CHANNEL indicator is within 10 channels of the assigned channel number.

Sentences to compare with the performance step:

- a. Insure that CHANNEL indicator is within 10 channels of the assigned channel number.
- b. Monitor the CHANNEL indicator to see that it is within 10 channels of the assigned channel number.
- c. Set the CHANNEL indicator to within 10 channels of the assigned channel number.
- d. Insure that CHANNEL indicator reading is 10 channels or less from the assigned channel number.

2. Performance step: Check for a hairline indication on the TEST ALIGN meter.

Sentences:

- a. Operate the TEST ALIGN meter to a hairline indication.
- b. Monitor the TEST ALIGN meter for a hairline indication.
- c. Insure that TEST ALIGN meter shows a hairline indication.

CHECK YOUR ANSWERS ON PAGE 69.

In this section, you learned how to read various kinds of performance steps. You learned the meanings of words and terms like:

Set a switch to a position.  
Operate a switch to a position.

Adjust a control.

Check something.  
Insure that something happens.  
Monitor something.

You also learned the meanings of words like momentarily and sequentially, which sometimes appear in performance steps.

The words that are underlined above are used very often in performance steps. So it is very important for you to understand them. However, sometimes other kinds of words are used too. The exercise below will give you practice reading some other kinds of performance steps.

#### EXERCISE 23

1. Rotate the mast until the antenna is oriented toward the distant terminal.

Which of the following says the same thing?

- a. Turn the mast until the antenna points toward the distant terminal.
- b. Lower the mast until the antenna points toward the distant terminal.
- c. Raise the mast until the antenna points toward the distant terminal.

2. Refer uncorrectable defects to a higher level of maintenance.

Which of the following says the same thing?

- a. Repair uncorrectable defects to a higher level of maintenance.
- b. Look up defects you can't fix in a higher level of maintenance.
- c. Tell someone at a higher level of maintenance about defects you can't fix.

3. Attach red guy to the center mast section.

Which of the following says the same thing?

- a. Detach the red guy to the center mast section.
- b. Wrap the red guy around the center mast section.
- c. Connect the red guy to the center mast section.

4. Determine the correct position for Switch X.

Which of the following says the same thing?

- a. Set Switch X to the correct position.
- b. Find out the correct position for Switch X.
- c. Adjust Switch X until it is in the correct position.

5. Observe safety regulations while installing receiver.

Which of the following says the same thing?

- a. Follow the safety regulations while you are setting up the receiver.
- b. Look at the safety regulations. Then install the receiver.
- c. Set up the receiver. Then observe safety regulations.

6. Insert the cable in PCM-IN cable connector of the receiver.

Which of the following says the same thing?

- a. Take the cable off the PCM-IN cable connector of the receiver.
- b. Place the cable into the connector labeled PCM-IN on the receiver.
- c. Place the PCM-IN connector cable into the receiver.

CHECK YOUR ANSWERS ON PAGE 70.

ANSWER KEYS TO EXERCISES IN UNIT I, LESSON 2

ANSWERS TO EXERCISE 1

1. You should have listed two of the following:

The equipment components.  
What the equipment does.  
The name of each component.  
The names of knobs and switches.  
What the knobs and switches do.  
The names of dials and meters.  
What the dials and meters do.  
How much power the equipment uses.

2. You should have listed one of the following:

The location in which the task is performed.  
How much help the operator can have.  
Tools and references that can be used.

3. You should have listed one of the following:

The time limits for doing the task.  
How many mistakes are allowed.  
How performance will be scored.

4. The correct answer is:

c. instructions

- |                  |               |
|------------------|---------------|
| 5. <u>(2)</u> a. | <u>(4)</u> f. |
| <u>(3)</u> b.    | <u>(2)</u> g. |
| <u>(1)</u> c.    | <u>(1)</u> h. |
| <u>(1)</u> d.    | <u>(4)</u> i. |
| <u>(2)</u> e.    | <u>(3)</u> j. |

---

CONTINUE WITH THE LESSON.

ANSWERS TO EXERCISE 2

1. a. information
2. communication

Did you answer the questions correctly? If you did, it is because you understood the sentence about communication.

---

ANSWERS TO EXERCISE 3

1. d. audio frequency.
  2. sound waves.
- 

ANSWERS TO EXERCISE 4

1. b.
  2. increased.
  3. d.  
Explanation: The sentence tells about amplification of sound waves, not radio waves.
-

ANSWERS TO EXERCISE 5

1. b.
  2. amplified. (Notice that the sentence says that amplified radio waves travel over great distances.)
  3. a. RF stands for radio frequency.
- 

ANSWERS TO EXERCISE 6

1. b. The transmitter sends messages.
  2. a. Your radio receives messages.
  3. If you forget what a term means, you should ask your instructor or look it up. You probably remember that RF was defined in a sentence you read earlier. You can go back to that sentence to find the meaning.
- 

ANSWERS TO EXERCISE 7

1. generate produce  
convert switch or change to something else, change to another form.

If you used different words in any of your definitions and you are not sure if they are correct, have your instructor check them. If the words are new to you, study the definitions until you know them.

2. b.
-

ANSWERS TO EXERCISE 8

1. process means, method, way of doing something.  
modify change

If you used different words in any of your definitions and you are not sure if they are correct, have your instructor check them. If any of the words are new to you, study the definitions until you know them.

2. b.

Note: This is a difficult sentence to read. If you chose the wrong answer to Question No. 2, or if you were not sure of your answer, go over the sentence a few more times before going on with the lesson.

---

ANSWERS TO EXERCISE 9

Modulating equipment changes sound waves to a form that can be carried by radio waves. Modulated radio waves are radio waves which carry a message.

---

ANSWERS TO EXERCISE 10

1. Extract: remove, take out
  2. b.
  3. At the receiver end, modulating equipment is used to extract  
the message from the radio waves and convert it to  
sound.
- 

ANSWERS TO EXERCISE 11

1. various several kinds  
enable make possible, permit, allow

If you used different words in any of your definitions and you are not sure if they are correct, have your instructor check them. If these words are new to you, study the definitions above until you know them.

2. d.
3. a.
4. d.

IF YOU ARE NOT SURE ABOUT ANY OF THE MATERIAL SO FAR,  
NOW IS A GOOD TIME TO REVIEW.

IF YOU ARE SURE THAT YOU UNDERSTAND THE MATERIAL SO FAR,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 12

1. S.
2. D. The original sentence says that the uniforms are designed to fit soldiers well, not that they fit designers well.
3. S. "Stylish" means the same thing as "fashionable."
4. D. The original sentence says nothing about the cost of Army uniforms.
5. D.
6. S. "Get too hot" means the same thing as "overheat."
7. S.
8. D. The original sentence does not say that overheating is the only reason for turning the engine off.
9. ASK YOUR INSTRUCTOR TO READ YOUR SENTENCE IN NO. 9  
AND TELL YOU IF IT IS O.K.

---

THEN CONTINUE WITH THE LESSON.

ANSWERS TO EXERCISE 13

1. D. The sample sentence says that most, but not all, the modulating equipment is PCM equipment.
2. S.
3. S.
4. S. Notice that RF waves are the same as radio waves, and produced is the same as generated.
5. S. Sent means the same as transmitted, and strengthened means the same as amplified.
6. D. Sentence 6 says that radio waves are first transmitted, then amplified. However, the sample sentence says that radio waves are first amplified, then transmitted.
7. D. Sentence 7 says that the oscillator amplifies radio waves. The sample sentence says that the oscillator generates radio waves, not that it amplifies them.
8. S.

HAS YOUR INSTRUCTOR CHECKED YOUR SENTENCE IN 9?  
IF NOT, HAVE IT DONE NOW.

HAVE YOU UNDERSTOOD ALL THE MATERIAL SO FAR?  
IF NOT, NOW IS A GOOD TIME TO REVIEW.

IF YOU UNDERSTAND EVERYTHING SO FAR,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 14

1. The function of the transmitter antenna is to radiate signals into space toward the distant receiver. At the receiver, another antenna picks up or intercepts the signal.
2. (1) The antenna mast must be vertical.  
(2) The antenna must be oriented toward the distant receiver (or transmitter).  
(3) The antenna must be located on a high, clear site.
3. c.
4. a.
5. b.

IF YOU HAD TROUBLE WITH THIS PASSAGE,  
REVIEW ALL OF SECTION B.

IF YOU ARE CONFIDENT ABOUT YOUR ABILITY TO READ SENTENCES ABOUT  
RADIO AND RADIO EQUIPMENT, GO TO THE NEXT SECTION.

ANSWERS TO EXERCISE 15

1. operable AN/TRC-113(V), basic issue tools, test equipment, safety equipment.
2. TM 11-5820-562-14.
3. a tactical situation.
4. a multichannel systems diagram.
5. test equipment.
6. a flashlight.
7. Yes. (The conditions say that the task is performed under all weather conditions.)
8. Convoy commander.

---

CONTINUE WITH THE LESSON.

ANSWERS TO EXERCISE 16

1. Yes. 55 minutes is within 1 hour, so the standards are met.
2. No. If Pvt. Brown left out one step, she did not complete the installation within 1 hour.

---

CONTINUE WITH THE LESSON.

ANSWERS TO EXERCISE 17

1. All corrected faults and all uncorrected faults.
2. No. She did not record the corrected faults on DA Form 2404.
3. No. He did not correct the faults he was authorized to correct.

IF YOU ANSWERED ANY OF THESE QUESTIONS INCORRECTLY,  
GO OVER THEM AND MAKE SURE YOU UNDERSTAND THEM BEFORE YOU GO ON.

---

ANSWERS TO EXERCISE 18

1. 30 minutes.
2. No. ( $7^\circ$  is not within  $5^\circ$ ).
3. When the installation is complete, the antenna should be 35 feet high, and the mast should be straight and vertical.
4. 12- or 24-channel nonsecure.
5. 30 minutes.
6. Ground it.
7. 35,000 meters.
8. Yes. (8520 meters is within 100 meters of 8608 meters.)

IF YOU ARE NOT SURE ABOUT ANY OF THIS MATERIAL,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU ARE SURE THAT YOU UNDERSTAND ALL THESE ANSWERS,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 19

1. a. MULTIMETER SELECTOR switch.  
b. AMP.
2. a. CABLE CURRENT switch.  
b. ON.
3. a. Step (1).  
b. Step (2) tell you to set the TALK-OFF-SIG switch to TALK.  
c. No. Step (2) tells you to set the switch to TALK. But Step (3) tells you to set the switch to OFF.  
d. Yes

---

CONTINUE WITH THE LESSON.

ANSWERS TO EXERCISE 20

1. D a. Explanation: Sequentially does not mean "at the same time." It means one after the other.  
S b.  
D c. If you got this sentence wrong, you probably confused sequentially with momentarily. They do not mean the same thing. Review their meanings by re-reading the material just before this exercise.
2. S a.  
D b. Sequentially does not mean the same thing as momentarily. Review the following definitions:  
Sequentially: one after the other.  
Momentarily: for a short time.  
S c.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON WITH THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 21

1. a. VOLTAGE control
- b. VOLTMETER
- c. When the VOLTMETER shows a maximum reading.

Remember: Maximum reading means the highest reading that is possible.

2. a. AFC CORRECTION control
- b. Multimeter
- c. When the multimeter shows a peak reading.  
(Peak means about the same thing as maximum.)

---

GO ON WITH THE LESSON.

ANSWERS TO EXERCISE 22

1. S a. Explanation: "Insure" means the same thing as "Check to see."
- S b. Explanation: "Monitor" also means the same thing as "Check to see."
- D c. Explanation: "Set" does not mean the same thing as "Check to see."
- S d. Explanation: "Within 10 channels of the assigned channel number" means the same thing as "10 channels or less from the assigned channel number."
2. D a. Explanation: "Operate" does not mean the same thing as "Check."
- S b. Explanation: "Monitor" means the same thing as "Check."
- S c. Explanation: "Insure" also means the same thing as "Check."

IF YOU MISSED ANY OF THE QUESTIONS ABOVE,  
RE-READ THE ANSWERS AND EXPLANATIONS CAREFULLY.  
IF YOU STILL DO NOT UNDERSTAND, ASK YOUR INSTRUCTOR FOR HELP.

---

IF YOU UNDERSTAND ALL THE MATERIAL, CONTINUE WITH THE LESSON.

ANSWERS TO EXERCISE 23

1. a. Rotate means turn.  
Orient means point to.
2. c. Refer to a higher level of maintenance means "Tell someone at a higher level of maintenance."  
Uncorrectable defects are defects you can't fix.
3. c. Attach means connect.
4. b. Determine means find out.
5. a. Observe safety regulations means "Follow safety regulations."
6. b. Insert means "place into."

REVIEW ANY OF THE QUESTIONS THAT YOU MISSED.

MAKE SURE THAT YOU KNOW THE MEANINGS OF ALL THE WORDS  
THAT ARE UNDERLINED.

WHEN YOU ARE FINISHED, TELL YOUR INSTRUCTOR THAT YOU ARE READY  
FOR CHECKPOINT 2, FORM A IN UNIT I - LESSON 2.

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT I**  
**READING COMPREHENSION**  
**LESSON 3**  
**READING NEGATIVE SENTENCES**

**PREREQUISITE:** Unit 1, Lesson 2  
**MATERIALS REQUIRED:** None  
**TYPE OF LESSON:** Self-Paced

UNIT I. READING COMPREHENSION

Lesson 3. Reading Negative Sentences

INTRODUCTION:

In the 31M10 course and on the job, you often read instructions that tell you how to perform a task. Step-by-step instructions are called performance steps. Sometimes, performance steps tell you what you should not do, instead of what you should do. Performance steps which include terms like not, none, and no can be hard to understand. This lesson is about reading these kinds of performance steps.

LEARNING GOALS:

In this lesson you will learn to read performance steps in negative form, that is, performance steps with words like not, none, and no.

On the pages that follow, you will find material to read and questions to answer. Most of the time, you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

When you finish the lesson, your instructor will give you a checkpoint. When you finish the checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

GO ON TO THE NEXT PAGE TO BEGIN THE LESSON.

This lesson will teach you methods for understanding particular kinds of sentences called negative sentences. These are sentences with terms like no, not, cannot, and fail to. Sometimes, performance steps in TMs and FMs are in negative form. They tell you what you should not do instead of what you should do. Or they will tell you what will happen if you do not do something instead of what will happen if you do something.

Even though there are some special rules to use for negative sentences, you should continue to use the five guidelines you learned in Lesson 2. These guidelines are useful for all kinds of sentences, including negative sentences. The five guidelines are listed below. Remember to use them wherever they will help you to understand a sentence.

#### Five Guidelines for Understanding Sentences

1. Pay close attention to new terms and their definitions.
2. Do not skip over terms you do not understand. Find out what they mean before you go on.

If you do not understand a sentence the first time you read it, do the following:

3. Read the sentence again, slowly and carefully.
4. Read the sentence out loud.
5. Form an image (a picture in your mind) of what the sentence says.

Let us add one more guideline:

6. Read sentence carefully so that you do not skip over words like "no" or "not." These are short words, but they are very important for understanding the meaning of the sentence.

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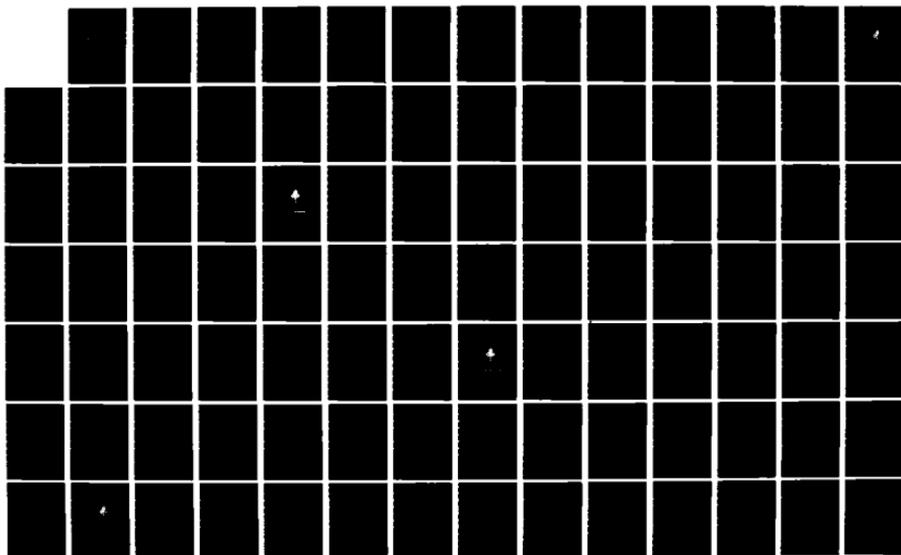
31M10 FUNCTIONAL BASIC SKILLS EDUCATION PACKAGE(U)  
APPLIED SCIENCE ASSOCIATES INC PITTSBURGH PA SEP 82  
DABT60-81-C-0006

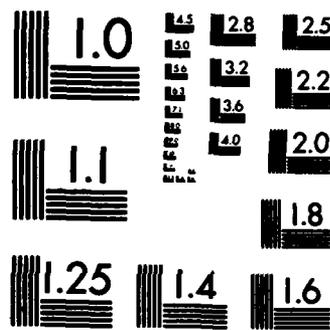
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MICROCOPY RESOLUTION TEST CHART  
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Here are some examples of performance steps that tell you what should not happen instead of what should happen.

1. Do not hold START-STOP switch in START position longer than 15 seconds.
2. The load meter should not exceed 100% in any position of the current selector switch.
3. Dig the ditch neither wide nor deep.
4. Insure that the antenna mast is no more than 5° from the vertical.
5. Failure to set the control correctly results in no signal being transmitted.

Let us take some of the examples and analyze them.

Example 1: Do not hold START-STOP switch in START position longer than 15 seconds.

When a sentence starts with "Do not," it means that you must not do what follows the word "not." In this sentence, the rest of the sentence after "not" says:

"hold START-STOP switch in START position longer than 15 seconds."

This is what you should not do. Longer than 15 seconds is a no-no. But 15 seconds or less is all right.

Here are some questions and answers about Example 1.

READ THE QUESTIONS AND ANSWERS CAREFULLY.

MAKE SURE THAT YOU UNDERSTAND THEM.

Question: Is it all right to hold the START-STOP switch in the START position for less than 15 seconds?

Answer: Yes. The performance step says not to hold it more than 15 seconds. Less than 15 seconds is all right.

Question: Is it all right to hold the switch for just 15 seconds?

Answer: Yes. The performance step says not to hold it more than 15 seconds. Just 15 seconds is all right.

Question: How long should the START-STOP switch be held in the START position?

Answer: 15 seconds or less.

Let us try Example 3.

Dig the ditch neither wide nor deep.

When a sentence has the words "neither...nor" in it, it means that you should not do what follows the "neither." You should not dig the ditch wide, and you should not dig it deep.

READ THE FOLLOWING QUESTIONS AND ANSWERS ABOUT EXAMPLE 3 CAREFULLY.

Question: Should the ditch be wide?

Answer: No. It should not be wide. It should be narrow.

Question: Should the ditch be shallow?

Answer: Yes. It should not be deep. This means that it should be shallow.

Question: How should you dig the ditch?

Answer: Dig the ditch narrow and shallow.

IF YOU DO NOT UNDERSTAND ANY OF THESE EXAMPLES,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU ARE SURE THAT YOU UNDERSTAND THE EXAMPLES,  
ANSWER THE FOLLOWING QUESTIONS.

EXERCISE 1

Each question below gives a performance step. Answer the questions about each performance step.

1. The load meter should not exceed 100% in any position of the current selector switch. (Remember: "Exceed" means "more than.")
  - a. Should the load meter be more than 100%? \_\_\_\_\_
  - b. Is it all right if the load meter is exactly 100% in all positions of the current selector switch? \_\_\_\_\_
  - c. Is it all right if the load meter is less than 100% in all positions of the current selector switch? \_\_\_\_\_
  - d. Is it all right if the load meter is 100% in one position and less than 100% in the rest? \_\_\_\_\_
  - e. Is it all right if the load meter is 110% in one position and 90% in the rest? \_\_\_\_\_
  
2. Insure that the antenna mast is no more than 5° from the vertical.
  - a. Is it all right if the antenna mast is more than 5° from the vertical? \_\_\_\_\_
  - b. Is it all right if the antenna mast is just 5° from the vertical? \_\_\_\_\_
  - c. Is it all right if the antenna mast is less than 5° from the vertical? \_\_\_\_\_

3. Failure to set the control to -10 results in no signal being transmitted.

a. What happens if you do not set the control to -10?

---

b. No signal will be transmitted if you (Choose one):

- (1) Set the control to -10.
- (2) Do not set the control to -10.

c. If you want to transmit a signal, what should you do to the control? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 12.

When you read an instruction that tells you what you should not do, you must figure out what the instruction tells you to do. Some examples are given below. Read them slowly and carefully, and be sure that you understand them.

1. Do not allow angle to exceed  $15^\circ$ .

How big should the angle be?

- a. Exactly  $15^\circ$ , no more, no less.
- b. More than  $15^\circ$ .
- c.  $15^\circ$  or less.
- d.  $15^\circ$  or more.

The answer is c. The angle should not exceed  $15^\circ$ . It should not be more than  $15^\circ$ . An angle that does not exceed  $15^\circ$  means  $15^\circ$  or less.

2. No control should be adjusted to more than 115 volts.

This means that:

- a. All controls should be adjusted to 115 volts or less.
- b. At least one of the controls should be adjusted to less than 115 volts.
- c. Only one control should exceed 115 volts.

a is correct. If no control should be more than 115 volts, then all controls should be 115 volts or less.

3. Insure that bottom of trailer is not lower than 3 feet above the ground.

How high above the ground should the bottom of the trailer be?

- a. Less than 3 feet above the ground.
- b. Exactly 3 feet above the ground.
- c. 3 feet or more above the ground.

The answer is c. "Not lower than 3 feet above the ground" means "3 feet or higher above the ground."

4. Any corrective actions that cannot be performed with basic issue tools should be referred to a higher level of maintenance.

What should be referred to a higher level of maintenance?

- a. All corrective actions.
- b. Basic issue tools.
- c. Corrective actions that need basic issue tools.
- d. Corrective actions that need special tools.

The answer is d. The performance step tells you to refer corrective actions that cannot be done with basic issue tools. This means actions that need special tools.

DO YOU UNDERSTAND ALL THESE EXAMPLES?  
IF NOT, ASK YOUR INSTRUCTOR FOR HELP.

The rest of this lesson gives you practice with instructions that tell you what not to do, or that include words like none, no, and cannot. Select your answers carefully, then check them on page 13.

## EXERCISE 2

Each question below gives a performance step. Answer the question which follows.

1. Check reading in all three positions of AMMETER to insure no operation in excess of 100%.

Which of the following sets of AMMETER readings is all right?

- a. Position 1: 110%  
Position 2: 80%  
Position 3: 90%
- b. Position 1: 100%  
Position 2: 90%  
Position 3: 100%
- c. Position 1: 110%  
Position 2: 105%  
Position 3: 120%

2. Insure that the video cables are not connected to the radio during alignment.

You are about to perform an alignment. The video cables are not connected to the radio. What should you do?

- a. Go ahead with the alignment immediately.
- b. Connect the cables before doing the alignment.

3. Failure to connect the cable results in not getting accurate readings on the ammeter.

In order to get accurate readings on the ammeter, you must;

- a. connect the cable.
- b. not connect the cable.
- c. fail to connect the cable.

4. Select an antenna site that will not interfere with field wires, signal cables, or the movement of personnel.

Which of the following sites should you select?

- a. Site A: There are no wires or cables nearby. People do not need to go through this site to get from one place to another.
- b. Site B: Field wires and cables are strung along the ground. People walk through this site to get from one place to another.
- c. Site C: Field wires and cables are strung along the ground. People do not need to go through this site to get from one place to another.
- d. Site D: There are no wires or cables nearby. People walk through this site to get from one place to another.

5. If voltmeter fails to show voltage, momentarily depress field flash switch.

The voltmeter reading is zero. What should you do?

- a. Nothing.
- b. Set the voltmeter to a higher reading.
- c. Depress the field flash switch.

6. Do not press the button longer than 30 seconds.

How long should you press the button?

- a. Longer than 30 seconds.
- b. 30 seconds or more.
- c. Exactly 30 seconds - no more, no less.
- d. 30 seconds or less.

7. If the meter reading is not within  $10^\circ$  of center, readjust the setting of the control.

The meter reading is  $5^\circ$  from the center. Should you readjust the setting of the control?

- a. Yes
- b. No

CHECK YOUR ANSWERS ON PAGE 13.

ANSWER KEYS TO EXERCISES IN UNIT I, LESSON 3

Unit I  
Lesson 3

11

ANSWERS TO EXERCISE 1

1.
  - a. No. "Exceed 100%" means "be more than 100%." So when the performance step says that the meter should not exceed 100%, this means the meter should not be more than 100%.
  - b. Yes. Exactly 100% does not exceed 100%. As long as the reading is not over 100%, it is all right.
  - c. Yes. 100% or less is all right
  - d. Yes. As long as none of the positions has a reading more than 100%, it is OK.
  - e. No. 110% is more than (exceeds) 100%. The load meter should not exceed 100% in any position. So this is not all right.
  
2.
  - a. No. The antenna should not be more than 5° from the vertical.
  - b. Yes. 5° or less is all right.
  - c. Yes.
  
3.
  - a. No signal is transmitted.
  - b. (2). No signal will be transmitted if you do not set the control to -10.
  - c. Set the control to -10.

STUDY THE ANSWERS CAREFULLY.  
IF YOU DO NOT UNDERSTAND ANY OF THESE ANSWERS,  
ASK YOUR INSTRUCTOR FOR HELP.

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OTHERWISE, CONTINUE WITH THE LESSON.

ANSWERS TO EXERCISE 2

1. b. Only choice b has no readings that are more than (in excess of) 100%. (Note: A reading of exactly 100% is all right.)
2. a. The video cables are not supposed to be connected to the radio during alignment. So it is O.K. to go ahead with the alignment.
3. a. If you do not connect the cable, you will not get accurate readings. So to get accurate readings, you must connect the cable.
4. a. Only Site A does not interfere with wires, cables or the movement of personnel. ("Movement of personnel" means people moving about.)
5. c. If the voltmeter reading is zero, it is failing to show voltage. So you should momentarily depress the flash switch.
6. d. Not longer than 30 seconds means 30 seconds or less.
7. b. You should readjust the setting if the reading is not within 10°. 5° is within 10°. So you should not readjust the setting.

IF YOU DO NOT UNDERSTAND ANY OF THESE ANSWERS,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS LESSON,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A  
IN UNIT I - LESSON 3.

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT I**  
**READING COMPREHENSION**

**LESSON 4**  
**READING SENTENCES WITH DEPENDENT CLAUSES**

**PREREQUISITE:** Unit 1, Lesson 2  
**MATERIALS REQUIRED:** None  
**TYPE OF LESSON:** Self-Paced

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STUDENT GUIDE

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UNIT I. READING COMPREHENSION

Lesson 4. Reading Sentences with Dependent Clauses

INTRODUCTION:

In the 31M course and on the job, you have to read many kinds of sentences that tell you how to do your job. Some of the sentences are long and hard to read. Sentences with dependent clauses are often long sentences. Clauses are parts of sentences starting with words like "when," "if," "until," "who," and "which." This lesson will show you some things you can do with these sentences to make them easier to read. It will also give you practice reading and understanding sentences with dependent clauses.

LEARNING GOALS:

In this lesson, you will learn to:

- A. Read sentences with dependent clauses that begin with "when," "if," "as" or "while," and "until." (p. 2)
- B. Read sentences with dependent clauses that begin with "who" or "whom," "which," "that," and "where." (p. 10)

On the pages that follow, you will find material to read and questions to answer. Most of the time, you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

When you finish the lesson, your instructor will give you a checkpoint. When you finish the checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

GO ON TO THE NEXT PAGE TO BEGIN THE LESSON.

## Section A

### Reading Sentences with Dependent Clauses That Start with When, As, While, Until, and If

Sentences with dependent clauses are not new to you. You have often read and heard them before. Not all sentences with dependent clauses are hard to read. Here are some that you will probably have no trouble reading:

Sentence A: When you finish your homework, clean your room.

Sentence B: Let out the clutch as you feed gas to the engine.

Sentence C: Hold the button until the motor starts.

Sentence D: If the engine overheats, turn it off.

Sometimes, however, sentences with dependent clauses are very long. Sometimes, they have two or more dependent clauses in them. Sentences that are very long and sentences with one or more dependent clauses can be hard to read.

This lesson will teach you some methods you can use to understand sentences with dependent clauses. In addition, you should continue to use the five guidelines you learned in Lesson 2. These guidelines are useful for all kinds of sentences, including sentences with dependent clauses. The five guidelines are repeated below. Remember to use them whenever they will help you to understand a sentence.

#### Five Guidelines for Understanding Sentences

1. Pay close attention to new terms and their definitions.
2. Do not skip over terms you do not understand. Find out what they mean before you go on.

If you do not understand a sentence the first time you read it, do the following:

3. Read the sentence again, slowly and carefully.
4. Read the sentence out loud.
5. Form an image (a picture in your mind) of what the sentence says.

There are several things you can do to make sentences with dependent clauses easier to read. First, we will show these things with sentences A to D. Then we will do them with longer sentences. You will have a chance to practice doing them too.

Sentences with one dependent clause can be divided into two parts. One part is the dependent clause. The other is the main part of the sentence - the main clause.

If the sentence begins with "when," "if," "as," "while," or "until," the dependent clause is at the beginning. If the "when" "if," "as," "while," or "until" is somewhere near the middle, the sentence begins with the main clause, and the dependent clause is at the end.

Sentences A and D start with "when" and "if." So the dependent clause is first in these sentences. The main clause starts after the comma. Here is how Sentences A and D divide into two parts:

A: When you finish your homework, | clean your room.  
DEPENDENT CLAUSE | MAIN CLAUSE

D: If the engine overheats, | turn it off.  
DEPENDENT CLAUSE | MAIN CLAUSE

In Sentences B and C, the words "as" and "until" are in the middle. In these sentences, the main clause comes first. The dependent clause begins with "as" or "until." Here is how Sentences B and C divide into two parts:

B. Let out the clutch | as you feed gas to the engine.  
MAIN CLAUSE | DEPENDENT CLAUSE

C. Hold the button | until the motor starts.  
MAIN CLAUSE | DEPENDENT CLAUSE

You can tell that these are the right places to divide the sentences by reading them out loud. If you pause (stop momentarily) at the dividing line, the sentence still sounds right. But if you pause anywhere else in the sentence, it does not sound right.

TRY IT YOURSELF. DO THE FOLLOWING:

1. Read Sentences A to D out loud, pausing at the vertical line.

Do the sentences sound right? \_\_\_\_\_

2. Read Sentences A to D out loud again. This time, pause somewhere else in each sentence, and do not pause at the vertical line.

Do the sentences sound right? \_\_\_\_\_

Your answer to question 1 should be Yes. And your answer to question 2 should be No.

Sometimes, a sentence contains more than one dependent clause. Then you can divide it into three or more parts. Here is an example:

There is a malfunction		if generator voltage drops,	
MAIN CLAUSE		DEPENDENT CLAUSE	
when load is applied or increased.			
DEPENDENT CLAUSE			

Read the sentence out loud. Be sure to pause at the vertical lines.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

## EXERCISE 1

Here are some sentences with dependent clauses. Draw a vertical line to divide each sentence into parts, as we did with the sentences on the previous page. Label the MAIN CLAUSE and each DEPENDENT CLAUSE.

1. Stop operation immediately if a deficiency is noted during operation.
2. The voltmeter reading will change as the variable resistor knob is turned.
3. Turn the variable resistor knob until the required voltage is attained.
4. If the polarization must be changed, detach the mounting bracket from the horn.
5. Gradually open choke with choke control lever as engine attains operating temperature.
6. If engine does not start, wait one minute until the engine cools off. (Hint: This sentence has two dependent clauses.)
7. Place air intake shutter in the summer position when temperature is above 32°F (0°C).

CHECK YOUR ANSWERS ON PAGE 16.

Sometimes, if you are having trouble reading a sentence with a dependent clause in it, try doing this:

1. Divide the sentence into parts.
2. Read each part by itself several times. Read the main clause first, then each dependent clause. Make sure you understand each part.
3. Then put the whole sentence together again.

Let us try this with the following sentence about raising an antenna:

If the wind is strong, station at least one man to maintain adequate tension on the windward upper guy to keep the mast vertical while it is being raised.

This sentence has two dependent clauses, one at the beginning and one at the end, so it has three parts. Let us use vertical lines to divide the dependent clauses from the main clause:

If the wind is strong,	
DEPENDENT CLAUSE	
station at least one man to maintain adequate tension on the windward upper guy to keep the mast vertical	
MAIN CLAUSE	
while it is being raised.	
DEPENDENT CLAUSE	

If you are having trouble understanding this sentence, work on the main clause first. The main clause tells you to:

station at least one man	This means: Place at least one man.
to maintain adequate tension on the windward upper guy	This means: to keep the upper guy, which is toward the wind, tight enough.
to keep the mast vertical	This means: to keep the mast straight up and down.

So the main part of the sentence says:

Place at least one man to keep the upper guy, which is toward the wind, tight enough to keep the mast straight up and down.

The two dependent clauses give you information about when you should do what the main clause says. You should do what the main clause says

When: If the wind is strong (you do not need to do what the main clause says if the wind is not strong).

When: While it (the mast) is being raised.

Now, you should be able to put the whole sentence together and understand what it says.

When you understand a sentence, you should be able to answer questions about it. Here are some questions based on the sentence about raising an antenna. See if you can answer them. Look back at the sentence on the previous page whenever you need to.

#### EXERCISE 2

1. What should you do if the wind is strong?
  - a. You should not raise the antenna at all, because it may blow down.
  - b. You should use a larger team to raise the antenna.
  - c. You should have someone keep the windward upper guy tight.
  
2. Which words in the sentence mean the same thing as "keep sufficient tightness"? \_\_\_\_\_
  
3. You need to keep someone stationed by the windward upper guy until \_\_\_\_\_
  
4. Is it all right to station two people by the windward upper guy? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 17.

### EXERCISE 3

Each question below gives you a sentence to read and a question to answer. Make sure you understand each sentence before you try to answer the question. If you have trouble understanding the sentence, divide it into parts and figure out each part. Then put the whole sentence together again. In addition, use the five guidelines from Lesson 2 whenever they will help you.

1. If engine does not start, allow a cooling off period of one minute before attempting to restart.

Which of the following says the same thing?

- a. After you start the engine, let it cool off for one minute.
- b. Never start any engine without waiting for one minute.
- c. The engine should cool off for one minute if it does not start. Then you can try again.

2. Gradually open choke with choke control lever as engine attains operating temperature.

Which of the following says the same thing?

- a. While the engine is warming up, move the choke control lever slowly to open the choke.
- b. Opening the choke with the choke control lever enables the engine to reach operating temperature.
- c. Attain engine operating pressure as you gradually open choke and open choke control lever.
- d. Gradually choke the control lever and the engine will attain operating temperature.

3. There is a malfunction if generator voltage drops when load is applied or increased.

You apply a load. The generator voltage drops. Is something wrong? \_\_\_\_\_

4. Use the clamps to adjust the tension of the three middle guys until the lower half of the mast is straight.

How long should you use the clamps? \_\_\_\_\_

5. If high reflected power is indicated on the receiver meter or transmitter meter, and if adjustment of the control does not reduce the meter indications, check the entire antenna system for poor connections, broken cables, and similar defects.

Your receiver and transmitter meters show high reflected power. What should you do next?

- a. Check the antenna system.
- b. Adjust the control.
- c. Indicate the receiver and transmitter meters.
- d. Fix the poor connections.

CHECK YOUR ANSWERS ON PAGE 17.

Section B

Reading Sentences with Dependent Clauses That Start with  
Who or Whom, Which, That, and Where

Some kinds of dependent clauses start with who (or whom), which, that, or where. Some are easy to read and others are hard, especially if they are very long. Here are some examples:

Sentence A: Give the report to the sergeant who is in charge.

Sentence B: The TM has five chapters, one of which deals with maintenance.

Sentence C: He is the person to whom you have to talk.

Sentence D: The meter indication should be at least 20, except for channels 1 thru 20, where the indication should be at least 16.

Sentence E: The girl whom I met yesterday is joining the Army.

Just like you already learned, these sentences can be divided into parts: main clause and dependent clause. For example, here is Sentence A:

A: Give the report to the sergeant, | who is in charge.  
MAIN CLAUSE | DEPENDENT CLAUSE

I 4-11

And here is Sentence D:

D: The meter indication should be at least 20, except for channels 1 thru 20, |  
MAIN CLAUSE

where it should be at least 16.  
DEPENDENT CLAUSE

But there are two differences:

1. Sometimes, the dependent clause is in the middle of the sentence, instead of the beginning or end.

An example is Sentence E:

E: The girl, | whom I met yesterday, | is joining the Army.  
FIRST PART OF MAIN CLAUSE      DEPENDENT CLAUSE      REST OF MAIN CLAUSE

As you can see, the main clause is: The girl is joining the Army.

And the dependent clause tells which girl is joining the Army: the girl whom I met yesterday.

2. Sometimes, the dependent clause begins with "of which" or "of whom," or "to which" or "to whom," or "one of which" or "one of whom," or something like that. Sentences B and C are examples:

B: The TM has five chapters, | one of which deals with  
MAIN CLAUSE      DEPENDENT CLAUSE  
maintenance.

C: He is the person | to whom you have to talk.  
MAIN CLAUSE      DEPENDENT CLAUSE

Otherwise sentences like these are similar to those you read in Section A. As before, the vertical lines mark places where you can pause while reading the sentences.

READ SENTENCES A TO E OUT LOUD, AS FOLLOWS:

1. Pause at the vertical line or lines in each sentence.
2. Pause somewhere else in each sentence, but not at the vertical line.

The sentences should sound right when you pause at the vertical lines, but not when you pause somewhere else.

You can use the same rules to help you understand these sentences too.

Here are the rules:

1. Divide the sentence into parts.
2. Read each part by itself several times. Read the main clause first, then each dependent clause. Make sure you understand each part.
3. Then put the whole sentence together again.

Let us try this with Sentence D: The sentence is repeated below:

The meter indication should be at least 20, except for channels 1 thru 20,

MAIN CLAUSE

where it should be at least 16.

DEPENDENT CLAUSE

Read the main clause several times. It means:

The reading on the meter should be 20 or more on all channels except channels 1 thru 20.

The dependent clause tell you what the meter reading should be on channels 1 thru 20.

On channels 1 thru 20, the reading should be 16 or more.

So the whole sentence says:

On channels 1 thru 20, the reading on the meter should be 16 or more. On all other channels, it should be 20 or more.

EXERCISE 4

If you understand sentences, you can answer questions about them. Here are some questions based on Sentence D. See if you can answer them.

1. On channel 15, the meter indication is 18. Is this all right?

\_\_\_\_\_

2. On channel 40, the meter indication is 18. Is this all right?

\_\_\_\_\_

3. Here are two meter readings:

Channel 12: 22  
Channel 30: 20

Is this all right? \_\_\_\_\_

4. Here are two meter readings:

Channel 26: 8  
Channel 5: 18

Is this all right? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 18.

## EXERCISE 5

Each question below gives a sentence to read and a question to answer. Make sure you understand each sentence before you try to answer the question. If you have trouble understanding the sentence, divide it into parts first, as we did with Sentence D. In addition, use the Guidelines of Lesson 2 whenever they will help you.

1. The TM has five chapters, one of which deals with maintenance.

How many chapters deal with maintenance? \_\_\_\_\_

2. Report to team chief any defects that are beyond the operator's scope and require corrective action.

Which of the following says the same thing?

- a. If something goes wrong, report it to the team chief, then fix it.
  - b. All things that go wrong must be reported to the team chief.
  - c. Report any defects to the team chief and note that they are beyond the operator's scope to fix.
  - d. If something goes wrong that needs to be fixed, and if the operator cannot fix it, report it to the team chief.
3. Because of safety requirements, this is a team task, performed by two or three members, one of whom (normally the team chief) will be in charge and provided with the required azimuth, antenna polarization, antenna height, and operating frequencies.

Who is usually given the azimuth, polarization, height, and operating frequencies? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 18.

ANSWER KEYS TO EXERCISES IN UNIT I, LESSON 4

Unit I  
Lesson 4

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ANSWERS TO EXERCISE 1

1. Stop operation immediately | if a deficiency is noted during  
MAIN CLAUSE | DEPENDENT CLAUSE  
operation.
2. The voltmeter reading will change | as the variable resistor  
MAIN CLAUSE | DEPENDENT CLAUSE  
knob is turned.
3. Turn the variable resistor knob | until the required voltage is  
MAIN CLAUSE | DEPENDENT CLAUSE  
attained.
4. If the polarization must be changed, | detach the mounting  
DEPENDENT CLAUSE | MAIN CLAUSE  
bracket from the horn.
5. Gradually open choke with choke control lever | as engine  
MAIN CLAUSE |  
attains operating temperature.  
DEPENDENT CLAUSE
6. If engine does not start, | wait one minute |  
DEPENDENT CLAUSE | MAIN CLAUSE |  
until the engine cools off.  
DEPENDENT CLAUSE
7. Place air intake shutter in the summer position | when  
MAIN CLAUSE |  
temperature is above 32°F (0°C).  
DEPENDENT CLAUSE

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CONTINUE WITH THE LESSON.

ANSWERS TO EXERCISE 2

1. c.
2. maintain adequate tension  
Maintain means keep.  
Adequate means enough.  
Tension means tightness.
3. until you have finished raising the mast. (The sentence says to station someone by the guy while it (the mast) is being raised. That means as long as it is being raised.
4. Yes. "At least one man" means one or more men.

IF ANY OF THE ANSWERS ABOVE ARE NOT CLEAR TO YOU,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
ANSWER THE QUESTIONS IN EXERCISE 3.

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ANSWERS TO EXERCISE 3

1. c.
2. a.
3. Yes. (Malfunctions mean something wrong.)
4. Until the lower half of the mast is straight.
5. b.

ASK YOUR INSTRUCTOR TO EXPLAIN ANY ANSWERS YOU DO NOT UNDERSTAND.

IF YOU UNDERSTAND ALL THE ANSWERS,  
GO ON TO SECTION B BELOW.

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ANSWERS TO EXERCISE 4

1. Yes.
2. No.
3. Yes.
4. No.

IF ANY OF THE ANSWERS ABOVE ARE NOT CLEAR TO YOU,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
ANSWER THE QUESTIONS IN EXERCISE 5.

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ANSWERS TO EXERCISE 5

1. one
2. d.
3. the team chief

IF YOU HAVE TROUBLE UNDERSTANDING ANY OF THESE ANSWERS,  
ASK YOUR INSTRUCTOR FOR HELP.

YOU HAVE NOW COMPLETED LESSON 4 IN UNIT 1.  
IF YOU UNDERSTAND EVERYTHING YOU HAVE READ,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A  
IN UNIT I - LESSON 4.

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT I**  
**READING COMPREHENSION**

**LESSON 5**  
**ORDERING ONE, TWO, OR THREE TASKS**

**PREREQUISITE: None**  
**MATERIALS REQUIRED: None**  
**TYPE OF LESSON: Self-Paced**

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STUDENT GUIDE

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UNIT 1. READING COMPREHENSION

Lesson 5. Ordering One, Two, or Three Tasks

INTRODUCTION:

As you learn to operate the equipment used in the 31M course, you will need to follow directions given by your instructor and in the manuals. Sometimes, these directions will tell you the order in which you are to do the tasks. You must be able to tell what to do first, what to do second, and what to do third.

This lesson will teach you how to read directions and pick out what comes first, what comes second, and what comes third.

LEARNING GOALS:

In this lesson, you will learn to:

- A. Choose the order of two tasks (p. 2).
- B. Choose the order of three tasks (p. 8).
- C. Choose the order when tasks are mixed up (p. 12).
- D. List and paraphrase steps (p. 21).

On the pages that follow, you will find material to read and questions to answer. Most of the time, you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

When you finish the lesson, your instructor will give you a checkpoint. When you finish the checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

GO TO THE NEXT PAGE TO BEGIN THE LESSON.

## Section A

### The Order of Two Tasks

In the 31M course, you will be given directions to do many tasks. You may be told to do two or three tasks and you must be able to figure out what you are to do first.

Let's say that you are to do two things in the order they are presented below:

1. Turn on the power.
2. Connect the cable.

Here are a number of ways the directions could be written or read:

- a. Turn on the power before connecting the cable.
- b. After turning on the power, connect the cable.
- c. Turn on the power and then connect the cable.
- d. First turn on the power, then connect the cable.

Directions a, b, c, and d all tell you to do the tasks in the same order. First: Turn on the power. Second: Connect the cable.

Here is an example of the type of directions you will be given in the 31M course:

Perform preventive maintenance checks before completing the required services.

The word "before" tells you that the task "to perform preventive maintenance checks" happens before the other tasks. Since there are only two tasks, that means it happens first.

Here is another example:

First give a training statement, then state the safety requirements.

The word "first" tells you that the task "to give a training statement" happens before the task "state the safety requirements." Another clue is the word "then." What follows the word "then" happens next in order. So we have two clues about which event happens first and which happens second.

Read the following examples:

EXAMPLE: What happens first in this statement?

Turn the voltage adjusting knob fully counterclockwise before setting the voltage selector switch to monitor line voltage.

- a. Set the voltage selector switch to OFF.
- b. Set the voltage selector switch to monitor line voltage.
- c. Turn the voltage adjusting knob fully counterclockwise.
- d. Turn the voltage adjusting knob fully clockwise.

ANSWER: c. Turn the voltage adjusting knob fully counterclockwise.

Because it says to turn the voltage adjusting knob fully counterclockwise before doing anything else.

EXAMPLE: What happens first in this statement?

Enter the GMT time before submitting the completed DD Form 1234.

ANSWER: Enter the GMT time.

Because it happens before the other action.

EXAMPLE: What happens first in this statement?

First place the Stop-Run switch in the Run position, then place the Remote-Local switch in the Local position.

ANSWER: Place the Stop-Run switch in the Run position.

Because it happens first.

You should notice that sometimes you can tell the order of events just because of their nature.

For example, look at the tasks listed below:

Task A: Take the bolt out.

Task B: Loosen the bolt.

Without any other clues, you can guess which event should happen first. Task B should happen first because a bolt must be loosened before it can be taken out. So both of the following sentences are correct.

First loosen the bolt, then take the bolt out.

Loosen the bolt before taking it out.

Other times the order of the tasks is not so obvious. For example:

Task A: Check the voltmeter.

Task B: Turn the circuit breaker to ON.

Without any other clues, it is hard to tell which task should happen first. But look at these statements:

First check the voltmeter, then turn the circuit breaker to ON.

Check the voltmeter before turning the circuit breaker to ON.

These statements tell you to turn the circuit breaker to ON first. So you must read the statements carefully to tell which event is to happen first.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 1

ANSWER THE FOLLOWING QUESTIONS:

1. What happens first in this statement?

Check the tank before checking the fuel lines.

- a. Check the tank.
- b. Empty the tank.
- c. Check the fuel lines.
- d. Clean the fuel lines.

2. What happens first in this statement?

First check the fuel hose, then check the tank straps.

- a. Check the tank straps.
- b. Clean the tank straps.
- c. Check the fuel hose.
- d. Clean the fuel hose.

3. What happens first in this statement?

Place the vehicle in low gear, then drive into the heavy slush area.

- a. Place the vehicle in high gear.
- b. Place the vehicle in low gear.
- c. Drive into the snow bank.
- d. Drive into the heavy slush area.

4. What happens first in this statement?

Dig a hole 6 inches deep and then drive the sections of the ground rod into the hole.

Answer: \_\_\_\_\_

5. What happens first in this statement?

Ground the generator set before connecting the power cable.

Answer: \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 27.

When you are given two tasks in sequence and can figure out which comes first, it is easy to figure out which comes second.

Let's look at the examples you read before.

EXAMPLE: What happens second in this statement.

Turn the voltage adjusting knob fully counterclockwise before setting the voltage selector switch to monitor line voltage.

- a. Set the voltage selector switch to OFF.
- b. Set the voltage selector switch to monitor line voltage.
- c. Turn the voltage adjusting knob fully counterclockwise.
- d. Turn the voltage adjusting knob fully clockwise.

ANSWER: b.

Because it says the other task happens before setting the voltage selector switch to monitor line voltage.

EXAMPLE: What happens second in this statement?

Enter the GMT time before submitting the completed DD Form 1234.

ANSWER: Submit the completed DD form 1234.

Because the other task happens before it does.

EXAMPLE: What happens second in this statement?

First place the Stop-Run switch in the Run position, then place the Remote-Local switch in the Local position.

ANSWER: Place the Remote-Local switch in the Local position.

Because it says the other task happens first.

EXERCISE 2

ANSWER THE FOLLOWING QUESTIONS:

1. What happens second in this statement?

Check the tank before checking the fuel lines.

- a. Check the tank.
- b. Empty the tank.
- c. Check the fuel lines.
- d. Clean the fuel lines.

2. What happens second in this statement?

First check the fuel hose, then check the tank straps.

- a. Check the tank straps.
- b. Clean the tank straps.
- c. Check the fuel hose.
- d. Clean the fuel hose.

3. What happens second in this statement?

Place the vehicle in low gear, then drive into the heavy slush area.

- a. Place the vehicle in high gear.
- b. Place the vehicle in low gear.
- c. Drive into the snow bank.
- d. Drive into the heavy slush area.

4. What happens second in this statement?

Dig a hole 6 inches deep and then drive the sections of the ground rod into the hole.

Answer: \_\_\_\_\_

5. What happens second in this statement?

Ground the generator set before connecting the power cable.

Answer: \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 27.

## Section B

### The Order of Three Tasks

Let's say that you are to do three things in the order they are presented below:

1. Turn on the power.
2. Connect the cable.
3. Operate the switch to CLEAR.

Here are a number of ways the directions could be written or read.

- a. After turning on the power, connect the cable and operate the switch to CLEAR.
- b. Turn on the power before connecting the cable. Then operate the switch to CLEAR.
- c. Turn on the power and connect the cable, before operating the switch to CLEAR.
- d. First, turn on the power. After connecting the cable, operate the switch to CLEAR.

Directions a, b, c, and d all tell you to do the tasks in the same order. First: Turn on the power. Second: Connect the cable. Third: Operate the switch to CLEAR.

Now, what will happen if the statement or statements give three events and you have to figure out which comes first, second, and third? For example, look at the directions given below:

Insure that the landing wheel is down before removing the front baffle. Then roll up the canvas.

How can you figure out which event or task happens first, which happens second, and which happens third? Let's break up the directions in the two sentences. Look at the first sentence.

Insure that the landing wheel is down before removing the front baffle.

Like the exercise you have just completed, you can tell that the first task is: "Insure that the landing wheel is down."

And the second task is "Remove the front baffle." The next sentence (Then roll up the canvas.) tells you what happens third in order.

This is the order in which the events are to occur:

1. Insure that the landing wheel is down.
2. Remove the front baffle.
3. Roll up the canvas.

EXAMPLE:

First, turn the control to obtain 60 Hz, then lock t.e control. Then adjust the voltage adjusting rheostat.

What task happens first?

ANSWER: Turn the control to obtain 60 Hz.

What task happens second?

ANSWER: Lock the control.

What task happens third.

ANSWER: Adjust the voltage adjusting rheostat.

EXAMPLE:

First correct defects, then complete DA Form 2404 before reporting uncorrectable defects.

Number the order of events.

- |   |                                  |
|---|----------------------------------|
| 2 | a. Complete DA form 2404.        |
| 3 | b. Report uncorrectable defects. |
| 1 | c. Correct defects.              |

EXAMPLE:

Find the word to be encoded before identifying the three-letter code group, then write the code group under the word.

- |   |  |
|---|--|
| 3 | a. Write the code group under the word.  |
| 1 | b. Find the word to be encoded           |
| 2 | c. Identify the three-letter code group. |

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 3

Read the following directions and pick the best answer for the questions.

Insure that the ground rod is driven to its full length before tightening connections. Then direct the output voltage selection.

1. What event happens first?  
 a. Insure that the ground rod is driven to its full length.  
 b. Direct the output voltage selection.  
 c. Tighten the connections.
2. What event happens second?  
 a. Insure that the ground rod is driven to its full length.  
 b. Direct the output voltage selection.  
 c. Tighten the connections.
3. What event happens third?  
 a. Insure that the ground rod is driven to its full length.  
 b. Direct the output voltage selection.  
 c. Tighten the connections.

Read the following directions and write out the best answer for the questions.

Erect the launcher. Then raise the mast before orienting the antenna.

4. What task happens first?  
ANSWER: \_\_\_\_\_
5. What task happens second?  
ANSWER: \_\_\_\_\_
6. What task happens third?  
ANSWER: \_\_\_\_\_

7. Read the following directions and number the order of events.

First, adjust INPUT control until test meter indicates in GREEN band, then set receiver meter switch to 12 CH PCM. Set AC POWER switches to OFF.

- a. Set AC POWER switches to OFF.
- b. Set receiver meter switch to 12 CH PCM.
- c. Adjust INPUT control until test meter indicates in GREEN band.

8. Read the following directions and number the order of events.

Perform orderwire check first. Then perform PCM video alignment before monitoring the orderwire.

- a. Monitor the orderwire.
- b. Perform orderwire check.
- c. Perform PCM video alignment.

CHECK YOUR ANSWERS ON PAGE 28.

Section C

Mixed Up Order of Tasks

Let's say that you are to do two things in the order presented below:

1. Turn on the power.
2. Connect the cable.

Look at the following examples:

- A. Turn on the power before connecting the cable.
- B. After turning on the power, connect the cable.
- C. Turn on the power and then connect the cable.
- D. First turn on the power, then connect the cable.

You already know that Examples A, B, C, and D tell you to do the tasks in the proper order. But the directions may also be given as follows:

- E. Before connecting the cable, turn on the power.
- F. Connect the cable after turning on the power.

Compare Example A and example E. They both describe the order in which the tasks should occur, but the words are arranged differently. In each one, the task that follows the word "before" is the one that is to be done second.

Compare Examples B and F. In each one, the task that follows the word "after" is the one that is to be done first.

Sometimes, the events do not occur in the exact order that they appear in the sentence. For example, in the sentence, "Before connecting the cable, turn on the power," the order the events appear in the sentence is:

- A. Connect the cable.
- B. Turn on the power.

However, the word "before" changes the order of the tasks, saying that something should happen before connecting the cables so that something happens first and the actual order that you will do the task is:

1. Turn on the power.
2. Connect the cable.

This is also true for Example F on the previous page:

Connect the cable after turning on the power.

The order that we see the tasks in the sentence is:

- A. Connect cable.
- B. Turn on power.

However, the word "after" changes the order in which the tasks are to be done. It says to connect the cable after doing something else so that the true order of events is:

1. Turn on the power.
2. Connect cable.

Look at another example:

Before submitting the completed DD Form 1234, get authorization from the sergeant.

The order in which the events appear within the sentence is not the order in which they should be performed. Can you figure out what is to happen first? Well, let's see what the tasks are and then we will figure out the order. Here is the list of tasks in the order they appear in the sentence:

- A. Submit completed DD Form 1234.
- B. Get authorization from sergeant.

But, now look more closely to see which task happens first. It says to do something before submitting completed DD Form 1234. So the order in which the tasks are to be completed is:

1. Get authorization from sergeant.
2. Submit the completed DD Form 1234.

Here is another example:

Check the voltmeter after turning the circuit breaker to ON.

Once again, the order that the events appear within the sentence is not the order in which they should be performed. What is to happen second?

ANSWER: Check the voltmeter, because it says to do that after doing the other task.

Here are some more examples for you to read over.

EXAMPLE: What task should be done first in this sentence?

Place the Remote-Local switch in the Local position after placing the Stop-Run switch in the Run position.

ANSWER: Place the Step-Run switch in the Run position.  
Because it says to do the other task after doing this one.

EXAMPLE: What task should be done second in this sentence?

Before performing corrective actions, check the exterior.

ANSWER: Perform corrective actions.  
Because it says to do the other task before doing this one.

EXAMPLE: What task should be done second in this sentence?

Place the XY-123 on the end of the section after setting a coupler over the mast section.

ANSWER: Place the XY-123 on the end of the section.  
Because it says to do this task after the other one.

EXAMPLE: What task should be done first in this sentence?

Before adjusting the PWR OUT control for a peak indication, adjust the ALARM ADJ control until the LOW POWER indicator lights.

ANSWER: Adjust the ALARM ADJ control until the LOW PWER indicator lights.  
Because it says to do this before the other tasks.

Notice the difference between the examples below.

EXAMPLE A: Before submitting the completed DD Form 1234, get authorization from the sergeant.

EXAMPLE B: After submitting the completed DD Form 1234, get authorization from the sergeant.

The order of events in Example A is:

1. Get authorization.
2. Submit the form.

And the order of events in Example B is:

1. Submit the form.
2. Get authorization.

So the order of events can be changed by one small word and that word will sometimes be "before" and sometimes "after." You must read carefully to determine the order of events.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 4

Directions: For some of the questions below you will choose the correct answer from those supplied, and for other questions you must write out the answer in the space provided.

1. Which of the tasks listed below should be done first?

Connect the power cables between the shelter and power source after grounding the shelter.

- a. Connect the power cables between the shelter and power source.
- b. Ground the shelter.
- c. Connect the shelter.
- d. Ground the power source.

2. Which of the tasks listed below should be done second?

Complete DA Form 6789 after checking Modification Work Orders.

- a. Complete Modification Work Orders.
- b. Complete DA Form 6789.
- c. Check DA Form 6789.
- d. Check Modification Work Orders

3. Which of the tasks listed below should be done first?

Turn the switch to ON before adjusting the voltage.

- a. Adjust voltage.
- b. Turn switch to adjust.
- c. Turn switch to ON.
- d. Adjust transmitter

4. Which of the tasks listed below should be done second?

Disconnecting the cables, take off the back panel.

- a. Take off back panel.
- b. Disconnect cables.
- c. Disconnect back panel.
- d. Readjust the voltage.

5. What task should be done first?

Before locking the control, position GOVERNOR CONTROL to obtain 60 Hz.

ANSWER: \_\_\_\_\_

6. What task should be done second?

Before setting the VOLTAGE/PHASE switch, connect auxiliary fuel hose.

ANSWER: \_\_\_\_\_

7. What task should be done first?

Place the Remote-Local switch in the Local position after placing the Stop-Run switch in the Run position.

ANSWER: \_\_\_\_\_

8. What task should be done first?

Before performing corrective actions, check the exterior.

ANSWER: \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 29.

Sometimes, you will read or hear sentences giving you directions to do three actions or tasks in sequence. You must be able to tell which event should happen first, second, and third. In the examples below, directions are given and, sometimes, it is hard to tell which task should be done first, second, or third.

EXAMPLE: What happens third?

Before insuring that the connections are tight, connect one end of the strap to the ground thumbscrew and connect the other end to the lower ground terminal.

The order events appear in the sentence is:

- A. Insure that connections are tight.
- B. Connect one end of strap to ground thumbscrew.
- C. Connect other end to lower ground terminal.

But the word before changes the order in which the tasks have to be completed. Tasks B and C are to happen before task A. Therefore, task A is to happen third.

ANSWER: Insure that the connections are tight.  
Because it say to do the other tasks before this one.

EXAMPLE: What happens first?

Remove the six outside mast positions and raise the center mast section, after positioning the mast assembly on the selected location.

The order of events in the sentence is:

- A. Remove the outside mast positions.
- B. Raise center mast section.
- C. Position the mast assembly.

But the word after changes the order in which the tasks are to be done. Task A and B are to be done after task C. So Task C is to be done first.

ANSWER: Position the mast assembly on the selected location.  
Because it says to do the other tasks after this one.

EXAMPLE: What should happen second?

Stand the launcher upright, then extend the launcher after driving three spikes into the ground through the hole in the base plate.

ANSWER: Drive three spikes into the ground through the hole in the base plate.  
Because it says to extend the launcher after doing this.

### EXERCISE 5

Directions: In the questions below, choose the correct answer from the list.

1. Which of the tasks below should be done third?

Before preparing the launcher, establish a ground layout plan and install guy anchors.

- a. Install guy anchors.
- b. Establish ground layout plan.
- c. Prepare the launcher.
- d. Install the launcher.

2. Which of the tasks below should be done first?

Raise the mast and orient the antenna, after erecting the launcher.

- a. Raise the mast.
- b. Orient the antenna.
- c. Erect the launcher.
- d. Orient the launcher.

3. Which of the tasks below should be done second? (Read this carefully.)

Place the jacking lever in the stored position, then adjust the lower guy wires after adjusting the top guy wires.

- a. Adjust the top guy wires.
- b. Adjust the lower guy wires.
- c. Place the jacking lever in the stored position.
- d. Adjust the jacking lever.

4. Which of the following tasks should be done third?

Before adjusting channel gain, check voltages at selector switch I and set selector switch I to SW III position.

- a. Adjust channel gain.
- b. Check voltage at selector switch I.
- c. Adjust selector switch I.
- d. Set selector switch I to SW III position.

5. Which of the tasks below should be done first?

Set POWER switch to OFF and set MODE SWITCH TO 6 CH, after connecting the cables.

- a. Set POWER switch to OFF.
- b. Set mode switch to 6 CH.
- c. Connect the POWER switch.
- d. Connect the cables.

CHECK YOUR ANSWERS ON PAGE 29.

Section D

Listing and Paraphrasing Steps

Sometimes, you may be asked to repeat a set of directions. In order to do this, you will need to understand what tasks happen first, second, and third, and you will need to describe those tasks.

Read this set of directions:

Before insuring that the connections are tight, connect one end of the strap to the ground thumbscrew and connect the other end to the lower ground terminal.

Which of the following lists the tasks as they should be performed?

- a. Tighten connections. Connect strap to thumbscrew. Connect strap to terminal.
- b. Connect strap to thumbscrew. Tighten connections. Connect strap to terminal.
- c. Connect strap to terminal. Tighten connections. Connect strap to thumbscrew.
- d. Connect strap to thumbscrew. Connect strap to terminal. Tighten connections.

ANSWER: d. Connect strap to thumbscrew. Connect strap to terminal. tighten connections.

Answer d. is correct because the other two tasks must happen before the connections are tightened.

And we could also say: Connect the strap to the thumbscrew, then to the terminal, and then tighten the connections.

Read this set of directions:

Remove the six outside mast positions and raise the center mast section after positioning the mast assembly on the selected location.

Which of the following lists the tasks as they should be performed?

- a. Remove 6 outside mast positions. Raise center mast section. Place assembly on location.
- b. Raise center mast section. Remove 6 outside mast positions. Place assembly on location.
- c. Place assembly on location. Remove 6 outside mast positions. Raise center mast section.
- d. Remove 6 outside mast positions. Place assembly on location. Raise center mast section.

ANSWER: c. Place assembly on location. Remove 6 outside mast positions. Raise center mast section.

Answer c. is correct because the other two tasks must be done after the assembly is on location.

And we could also say: First, position the mast assembly on location and remove 6 outside mast positions, then raise the center mast section. This means the same thing. The tasks are to be performed in the same order.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 6

Directions: Read the directions below and answer the questions that follow.

First, stand the launcher upright. Then extend the launcher after driving three spikes into the ground through the hole in the base plate.

1. Which of the following lists the tasks as they should be performed?
  - a. Stand launcher upright. Extend launcher. Drive spikes through hole in base plate.
  - b. Stand launcher upright. Drive spikes through hole in base plate. Extend launcher.
  - c. Drive spikes through hole in base plate. Stand launcher upright. Extend launcher.
  - d. Extend launcher. Stand launcher upright. Drive spikes through hole in base plate.
  
2. Which of the following describes the correct order of the tasks?
  - a. Stand the launcher upright, then drive three spikes into the ground through the hole in the base plate before extending the launcher.
  - b. Stand the launcher upright, then extend the launcher before driving three spikes into the ground through the hole in the base plate.
  - c. Drive three spikes into the ground through the hole in the base plate before standing the launcher upright. Then extend the launcher.
  - d. First, extend the launcher, then stand the launcher and drive three spikes into the ground through the hole in the base plate.

Read the directions below and answer the questions that follow.

Before preparing the launcher, establish a ground layout plan and install guy anchors.

3. Which of the following lists the tasks as they should be performed?

- a. Prepare the launcher. Do a layout plan. Install guy anchors.
- b. Do a layout plan. Prepare the launcher. Install guy anchors.
- c. Install guy anchors. Prepare the launcher. Do a layout plan.
- d. Do a layout plan. Install guy anchors. Prepare the launcher.

4. Which of the following describes the correct order of the tasks?

- a. Establish a ground layout plan, then prepare the launcher and install guy anchors.
- b. Install guy anchors before establishing a ground layout plan and preparing the launcher.
- c. Establish a ground layout plan first. Then install guy anchors and prepare the launcher.
- d. Prepare the launcher, then establish a ground layout plan and install guy anchors.

Read the directions below and answer the questions that follow.

Raise the mast and orient the antenna, after erecting the launcher.

5. Which of the following lists the tasks as they should be performed?

- a. Erect launcher. Raise mast. Orient antenna.
- b. Orient antenna. Raise mast. Erect launcher.
- c. Raise mast. Erect launcher. Orient antenna.
- d. Raise mast. Orient antenna. Erect launcher.

6. Which of the following describes the correct order of the tasks?

- a. Raise the mast before orienting the antenna and erecting the launcher.
- b. First, erect the launcher, then raise the mast before orienting the antenna.
- c. First, raise the mast, then erect the launcher and orient the antenna.
- d. First, orient the antenna, then raise the mast before erecting the launcher.

CHECK YOUR ANSWERS ON PAGE 30.

ANSWER KEYS TO EXERCISES IN UNIT I, LESSON 5.

ANSWERS TO EXERCISE 1

1. a. Because it says to check the tank before doing the other task.
2. c. Because it says to check the fuel hose first.
3. b. Because it implies that the vehicle must be in low gear before driving it into the slush.
4. Dig a hole 6 inches deep.  
Because it implies that the hole must be dug first, and logically this must be so.
5. Ground the generator set.  
Because it says to ground the generator set before doing the other task.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON WITH THE LESSON.

IF YOU UNDERSTAND ALL OF THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

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ANSWERS TO EXERCISE 2

1. c. Because it says to do the other task before this one.
2. a. Because it says "then check the tank straps."
3. d. Because it says "then drive into the heavy slush area."
4. Drive the sections of the ground rod into the hole.  
Because it says "then drive the sections of the ground rod into the hole."
5. Connect the power cables.  
Because it says to do the other task before this one.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL OF THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

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ANSWERS TO EXERCISE 3

1. a.
2. c.
3. b.
4. Erect the launcher.
5. Raise the mast.
6. Orient the antenna.
7. 
$$\begin{array}{r} 3 \\ \underline{2} \\ 1 \end{array}$$
8. 
$$\begin{array}{r} 3 \\ \underline{1} \\ 2 \end{array}$$

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

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ANSWERS TO EXERCISE 4

1. b. Because it says to do the other task after this one.
2. b. Because it says to do this task after the other task.
3. c. Because it says to do this before the other task.
4. a. Because it says to do this after the other task.
5. Position GOVERNOR CONTROL to obtain 60 Hz.  
Because it says to do this before doing the other task.
6. Set the VOLTAGE/PHASE switch.  
Because it says to do the other task before this one.
7. Place the Remote-Local switch in the Local position.
8. Check the exterior.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON WITH THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

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ANSWERS TO EXERCISE 5

1. c. Because it says to do the other tasks before this one.
2. c. Because it says the other tasks are done after this one.
3. a. Because it says to adjust the lower guy wires after doing this task.
4. a. Because it says to do the other tasks before this one.
5. d. Because it says to do the other tasks after this one.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

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ANSWERS TO EXERCISE 6

1. b.
2. a.
3. d.
4. c.
5. a.
6. b.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS LESSON,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A  
IN UNIT I - LESSON 5.

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**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT I**  
**READING COMPREHENSION**

**LESSON 6**  
**DETERMINING THE ORDER OF STEPS: MULTIPLE ACTIONS**

**PREREQUISITE: None**  
**MATERIALS REQUIRED: None**  
**TYPE OF LESSON: Self-Paced**

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STUDENT GUIDE

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UNIT 1. READING COMPREHENSION

Lesson 6. Determining the Order of Steps: Multiple Actions

INTRODUCTION:

You already know how to pick which task comes first, second, and third when given a set of directions. In the 3IM course, you will often find directions telling you the order in which to perform four or five tasks. You will need to be able to understand the directions in order to carry them out.

In this lesson, you will read many directions having four or five steps. And you will learn to identify which task comes before and after a given one, and you will answer questions about the order of the tasks.

LEARNING GOALS:

In this lesson, you will learn to:

- A. Identify which task comes first, second, third, fourth, or fifth (p. 2) .
- B. Identify tasks that come before and after other tasks (p. 7).
- C. Answer questions about the order of the tasks (p. 12).

On the pages that follow, you will find material to read and questions to answer. Most of the time, you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

When you finish the lesson, your instructor will give you a checkpoint. When you finish the checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

GO ON TO THE NEXT PAGE TO BEGIN THE LESSON.

## Section A

### Position of Tasks

To begin, this lesson will review directions telling you the order of three tasks. Then, examples of directions telling you the order of four and five tasks will be presented.

Read the directions below:

Loosen the bolts before disconnecting the wires, and then connect the new circuit breaker.

These directions tell the order in which to perform three tasks. The order is:

1. Loosen the bolts.
2. Disconnect the wires.
3. Connect the new circuit breaker.

Here are some examples of directions giving the order in which to perform four tasks.

Example:

Connect one end of the cargo strap to the floor. Route the strap up over the roof and then connect the ratchet end to the front plate. Tighten the ratchet securely.

The four tasks listed in the order they are to be performed are:

1. Connect one end of the cargo strap to the floor.
2. Route the strap over the roof.
3. Connect the ratchet end to the front plate.
4. Tighten the ratchet securely.

Example:

Fold inward and raise the sides of the cover. Secure the folded sections in place and then roll up the floor mat.

The four tasks listed in the order they are to be performed are:

1. Fold the sides of the cover.
2. Raise the sides of the cover.
3. Secure the folded sections in place.
4. Roll up the floor mat.

Here are some examples of directions giving the order in which to perform five tasks.

Example:

Twist the three floor mountings to their transit positions and then secure them to the floor with retaining bolts. Install the ground rods and secure them in position. Put the support bar in place.

The five tasks listed in the order they are to be performed are:

1. Twist the mountings to their transit positions.
2. Secure the mountings to the floor.
3. Install the ground rods.
4. Secure the ground rods.
5. Put the support bar in place.

Example:

Remove both ground rods, clean them and lay them near the assemblage. Disconnect the cables and replace the connector covers.

The five tasks listed in the order they are to be performed are:

1. Remove both ground rods.
2. Clean the ground rods.

Unit I  
Lesson 6

3. Lay them near the assemblage.
4. Disconnect the cables.
5. Replace the connector covers.

#### EXERCISE 1

Read the directions below.

Secure the pintle on the truck. Then unlock the handbrake before pulling out the support leg lever.

1. Which of the following is to be done first?
  - a. Unlock the handbrake.
  - b. Pull out support leg lever.
  - c. Unlock the pintle.
  - d. Secure the pintle.
  
2. Which of the following is to be done second?
  - a. Unlock the handbrake.
  - b. Pull out support leg lever.
  - c. Unlock the pintle.
  - d. Secure the pintle.
  
3. Which of the following is to be done third?
  - a. Unlock the handbrake.
  - b. Pull out support leg lever.
  - c. Unlock the pintle.
  - d. Secure the pintle.

Read the directions below:

Disconnect the exhaust blower power cable, loosen the retaining bolts and remove the blower from the rack. Put the blower at the front of the assemblage.

4. Which of the following is to be done first?
  - a. Put the blower at the front of the assemblage.
  - b. Loosen the retaining bolts.
  - c. Disconnect the exhaust blower cable.
  - d. Remove the blower from the rack.
  
5. Which of the following is to be done second?
  - a. Put the blower at the front of the assemblage.
  - b. Loosen the retaining bolts.
  - c. Disconnect the exhaust blower cable.
  - d. Remove the blower from the rack.
  
6. Which of the following is to be done third?
  - a. Put the blower at the front of the assemblage.
  - b. Loosen the retaining bolts.
  - c. Disconnect the exhaust blower cable.
  - d. Remove the blower from the rack.
  
7. Which of the following is to be done fourth?
  - a. Put the blower at the front of the assemblage.
  - b. Loosen the retaining bolts.
  - c. Disconnect the exhaust blower cable.
  - d. Remove the blower from the rack.

Read the directions below:

Release the loading catch and lock the sections in position.  
Lower the remaining mast section. Snap the binding wires  
and tighten each of the canvas straps.

8. Which of the following is to be done first?
  - a. Lower the remaining mast section.
  - b. Snap the binding wires.
  - c. Release the loading catch.
  - d. Tighten the canvas straps.
  
9. Which of the following is to be done second?
  - a. Lock the sections in position.
  - b. Tighten the canvas straps.
  - c. Lower the remaining mast section.
  - d. Release the loading catch.
  
10. Which of the following is to be done third?
  - a. Release the loading catch.
  - b. Lock the sections in position.
  - c. Lower the remaining mast section.
  - d. Snap the binding wires.
  
11. Which of the following is to be done fourth?
  - a. Tighten the canvas straps.
  - b. Snap the binding wires.
  - c. Lower the remaining mast section.
  - d. Lock the sections in position.
  
12. Which of the following is to be done fifth?
  - a. Tighten the canvas straps.
  - b. Snap the binding wires.
  - c. Lower the remaining mast section.
  - d. Lock the sections in position.

CHECK YOUR ANSWERS ON PAGE 18.

Section B

Before and After

When given directions, you must be able to tell what is to be done before a certain task and what is to happen after a certain task.

For example, read these directions:

Loosen the bolts before disconnecting the wires,  
and then connect the new circuit breaker.

The correct order of tasks is:

1. Loosen the bolts.
2. Disconnect the wires.
3. Connect the new circuit breaker.

Question: What task should you do just before disconnecting the wires?

Answer: Loosen the bolts.

Question: What task should you do just before connecting the new circuit breaker.

Answer: Disconnect the wires.

Question: What task should you do just after you loosen the bolts?

Answer: Disconnect the wires.

Question: What task should you do just after you disconnect the wires?

Answer: Connect the new circuit breaker.

These are the things you need to know in order to carry out the directions.

Here is another example:

Connect one end of the cargo strap to the floor. Route the strap up over the roof and then connect the ratchet end to the front plate. Tighten the ratchet securely.

The correct order of tasks is:

1. Connect one end of the cargo strap to the floor.
2. Route the strap over the roof.
3. Connect the ratchet end to the front plate.
4. Tighten the ratchet securely.

Question: What task should you do just before routing the strap up over the roof?

Answer: Connect one end of the cargo strap to the floor.

Question: What task should you do just after routing the strap up over the roof?

Answer: Connect the ratchet end to the front plate.

#### EXERCISE 2

1. Question: What task should be done just before tightening the ratchet securely.

Answer: \_\_\_\_\_

2. Question: What task should be done just after connecting the ratchet end to the front plate?

Answer: \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 19.

Read this example:

Fold inward and raise the sides of the cover. Secure the folded sections in place and then roll up the floor mat.

Question: What tasks should be done just after raising the sides of the cover?

Answer: Secure the folded sections.

Question: What task should be done just before raising the sides of the cover?

Answer: Fold the sides of the cover inward.

### EXERCISE 3

1. Question: What task should be done just before rolling up the floor mat?

Answer: \_\_\_\_\_

2. Question: What task should be done just after folding the sides of the cover inward?

Answer: \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 19.

Read this example:

Twist the three floor mountings to their transit positions and secure them to the floor with retaining bolts. Install the ground rods and secure them in position. Put the support bar in place.

Question: What task should be done just after installing the ground rods?

Answer: Secure the ground rods in position.

Question: What task should be done just before installing the ground rods?

Answer: Secure the floor mountings to the floor.

Question: What task should be done just after twisting the floor mountings to their transit positions?

Answer: Secure the floor mountings to the floor.

#### EXERCISE 4

1. Question: What task should be done just before putting the support bar in place?

Answer: \_\_\_\_\_

2. Question: What task should be done just after securing the floor mountings to the floor?

Answer: \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 19.

Read this example and answer the questions below:

Remove both ground rods, clean them and lay them near the assemblage. Disconnect the cables and replace the connector covers.

Question: What task should be done just before disconnecting the cables?

Answer: Lay the ground rods near the assemblage.

#### EXERCISE 5

1. Question: What task should be done just after disconnecting the cables?

Answer: \_\_\_\_\_

2. Question: What task should be done just after cleaning the ground rods?

Answer: \_\_\_\_\_

3. Question: What task should be done just before replacing the connector covers?

Answer: \_\_\_\_\_

4. Question: What task should be done just after removing the rods?

Answer: \_\_\_\_\_

5. Question: What task should be done just before cleaning the ground rods?

Answer: \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 20.

Section C

Directions in Simpler Form

Sometimes, it is helpful to reduce directions to a simpler form to understand the ordering of tasks. Read these directions:

Operate ON-OFF switch to ON. After establishing communication, request the distant operator to switch TONE ON. When the tone is received, adjust the panel control for green band indication.

Here is a list of tasks in the order they are to be performed:

1. Operate ON-OFF switch to ON.
2. Establish communication.
3. Request the distant operator to switch TONE ON.
4. Receive tone.
5. Adjust panel control for green band indication.

You could simplify or condense the steps into:

Turn ON-OFF switch to ON. Establish communication. Request TONE to be ON. Receive TONE. Adjust panel control

Here is another example:

Connect the handset to the receptacle before turning on power. Then operate the current switch to ON and silence the buzzer.

List the steps below:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

Check your answers on the next page.

Answers:

1. Connect handset to receptacle.
2. Turn on power.
3. Operate current switch to ON.
4. Silence buzzer.

And these four steps can be summarized as follows:

Connect handset. Turn on power. Turn on current. Silence buzzer.

Another example:

Set the multimeter selector switch to 1 KC IN before adjusting input levels. Then set multimeter selector switch to 1 KC MOD.

Which of the following summarizes the directions best?

- a. Set switch to 1 KC MOD. Adjust input. Set switch to 1 KC IN.
- b. Set switch to 1 KC IN. Adjust input. Set switch to 1 KC MOD.
- c. Adjust input. Set switch to 1 KC IN. Set switch to 1 KC MOD.
- d. Set switch to 1 KC MOD. Set switch to 1 KC IN. Adjust input.

Answer: B Because the tasks are in the correct order and they tell what to do in simple words.

Another example:

Release the loading catch and lock the sections in position. Lower the remaining mast section. Snap the binding wires and tighten each of the canvas straps.

Which of the following summarizes the directions best?

- a. Lower remaining section. Lock section in place. Snap wires. Tighten straps. Release catch.
- b. Lock section in place. Lower remaining section. Release catch. Tighten straps. Snap wires.
- c. Release catch. Lock section in place. Lower remaining section. Snap wires. Tighten straps.
- d. Tighten straps. Snap wires. Lower remaining section. Lock section in place. Release catch.

Answer: C Because the tasks are in the correct order and they tell what to do in simple words.

Unit I  
Lesson 6

## EXERCISE 6

Read the following directions.

Set the ODD-EVEN switch to EVEN. Then rotate the CORRECTION control before adjusting the alarm. Depress the button to silence the buzzer.

1. Which of the following tasks is to be done second?
  - a. Set ODD-EVEN switch to EVEN.
  - b. Rotate the CORRECTION control.
  - c. Adjust the alarm.
  - d. Depress button.
  
2. Which task is to be done just before the alarm is adjusted?
  - a. Set ODD-EVEN switch to EVEN.
  - b. Rotate the CORRECTION control.
  - c. Adjust the alarm.
  - d. Depress button.
  
3. Which of the following summarizes the directions best?
  - a. Set switch to EVEN. Rotate control. Adjust alarm. Press button.
  - b. Rotate control. Set switch to EVEN. Press button. Adjust alarm.
  - c. Adjust alarm. Press button. Set switch to EVEN. Rotate control.
  - d. Press button. Set switch to EVEN. Rotate control. Adjust alarm.

Read the following directions.

Operate the switch to STANDBY before removing the HI-678 connection. Then connect the antenna cable to the transmitter and reset the switch to OPERATE. Check the wavemeter.

4. Which of the following tasks is to be done first?
  - a. Reset the switch to OPERATE.
  - b. Operate the switch to STANDBY.
  - c. Connect cable to transmitter.
  - d. Remove HI-678 connection.
  
5. Which of the following tasks is to be done third?
  - a. Check the wavemeter.
  - b. Reset the switch to OPERATE.
  - c. Connect the antenna cable to the transmitter.
  - d. Operate the switch to STANDBY.
  
6. Which of the following tasks is to be done fifth?
  - a. Check the wavemeter.
  - b. Reset the switch to OPERATE.
  - c. Connect the antenna cable to the transmitter.
  - d. Operate the switch to STANDBY.
  
7. Which task is to be done just after removing the HI-678 connection?
  - a. Operate the switch to STANDBY.
  - b. Connect the antenna cable to the transmitter.
  - c. Reset the switch to OPERATE.
  - d. Check the wavemeter.
  
8. Which task is to be done just before resetting the switch to OPERATE?
  - a. Operate the switch to STANDBY.
  - b. Remove the HI-678 connection.
  - c. Connect the antenna cable to the transmitter.
  - d. Check the wavemeter.

9. Which task is to be done just after connecting the antenna cable to the transmitter?
- a. Operate the switch to STANDBY.
  - b. Remove the HI-678 connection.
  - c. Reset the switch to OPERATE.
  - d. Check the wavemeter.
10. Which of the following summarizes the directions best?
- a. Reset switch to OPERATE. Remove connection. Connect cable. Set switch to OPERATE. Check wavemeter.
  - b. Turn switch to STANDBY. Remove connection. Connect cable. Reset switch to OPERATE. Check wavemeter.
  - c. Check wavemeter. Remove connection. Reset switch to OPERATE. Connect cable. Turn switch to STANDBY.
  - d. Remove connection. Reset switch to OPERATE. Turn switch to STANDBY. Check wavemeter. Connect cable.

CHECK YOUR ANSWERS ON PAGE 21.

ANSWER KEYS TO EXERCISES IN UNIT I, LESSON 6

Unit I  
Lesson 6

17

ANSWERS TO EXERCISE 1

1. d.
2. a.
3. b.
4. c.
5. b.
6. d.
7. a.
8. c.
9. a.
10. c.
11. b.
12. a.

IF YOU DO NOT UNDERSTAND ANY OF THE QUESTIONS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 2

1. Answer: Connect the ratchet end to the front plate.
2. Answer: Tighten the ratchet securely.

---

GO ON WITH THE LESSON.

ANSWERS TO EXERCISE 3

1. Answer: Secure the folded sections in place.
2. Answer: Raise the sides of the cover.

---

GO ON WITH THE LESSON.

ANSWERS TO EXERCISE 4

1. Answer: Secure the ground rods.
2. Answer: Install the ground rods.

---

GO ON WITH THE LESSON.

ANSWERS TO EXERCISE 5

1. Answer: Replace the connector covers.
2. Answer: Lay the ground rolls near the assemblage.
3. Answer: Disconnect the cables.
4. Answer: Clean the ground rods.
5. Answer: Remove the ground rods.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE AND ON PREVIOUS PAGES, ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS SO FAR,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 6

1. b.
2. b.
3. a.
4. b.
5. c.
6. a.
7. b.
8. c.
9. c.
10. b.

IF YOU DO NOT UNDERSTAND ANY OF THESE ANSWERS,  
ASK YOUR INSTRUCTOR FOR HELP.

IF UNDERSTAND ALL THE MATERIAL IN THIS LESSON,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A  
IN UNIT I - LESSON 6.

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT I**  
**READING COMPREHENSION**

**LESSON 7**  
**UNDERSTANDING LISTS AND PARAGRAPHS**

**PREREQUISITE: None**  
**MATERIALS REQUIRED: None**  
**TYPE OF LESSON: Self-Paced**

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STUDENT GUIDE

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UNIT I. READING COMPREHENSION

Lesson 7. Understanding Lists and Paragraphs

INTRODUCTION:

You already know how to look for certain information in sentences and how to tell the order in which tasks are to be performed. In the 31st course, you will be given large amounts of information and will need to understand this information in order to perform your duties correctly. The information may be contained in lists or paragraphs.

In this lesson, you will learn to identify important information contained in lists and paragraphs.

LEARNING GOALS:

In this lesson, you will learn to:

- A. Identify information contained in lists (p. 2).
- B. Identify information contained in paragraphs (p. 9).

On the pages that follow, you will find material to read and questions to answer. Most of the time, you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

When you finish the lesson, your instructor will give you a checkpoint. When you finish the checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

GO TO THE NEXT PAGE TO BEGIN THE LESSON.

## Section A

### Information in Lists

You will often refer to lists and be asked to find information in the lists. For example, below you will find some standards and performance measures given in list form. Following the lists are examples of questions that you may be asked about such lists.

#### STANDARDS

1. Be physically fit to lead conditioning activities.
2. Give enough time between commands to permit the average man to understand the preparatory command before the command of execution is given.
3. Be able to form and control the extended rectangular formation, circle formation, and double-time column.
4. Lead each exercise in accordance with FM 21-20.
5. Demonstrate each exercise with cadence.
6. Follow guidance given concerning what, when, where, and how long activities are to be conducted.

#### PERFORMANCE MEASURES

1. How to Prepare. Once guidance is given concerning the conditioning requirement, preparations must be made.
2. Preparatory Commands. The preparatory command describes and specifies what is required. All preparatory commands are given with rising inflection.
3. Commands of Execution. The command of execution calls into action what has been prescribed. The interval between commands is long enough to permit the average man to understand the first one before the second one is given.
4. Extended Rectangular Formation. This is the formation used most frequently for carrying on physical training activities. It is the best type for large numbers of men because it is easy to control.

5. Circle Formation. This formation is effective for the conduct of various exercise activities. It has an advantage that you can supervise all of the men.
6. Conditioning Run. This is a column moving at double-time. Reflector-vested road guards must be placed ahead of and behind the column if the course follows a road.

You may need to refer to lists such as these presented for a number of reasons. In order to explain rectangular formation, your instructor may tell you to refer to point 4 of the Performance Measures. Since both lists have a point 4, you must know the name of each list so that you can find the correct point 4. Point 4 of the Performance Measures is:

4. Extended Rectangular Formation. This is the formation used most frequently for carrying on physical training activities. It is the best type for large numbers of men because it is easy to control.

This is the point referred to.

If, by mistake, you had looked at point 4 of the Standards, you would have read:

4. Lead each exercise in accordance with FM 21-20.

And, of course, you would not be able to understand what the instructor is talking about. So, it is important to find the right list.

EXAMPLE: What does point 2 of the Standards say?

ANSWER: Give enough time between commands to permit the average man to understand the preparatory command before the command of execution is given.

EXAMPLE: What does point 6 of the Performance Measures say?

ANSWER: Conditioning Run. This is a column moving at double-time. Reflector-vested road guards must be placed ahead of and behind the column if the course follows a road.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 1

ANSWER THE FOLLOWING QUESTIONS, USING THE STANDARDS AND PERFORMANCE MEASURES LISTED ON THE PREVIOUS PAGES.

1. What does point 3 of the Performance Measures say?

ANSWER: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. What does point 4 of the Standards say?

ANSWER: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. What does point 6 of the Standards say?

ANSWER: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. What does point 1 of the Performance Measures say?

ANSWER: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 22.

There are other things you need to do with the information in lists. For example, you will need to tell what kind of information is found in the list, and you will need to tell whether some specific information is not found in the list. Read the examples given below.

EXAMPLE: Which of the following means the same thing as point 2 of the Standards?

- a. Preparatory Commands. Tells what to do and is given with rising inflection.
- b. You must be fit to lead conditioning.
- c. Pause between commands so everybody understands what you say.
- d. Give guidance about the conditioning before giving preparation.

ANSWER: c. (Go back and read point 2 of Standards to be sure you understand.)

EXAMPLE: Which of the following means the same thing as point 6 in the Performance Measures?

- a. Use cadence when demonstrating the exercises.
- b. Circle formation is good to use in some cases. It is good because you can see all of the men.
- c. Remember rules about what, when, where, and how long activities should be done.
- d. Conditioning running is running at double-time and you need road guards if running along a road.

ANSWER: d. (Go back and read point 6 of Performance Measures to be sure you understand.)

EXAMPLE: Does point 2 of the Performance Measures tell you how long the interval between commands should be?

ANSWER: No.  
(It says only that the preparatory commands are given with rising inflection.)

EXAMPLE: Does point 5 of the Standards tell you how many times to demonstrate the activities.

ANSWER No.

EXAMPLE: Does point 5 of the Performance Measures tell you an advantage of Circle Formation.

ANSWER: Yes.  
(It says you can see all of the men in Circle Formation.)

ANSWER THE QUESTIONS ON THE NEXT PAGE.

## EXERCISE 2

ANSWER THE FOLLOWING QUESTIONS USING THE STANDARDS AND PERFORMANCE MEASURES LISTS GIVEN PREVIOUSLY.

1. Which of the following means the same thing as point 5 of the Performance Measures list?
  - a. Use cadence when demonstrating the exercises.
  - b. Remember rules about what, when, where, and how long activities should be done.
  - c. Circle formation is good to use in some cases.
  - d. Conditioning running is running at double-time and you need road guards if running along a road.
  
2. Which of the following means the same thing as point 1 of the Standards list?
  - a. Preparatory commands tell what to do and are given with rising inflection.
  - b. You must be fit to lead conditioning.
  - c. Pause between commands so everybody understands what you say.
  - d. Give guidance about the conditioning before giving preparation.
  
3. Which of the following means the same thing as point 2 of the Standards list?
  - a. You have to lead three things: (1) extended rectangular formation, (2) circle formation, and (3) double-time column.
  - b. The command of execution activates what has been prescribed, and should be given after an interval.
  - c. You must be fit to lead conditioning.
  - d. Preparations must be made after guidance on conditioning has been given.
  
4. Does point 1 of the Performance Measures describe the preparations that are to be done?
  - a. Yes
  - b. No

5. Does point 6 of the Performance Measures tell you what conditioning running is?
- a. Yes
  - b. No
6. Does point 1 of the Standards tell you how to become physically fit?
- a. Yes
  - b. No

CHECK YOUR ANSWERS ON PAGE 22.

## Section B

### Information in Paragraphs

You will often refer to paragraphs and will need to find information in them. A paragraph is simply many sentences put together and these sentences all relate to the same main idea or topic. Below is a paragraph and some examples of the kinds of things you should know about that paragraph after reading it.

#### PARAGRAPH A

On the march, the feet should be kept as dry as possible. If socks become damp from perspiration or wet from water, they should be changed to dry ones at the first opportunity. If necessary, socks may be dried by putting them under the shirt around the waist. Tender pressure spots should be relieved promptly by adjusting gear or applying adhesive tape. Once or twice daily during the march, the feet should be dusted lightly with foot powder, according to FOOT-123.

This paragraph tells you how to care for your feet when on the march. Care for feet when on the march is the main idea of the paragraph. There are many ways this paragraph could have been written to mean the same thing. For example, read the paragraph below.

#### PARAGRAPH B

On the march, you must take good care of your feet. Your feet must be kept as dry as possible, so change your socks if they are damp. To dry out damp socks, put them under your shirt at the waist. Adjust your gear or apply adhesive tape to relieve pressure spots on your feet. Use foot powder once or twice each day during the march. Go to manual FOOT-123 for directions on how to apply the foot powder.

Paragraph B tells you the same thing as Paragraph A. On the next page is a list of what it says.

Care for feet on marches (main idea)

1. Keep your feet dry.
2. Change socks if they are damp.
3. Socks will dry out by putting them under your shirt at the waist.
4. Relieve pressure spots by shifting gear or applying adhesive tape.
5. Use foot powder 1 or 2 times daily (see FOOT-123 for directions).

Look carefully at both Paragraph A and Paragraph B. Notice that all five points listed above are covered in both Paragraph A and Paragraph B. Be sure you can find all five points in both Paragraph A and Paragraph B. If you cannot, ask your instructor for help.

While it is important to know what points are mentioned in a paragraph, it is also important to identify points that are not covered in a paragraph. For example, Paragraph A and Paragraph B do not tell us any of the following:

1. How to prevent socks from getting wet.
2. How to apply adhesive tape.
3. How long you can march with wet socks on.

Of course, there are many other points that are not covered in the paragraphs. You could probably list some things that are not mentioned in the paragraphs too. The important thing is for you to be able to tell if something is or is not mentioned in a given paragraph.

EXAMPLE: Which of the following are mentioned in Paragraph A?

- a. Put socks around your waist under a shirt to dry them out.
- b. Always wear wool socks on marches.
- c. Keep your feet dry on marches.
- d. Apply medication to broken blisters.
- e. Use foot powder 1 or 2 times each day of marching.

ANSWER: a, c, and e are mentioned in Paragraph A.

EXAMPLE: Which of the following are not mentioned in Paragraph A.

- a. Put socks around your waist under a shirt to dry them out.
- b. Always wear wool socks on marches.
- c. Keep your feet dry on marches.
- d. Apply medication to broken blisters.
- e. Use foot powder 1 or 2 times each day of marching.

ANSWER: b and d are not mentioned in Paragraph A.

Read the paragraph below. Following the paragraph is a list of points covered in the paragraphs and some examples of questions you should be able to answer about the paragraph.

#### PARAGRAPH C

Salt requirements. When water is lost through perspiration (sweat), body salt is also lost. An ordinary diet contains enough salt to make up this loss when a person's water intake is less than 1 gallon a day. If daily water intake increases (as it will in the heat), the soldier should lightly salt his food from his field rations pack. First aid for heat injuries is found in FM 21-11.

Points covered in Paragraph C:

1. Body salt is lost through sweat.
2. If you drink less than one gallon of water each day, salt in your diet is enough to make up for the loss.
3. If you drink more than one gallon of water of each day, salt your food more.
4. Heat injury first aid is found in FM 21-11.

EXAMPLE: Which of the following means the same thing and mentions the same points as Paragraph C? Look for the one that mentions all four points listed on the previous page.

- a. You can use up a lot of water and salt when marching. If you eat enough, you don't need to drink anything. FM 21-11 gives you directions for how to eat enough.
- b. We all need salt and should take salt tablets with each meal. FM 21-11 explains how the body uses salt. An ordinary diet contains 100 grams of salt.
- c. Water and body salt are lost through perspiration. When a person drinks less than 1 gallon in a day, the ordinary diet has enough salt in it. If you drink more water because you are hot, you should put salt on your food. See FM 21-11 for first aid for heat related injuries.
- d. If you salt your food, you will not perspire. You will lose water but not salt. FM 21-11 tells you how much salt you should use for different types of exercise. You must use at least 1 gallon of salt each day you exercise a lot.

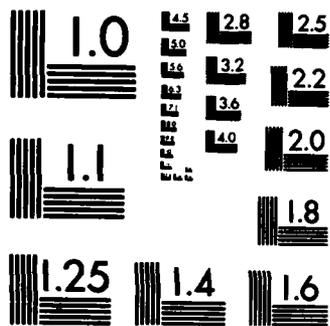
ANSWER: c.

EXAMPLE: Which of the following is not included in Paragraph C?

- a. When a person drinks less than 1 gallon in a day, the ordinary diet has enough salt in it.
- b. Water is lost through perspiration.
- c. FM 21-11 tells how much salt you should use for different types of exercises.
- d. Body salt is lost through perspiration.

ANSWER: c. Points a, b, and d are all included in the paragraph.





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EXAMPLE: Which of the following is included in Paragraph C? Look at the rest of the points covered in Paragraph C.

- a. FM 21-11 tells how much salt you should use for different types of exercises.
- b. If daily water intake increases, you should salt your food.
- c. Soldiers should take salt tablets after each meal.
- d. If you salt your food, you will not perspire.

ANSWER: b.

ANSWER THE QUESTIONS ON THE NEXT PAGES.

### EXERCISE 3

ANSWER THE FOLLOWING QUESTIONS USING PARAGRAPH D BELOW:

#### PARAGRAPH D

Care of the feet before a long march. All men should be equipped with the proper type of correctly fitted, broken-in footgear, clean socks which are free of holes or knotty darns, and an adequate supply of foot powder. A soldier must never attempt to break in a new pair of shoes or boots on a long march. Blisters, pressure spots, and infections should be treated and properly protected before the march starts.

NOTE: You may list out the points covered in Paragraph D to help you answer the next three questions.

1. Which of the following means the same thing and mentions the same points as Paragraph D.
  - a. Proper footwear for long marches include low-heeled, high-top leather shoes or boots, two pairs of new socks (one pair cotton, one pair wool), and foot powder. New shoes and boots should be used with care.
  - b. Blisters, pressure spots, and infections should be treated every five miles. Mend socks and alternate shoes every 10 miles. Foot powder should be used each week. Break in new shoes and boots on short marches.
  - c. During a march, footgear should be continually checked for worn spots. Socks should be clean and dry. Apply foot powder every 10 miles and repair holes in socks. Equip all men with bandages and adhesive tape.
  - d. In order to take good care of feet before a march, equip all men with the following: (1) proper, well-fitted, broken-in footgear; (2) clean, hole-free socks; (3) foot powder. (New shoes or boots should not be used on long marches.) Treat and protect blisters, pressure spots, and infections before the march.

2. Which one of the following is included in Paragraph D?
- a. Only boots should be worn on long marches.
  - b. Don't wear new shoes on long marches.
  - c. Soldiers with blisters should not participate in long marches.
  - d. A long march is at least 10 miles.
3. Which one of the following is not included in Paragraph D?
- a. Blisters should be treated and protected before the march.
  - b. Pressure spots should be treated and protected before the march.
  - c. Socks should not be worn on long marches.
  - d. Soldiers should be given foot powder before a long march.

Read Paragraph E below and answer the questions that follow.

#### PARAGRAPH E

In cold weather, good circulation should be maintained by exercising the feet and legs. This is especially important during rest breaks. It is advisable that troops in cold weather be paired as "buddies," each having the responsibility for reminding the other to take warming exercises at frequent intervals and watching for signs of frostbite and trench foot. FM 21-11 gives signs and first aid for cold-weather injuries.

4. Which of the following means the same thing and mentions the same points as Paragraph E?
- a. Good circulation is easy to maintain in cold weather. This can be done by wrapping legs and feet in clothing or blankets. FM 21-11 gives directions for wrapping feet and legs correctly. "Buddies" can wrap one another's feet and legs.
  - b. During rest breaks in cold weather, soldiers should exercise feet and legs to keep good circulation. "Buddies" can remind each other about doing warming exercises often and can watch for frostbite and trench foot signs. See FM 21-11 for signs and first aid for cold-weather injuries.
  - c. Warm weather is good for circulation. Soldiers do not need to exercise feet and legs in warm weather. Troops sometimes need to use a "buddy" system to check that each soldier is doing his duties correctly. FM 21-11 gives directions for completing cold weather tasks.
  - d. In cold weather, it is easy to overeat and to exercise too much. It is advisable that troops in cold weather be paired as "buddies," each checking that the other is not overeating or exercising too much. FM 21-11 gives signs and first aid for cold-weather injuries.
5. Which one of the following is included in Paragraph E?
- a. FM 21-11 is the place to look for cold-weather forecasts.
  - b. It is important to exercise feet and legs during rest breaks in cold weather.
  - c. "Buddies" can share a FM 21-11 manual.
  - d. In cold weather, "buddies" should take rest breaks often.
6. Which one of the following is not included in Paragraph E?
- a. Look in FM 21-11 for descriptions of signs and first aid for cold-weather injuries.
  - b. "Buddies" should remind one another about warming exercises.
  - c. In cold weather, special care is needed for the head and neck.
  - d. "Buddies" should check for signs of frostbite and trench foot.

CHECK YOUR ANSWERS ON PAGE 23.

So far, so good. Now let's see if you can pick out what is missing from a paragraph. Read Paragraph F below.

#### PARAGRAPH F

Clothing for cold weather is designed to afford protection, insulation, and ventilation. Protection is provided by covering as large an area of the body as possible. Insulation is provided by trapping air which has been warmed by the body and holding it near the skin to prevent loss of heat from the body. Ventilation is provided by allowing a two-way exchange of air through the various layers of clothing. This exchange of air prevents overheating and excessive perspiring.

The following points are covered in Paragraph F.

#### Clothing for cold weather

Gives protection - covers large body area

Gives insulation - traps warm air

Gives ventilation - prevents overheating and too much perspiring by allowing an exchange of air through layers of clothing

Now read Paragraph G below.

#### PARAGRAPH G

Clothing for cold weather gives protection, insulation, and ventilation. Clothing covers a large area of the body to give protection. Clothing prevents overheating and too much perspiration by allowing ventilation by an exchange of air through layers of clothing.

Joe says that Paragraph F and Paragraph G use different words but mean and say exactly the same things. Alice says Paragraph G is missing something. Which one is right?

If you said Alice, you are correct. She figured out that something was missing by listing all of the points covered in Paragraph G, like this:

**Clothing for cold weather**

Gives protection - covers a large area of the body

Gives insulation -

Gives ventilation - allows an exchange of air so it prevents overheating and too much perspiring

Paragraph G does not describe or explain how cold weather clothing provides insulation. Which of the following sentences needs to be added to Paragraph G to make it match Paragraph F?

- a. Wear wool and cotton clothing in cold weather.
- b. Insulation keeps heat in close to the body.
- c. Insulated clothing can be made of wool or cotton.
- d. Wear three layers for best insulation.

**ANSWER:** b could be added to Paragraph G to make it match Paragraph F.

If you do not understand why b is the answer, read Paragraphs F and G again and ask your instructor to explain.

**ANSWER THE QUESTIONS ON THE NEXT PAGE.**

## EXERCISE 4

Read Paragraph H and Paragraph I below:

### PARAGRAPH H

Water requirements: The human body cannot be trained to function with less than the minimum amount of water it requires for cooling, waste elimination, and other body functions. Any attempt to train the body to function with less than the minimum amount of water needed can be harmful and lead to heat injuries. In hot weather, troops should drink water more often than is necessary to satisfy their thirst.

### PARAGRAPH I

Water requirements: Our bodies cannot work unless they have a minimum amount of water. The water is needed for cooling, waste elimination, and other body functions. Soldiers need to drink more water than they need to satisfy their thirst in hot weather.

NOTE: You may list the points covered in Paragraphs H and I to help you answer the questions.

1. Which of the following statements needs to be added to Paragraph I to make it match Paragraph H?
  - a. Although it can lead to heat injuries, you can sometimes train the body to function with less water than it usually needs.
  - b. In order to retain water, a soldier can wrap insulation around exposed areas. This will eliminate heat injuries.
  - c. It is risky and can cause heat injuries to try to train the body to function with less than the minimum amount of water required.
  - d. Soldiers need just a small amount of water when on long marches. They will conserve the water because they are moving quickly.

Read Paragraph J and Paragraph K below:

**PARAGRAPH J**

Select and schedule a site for the counseling session. The site must give privacy and a relaxed feeling in order to allow for a free exchange of ideas and information. The site should be one where you will not be interrupted. It should also be away from your usual work area.

**PARAGRAPH K**

Pick and reserve a location away from your usual work area for the counseling session. Privacy and a relaxing environment must be provided by the location chosen. This will promote a free exchange of ideas and information.

**NOTE:** You may list the points covered in Paragraphs J and K to help you answer the question.

2. Which of the following statements needs to be added to Paragraph K to make it match Paragraph J?
- a. The schedule of sessions must not be interrupted.
  - b. Relax before you start the session.
  - c. Get authorization before choosing the location.
  - d. Pick a location where you will not be interrupted.

**CHECK YOUR ANSWERS ON PAGE 23.**

ANSWER KEYS TO EXERCISES IN UNIT I, LESSON 7

Unit I  
Lesson 7

21

ANSWERS TO EXERCISE 1

1. **Commands of Execution.** The command of execution calls into action what has been prescribed. The interval between commands is long enough to permit the average man to understand the first one before the second one is given.
2. Lead each exercise in accordance with FM 21-20.
3. Follow guidance given concerning what, when, where, and how long activities are to be conducted.
4. **How to Prepare.** Once guidance is given concerning the conditioning requirement, preparations must be made.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON WITH THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 2

1. c.
2. b.
3. b.
4. b.
5. a.
6. b.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO QUESTIONS ON THE PREVIOUS PAGES.

1. d.
2. b.
3. c.
4. b.
5. b.
6. c.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON WITH THE LESSON.

IF YOU UNDERSTAND THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 4

1. c.
2. d.

IF YOU DO NOT UNDERSTAND ANY OF THESE ANSWERS,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS LESSON,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A,  
IN UNIT I - LESSON 7.

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
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**UNIT II**  
**USING A TABLE OF CONTENTS**

**LESSON 1**  
**CHAPTERS AND SECTIONS**

**PREREQUISITE: None**  
**MATERIALS REQUIRED: None**  
**TYPE OF LESSON: Self-Paced**

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STUDENT GUIDE

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UNIT II. USING A TABLE OF CONTENTS

Lesson 1. Chapters and Sections

INTRODUCTION:

In the 31M course, you will use your Soldier's Manual a lot for looking up step-by-step directions on how to do different tasks. Finding a particular task description in the Soldier's Manual can be tricky. To help you find task descriptions, the Manual has a Table of Contents and Task Lists. In this lesson, you will use a Table of Contents. Use of the Task Lists is taught in another lesson.

LEARNING GOALS:

In this lesson, you will learn to:

- A. Recognize a Chapter and a Section (p. 2).
- B. Use a two-part page number (p. 9).
- C. Use a Table of Contents like the one in the Soldier's Manual to find a page number (p. 11).

On the pages that follow, you will find material to read and questions to answer. Most of the time, you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

When you finish the lesson, your instructor will give you a checkpoint. When you finish the checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

GO ON TO THE NEXT PAGE TO BEGIN THE LESSON.

## Section A

### Recognizing Chapters and Sections

You have probably seen dozens and dozens of Tables of Contents in the fronts of books. But you may not have had to use them much.

If you are reading a novel, you start at the beginning and go to the end. You don't need a Table of Contents to tell you what page Chapter 12 starts on.

In school, if the history teacher told you to read Chapter 3 in your text book, maybe you had to look in the Table of Contents to find what page Chapter 3 started on. But the teacher probably gave you the numbers of the pages you had to read, so you didn't have to use the Table of Contents. But if the teacher only said "Read Chapter 25" and the book was a thick one, the quickest way to find where Chapter 25 started was to look it up in the Table of Contents.

In case you are not too familiar with what a Table of Contents is, let's describe it. The word "Contents" means: What is contained inside something. For example, what are the contents of a box of pretzels? Pretzels. What are the contents of a cigarette? Tobacco. What are the contents of a book? The chapters in the book.

A "Table of Contents" in a book is a list of all the chapters in that book. It also lists the first page of each chapter.

On the next page is a Table of Contents from a book on how to study better in school. Look it over quickly and use it to answer the questions that follow.

TABLE OF CONTENTS

	<u>Page</u>
WHAT DID YOU COME FOR?	1
KEEPING YOUR EMOTIONAL BALANCE	3
CONTROL YOUR TIME	11
HOW TO CONCENTRATE	33
FORGETTING	52
HOW TO BUILD A STRONG MEMORY	61
IMPROVE YOUR READING SKILLS	99
HOW TO TAKE GOOD NOTES	123
HOW TO STUDY FOR TESTS	140
HOW TO TAKE TESTS	167

NOTE: Chapters are usually numbered. The chapter numbers were removed from this Table of Contents for teaching reasons.

EXERCISE 1

USE THIS TABLE OF CONTENTS TO ANSWER THE FOLLOWING QUESTIONS:

1. How many chapters are in this Table of Contents?

\_\_\_\_\_

2. On what page does the chapter about forgetting start? \_\_\_\_\_

3. What is the title of the chapter that starts on page 11?

\_\_\_\_\_

4. If you want to read about how to take good notes, what page would you go to? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 15.

In the 3IM course, you will use your Soldier's Manual a lot for looking up step-by-step directions on how to do different tasks. When the sergeant gives you a task to look up in the Soldier's Manual, he won't give you a page number or a chapter number. He'll give you the Task Number. The tasks in the Soldier's Manual are not in numerical order. The Soldier's Manual is a thick book. If you try to just thumb through the pages to find a task, it will take you a very long time. The quickest way to find what you are looking for is to USE the Table of Contents.

The Table of Contents in the Soldier's Manual is not complicated. But it has some features that are probably new to you. Let's look at one of the features:

FEATURE #1 THE CHAPTERS ARE DIVIDED INTO SECTIONS.

Here's an example of what a Table of Contents looks like when the chapters are divided into sections. This is part of a Table of Contents from a simple book on radio. (Only the first two chapters are shown here.)

	<u>Page</u>
Chapter 1: AN INTRODUCTION TO ELECTRICITY	1
Some Terms Used in Electronics	4
The Nature of Electricity	6
The Volt, Ampere and Watt	10
Resistance and Ohm's Law	13
Chapter 2: INDUCTANCE, IMPEDANCE, CAPACITANCE	16
Electricity Creates Magnetism	16
Tuning a Radio Circuit	21
Transformers	25
An Experiment with Electromagnetic Induction	26
An Experiment with the Transformer	31

NOTICE THESE THINGS:

1. The chapter titles are all in CAPITALS.
2. Under each chapter title are some other titles that are not all in capital letters. Those are the section titles.
3. Page numbers are listed for the start of each chapter and each section.

USE THIS TABLE OF CONTENTS TO ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 2

1. Write down the titles of the two chapters.

---

---

2. Write the title of the first section in Chapter 1.

---

3. Write the title of the first section in Chapter 2.

---

4. How many sections are in Chapter 1? \_\_\_\_\_

5. What is the page number for the section on The Nature of Electricity? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 16.

Let us start with a Table of Contents that is not from the Soldier's Manual. The Table of Contents on the next page is from a simple book on radio. It has chapters that are divided into sections.

You have already seen the first two chapters of this Table of Contents. Look it over very quickly. Then use it to answer the questions that are on the following page.

- NOTE:
1. The chapter numbers were removed from this Table of Contents.
  2. The chapter titles are all in CAPITALS.
  3. Under each chapter title are some other titles. They refer to sections.

LOOK AT THE TABLE OF CONTENTS ON THE NEXT PAGE.

NOTE: READ THIS OVER QUICKLY. YOU DO NOT NEED TO KNOW WHAT ALL THE TERMS MEAN.

TABLE OF CONTENTS

	<u>Page</u>
AN INTRODUCTION TO ELECTRICITY	1
Some Terms Used in Electronics	4
The Nature of Electricity	6
The Volt, Ampere and Watt	10
Resistance and Ohm's Law	13
INDUCTANCE, IMPEDANCE, CAPACITANCE	16
Electricity Creates Magnetism	18
Tuning a Radio Circuit	21
Transformers	25
An Experiment with Electromagnetic Induction	28
An Experiment with the Transformer	31
SOME COMPONENTS OF ELECTRONIC CIRCUITS	37
Resistors	37
Capacitors	39
Transducers	42
Headphones	46
Speakers	49
Loopsticks	52
THE TRANSISTOR - WHAT IT IS, HOW IT WORKS	56
Semiconductors	57
Power Transistors	62
Sockets and Mounts for Transistors	65
Heat Sinks	69
RADIO COMMUNICATIONS AND ELECTROMAGNETIC WAVES	71
Oscillators	73
Modulation	74
What a Receiver is and How it Works	76
Selectivity	77
A Basic Radio Receiver	80

USE THIS TABLE OF CONTENTS TO ANSWER THE QUESTIONS ON THE NEXT PAGE.

Unit II  
Lesson 1

7

EXERCISE 3

1. How many chapters are in this Table of Contents? \_\_\_\_\_
2. How many sections are in the Chapter SOME COMPONENTS OF ELECTRONIC CIRCUITS? \_\_\_\_\_
3. Is "Capacitors" the title of a chapter or a section? \_\_\_\_\_
4. What page would you go to to read about the volt, ampere and watt? \_\_\_\_\_
5. On what page does the chapter about the transistor start? \_\_\_\_\_
6. If you need to read about power transistors, what page would you go to? \_\_\_\_\_
7. What is the name of the chapter that contains the section called Speakers? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 17.

Section B

Using a Two-Part Page Number

Another feature of the Soldier's Manual Table of Contents that may be new to you is the way the pages are numbered. Your Soldier's Manual and most other manuals you will use in the 31M course have page numbers that look like the ones below:

FEATURE #2: THE PAGE NUMBERS HAVE TWO PARTS.

1-1  
1-3  
1-27

2-1  
2-2  
2-30  
2-38

3-15

12-1  
12-2  
12-12  
12-41

NOTE: The FIRST Number is always the CHAPTER number.

The SECOND Number is the PAGE Number.

So, 1-3 means Chapter 1, page 3.  
12-1 means Chapter 12, page 1  
And so on.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 4

1. What does the page number 2-3 mean? (Include both page and chapter numbers in your answer.) \_\_\_\_\_
2. What does the page number 3-15 mean? (Include both page and chapter numbers in your answer.) \_\_\_\_\_
3. What does the page number 8-6 mean? (Include both page and chapter numbers in your answer.) \_\_\_\_\_
4. What is the two-part page number for Chapter 10, page 7? \_\_\_\_\_
5. What is the two-part page number for Chapter 4, page 30? \_\_\_\_\_

NOTE: READ THE NEXT TWO QUESTIONS CAREFULLY.

6. What is the two-part page number for page 9 of Chapter 11? \_\_\_\_\_
7. What is the two-part page number for page 4 of Chapter 20? \_\_\_\_\_
8. The first part of a two-part page number is always the number of the:
  - a. chapter.
  - b. section.
  - c. page.

CHECK YOUR ANSWERS ON PAGE 18.

Section C

Using a Table of Contents Like the One in the Soldier's Manual

Another feature of the Soldier's Manual Table of Contents that will definitely be new to you are these terms:

SKILL LEVEL TASKS

DUTY POSITION TASKS

SKILL LEVEL 1

SKILL LEVEL 2

- NOTE: 1. Right now you don't have to know exactly what those terms mean.
2. All you have to know about those terms now is that they are the titles for chapters and sections.

LOOK AT THE TABLE OF CONTENTS ON THE NEXT PAGE.

The Table of Contents below is a made-up one. It is like part of the Table of Contents in your Soldier's Manual. It is not the whole Table of Contents. Look it over very quickly. Then use it to answer the questions on the next page.

	PAGE
<b>SKILL LEVEL TASKS</b>	<b>2-1</b>
Task List	2-1
Task Summaries for Skill Level 1	2-9
Task Summaries for Skill Level 2	2-315
Task Summaries for Skill Level 3	2-385
<b>DUTY POSITION TASKS</b>	<b>3-1</b>
Task List	3-1
Task Summaries for Skill Level 1	3-10
Task Summaries for Skill Level 2	3-200
Task Summaries for Skill Level 3	3-310

- NOTE: 1. The chapter numbers were removed from this Table of Contents. But you can still tell what the chapter is from the page number.
2. The section titles are the same for both chapters. So, to find a particular section, you will have to look at both the section title and the chapter title.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 5

1. Is "Task List" the title of a section or a chapter? \_\_\_\_\_
2. Is "Duty Position Tasks" the title of a section or a chapter?  
\_\_\_\_\_
3. What is the page number of Task Summaries for Skill Level 2 of SKILL LEVEL TASKS? (Give both parts of the page number.)  
\_\_\_\_\_
4. What chapter is the Task List of SKILL LEVEL TASKS found in? (Give only the chapter number.) \_\_\_\_\_
5. What is the page number of Task Summaries for Skill Level 1 of DUTY POSITION TASKS? (Give both parts of the page number.) \_\_\_\_\_
6. What chapter is the Task Summaries for Skill Level 1 of DUTY POSITION TASKS found in? (Give only the chapter number.) \_\_\_\_\_
7. You are told to look up a task that starts on page 3-207. What is the number of the chapter that task is in? (You don't need to look at the Table of Contents to answer.) \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 19.

ANSWER KEYS TO EXERCISES IN UNIT II, LESSON 1

Unit II  
Lesson 1

ANSWERS TO EXERCISE 1

1. ten  
Explanation: Just count the number of titles of chapters. Usually chapters are numbered. The numbers were removed for this exercise so you would have to look carefully at the Chapters while you counted them.  
If you wrote 167 you confused a page number with the number of chapters.
2. page 52
3. CONTROL YOUR TIME
4. page 123

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
OR IF YOU DO NOT KNOW WHAT A CHAPTER IS,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
CONTINUE WITH THE LESSON.

---

ANSWERS TO EXERCISE 2

1. AN INTRODUCTION TO ELECTRICITY

INDUCTANCE, IMPEDANCE, CAPACITANCE

(Your answers don't have to be written in all capital letters.)  
Explanation: If you wrote just Chapter 1, Chapter 2, that doesn't answer the question. The question asked for the titles of the chapters, not the numbers. If you wrote the titles and the numbers, that is OK.

2. Some Terms Used in Electronics

Explanation: If you wrote "An Introduction to Electricity," that is the title of the chapter. The question asked for the title of the section.

3. Electricity Creates Magnetism

4. four (4)

Explanation: If you wrote 5, you probably counted the chapter title. It should not be counted. The question only asked about sections. The chapter is not a section.

5. page 6

Explanation: If you wrote 4 or 10, your eye probably skipped up or down one space when you were looking across from the section title to the number. That happens to everybody now and then. If it happens to you often, you need to double-check yourself.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
CONTINUE WITH THE LESSON.

---

ANSWERS TO EXERCISE 3

1. five  
Explanation: If you said a number higher than five, you were probably counting sections. The question only asked about chapters.
2. six  
Explanation: If you said seven, you were including the chapter title. It should not be included. The chapter is not a section. If you had another number than either six or seven, see your instructor so he/she can explain your problem.
3. section  
Explanation: "Capacitors" is the title of a section of the chapter on COMPONENTS OF ELECTRONIC CIRCUITS.
4. 10  
Explanation: If you got another page number, perhaps you were not being careful in reading the column numbers.
5. 56  
Explanation: If you put down 62, you were looking at the section on Power Transistors. The question asked for the chapter on transistors.
6. 62  
Explanation: If you put down 56, you were looking at the chapter title. The question asked about "Power Transistors." That is the name of a section.
7. SOME COMPONENTS OF ELECTRONIC CIRCUITS  
Explanation: To answer this, you had to do 2 steps: 1) Find the section called "Speakers," then 2) Look up to the name of the chapter that contains that section.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 4

1. Chapter 2, page 3  
Explanation: The first number is always the chapter number.
2. Chapter 3, page 15
3. Chapter 8, page 6
4. 10-7  
  
4-30
6. 11-9  
Explanation: If you wrote 9-11, you probably didn't notice that the question gave you the page number (9) before it gave you the chapter number (11). When you write the number, though, you must still put the chapter number first.
7. 20-4  
Explanation: This question is like question 6. The page number was given before the chapter number, but you still must write the chapter number first.
8. a. chapter

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

---

EXERCISE 5

1. section
2. chapter
3. 2-315  
Explanation: If you wrote 3-200, you were looking at the wrong chapter.
4. 2  
Explanation: If you wrote 1, you confused the page number with the chapter number. If you wrote 3, you were looking at the wrong chapter. If you wrote 2-1, you gave the full page number. The question only asked for the chapter number.
5. 3-10  
Explanation: If you wrote 2-9, you were looking at the wrong chapter.
6. 3  
Explanation: If you wrote 10, you confused the page number with the chapter number.
7. 3  
Explanation: The first part of a two-part page number is the number of the chapter.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS LESSON,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A  
IN UNIT II - LESSON 1.

**FBSEP**  
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**UNIT II**  
**USING A TABLE OF CONTENTS**

**LESSON 2**  
**USING A TASK LIST TO FIND A TASK DESCRIPTION**

**PREREQUISITE: None**  
**MATERIALS REQUIRED: Soldier's Manual**  
**TYPE OF LESSON: Self-Paced**

UNIT II. USING A TABLE OF CONTENTS

Lesson 2. Using a Task List to Find a Task Description

INTRODUCTION:

In the 31M course, you will use your Soldier's Manual a lot to look up step-by-step directions on how to do different tasks. Finding a particular task description in the Soldier's Manual can be tricky. To help you find task descriptions, the Manual has a Table of Contents and Tasks Lists. In this lesson, you will use a Task List to look up task descriptions. The parts of a Task List and where to find the Task Lists in the Soldier's Manual are also taught.

LEARNING GOALS:

In this lesson, you will learn to:

- A. Find a Task List in the Soldier's Manual (p. 2).
- B. Scan a Task List to find a task number (p. 5).
- C. Scan a Task List to find a task title (p. 13).
- D. Use a Task List to find a page number, when you have either a task title or number (p. 15).

On the pages that follow, you will find material to read and questions to answer. Most of the time, you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

After Section C and at the end of the lesson, there are checkpoints. At the appropriate time, your instructor will give you each checkpoint. When you finish the checkpoints, take them to your instructor for scoring. The instructor will tell you your score and what you should do next.

YOU NEED A SOLDIER'S MANUAL FOR THIS LESSON.

IF YOU DO NOT HAVE ONE, SEE YOUR INSTRUCTOR.

IF YOU HAVE ONE, GO ON TO THE NEXT PAGE TO BEGIN THE LESSON.

Section A

Finding a Task List in the Soldier's Manual

You have probably seen Tables of Contents in the front of books hundreds of times. You may not have used them much. It is sometimes just as easy to thumb through a book to find the part you want. That won't work very well, though, when you are looking in your Soldier's Manual to find directions on how to do a certain task. (And you'll be doing that a lot.)

There are several reasons why thumbing through the Soldier's Manual doesn't work very well.

One reason: Only the first page of a task description has a title.

To see what this means, answer the following questions:

EXERCISE 1

1. Open your Soldier's Manual to page 2-402.  
If you find the title of a Task on that page, write it in the blank.  
If you don't find a title, write "None."
- 

2. Open your Soldier's Manual to page 3-62.  
If you find the title of a Task on that page, write it in the blank.  
If you don't find a title, write "None."
- 

CHECK YOUR ANSWERS ON PAGE 19.

Now, what is the quickest way to find a task description in the Soldier's Manual? Use the Task Lists.

Here is part of a Task List from the Soldier's Manual. Do not read it. Just look it over quickly.

TASK LIST  
LOW CAPACITY EQUIPMENT OPERATOR  
SKILL LEVEL 1

<u>TASK NO</u>	<u>TITLE</u>	<u>PAGE</u>
113-593-1021	Install the AN/GRC-103(V) Antenna System	3-16
113-593-2005	Operate Radio Terminal Set, AN/TRC-145 (V)	3-20
113-593-2019	Perform System Alignment of a Radio Terminal in the AN/TRC-145(V)	3-34
113-593-3005	Perform Operator's Daily Preventive Maintenance on Radio Terminal Set, AN/TRC-145 (V)	3-38
113-593-3033	Perform Monthly Preventive Maintenance on Radio Terminal Set, AN/TRC-145(V)	3-40

The Task List is really a kind of Table of Contents. But there are some important DIFFERENCES between a Task List and most Tables of Contents.

DIFFERENCE #1

The Task List is NOT at the FRONT of the book.

Unit II  
Lesson 2

3

Before you can use a Task List, you have to find it. To find it, you must look in the TABLE OF CONTENTS of the Soldier's Manual. This Table of Contents is at the front of the Soldier's Manual.

#### EXERCISE 2

1. Turn to the Table of Contents on the very first page of your Soldier's Manual. How many Task Lists are listed in the Table of Contents?
- 

2. Write the page number of each Task List you see listed in the Table of Contents.
- 

3. Turn to the first page of each Task List you see listed in the Table of Contents. Write down the Task Number of the first task in each Task List.
- 

CHECK YOUR ANSWERS ON PAGE 19.

Section B

Scanning a Task List to Find a Task Number

Here is a short part of a Task List from the Soldier's Manual.

MEDIUM CAPACITY EQUIPMENT OPERATOR  
SKILL LEVEL 1

<u>TASK NO</u>	<u>TITLE</u>	<u>PAGE</u>
113-593-1020	Install the AN/GRC-50 Antenna System	3-101
113-593-1010	Install Radio Terminal Set, AN/TRC-117(V)	3-110
113-593-2010	Operate Radio Terminal Set, AN/TRC-117(V)	3-124
113-593-2023	Perform System Alignment of Radio Terminal in AN/TRC-117(V)	3-136
113-593-3010	Perform Operator's Daily Preventive Maintenance on Radio Terminal Set, AN/TRC-117(V)	3-145

You can see that the parts of a Task List are:

- . The TASK NUMBER (or TASK NO for short)
- . The TITLE of the task description
- . The PAGE where you will find the task description

There are two more important DIFFERENCES between a Task List and an ordinary Table of Contents.

DIFFERENCE #2 - In the place where you usually find the chapter number, here you find the TASK NUMBER. When the sergeant tells you to look up a task, he won't tell you the Task Title or the page number. He will tell you the Task Number.

DIFFERENCE #3 - The Task Numbers are NOT in a neat order like the chapters in a book. Sometimes a lower number comes after a higher number. And there are often big gaps between the numbers.

Difference #3 is another reason why thumbing through the Soldier's Manual is not a good way to find a task description.

In ordinary books, Chapter 2 comes right after Chapter 1. Chapter 5 comes right before Chapter 6. Between Chapter 9 and Chapter 12, you will find Chapters 10 and 11. And so on.

On the next page is the TASK NUMBER column from one page of a Task List in your Soldier's Manual.

QUESTION: Does number 113-593-1002 come before or after 113-593-4004 in this TASK NUMBER List?

Look over the list on the next page to find the answer.

TASK NO

113-593-2020

113-593-3004

113-593-3020

113-593-3021

113-593-4004

113-593-1002

113-593-2002

113-593-2021

113-593-2022

113-593-3002

Task Number 113-593-1002 comes after Task Number 113-593-4004. You would expect it to come before.

You see that the task descriptions in your Soldier's Manual are NOT arranged in neat order like the chapters of a book. This makes it very hard to find a task description by just paging through the book. You really need to use the Task Lists.

Unit II  
Lesson 2

7

The first step in using the Task Lists is getting used to the TASK NUMBER. When the sergeant gives you a task to look up in the Soldier's Manual, he won't give you a page number. He usually won't give you the task title. He will give you a TASK NUMBER, like this: Task 113-593-1006. You will have to find out what that task is, and where it is in the Soldier's Manual. The Task List will tell you that information.

Here are some Task Numbers:

031-503-1005  
113-593-1006  
071-327-0202  
114-493-4006  
113-573-4002

NOTE: Task numbers are always divided into 3 sections with dashes (-) between the sections.

Here are some points to remember when looking up a Task Number:

1. There are two Task Lists in the Soldier's Manual.
2. The Task Lists are several pages long.
3. The Task Numbers in the Task List are not in numerical order.
4. To find a Task Number in the list, you have to look down the Task Number column until you find the number you want.

Here is a hint to help you find a Task Number faster:

HINT #1. Look for the first section of the Task Number first.

To see how this works,

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 3

1. Open your Soldier's Manual to the Chapter 3 Task List (page 3-1). Will you find any Task Numbers that begin with 071- in that Task List? (Check all pages in the Task List.)
- 

2. Use the Chapter 3 Task List to answer this question. Look through the whole list and write down all the different first sections of the Task Numbers.

For example, if some Task Numbers begin with 082, write 082. If some begin with 791, also write down 791. And so on.

---

3. Open your Soldier's Manual to the Chapter 2 Task List (page 2-1). Will you find any Task Numbers that begin with 071- in that Task List? (Check all pages in the Task List.)
- 

4. Use the same Task List to answer this question. Look through the whole list and write down all the different first sections of the Task Numbers.
-

NOTE: Do not use the Soldier's Manual to answer questions 5 and 6. Use the information you got in answering Questions 1-4.

5. You are told to look up a task that begins with 051-. Where would you have to look?

- a. Chapter 2 Task List only
- b. Chapter 3 Task List only
- c. Both Chapter 2 and Chapter 3 Task Lists

6. You are told to look up a task that begins with 113-. Where would you have to look?

- a. Chapter 2 Task List only
- b. Chapter 3 Task List only
- c. Both Chapter 2 and Chapter 3 Task Lists

CHECK YOUR ANSWERS ON PAGE 20.

Using a Task List to look up a task description in the Soldier's Manual is not like using an ordinary Table of Contents, because the Task Numbers are not in exact order.

To use the Task List, you have to do a lot of scanning, or quick looking, down the pages. This is not hard to do but it takes some practice to learn to do it quickly.

Here are two more hints to help you find a Task Number faster:

HINT #2 - Look for the third section of the Task Number second.  
(That is, after you have looked for the first section.)

HINT #3 - Check the middle section of the Task Number last.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 4

NOTE: Use only the Chapter 2 Task List in your Soldier's Manual to answer these questions.

1. Look up Task 551- -1017. (The middle numbers have been left out. You won't need them to find this task.) Write down the task title.  

---

2. Look up Task 071- -2007. What is the title of that task?  

---

3. Look up Task 031- -1008. Write down the title of that task.  

---

NOTE: Questions 1-3 left out the middle part of the Task Number to show that sometimes you don't need to check it at all. Most of the time you do need to check it. But when you do, check it last. You will need to check it in answering questions 4 and 5.

4. Look up Task 113-573-4001. What is the title of that task?  

---

5. Look up Task 113-608-4001. What is the title of that task?  

---

CHECK YOUR ANSWERS ON PAGE 21.

Section C

Scanning a Task List to Find a Task Title

Usually you use the Task Number to look up a task description. However, if you have the Task Title, it can be just as quick to use that.

Finding a Task Title in the Task List is not like using an index or using a dictionary because the Task Titles are not in alphabetical order.

Again, you have to scan the pages of the Task List.

Here are two features of the Task List that make scanning the titles easier:

FEATURE #1 - All the task descriptions on the same piece of equipment are grouped together.

FEATURE #2 - The name of the piece of equipment stands out because it is in capital letters, like this: AN/TCC-61.

To see what this looks like, open your Soldier's Manual to page 3-1.

EXERCISE 5

1. Write down the names of all the different pieces of equipment listed in the titles on page 3-1.  

---
2. Open your soldier's Manual to page 3-7. How many of the tasks listed on that page deal with the AN/MCC-6?  

---
3. Turn to page 3-8. How many tasks listed on that page deal with the AN/MRC-54(V)?  

---

CHECK YOUR ANSWERS ON PAGE 21.

When you scan the Task Titles:

1. First look for the name of the piece of equipment you want.
2. Then read the whole Task Title to find the task description you want.

#### EXERCISE 6

NOTE: Use the Chapter 3 Task List in your Soldier's Manual to answer these questions.

1. Look up the task, "Perform System Alignment of Radio-to-Cable Conversion Repeater in AN/TRC-110(V)." What is the Task Number?  
\_\_\_\_\_
2. Look up the task that tells you how to Troubleshoot Terminal Set, Telephone, AN/TCC-65. What is the Task Number? \_\_\_\_\_
3. Look up the task, "Operate Terminal Set, Telephone, AN/TCC-61." What is the Task Number? \_\_\_\_\_
4. Look up how to Perform Quarterly Preventive Maintenance on Terminal Set, Telephone, AN/TCC-73. What is the Task Number?  
\_\_\_\_\_
5. Look up the task, "Troubleshoot Radio Terminal Set, AN/MRC-73(V)." What is the Task Number? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 22.

Section D

Using a Task List to Find a Page Number

You have learned:

- . where to find the Task List.
- . the parts of a Task List
- . how to scan the Task Numbers and Titles to find the one you want

Now you will take the next step and use a Task List to look up page numbers.

Remember these hints when using the Task List:

HINT #1 If you are given the Task Number, first look for the first part of the number. Then look for the last part of the number. Finally, check the middle part of the number.

HINT #2 If you are given the Task Title, first look for the name of the piece of equipment. Then read the rest of the title to see which is the one you want.

EXERCISE 7

NOTE: 1. Open your Soldier's Manual to page 2-1. Use the Chapter 2 Task List to answer these questions.

2. Remember, the Task List is several pages long. The answer to a question can be on any of the pages in the Task List.

1. You want to look up Task 031-503-1008. What page is the task description on? (Give both parts of the page number.) \_\_\_\_\_
2. Look up Task 071-331-0822. What page is the task description on?  
\_\_\_\_\_
3. The task description for Task 874-896-3050 is on which page?  
\_\_\_\_\_

4. Your sergeant says to look up Task 071-329-1003. What page is the task description on? \_\_\_\_\_
5. You need to read how to do Task 113-601-0003. What page is the task description on? \_\_\_\_\_
6. Why do all these page numbers start with the number 2-?  
\_\_\_\_\_
7. When you are looking for a Task Number in the Task List, what part of the number should you look for first?
- a. The first part
  - b. The second part
  - c. The last part
  - d. The whole number
8. When you are looking for a Title in the Task List, which of the following should you do?
- a. First read the whole title.
  - b. First look for the name of the piece of equipment.

CHECK YOUR ANSWERS ON PAGE 23.

EXERCISE 8

NOTE: 1. Open your Soldier's Manual to page 3-1. Use the Chapter 3 Task List to answer these questions.

2. Remember, the Task List is several pages long. The answer to a question can be on any page in the Task List.

1. You need to Perform System Alignment of a Cable Terminal in the AN/TCC-65. What page is the task description on? \_\_\_\_\_
2. You have to Install a Radio Terminal Set, AN/MRC-73(V). What page is the task description on? \_\_\_\_\_
3. You want to read how to Operate a Terminal Set, Telephone, AN/TCC-61. What page is the task description on? \_\_\_\_\_
4. You want to Perform Monthly Preventive Maintenance on A Repeater Set, Radio, AN/TRC-110(V). What page is the task description on?  
\_\_\_\_\_
5. You have to Perform Quarterly Preventive Maintenance on the AN/MCC-6. What page is the task description on? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 24.

ANSWER KEYS TO EXERCISES IN UNIT II, LESSON 2

Unit II  
Lesson 2

ANSWERS TO EXERCISE 1

1. Direct Installation of Generator Sets.  
Explanation: If you wrote the number 113-601-7033, that's O.K., too. You usually look up tasks by using their numbers.
2. None

IF YOU COULD NOT FIND PAGES 2-402 AND 3-62,  
YOU PROBABLY NEED TO TAKE UNIT II, LESSON 1.  
SEE YOUR INSTRUCTOR NOW. DO NOT GO ON WITH THIS LESSON.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
WITH THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 2

1. two  
Explanation: There is a Task List in Chapter 2 and one in Chapter 3. There is no Task List in Chapter 1. If you put down a higher number, you probably counted the Task Summaries. They are not part of the Task List.
2. 2-1 and 3-1
3. 031-503-1001 (for the Task List on page 2-1)  
113-593-1005 (for the Task List on page 3-1)

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 3

1. No
2. 113-, 114-  
Explanation: If you missed 114-, that is O.K. There is only one Task Number in the list that starts with 114-. It is easy to miss. The main point is that all but one of the Task Numbers in this list start with 113-.
3. Yes
4. 031-, 051-, 071-, 081-, 113-, 551-, 874-  
Explanation: If you missed one or two of these numbers, that is O.K. The main point is that the Task Numbers in the Chapter 2 Task List begin with several different numbers. If you missed more than two of these numbers or if you wrote different numbers, see your instructor. He/she will explain your problem.
5. a. Chapter 2 Task List only  
Explanation: Your answer to Question 2 tells you that the Chapter 3 Task List does not have any numbers that start with 051-.
6. c. Both Chapter 2 and Chapter 3 Task Lists  
Explanation: Your answers to Questions 2 and 4 tell you that both Task Lists have numbers that begin with 113-.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
WITH THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 4

1. Utilize Vehicle Camouflage and Concealment  
Explanation: If you missed this, it is listed on page 2-4.
2. Qualify with the MI6A1 Rifle  
Explanation: If you missed this, it is listed on page 2-2.
3. Decontaminate Individual Equipment  
Explanation: If you missed this, it is listed on page 2-1.
4. Encode and Decode Messages Using KTC-600, Tactical Operations Code  
Explanation: If you missed this, it is listed on page 2-7.
5. Prepare Master Station Log, DD-1753  
Explanation: If you missed this, it is listed on page 2-5.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUTOR FOR HELP BEFORE YOU GO ON  
WITH THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 5

1. AN/TRC-145(V), AN/GRC-103(V), AN/TCC-65  
Explanation: If you wrote: "Radio Terminal Set, Antenna,  
Telephone," that is OK.
2. seven (7)
3. eight (8)

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
WITH THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 6

1. 113-593-2026  
Explanation: If you missed this, it is listed on page 3-4.
2. 113-593-4004  
Explanation: If you missed this, it is listed on page 3-2.
3. 113-593-2007  
Explanation: If you missed this, it is listed on page 3-3.
4. 113-593-3019  
Explanation: If you missed this, it is listed on page 3-6.  
Remember that the Task List doesn't stop on page 3-5, though it might look that way.
5. 113-593-4012  
Explanation: If you missed this, it is listed on page 3-9.

IF YOU DO NOT UNDERSTAND ANY OF THE QUESTIONS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS PART OF THE LESSON,  
TELL YOUR INSTRUCTOR YOU ARE READY FOR CHECKPOINT 1, FORM A  
IN UNIT II - LESSON 2.

---

ANSWERS TO EXERCISE 7

1. 2-34
2. 2-126
3. 2-340
4. 2-104
5. 2-262
6. Because all the task descriptions are in Chapter 2.  
(Your answer doesn't have to have those exact words, but it must mention Chapter 2.)
7. a. The first part  
Explanation: If you got this wrong, go back to page 15 and reread Hint #1.
8. b. First look for the name of the piece of equipment.  
Explanation: If you got this wrong, go back to page 15 and reread Hint #2.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU DID NOT GET THE ANSWER TO QUESTION 6, YOU NEED TO TAKE OR TO REVIEW LESSON 1. SEE YOUR INSTRUCTOR.
---

IF YOU UNDERSTAND ALL OF THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 8

1. 3-65
2. 3-330
3. 3-165
4. 3-239
5. 3-284

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL OF THE MATERIAL IN THIS LESSON,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 2, FORM A  
IN UNIT II - LESSON 2.

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT II**  
**USING A TABLE OF CONTENTS**

**LESSON 3**  
**TABLES WITH PARAGRAPH NUMBERS AND PAGE NUMBERS**

**PREREQUISITE: None**  
**MATERIALS REQUIRED: None**  
**TYPE OF LESSON: Self-Paced**

UNIT II. USING A TABLE OF CONTENTS

Lesson 3. Tables with Paragraph Numbers and Page Numbers

INTRODUCTION:

In the 3IM course, you will often need to look up information in the Technical Manuals (TMs). Of course, each TM has a Table of Contents to help you find the section you want. But these Tables of Contents have some unusual features which may confuse you until you get used to them. This lesson explains how to use a Table of Contents in a TM to quickly find what you want.

LEARNING GOALS:

In this lesson, you will learn to:

- A. Recognize a Chapter, a Section, and a paragraph title (p. 2).
- B. Use a 2-part page number (p. 9).
- C. Use a 2-part paragraph number (p. 11).
- D. Use a Table of Contents like the one in a TM to find a paragraph number or a page number (p. 13).

On the pages that follow, you will find material to read and questions to answer. Most of the time, you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

When you finish the lesson, your instructor will give you a checkpoint. When you finish the checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

GO ON TO THE NEXT PAGE TO BEGIN THE LESSON.

## Section A

### Recognizing Chapters, Sections, and Paragraphs

You have probably seen Tables of Contents in the front of books hundreds of times. Maybe you haven't used them very often. Even if you have, the Tables of Contents in the Technical Manuals (TMs) may give you some trouble. There is a lot more information in them than there is in an ordinary Table of Contents. The extra information helps you to find what you are looking for a lot quicker. But first you have to know how to use it.

Here are two features of the TM Table of Contents that may be new to you:

FEATURE #1 - The Chapters are often divided into Sections.

FEATURE #2 - The Sections are divided into paragraphs.

On the next page is an example of what that looks like: (Note: The page numbers were removed from this example.)

CHAPTER	2	INSTALLATION
Section	I	UNPACKING AND SITING
		Unpacking and Checking Equipment
		Siting and Shelter Requirements
		Installation
	II	INTERUNIT CONNECTIONS
		Interunit Connections and Initial Adjustments
		Preliminary Installation Procedures
		Initial Checks
	III	SYSTEM ALIGNMENT
		General
		TD-660G Audio Gain Level Check
		Audio Gain Level Adjustments
		Channel Two Way Speech Test

**NOTICE THESE THINGS:**

1. The Chapter title is all in CAPITALS.
2. The word "Chapter" and a number are positioned in front of the Chapter title.
3. The word "Section" and a Roman numeral (number) are positioned in front of the first Section title.
4. Roman numerals (but not the word "Section") are positioned in front of all the other Section titles.
5. Under the Section titles are some other titles. These are the paragraph titles.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 1

USE THE TABLE OF CONTENTS ON THE PREVIOUS PAGE TO ANSWER THE FOLLOWING QUESTIONS.

1. What is the title of the chapter?  
\_\_\_\_\_
2. What is the number of the chapter? \_\_\_\_\_
3. What is the title of Section I?  
\_\_\_\_\_
4. What is the number of the Section called INTERUNIT CONNECTIONS?  
(Write the Roman numeral.) \_\_\_\_\_
5. How many Sections are in this chapter? (You can write either the Roman numeral or the regular number.) \_\_\_\_\_
6. "Unpacking and Checking Equipment" is the title of a:
  - a. Section.
  - b. paragraph.
7. How many paragraphs are in Section III, SYSTEM ALIGNMENT?  
\_\_\_\_\_
8. What is the title of the third (last) paragraph of Section II?  
\_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 16.

The Table of Contents on the next page is from a TM. Look it over very quickly. Look for the Chapter titles, the Section titles, and the paragraph titles. Then use it to answer the questions on the following page.

- NOTE:
1. The Chapter titles are all in CAPITALS. Each Chapter is numbered.
  2. Each Section is numbered with a Roman Numeral (I, II, III). The Section titles are usually all in CAPITALS.
  3. The titles that are not all in capitals and don't have a number in front of them refer to paragraphs.
  4. The page numbers were removed from this Table of Contents. You won't need them to answer the questions.

<b>CHAPTER</b>	<b>1. INTRODUCTION</b>
<b>Section</b>	<b>I. GENERAL</b>
	Scope .....
	Indexes of Publications .....
	Forms and records .....
	Reporting of errors .....
	Reporting equipment improvement recommendations (EIR) .....
	Administrative storage .....
	Destruction of Army electronics materiel .....
	<b>II. Description and data</b>
	Purpose and use .....
	Tabulated data .....
	Description .....
	Items comprising operable Multiplexers TD-660/G, TD-660A/G and TD-660B/G .....
<b>CHAPTER</b>	<b>2. INSTALLATION</b>
<b>Section</b>	<b>I. UNPACKING AND SITING</b>
	Unpacking and Checking Equipment .....
	Siting and Shelter Requirements .....
	Installation .....
	<b>II. INTERUNIT CONNECTIONS</b>
	Interunit Connections and Initial Adjustments .....
	Preliminary Installation Procedures .....
	Initial Checks .....
	<b>III. SYSTEM ALIGNMENT</b>
	General .....
	TD-660/G Audio Gain Level Check .....
	Audio Gain Level Adjustments .....
	Channel Two-Way Speech Test .....
<b>CHAPTER</b>	<b>3. OPERATING INSTRUCTIONS</b>
	Controls, Indicators, and Connectors .....
	Operating Procedures (Starting and Stopping) .....
	Operation under Unusual Conditions .....
<b>CHAPTER</b>	<b>4. MAINTENANCE</b>
<b>Section</b>	<b>I. PREVENTIVE MAINTENANCE</b>
	Scope of Maintenance .....
	Operator's Daily Preventive Maintenance Checks and Services .....
	Organizational Monthly Preventive Maintenance Checks and Services .....
	Organizational Quarterly Preventive Maintenance Checks and Services .....
	<b>II. TROUBLESHOOTING</b>
	General .....
	Troubleshooting Chart .....
	<b>III. REPAIR AND ADJUSTMENTS</b>
	Replacement of Plug-In Panels .....
	Power Supply +12-Volt Adjustment (11A1 only) .....
	CCL Adjustment Check .....
<b>CHAPTER</b>	<b>5. SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE</b>
<b>Section</b>	<b>I. SHIPMENT AND LIMITED STORAGE</b>
	Disassembly of Equipment .....
	Repackaging for Shipment or Limited Storage .....

USE THIS TABLE OF CONTENTS TO ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 2

1. How many chapters are in this Table of Contents? \_\_\_\_\_
2. Write the number of the chapter on MAINTENANCE. \_\_\_\_\_
3. How many Sections are in the chapter on MAINTENANCE? \_\_\_\_\_
4. How many paragraphs are in Section I of Chapter 2? \_\_\_\_\_
5. Write the Arabic numbers for the following Roman numerals. (Arabic numbers are the ordinary ones: 1, 2, 3, 4, etc.).
  - a. V \_\_\_\_\_
  - b. III \_\_\_\_\_
  - c. VI \_\_\_\_\_
  - d. IV \_\_\_\_\_
  - e. II \_\_\_\_\_
6. "Operating Instructions" is the title of a:  
 a. Chapter  
 b. Section  
 c. paragraph
7. "Troubleshooting" is the title of a:  
 a. Chapter  
 b. Section  
 c. paragraph
8. "Initial Checks" is the title of a:  
 a. Chapter  
 b. Section  
 c. paragraph

9. What is the name of the Chapter that contains the paragraph called "Forms and Records"? \_\_\_\_\_
10. Find a Chapter that is not divided into Sections. Write down the Chapter number. \_\_\_\_\_
11. "Operating Under Unusual Conditions" is the title of a:  
\_\_\_\_\_ a. Chapter  
\_\_\_\_\_ b. Section  
\_\_\_\_\_ c. paragraph

CHECK YOUR ANSWERS ON PAGE 17.

Section B

Using a Two-Part Page Number

NOTE: If you have taken Unit II, Lesson 1, you can skip this Section and go to Section C.

Another feature of the TM Table of contents that may be new to you is the way the pages are numbered. The TMs and most other manuals you will use in the 31M course have page numbers that look like this:

1-1  
1-3  
1-27

2-1  
2-2  
2-30  
2-38

3-15

12-1  
12-2  
12-12  
12-41

NOTE: The FIRST number is always the CHAPTER number.

The SECOND number is the PAGE number.

So, 1-3 means Chapter 1, page 3. 12-1 means Chapter 12, page 1. And so on.

EXERCISE 3

1. What does the page number 2-3 mean? (Include both page and chapter numbers in your answer.) \_\_\_\_\_
2. What does the page number 3-15 mean? (Include both page and chapter numbers in your answer.) \_\_\_\_\_
3. What does the page number 8-6 mean? (Include both page and chapter numbers in your answer.) \_\_\_\_\_
4. What is the two-part page number for Chapter 10, page 7? \_\_\_\_\_
5. What is the two-part page number for Chapter 4, page 30? \_\_\_\_\_
6. What is the two-part page number for page 9 of Chapter 11? \_\_\_\_\_
7. What is the two-part page number for page 4 of Chapter 20? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 19.

Section C

Using a Two-Part Paragraph Number

One more unusual feature of the TM Table of Contents is that the paragraphs are numbered. But wait a minute! Didn't we say in Section A of this lesson that the paragraph titles didn't have numbers in front of them? Yes, that's right.

Here is part of the TM Table of Contents you used earlier. This time both the paragraph numbers and the page numbers are included.

		Paragraph	Page
CHAPTER	2	INSTALLATION	
Section	1	UNPACKING AND SITING	
		Unpacking and Checking Equipment	2-1 2-1
		Siting and Shelter Requirements	2-2 2-1
		Installation	2-3 2-1
	II	INTERUNIT CONNECTIONS	
		Interunit Connections and Initial Adjustments	2-4 2-1
		Preliminary Installation Procedures	2-5 2-2
		Initial Checks	2-6 2-3
	III	SYSTEM ALIGNMENT	
		General	2-7 2-3
		TD-660G Audio Gain Level Check	2-8 2-4
		Audio Gain Level Adjustments	2-9 2-4
		Channel Two-Way Speech Test	2-10 2-4
CHAPTER	3	OPERATING INSTRUCTIONS	
		Controls, Indicators, and Connectors	3-1 3-1
		Operating Procedures (Starting and Stopping)	3-2 3-3
		Operation under Unusual Conditions	3-3 3-4

You see that the paragraph numbers are in a separate column all to themselves, just like the page numbers. The paragraph numbers also have two parts, just like the page numbers.

NOTE: The FIRST number is always the CHAPTER number, just as it is with a page number.

The SECOND number is the number of the PARAGRAPH.

So, paragraph 2-3 means Chapter 2, paragraph 3.  
Paragraph 5-2 means Chapter 5, paragraph 2.  
And so on.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 4

1. The paragraph number 2-3 means Chapter \_\_\_\_\_, paragraph \_\_\_\_\_.
2. The paragraph number 5-1 means paragraph \_\_\_\_\_.
3. Write the 2-part number for Chapter 4, paragraph 2. \_\_\_\_\_
4. Write the 2-part number for Chapter 7, paragraph 10. \_\_\_\_\_

NOTE: READ THE NEXT TWO QUESTIONS CAREFULLY.

5. Write the 2-part number for the 5th paragraph in Chapter 3. \_\_\_\_\_
6. Write the 2-part number for the 8th paragraph in Chapter 6. \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 20.

Section D

Using a Table of Contents with Paragraph and Page Numbers

Using a Table of Contents like those in the TMs requires a little extra care because of all the extra information you have to look at.

HINT: Be especially careful not to mix up the page numbers and the paragraph numbers.

The Table of Contents on the next page is from a TM. Look it over quickly. Then use it to answer the following questions.

EXERCISE 5

USE THE TABLE OF CONTENTS ON THE NEXT PAGE TO ANSWER THE FOLLOWING QUESTIONS:

1. What is the paragraph number of the paragraph on "Electric heater repairs"? \_\_\_\_\_
2. What is paragraph 3-6 about? \_\_\_\_\_
3. On what page will you find paragraph 2-8? \_\_\_\_\_
4. On what page will you find "Depot maintenance"? \_\_\_\_\_
5. What is the paragraph number of the paragraph called "Technical characteristics"? \_\_\_\_\_
6. What is paragraph 3-4 about? \_\_\_\_\_
7. On what page will you find paragraph 1-3? \_\_\_\_\_
8. How many different paragraphs are found on page 4-22? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 21.

		Paragraph	Page
<b>CHAPTER</b>	<b>1</b>	<b>INTRODUCTION</b>	
<b>Section</b>	<b>I</b>	<b>General</b>	
		Scope .....	1-1 1-1
		Index of publications .....	1-2 1-1
		Forms and records .....	1-3 1-1
	<b>II.</b>	<b>Description and data</b>	
		Purpose and use .....	1-4 1-1
		Components .....	1-5 1-5
		Technical characteristics .....	1-6 1-5
		Description .....	1-7 1-7
<b>CHAPTER</b>	<b>2.</b>	<b>INSTALLATION</b>	
		Unpacking and checking .....	2-1 2-1
		Siting .....	2-2 2-1
		Grounding .....	2-3 2-3
		Power connections .....	2-4 2-5
		Signal connections .....	2-5 2-5
		Interunit cable connections .....	2-6 2-6
		Preliminary checks and adjustments .....	2-7 2-6
		System alignment .....	2-8 2-12
<b>CHAPTER</b>	<b>3.</b>	<b>OPERATING INSTRUCTIONS</b>	
		Controls and indicators .....	3-1 3-1
		Energizing ac circuits .....	3-2 3-4
		Operating heaters, blowers, LS-147C/FI, and TA-312/PT .....	3-3 3-5
		Operating rack equipment .....	3-4 3-5
		Order-wire communication .....	3-5 3-6
		Monitoring channels .....	3-6 3-6
		Operation under unusual conditions .....	3-7 3-6
		Stopping procedure .....	3-8 3-7
<b>CHAPTER</b>	<b>4.</b>	<b>MAINTENANCE</b>	
<b>Section</b>	<b>I.</b>	<b>Preventive maintenance</b>	
		Scope of maintenance .....	4-1 4-1
		Operator's daily preventive maintenance checks and services .....	4-2 4-2
		Organizational monthly preventive maintenance checks and services .....	4-3 4-5
		Organizational quarterly preventive maintenance checks and services .....	4-4 4-8
	<b>II.</b>	<b>Troubleshooting</b>	
		System troubleshooting .....	4-5 4-10
		Cable link troubleshooting .....	4-6 4-14
		Assemblage troubleshooting .....	4-7 4-16
	<b>III.</b>	<b>Organizational repair procedures</b>	
		Component removal and replacement .....	4-8 4-22
		Electric heater repairs .....	4-9 4-22
		Exhaust blower repairs .....	4-10 4-22
		Distribution panel repairs .....	4-11 4-22
		Repair of power cable connectors and POWER ENTRANCE BOX receptacles .....	4-12 4-24
	<b>IV.</b>	<b>DS, GS, and depot maintenance</b>	
		Scope of direct support and general support maintenance .....	4-13 4-24
		Direct support repair procedures .....	4-14 4-25
		General support repair procedures .....	4-15 4-25
		Depot maintenance .....	4-16 4-29
<b>CHAPTER</b>	<b>5.</b>	<b>SHIPMENT, LIMITED STORAGE, AND DEMOLITION TO PREVENT ENEMY USE</b>	
<b>Section</b>	<b>I.</b>	<b>Shipment and limited storage</b>	
		Disassembly of equipment .....	5-1 5-1
		Repackaging for shipment or limited storage .....	5-2 5-2
	<b>II.</b>	<b>Demolition of materiel to prevent enemy use</b>	
		Authority for demolition .....	5-3 5-2
		Methods of destruction .....	5-4 5-2

ANSWER KEYS TO EXERCISES IN UNIT II, LESSON 3

Unit II  
Lesson 3

15

67

ANSWERS TO EXERCISE 1

1. INSTALLATION
2. 2
3. UNPACKING AND SITING
4. II
5. III (or 3)  
Explanation: If you wrote a higher number, you probably were counting the paragraphs. They should not be counted since the question only asked about Sections.
6. b. paragraph
7. 4
8. Initial Checks

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 2

1. 5  
Explanation: If you wrote a number higher than five, you were probably counting Sections or paragraphs. The question only asked about Chapters.
2. 4
3. 3 (or III)  
Explanation: If you wrote a higher number, you probably counted paragraphs. The question asked about Sections.
4. 3  
Explanation: If you missed this, here is the Chapter 2, Section I part of the Table of Contents. The paragraphs are marked with checks.

CHAPTER 2 INSTALLATION  
Section I UNPACKING AND SITING  
    ✓ Unpacking and Checking Equipment  
    ✓ Siting and Shelter Requirements  
    ✓ Installation

5. a. 5  
    b. 3  
    c. 6  
    d. 4  
    e. 2
6. a. Chapter
7. b. Section
8. c. paragraph

9. INTRODUCTION

Explanation: If you wrote GENERAL, you were looking at the Section title.

10. 3

Explanation: The chapter is divided into paragraphs. But there are no section titles listed under Chapter 3.

11. c. paragraph

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 3

1. Chapter 2, page 3  
Explanation: The first number is always the chapter number.
2. Chapter 3, page 15
3. Chapter 8, page 6
4. 10-7
5. 4-30
6. 11-9  
Explanation: If you wrote 9-11, you probably didn't notice that the question gave you the page number (9) before it gave you the chapter number (11). When you write the number, though, you must still put the chapter number first.
7. 20-4  
Explanation: This question is like question 6. The page number was given before the chapter number, but you still must write the chapter number first.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 4

1. 2, 3  
Explanation: The first number is always the Chapter number.
2. 1  
Explanation: If you wrote 5, you forgot that the first part of the number is the Chapter number.
3. 4-2
4. 7-10
5. 3-5  
Explanation: If you wrote 5-3, you probably didn't notice that the question gave you the paragraph number (5) before it gave you the Chapter number (3). When you write the number, though, you still put the Chapter number first.
6. 6-8  
Explanation: This question is like question 5. The paragraph number was given before the Chapter number, but you still must write the Chapter number first.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 5

1. 4-9  
Explanation: If you wrote 4-22, you mixed up the page number with the paragraph number.
2. Monitoring Channels  
Explanation: If you wrote something else, you probably were looking at the page number instead of the paragraph number.
3. 2-12
4. 4-29  
Explanation: If you wrote 4-16, you mixed up the paragraph number with the page number.
5. 1-6
6. Operating rack equipment
7. 1-1
8. 4  
Explanation: If you wrote 5, you probably counted the last page number in that column. Check it again. You will see that the last number is 4-24, not 4-22.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS LESSON,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A  
IN UNIT II - LESSON 3.

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**

**MOS 31M10**  
**STUDENT GUIDE**



**UNIT III**  
**LISTENING SKILLS**

**LESSON 1**  
**REMEMBERING INFORMATION HEARD IN LECTURES**

**PREREQUISITE: None**  
**MATERIALS REQUIRED: Audiotape**  
**TYPE OF LESSON: Self-Paced**

UNIT III. LISTENING SKILLS

Lesson 1. Remembering What You Have Heard in a Lecture

INTRODUCTION:

Much important information in the 31M course will come from the lectures and demonstrations you will get in the classroom and out in the field. Most of the time, you will be able to take notes on these lectures and demonstrations. Your notes will help you remember what the instructor said. But sometimes you will not be able to take notes. For example, when you are in the field and the instructor demonstrates the equipment in the vans for the first time, you won't have room to write because a lot of people will all be standing up in a small space. The instructor will point out the equipment in the van and describe it. You will have to remember what he says without taking notes. This may sound hard to do, but there are ways to help you remember. In this lesson, you will learn some of those ways.

LEARNING OBJECTIVES:

In this lesson you will learn to:

- A. Listen carefully (p. 2).
- B. Recognize important points in a lecture (p. 6).
- C. Store what you hear in your memory (p. 15).
- D. Recall what you have stored in your memory (p. 34).

On the pages that follow, you will find material to read and questions to answer. Most of the time, you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

When you finish the lesson, your instructor will give you a checkpoint. When you finish the checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

GO TO THE NEXT PAGE TO BEGIN THE LESSON.

Section A

Listening Carefully

Being able to listen and remember what you hear is very important in the 31M course. Much information will be given in class lectures and demonstrations. Usually you will be able to take notes. But sometimes that won't be possible. Whether you take notes or not, the first important thing in listening to a lecture is to listen carefully. That sounds simple enough. But actually, it takes some practice. Here is an exercise to give you some practice in listening to and following directions a step at a time.

Directions:

1. LISTEN TO THE AUDIO CASSETTE TAPE FOR UNIT III, LESSON 1, LECTURE 1.
2. YOU WILL NEED A PENCIL AND THIS STUDENT GUIDE FOR THIS EXERCISE EXERCISE.
3. AFTER YOU FINISH THE EXERCISE, THE TAPE WILL TELL YOU WHAT TO DO NEXT.

\*\*IF YOU NEED HELP OPERATING THE TAPE RECORDER, SEE YOUR INSTRUCTOR\*\*

START THE TAPE NOW.

EXERCISE 1

FOLLOW THE DIRECTIONS ON THE AUDIO CASSETTE TAPE.

A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

P

CHECK YOUR ANSWER ON PAGE 36.

Exercise 1 was fairly easy. Here's another exercise to give you some more practice in listening to and following directions a step at a time. This one is a bit more difficult.

Directions:

1. BEFORE YOU START THE TAPE FOR EXERCISE 2, RESET THE TAPE COUNTER TO ZERO. YOU MAY NEED TO PLAY EXERCISE 2 AGAIN.
- \*\* IF YOU CAN'T FIND THE TAPE COUNTER, ASK YOUR INSTRUCTOR\*\*
2. LISTEN TO LECTURE #2, WHICH COMES RIGHT AFTER LECTURE #1 ON THE TAPE.
3. YOU WILL NEED A PENCIL FOR THIS EXERCISE.
4. AFTER YOU FINISH THE EXERCISE, THE TAPE WILL TELL YOU WHAT TO DO.

START THE TAPE NOW.

EXERCISE 2

DRAW FIGURES ON THIS PAGE ACCORDING TO DIRECTIONS  
ON THE AUDIO CASSETTE TAPE.

CHECK YOUR ANSWER ON PAGE 37.

Unit III  
Lesson 1

## Section B

### Listening for Important Points in a Lecture

In the exercises you just did, you had to listen to and follow directions given one step at a time. You will do that kind of listening in the 31M course. Of course, the actions you will perform will be on radio equipment.

There is also a different kind of listening you will have to do in the 31M course. This kind involves listening to descriptions of pieces of equipment and remembering what was said about the equipment. You will mostly have to do this kind of listening when you are introduced to the equipment in the vans, out in the field. Remember, you usually won't be able to take notes immediately. It's a good idea, though, to write down what you remember as soon as you have a chance. (That might not be until the end of the day.)

That kind of listening is different from the first kind of listening (what you did in the exercises) in a couple of ways.

*DIFFERENCE #1.* The information will not be step-by-step actions. Instead, it will mostly be descriptions of equipment, where a piece of equipment is located, what the function of the equipment is, and so on.

*DIFFERENCE #2.* There won't be any steps for you to perform actions on equipment.

While you are listening to this kind of information, there is one very important thing that you have to do: YOU HAVE TO PICK OUT WHAT THE IMPORTANT POINTS ARE.

Why do you have to do that? Because it is not possible to remember a subject with all its details all at once. If you try to do that, you will be confused and end up LEARNING LESS than if you try to learn the IMPORTANT POINTS first.

How can you tell what the important points are? One way is to listen for signals the instructor gives you.

Here are some ways an instructor signals which are the most important points:

- . repeats information
- . changes tone of voice or loudness
- . pauses before or after an important point
- . makes comments like: "Now pay attention to this," or "You'll need this information," and so on.

For an example of these signals an instructor gives while lecturing, do the next exercise.

Directions:

1. LISTEN TO LECTURE # 3 ON THE AUDIO CASSETTE TAPE.
2. DO NOT TAKE NOTES.
3. WHEN YOU ARE DONE LISTENING TO THIS SHORT LECTURE, ANSWER THE QUESTIONS BELOW.

START THE TAPE NOW.

EXERCISE 3

1. Which of these signals did the instructor use?

- a. Repeats points. III 1-9
- b. Changes tone of voice or loudness.
- c. Pauses before or after an important point.
- d. Uses comments like: "Pay attention to this," "You will need to know this," etc.

2. Did the instructor use any other signal of importance? If so, what was it?

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3. Which of the following is the main point of the short lecture?

- a. Disadvantages of radio
- b. Kinds of radio equipment
- c. Advantages of radio
- d. How radio frequency energy is changed into sound.

CHECK YOUR ANSWERS ON PAGE 38.

You have seen that the instructor can help you to pick out the most important information from the less important details. However, some signals, like a change in tone of voice, are hard to notice. It's a good idea not to rely too much on these signals. There is another way you can pick out the important information. Let's call this way USING ORGANIZERS.

What is an Organizer? It's something that helps you put information in order. In this case, using Organizers will help you sort out which pieces of information you will need to know and remember.

This next section on Organizers might be a little hard to understand at first. If you find it hard, REREAD it. Stick with it. This section is important.

Before you start the section on Organizers, ANSWER THE FOLLOWING QUESTIONS:

#### EXERCISE 4

1. This part of the lesson is about how to pick out important information from less important details. Two ways of doing this have been mentioned. What are those two ways?

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2. Look over the paragraphs on the top of the page again. Pick out two ways the writer of this lesson uses to tell you that using Organizers is information you should remember.

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CHECK YOUR ANSWERS ON PAGE 39.

## Organizers for the 3IM Course

In the 3IM course, you will be given a lot of detailed information. All of it will be new to you. That can be hard to deal with unless you can organize the information in some way. Here are some ideas to help you do that.

Most of the important information you will have to deal with in learning to operate the various pieces of radio equipment can be grouped under several headings, or Organizers.

These are the Organizers or kinds of information you will have to remember:

### NAMES -

- a. of the whole system, for example: AN/TRC-24
- b. of components or units, for example: Transmitter
- c. of dials, meters, switches, for example: Test Meter

FUNCTIONS - what the system, or component, or switch, or whatever does.

### LOCATION -

- a. Where in the van a piece of equipment is located.
- b. Where on the component a particular dial, switch, or meter is located.

PROCEDURES - what you do with the equipment.

To show you how to use these Organizers and give you practice in using them, do the exercise on the next page.

Directions:

1. BEFORE YOU START THE TAPE, RESET THE TAPE COUNTER TO ZERO.
2. LISTEN TO LECTURE #4. YOU WILL HEAR A SHORT DESCRIPTION OF SOME EQUIPMENT.
3. LISTEN FOR AND REMEMBER ALL NAMES OF EQUIPMENT THAT ARE MENTIONED.
4. DO NOT TRY TO REMEMBER ANYTHING ELSE BUT NAMES.
5. DO NOT TAKE NOTES.
6. AFTER YOU FINISH LISTENING, ANSWER THE QUESTION BELOW.

START THE TAPE NOW.

EXERCISE 5 (PART 1)

1. Write down all the equipment names you can remember hearing in this lecture. If you can recall the full name (with letters and numbers), include that.
  - a. Name of the Radio Set: \_\_\_\_\_
  - b. Names of the components in the Transmitting equipment: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
  - c. Names of the components in the Receiving equipment: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
  - d. Name of the Antenna: \_\_\_\_\_

CHECK YOUR ANSWER ON PAGE 40.

Now for practice in using another of the Organizers.

Directions:

1. REWIND THE TAPE TO ZERO ON THE TAPE COUNTER.
2. LISTEN TO LECTURE #4 AGAIN.
3. LISTEN FOR AND REMEMBER ALL FUNCTIONS THAT ARE MENTIONED. FUNCTIONS MEAN DESCRIPTIONS OF THE PURPOSE OF THE EQUIPMENT, OR WHAT IT IS FOR.
4. DO NOT TAKE NOTES
5. AFTER YOU FINISH LISTENING, ANSWER THE QUESTION BELOW.

EXERCISE 5 (PART 2)

2. Write down all the equipment functions you can remember hearing in this lecture.

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CHECK YOUR ANSWER ON PAGE 41.

Now for practice using another of the Organizers.

Directions:

1. REWIND THE TAPE TO ZERO ON THE COUNTER.
2. LISTEN TO LECTURE #4 AGAIN.
3. LISTEN FOR AND REMEMBER ALL LOCATIONS THAT ARE MENTIONED.
4. DO NOT TAKE NOTES.
5. AFTER YOU FINISH LISTENING, ANSWER THE QUESTION BELOW.

EXERCISE 5 (PART 3)

3. Write down all the locations of various pieces of equipment you can remember hearing in this lecture.

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CHECK YOUR ANSWER ON PAGE 42.

That is the end of this exercise on Organizers. Maybe you noticed that one Organizer was not included - PROCEDURES. The lecture didn't describe any actions you had to perform. That will be included later in this lesson.

Before you go on to the next part of the lesson, here is a quick question. Can you remember any information in the lecture that did not fit into these three Organizers: NAMES, FUNCTIONS, LOCATIONS?

The information on the number of available channels in the high band range and low band range and the fact that some configurations of the radio set have both bands don't fit into any of those Organizers. That does not mean that those pieces of information are useless. It does mean that that information is not the most important, however. That is information you can learn after you learn the most important things.

Remember: It is impossible to learn a topic with all its details all at once. If you try to do that, you will be confused and will end up learning less than if you tried to learn only the most important things to start with.

## Section C

### Storing What You Hear in Your Memory

Once you know what information is important to remember, you have to remember it. How do you remember things? You have probably noticed that some things you can remember easily while other things are harder to remember. Generally, the things you remember easily are the things that interest you. You already know a fair amount of information about the subjects you are interested in. So, when you hear new information on one of those subjects, you can RELATE it to what you already know. That is one way people remember things. In this section, you will read about and get some practice in using five different ways to remember information.

The five methods are:

1. Relating new information to information you already know
2. Paraphrasing (saying the same thing in your own words)
3. Grouping
4. Asking and answering your own questions
5. Repeating word-for-word

Each method will be presented one at a time.

Method 1. Relating new information to information you already know.

When you start the 31M course, all the information will be new so this method won't be too helpful right at the start. By the end of the second week, however, you will already have learned a lot. Just about everything you learn in the following weeks can be related to something you learned in an earlier week.

Even though you don't know anything about the radio equipment used in the 31M course when you start the course, you do know some information about radio and television that you can relate new information to. For example, you know that there are different channels for TV and stations for radio and that you have to tune your set to receive a particular channel or station clearly.

So when you learn about tuning and radio channels in the 31M equipment, you can relate it to what you do with your own radio.

How do you relate new information to information you know already? A good way is to ask yourself (or your instructor) this question: What is this new idea like in everyday life?

Your instructor will often point out relationships or similarities to help you remember new things. But you should also look for the relationships yourself.

Remember, when you relate new information to what you already know, that does not mean the new information is exactly like what you already know. Tuning a piece of 31M equipment is, of course, more complicated than tuning the radio in your car. Making these relationships is a way of helping you remember the new information.

Here's another example of relating something new to something you already know about. Some of the equipment used in 31M sends and receives messages over a cable (or wire). That is not like radio or TV, which send and receive messages through the air. What is 31M cable equipment like? Can you think of something in everyday life that sends and receives messages over a cable?

Probably by the time you finished reading that last sentence, you had already thought of the telephone. (Or you might have thought of cable TV.)

Now for some practice in relating new information to old information. In this exercise, you won't relate the new information to things you know about in everyday life. This exercise is more like what you will do in the 31M course when you relate information you are learning today to something you learned last week.

DO THE EXERCISE ON THE NEXT PAGE.

Directions:

1. READ THE FIRST SELECTION BELOW. WE WILL SAY THAT IS INFORMATION YOU ALREADY KNOW. (YOU DON'T HAVE TO MEMORIZE IT. YOU CAN REREAD IT WHENEVER YOU WANT TO.)
  2. NEXT, READ THE SECOND SELECTION. THAT WILL BE THE NEW INFORMATION YOU HAVE TO REMEMBER.
  3. THEN ANSWER THE QUESTIONS. THEY WILL ASK YOU TO FIND RELATIONSHIPS BETWEEN THE INFORMATION IN THE TWO SELECTIONS.
- 

Selection 1

Recognizing Fire Situations

There are several different kinds of fire situations. It's important to be able to tell them apart because what you do about each situation is different.

The first type of fire situation is smoldering. As an example of smoldering, you may have something like a motor or conveyor belt, or a pile of oily rags that have heated up enough to start giving off a burning smell and maybe a little smoke. But there are no flames yet.

The second type of fire situation is referred to as a fightable fire. An example of this type is a fire that is sending out a lot of flames and some smoke. The smoke is not the heavy, thick, black kind. You can get close enough to the fire to fight it. There is a very good chance of putting out this type of fire with a fire extinguisher.

The third type of fire situation is called an out-of-control fire. An example of this type is a fire that gives off a lot of thick, heavy, black smoke. The smoke is so thick you can't get close enough to the fire to fight it. There is a very poor chance of putting out this type of fire with a fire extinguisher.

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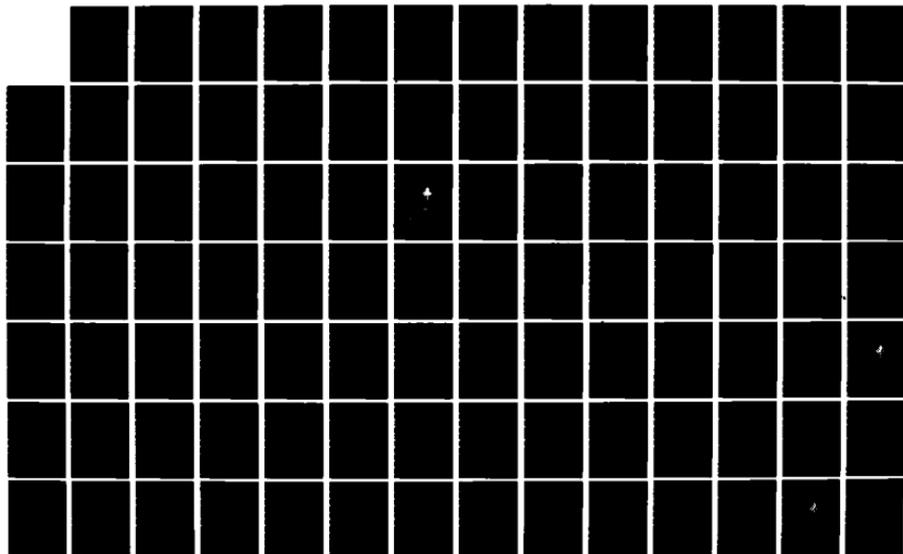
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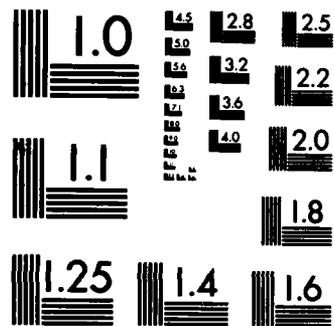
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MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

Selection 2

What to Do in Case of a Fire

Now we'll talk about what you should do in case of a fire. Let's say you see a fire that is making a lot of thick, black smoke. There is so much smoke you can't see the flames.

What should you do? You should not get a fire extinguisher and try to fight this fire.

The first thing you should do is alert others nearby. Especially, make sure that the person in charge is alerted. That person will organize the crew to leave the area of the fire. He will also notify someone outside the fire area so that trained firefighters with heavy duty equipment can be sent immediately.

---

EXERCISE 6

1. The information in Selection 2 is related to one of the types of fire described in Selection 1. Which type is it?

---

2. How is the information in Selection 2 related to the information in Selection 1? Describe the connection in your own words.

---

---

---

CHECK YOUR ANSWERS ON PAGE 43.

Method 2. Paraphrasing (Saying the same thing in your own words)

Another method for remembering information is to repeat it, but not to repeat it the way the instructor said it. Instead, you will remember it better if you change the words (but keep the same meaning). That is called "paraphrasing."

Here's an example of paraphrasing:

The instructor said: "Slowly adjust the Fine Tune Control until you get a maximum right hand deflection on the Test Meter. That means the indicator needle on the meter goes as far to the right as possible."

The student said (silently): "Turn the Fine Tune Control slowly until the needle on the test meter is all the way to the right."

Notice that the student said the same thing but used different words to say it.

Here's another example of paraphrasing:

The instructor said: "A front panel meter on the Voltage Regulator indicates the regulated alternating current - or AC - output voltage applied to the receiver and transmitter."

The student said (silently): "A meter on the front of the Voltage Regulator shows how much voltage is going to the receiver and transmitter."

Now for some practice in listening and paraphrasing.

Directions:

1. LISTEN TO LECTURE #5 ON THE AUDIO CASSETTE TAPE.
2. YOU WILL NEED A PEN OR PENCIL FOR THIS EXERCISE.
3. YOU WILL HEAR 5 SHORT STATEMENTS LIKE THE ONES YOU JUST READ. AFTER EACH ONE, YOU WILL BE TOLD TO STOP THE TAPE AND WRITE DOWN IN YOUR OWN WORDS WHAT YOU HEARD.
4. FOLLOW THE DIRECTIONS ON THE TAPE.

START THE TAPE NOW.

Unit III  
Lesson 1

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EXERCISE 7

WRITE YOUR PARAPHRASES IN THE SPACES BELOW.

Statement 1 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Statement 2 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Statement 3 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Statement 4 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Statement 5 \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 44.

### Method 3. Grouping Information

When you have a lot of separate facts to remember, it is helpful if you can gather them together into related groups. Notice the word "related." You used relations in Method 1, Relating new information to information you already know. And back in Section A of this lesson, you used Organizers. Well, Grouping is a way of organizing related information.

Here's an example of grouping:

If you went to the store to buy the following items, you might find it hard to remember them all.

hamburger	lettuce	pork chops
milk	steak	tomatoes
celery	eggs	butter

But if you grouped these items so that related items were together, you would have little trouble remembering them

(Meat)	(Vegetables)	(Dairy)
hamburger	celery	milk
steak	lettuce	butter
pork chops	tomatoes	eggs

In this case, you already know the names of the groups (Meat, Vegetables, Dairy) and you know which items belong to which groups. With the information in the 31M course, grouping is a bit harder.

Here's another example, this time from material that is like what you will learn in the 31M course.

Read the following information:

Multiplexer TD-202/U. The TD-202/U is a 12- or 24-channel, pulse code modulation (pcm), radio transmission interface unit. Its transmit section accepts time division multiplex (tdm) pcm outputs from one or two TD-352/U's, a TD-204/U, or from another TD-202/U, and processes these outputs for radio transmission. The receiver section accepts a pcm signal from a radio receiver, processes and retimes it, and extracts the order wire signal.

Here is one way of Grouping (or reorganizing) that information:

- Names of units (pieces of equipment):

Multiplexer TD-202/U  
TD-352/U  
TD-204/U

- Sections of units:

Transmit section of the TD-202/U  
Receive section of the TD-202/U

- Functions of units or sections:

Transmit section accepts output from other multiplexers  
and processes the outputs for radio transmission.

And so on.

Here is another grouping you can do with that information:

The TD-202/U is called a Multiplexer. Two other units are  
mentioned: the TD-352/U and the TD-204/U. Since these ID  
numbers also begin with the letters TD-, these units must  
also be \_\_\_\_\_ . (Fill in the blank.)

CHECK YOUR ANSWER ON THE NEXT PAGE.

ANSWER TO QUESTION ON THE PREVIOUS PAGE.

Since these ID numbers also begin with the letters TD-, these units must also be multiplexers.

Explanation: By noting that the ID numbers begin with the same letters, you are able to group all those units together as one type: multiplexers. Units that belong to the same type all have ID numbers that start with the same letters.

---

GO ON WITH THE LESSON.

---

How do you group information?

1. Listen carefully to the information you will have to learn. (Or look it over carefully, if it is material you are reading.)
2. Search for kinds of information that are alike.
3. Put names to those different kinds of information. (Make them into Organizers.)
4. Put the appropriate items of information with the proper Organizers.

Here are the Organizers that were mentioned in Section A of this lesson:

NAMES -

- a. of the whole system; for example, AN/TRC-24
- b. of components, or sections; for example, Transmitter
- c. of dials, meters, switches; for example, Test Meter

FUNCTION -

What the system, component, or switch or whatever does.

LOCATION -

- a. Where in the van a piece of equipment is located.
- b. Where on the component a particular dial, switch, or meter is located.

PROCEDURES -

Actions that you do on the equipment.

Other organizers are possible. For example, one more organizer that can be used with the information on the TD-202/U multiplexer might be called CONNECTING UNITS. In other words, what kinds of units is the TD-202/U used with? (Maybe you can think of a better name for this organizer than "connecting units.")

The selection tells you that the TD-202/U is used with other multiplexers, either TD-352/U TD-204/U, or another TD-202/U.

The kind of grouping you will be able to do when listening to lectures (without taking notes) is simple grouping. There is only a small group of organizers you will need to use in the 31M course. The most important ones you have already seen are:

NAMES OF EQUIPMENT  
PARTS OF UNITS  
LOCATIONS  
FUNCTIONS  
PROCEDURES

These are not the only organizers you can use or will need. But they will get you started. You will be able to think of others as you need them.

Now for some practice in Grouping information. Read the following selection. It is on the procedure for connecting a van containing radio equipment to a power source.

---

#### Power Connections

Make sure the van has been grounded before power connections are made.

Make sure that all circuit breakers and equipment power switches in the van are in the off position. Then remove the power cable, which is stored on a reel, from the van. Unwind the power cable from the reel.

Power to the van is normally supplied through a POWER 115 VOLT AC IN connector. Remove the cover from the 115 VOLT POWER IN connector in the POWER ENTRANCE BOX on the outside of the van. Remove the cover from one end of the power cable. Connect the power cable to the 115 VOLT AC POWER IN connector.

Make sure the power generator is turned off. Connect the other end of the power cable to the POWER OUT connector on the power generator.

---

EXERCISE 8

1. Write down some Organizers that are appropriate for the selection on the previous page. Under each Organizer, write all the items of information in the selection that belongs with that Organizer. Use the space below.

CHECK YOUR ANSWER ON PAGE 46.

Unit III  
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Now for some practice in listening and grouping. When you are listening without being able to take notes, only fairly simple grouping is possible. So this exercise will not be difficult.

Directions:

1. RESET THE TAPE COUNTER TO ZERO.
2. LISTEN TO LECTURE #6 ON THE AUDIO CASSETTE TAPE.
3. DO NOT TAKE NOTES.
4. WHEN YOU ARE DONE LISTENING TO THIS SHORT LECTURE, ANSWER THE QUESTION BELOW.
5. AFTER YOU ANSWER THE QUESTION, PLAY LECTURE #6 AGAIN AND CHECK YOUR ANSWER.

START THE TAPE NOW.

EXERCISE 9

1. Write down some Organizers that are appropriate for the lecture you heard. Under each organizer write all the items of information in the lecture that belong with that organizer. Use the space below and on the next page.

NOW PLAY LECTURE #6 AGAIN  
AND SEE IF YOU CAN ADD ANYTHING TO YOUR ANSWER.

THEN CHECK YOUR ANSWER ON PAGE 47.

Unit III  
Lesson 1

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#### Method 4. Asking Your Own Questions

Asking questions is, of course, a way of finding out information from people. But this part of the lesson is about a different kind of question asking.

A way of remembering information you have just heard is to turn it into a question. (You do this in your own mind; you don't actually ask the question out loud. You don't need to, because you already have the answer!) Here's an example of how that works.

The instructor said: "Turn the power switch on the CN-514/GRC to ON. The POWER ON indicator will light. Then turn the MANUAL/AUTOMATIC switch to AUTOMATIC. The meter should indicate 115 volts."

Here are some questions you could make up from the above information:

Question 1. Where is the power switch? (On what unit?)

Question 2. How do I know if the power is on?

Question 3. What switch do I turn next?

Question 4. What should happen after I put the MANUAL/AUTOMATIC switch to AUTOMATIC?

The answers to these questions are right there in the information the instructor gave you. To make sure that that is clear to you, go ahead and answer the questions. Do it from memory, if you can. If you don't remember the answers, look back at what the instructor said.

ANSWER THESE QUESTIONS

1. On what unit (piece of equipment) is the power switch located?

---

2. How can you tell that the power is on after you flip the switch?

---

3. After you turn on the power, what switch do you go to?

---

4. What should happen after the MANUAL/AUTOMATIC switch is put in the AUTOMATIC position?

---

CHECK YOUR ANSWERS ON THE NEXT PAGE.

ANSWERS TO QUESTIONS ON THE PREVIOUS PAGE.

1. The CN-514/GRC
2. The POWER ON indicator will light up
3. The MANUAL/AUTOMATIC switch
4. The meter should show 115 volts

---

GO ON WITH THE LESSON.

---

Now for some practice in asking your own questions.

READ THE FOLLOWING INSTRUCTIONS:

Checking Unpacked Equipment

- a. Inspect equipment for possible damage that may have occurred during shipment. If the equipment has been damaged, refer to paragraph 1-3 of your Manual for the applicable forms and records to fill out.
- b. Check to see that the equipment is complete as listed on the packing slip. If a packing slip was not included, check the equipment against the basic issue items list (in Appendix A of the Manual.)

EXERCISE 10

1. NOW WRITE THREE QUESTIONS AND ANSWERS FROM THE INFORMATION ON THE PREVIOUS PAGE. WRITE THEM IN THE SPACES PROVIDED.

IMPORTANT: YOUR QUESTIONS SHOULD NOT ASK FOR NEW INFORMATION. THEY SHOULD ONLY ASK FOR INFORMATION THAT IS ALREADY THERE.

Your Question 1:

Answer:

Your Question 2:

Answer:

Your Question 3:

Answer:

CHECK YOUR ANSWERS ON PAGE 48.

Now for some practice in listening and making up your own questions.

Directions:

1. LISTEN TO THE AUDIO CASSETTE TAPE FOR LECTURE #7.
2. DO NOT TAKE NOTES.
3. WHEN YOU ARE DONE LISTENING TO THIS SHORT LECTURE, ANSWER THE QUESTION BELOW.

START THE TAPE NOW.

EXERCISE 11

1. WRITE THREE QUESTIONS AND ANSWERS FROM THE INFORMATION IN THE LECTURE.

Your Question 1:

Answer:

Your Question 2:

Answer:

Your Question 3:

Answer:

CHECK YOUR ANSWERS ON PAGE 49.

### Method 5. Repetition

This is a way of remembering things that almost everybody knows about and uses sometimes. To use this method you just repeat over and over, in the same words, the information you want to remember. You can do this completely silently, or quietly to yourself, or out loud (if there is nobody around to be disturbed). Repeating out loud is the best way. You will remember the information better if you can repeat it out loud.

You won't need any practice in this method. What you will need to learn about this method is when it ought to be used and when it should not be used.

Let's start with when repetition should not be used. It is not a good method to use during a lecture or demonstration. The reason is that while you are repeating (and you have to repeat information many times), you will miss the next thing the instructor says.

If repetition is not a good method to use during a lecture, why is it included in this lesson?

The answer is that a large number of students reported that they do use this method as a way of remembering during a lecture. Yet when these same students were tested on how much they remembered of the lecture, they did not do as well as students who used other methods. So it is mentioned here as a sort of warning not to use repetition during a lecture.

When is the repetition method good to use? It is best to use repetition when you are studying alone.

Repetition is very effective when you are learning information like:

- names of the units
- names of meters, switches, and dials
- short lists of things, like all switches that are on a particular unit
- short lists of steps, like "the 4 steps for setting up the XYZ - power supply arc," etc.

## Section D

### Recalling What You Stored in Memory

Once you have information stored in your memory, you want to be able to remember or recall it when you need it. There are a few simple methods that can help you do this.

Some people recall things by using a word as a cue. This word can often be a name of a unit or section of a unit, or of a switch or whatever. When you have used Grouping and Repetition to store information in your memory, using a word to recall the information is helpful.

For example, by recalling the name of a particular switch, you can recall where it is located and what action you do with the switch.

Other words you can use to cue recall of information are the Organizers you used to learn the information. For Example: FUNCTION, PROCEDURES, and so on.

When you have used the method of relating new information to what you already know in order to learn something, you can recall the new information by thinking of the old information.

Remember, most of the time in the 31M course, you will be able to take notes. But sometimes you will have to rely on your memory to learn new information, at least for a couple of hours till you have a chance to write it down.

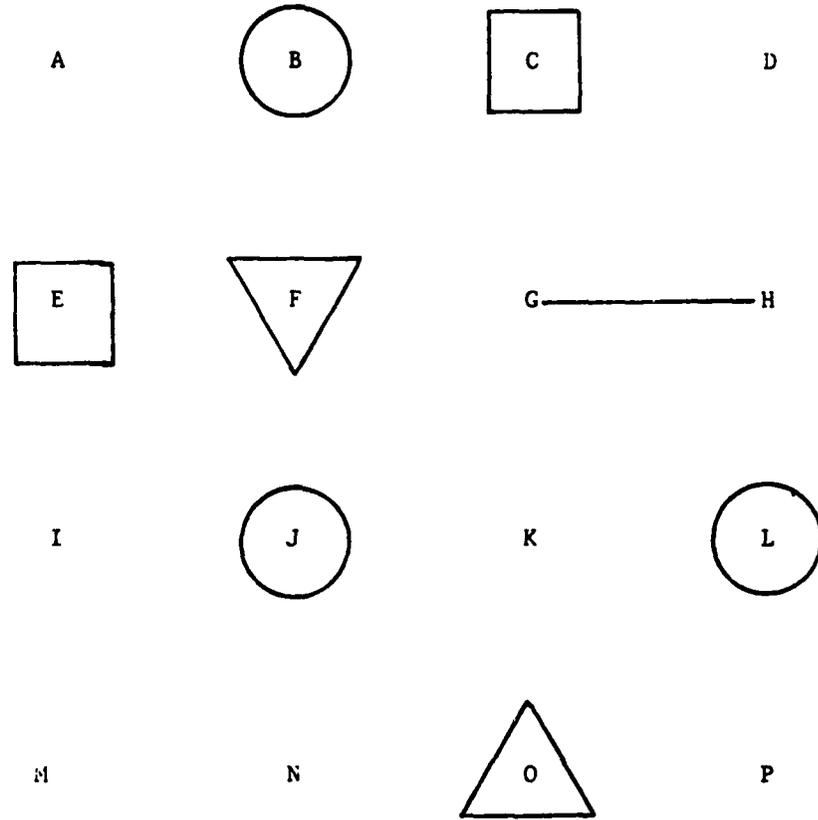
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A/B  
IN UNIT III - LESSON 1.

ANSWER KEYS TO EXERCISES IN UNIT III, LESSON 1

Unit III  
Lesson 1

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ANSWER TO EXERCISE 1



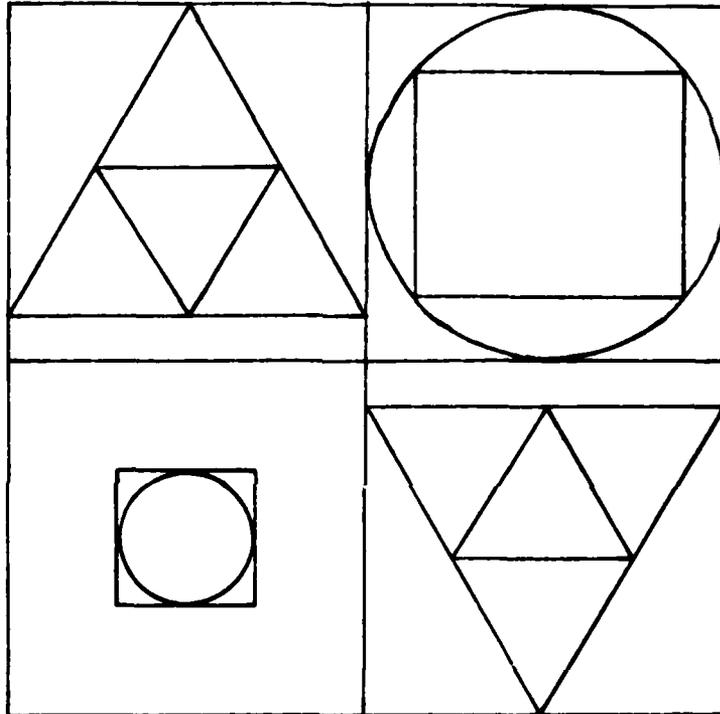
NOTE: THE LINE BETWEEN J AND L CAN BE ANY SHAPE, JUST SO IT DOES NOT TOUCH THE LETTER K.

IF YOU DID NOT GET THIS EXERCISE CORRECT,  
PLAY THE TAPE AGAIN AND FIND OUT WHERE YOU MADE THE ERROR.

IF YOU GOT THE ANSWER CORRECT, CONTINUE WITH THE LESSON.

ANSWER TO EXERCISE 2

Your page of drawings will look something like the picture below. Your drawings do not have to be exactly like these. However, you should have the same shapes in the same locations on the page. Also, make sure your triangles are pointing in the directions shown here.



IF YOU DID NOT GET THIS ANSWER RIGHT,  
PLAY THE EXERCISE #2 PART OF THE TAPE AGAIN.  
TO DO THAT, REWIND THE TAPE TO ZERO.

IF YOU GOT THE ANSWER RIGHT,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 3

1. a, c, and d.

Explanation: (a) The lecturer definitely repeated the advantages of radio. (b) Maybe you heard the lecturer use a change in tone of voice. If you checked b, that is O.K. It is not always easy to be sure when an instructor uses this signal.

(c) The instructor did use pauses. But if you did not check c, that is O.K. It is not always easy to notice when an instructor uses this signal.

(d) The instructor said, "You will need to know this, so listen carefully."

2. Yes. The instructor spelled the word "electromagnetic."

Explanation: Spelling out a word is a signal that it is important.

3. c.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON WITH THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 4

1. Listening for the instructor's signals.

Using organizers.

Explanation: Your answer doesn't have to be in exactly those words. But you should have the two main ideas. If you missed them, don't worry. You have the right idea now.

2. The word "Organizers" is repeated several times.

The sentence, "This section is important" is used.

Explanation: Your answer doesn't have to be in exactly those words. If you missed the answer, don't worry. But keep a sharp eye out for signals of importance as you do this lesson.

---

GO ON WITH THE LESSON.

ANSWERS TO EXERCISE 5 (PART 1)

1. a. Name of the Radio Set: AN/TRC-24
- b. Name of the components in the Transmitting equipment: Transmitter, Radio T-893/GRC, Power Supply PP-2054/GRC, Amplifier Oscillator AM 1957/GRC
- c. Names of the components in the Receiving equipment: Receiver, Radio R-1148/GRC, Amplifier-Converter AM-1955/GRC
- d. Name of the Antenna: AT-903/G

NOTE: You don't have to have the / and the - in your answers.

THAT WAS A LOT TO REMEMBER.

IF YOU MISSED 4 OR MORE NAMES,  
REWIND THE TAPE TO ZERO AND LISTEN TO LECTURE #4 AGAIN.

KEEP THIS ANSWER PAGE IN FRONT OF YOU,  
AND LISTEN FOR THE MOMENT WHEN EACH NAME IS MENTIONED.

IF YOU MISSED 3 OR FEWER NAMES, YOU DID VERY WELL.  
GO ON WITH THE EXERCISE.

IF YOU HAVE ANY QUESTIONS, SEE YOUR INSTRUCTOR.

ANSWER TO EXERCISE 5 (PART 2)

2. a. Function of the AN/TRC-24 radio set: a radio link in a communication network OR to provide multichannel, line of sight two-way communication

Explanation: Both of these statements were made in the lecture. Either answer is correct. If you put down both, you are doing very well. If you mentioned the number of operating channels, that's O.K. but you should also have one of the above statements.

- b. Function of the Antenna AT 903/G: for transmitting and receiving radio frequency energy.

Explanation: These two are the only Functions actually mentioned in the lecture. If you mentioned the function of the Power Supplies, that's O.K. It shows that you were able to understand the function of a piece of equipment even when the function was not actually mentioned.

IF YOU MISSED EITHER PART OF THIS ANSWER,  
REWIND THE TAPE TO ZERO AND LISTEN TO LECTURE #4 AGAIN.

KEEP THE ANSWER PAGE IN FRONT OF YOU,  
AND LISTEN FOR THE MOMENT WHEN EACH FUNCTION IS MENTIONED.

IF YOU GOT BOTH PARTS OF THE ANSWER,  
GO ON WITH THE EXERCISE.

---

ANSWER TO EXERCISE 5 (PART 3)

3. a. All operating controls, meters, and input and output connections are located on the front panels of the various units;
- b. The power supply for the transmitter is stacked on top of the radio T-893/GRC.
- c. The power supply for the receiver is located in the lower rear deck of the receiver.

Explanation: Your answers don't have to be in these exact words. These are all the locations that were mentioned in the lecture.

IF YOU MISSED ANY PART OF THIS ANSWER,  
REWIND THE TAPE TO ZERO AND LISTEN TO LECTURE #4 AGAIN.

KEEP THE ANSWER PAGE IN FRONT OF YOU  
AND LISTEN FOR THE MOMENT WHEN EACH LOCATION IS MENTIONED.

IF YOU GOT ALL THREE PARTS TO THIS ANSWER, GO ON WITH THE LESSON.

ANSWERS TO EXERCISE 6

1. Out-of-control fire

Explanation: Selection 2 doesn't mention that type of fire by name. But it does describe a fire that is making "a lot of thick, black smoke." In Selection 1, an out-of-control fire is described as one that makes "a lot of thick, heavy, black smoke."

2. Selection 2 tells what to do in one type of fire situation.

Explanation: Your answer does not have to be in these words. It should have the same idea, however.

IF YOU AREN'T SURE WHETHER YOUR ANSWER TO QUESTION 2 IS CORRECT,  
SEE YOUR INSTRUCTOR.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 7

NOTE: YOUR ANSWERS WILL, OF COURSE, BE IN YOUR OWN WORDS.

BELOW ARE THE STATEMENTS AS THEY WERE GIVEN ON THE TAPE. SAMPLE PARAPHRASES ARE INCLUDED TOO.

CHECK YOUR PARAPHRASES TO MAKE SURE THEY SAY THE SAME THING AS THE STATEMENTS ON THE TAPE.

MAKE SURE YOU DID NOT LEAVE OUT ANYTHING IMPORTANT. HOWEVER, YOU DO NOT HAVE TO INCLUDE ALL THE DETAILS THAT WERE IN THE STATEMENTS.

Statement 1 (as given on the tape)

"Set the circuit breaker on the TCC-7 to the ON position. The associated glow lamp should light."

Here's a sample paraphrase. This is one way of paraphrasing Statement #1. Your paraphrase does not have to match this one exactly.

Sample Paraphrase: Turn the circuit breaker on the TCC-7 ON. The light should go on.

Statement 2 (as given on the tape)

"One disadvantage of radio is that it is not very secure. The enemy can listen in to your message."

Sample Paraphrase: (Yours does not have to match this one.)  
A disadvantage of radio is that the enemy can listen in.

Statement 3 (as given on the tape)

"You will need a screwdriver to make the next adjustment. Adjust the High Frequency control for a zero reading on the Test Meter."

Sample Paraphrase: (Yours does not have to match this one.)  
Use a screwdriver to adjust the High Frequency control until the Test Meter reads zero.

Statement 4 (as given on the tape)

"Communication with highly mobile units, such as ships, aircraft, and tanks, would be extremely difficult if radio communication were not available."

Sample Paraphrase: (Yours does not have to match this one.)  
Without radio, communication with mobile units like ships, planes, would be very hard.

Statement 5 (as given on the tape)

"There are two important switches on the Test Panel. The Measure Selective switch and the Measure Non-Selective switch. I'll repeat those names: The Measure Selective switch and the Measure Non-Selective switch. Whenever one of these switches is being used, the other switch should be in the OFF position.

Sample Paraphrase: (Yours does not have to match this one.)  
On the Test Panel there is a Measure Selective switch and a Measure Non-Selective switch. When one of these switches is in use, the other must be off.

HAVE YOUR INSTRUCTOR CHECK YOUR ANSWERS TO THIS EXERCISE.

THEN GO ON WITH THE LESSON.

---

ANSWER TO EXERCISE 8

NOTE: YOUR ORGANIZATION WILL NOT BE EXACTLY LIKE THIS ONE BUT IT SHOULD BE CLOSE.

NAMES OF EQUIPMENT/PARTS OF UNITS

van  
power cable  
circuit breaker  
power switches  
115 Volt AC POWER IN connector  
Power Entrance Box  
Power generator  
Power Out connector

PROCEDURES

- Procedures to do before hooking up power
  - . Make sure van is grounded
  - . Turn circuit breakers and equipment power switches off
  - . Make sure power generator is off
- Procedures for hooking up power
  - . Remove cable from van, unwind from reel
  - . Connect cable to POWER IN connector on van
  - . Connect cable to POWER OUT connector on generator

LOCATIONS

Circuit breakers and power switches in vans  
Power cable on reel in van  
115 VOLT AC POWER IN connector in POWER ENTRANCE BOX  
POWER ENTRANCE BOX on outside of van.

HAVE THE INSTRUCTOR CHECK YOUR GROUPING.  
THEN GO ON WITH THE LESSON.

ANSWER TO EXERCISE 9

1. NOTE: YOUR ORGANIZATION WILL NOT BE EXACTLY LIKE THIS ONE.

NAMES OF UNITS, PARTS OF UNITS

Telephone Terminal set  
Power Entrance Box  
Power Distribution Panel  
Signal Entrance Box  
Fluorescent lights

LOCATIONS

Power Entrance Box on outside rear wall of van  
Power distribution Panel on inside rear wall of van  
Signal Entrance Box on outside rear wall of van

FUNCTIONS

Telephone Terminal sets - transmits (sends) messages over cable  
Power Entrance Box - makes connection to power source, also  
intercom  
Power Distribution Panel - distributes power to equipment in  
van  
Signal Entrance Box - makes connection to telephone lines

HAVE THE INSTRUCTOR CHECK YOUR ANSWER.

---

THEN GO ON WITH THE LESSON.

ANSWERS TO EXERCISE 10

NOTE: THESE ARE SAMPLE ANSWERS. YOURS WILL BE DIFFERENT, MAYBE VERY DIFFERENT.

Sample Question 1: What do I do if equipment has been damaged?

Answer: See paragraph 1-3 in the Manual. It will give the forms and records.

Sample Question 2: How do I check to see if all the equipment is there?

Answer: Compare the equipment with what is listed on the packing slip.

Sample Question 3: What do I do if the packing slip is lost?

Answer: Use the basic issue items list (Appendix A of the Manual).

IF YOUR QUESTIONS AND ANSWERS ARE VERY DIFFERENT FROM THESE SAMPLES, HAVE YOUR INSTRUCTOR CHECK THEM.

REMEMBER, THESE QUESTIONS ARE NOT ASKING FOR NEW INFORMATION.

ANSWERS TO EXERCISE 11

NOTE: THESE ARE SAMPLE ANSWERS. YOURS WILL BE DIFFERENT, MAYBE VERY DIFFERENT.

Sample Question 1: What is the function [or purpose] of the AN/TRC-24 radio set?

Answer: To provide two-way communication in the ultra high frequency range.

Sample Question 2: What are the components of the Transmitting section of the AN/TRC-24?

Answer: Transmitter, Radio T-893/GRC, Power Supply PP-2045/GRC, and amplifier oscillator AM-1957/GRC

Sample Question 3: What is the function of the antenna?

Answer: To receive and transmit (send) radio frequency energy.

IF YOUR QUESTIONS AND ANSWERS ARE VERY DIFFERENT FROM THESE,  
HAVE THE INSTRUCTOR CHECK THEM.

THEN GO ON WITH THE LESSON.

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**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT III**  
**LISTENING SKILLS**

**LESSON 2**  
**REMEMBERING INFORMATION SEEN IN DEMONSTRATIONS**

**PREREQUISITE: None**  
**MATERIALS REQUIRED: Videotape**  
**TYPE OF LESSON: Self-Paced**

UNIT III: LISTENING SKILLS

Lesson 2. Remembering Information Seen in Demonstrations

INTRODUCTION:

In the 3IM course, much of your instruction will be in the form of demonstrations. The instructor will teach you how to do procedures by actually showing you each step on the equipment. Most of the time, you will be able to take notes on these demonstrations. Your notes will help you remember what the instructor said. But sometimes you will not be able to take notes. In these demonstrations, there can be a lot of information to remember. This lesson will show you some ways to remember the information.

LEARNING GOALS:

In this lesson you will learn to:

- A. Select and organize what to remember (p. 2).
- B. Store information in your memory (p. 9).
- C. Recall information from your memory (p. 23).

On the pages that follow, you will find material to read and questions to answer. You will also watch a videotape and answer questions about it (Sections A and B).

Most of the time, you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

When you finish the lesson, your instructor will give you a checkpoint. When you finish the checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

GO ON TO THE NEXT PAGE TO BEGIN THE LESSON.

## Section A

### Selecting and Organizing What to Remember

Being able to listen and watch carefully and remember what you hear and see is very important in the 31M course. Much of the information you will learn will be presented in demonstrations. Most of the time, you will be able to take notes during demonstrations. Sometimes that won't be possible. Even when you are able to take notes, you will find that the ideas in this lesson will help you to notice important points in a demonstration and remember them more easily.

It is not possible to remember a topic and all its details the first time you see and hear it. You will remember things better if you pick out only the most important points to start with and learn them first. In the 31M course, you will have more than one opportunity to see a procedure demonstrated. Each time you see it, you can add more information to what you remember.

How do you know which points are most important when you are watching a demonstration of some procedure for the first time? Your goal in the 31M course is to learn how to operate radio equipment. All the information you will have to learn can be organized into different types of information. There are only a small number of different types of important information you will have to learn.

Here is a list of the most important types of information you will need to look for and remember when watching demonstrations:

- . The PURPOSE of the procedure being demonstrated
- . NAMES of switches, meters, jacks, etc.
- . LOCATIONS of switches, meters, jacks, etc.
- . ACTIONS you perform on the equipment.
- . The ORDER of steps (actions you do) in the procedure
- . SIGNS that tell you when a step is done correctly

In this section of the lesson, you will see examples of these kinds of information and get practice looking for each kind of information.

Here is an example of these types of information.

The instructor starts the demonstration by saying something like this:

"I'm going to show you how to do the Transmit Line-up on the AN/TCC-7. The first part is Adjusting the Gain Control. Go to the Coarse Tune Control and slowly turn it to the right until the indicator on the Test Meter moves to the right."

NOTICE these different items of information that are in the instructor's statement.

- PURPOSE of the procedure being demonstrated:

Transmit Line-up on the AN/TCC-7. First part:  
Adjusting the Gain Control.  
(There will be other parts to the Transmit Line-up procedure.  
Adjusting the Gain Control is just the first part.)

- NAMES of switches, meters, jacks, equipment, etc.:

AN/TCC-7 (name of the system)  
Gain Control  
Coarse Tune Control  
Test Meter

- ACTION you perform on the equipment.

Turn the Gain Control to the right.

- SIGNS that tell you when a step is DONE CORRECTLY.

Adjust the Coarse Tune Control until the indicator on the Test Meter moves to the right. (The underlined part tells you when the Coarse Tune Control has been adjusted.)

NOTICE that these following types of information were not included in this short statement:

- LOCATION of switches, meters, etc.

(Of course, in a demonstration you can see where a switch or control is located. Even so, instructors will often describe the location as they point to a switch or meter, to make sure that you know where it is.)

- ORDER of steps.

(In this short portion, only one step was mentioned so, naturally, there wasn't any order of steps given.)

Later you will look at another short example that does include those two types of information.

Now you have seen examples of these four types of important information that will be found in demonstrations:

- . The PURPOSE of the procedure being demonstrated.
- . NAMES of switches, meters, controls, and other parts of the equipment.
- . ACTIONS you perform on the equipment.
- . SIGNS of when a step is done correctly.

Next you will get some practice in looking for examples of these kinds of information in a videotaped demonstration.

Directions:

1. TELL YOUR INSTRUCTOR YOU ARE READY TO WATCH THE VIDEOTAPED PRACTICE EXERCISES FOR UNIT III, LESSON 2.
2. WATCH THE VIDEOTAPE UNTIL THE FIRST FADEOUT. (THE SCREEN WILL GO BLANK.)
3. TURN OFF THE VIDEOTAPE PLAYER.
4. ANSWER THE QUESTION ON THE NEXT PAGE.
5. DO NOT TAKE NOTES.

EXERCISE 1

1. Write down at least one item of information from the demonstration that belongs to each type of information. (Write more than one if you can.)

a. The purpose of the procedure being demonstrated.

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b. Names of switches, controls, meters, etc.

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c. Actions you perform on the equipment.

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d. Sign of when a step is done correctly.

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CHECK YOUR ANSWER ON PAGE 26.

Here are some examples of the remaining types of information you will find in demonstrations:

- LOCATIONS of switches, meters, jacks, etc.

Sometimes the instructor will say something like this:

"Next go to the High Frequency control located on the bottom left-hand corner of the Test Panel."

NOTICE that the instructor has told you two things:

- . which piece of equipment the High Frequency control is on (Test Panel)
- . exactly where on that piece of equipment you will find the control (lower left-hand corner)

Sometimes the instructor won't say where a control is located, but since he is demonstrating the equipment you can see where the control is located.

- ORDER of steps in the procedure.

This, of course, is very important. The order in which the instructor does the steps is - naturally - the order in which you have to do them. Sometimes the instructor will emphasize the order of the steps by saying something like this:

"The first step is ...

Then for the second step, you do ...

The third step is ..."

But sometimes the instructor will not emphasize which step is the second step, which is the third and so on. You will have to notice the order for yourself and remember it.

Whether the instructor emphasizes it or not, the order in which he does the steps will be clear.

- SIGNS that tell you when a step is DONE CORRECTLY.

You have already seen one example of this kind of information but it is worth seeing another example.

The instructor will say something like this.

"Turn the power switch to ON. The indicator light will come on"  
Action Sign that the Action is O.K.

Or like this:

"Adjust the Fine Tune control until the Test Meter reads zero."  
Action Sign that the Action is O.K.

This kind of information is very important and it is easy to overlook.

Now for practice in looking for examples of these three kinds of information in a videotaped demonstration.

Directions:

1. RESET THE TAPE COUNTER TO ZERO.
2. WATCH THE SECOND PART OF THE DEMONSTRATION ON THE VIDEOTAPE. (IT IS ABOUT SETTING THE 1 KILOCYCLE (KC) CONTROL.)
3. AT THE NEXT FADEOUT (THE SCREEN WILL GO BLANK), TURN OFF THE VIDEOTAPE PLAYER.
4. DO NOT TAKE NOTES.
5. ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 2

1. Where is the 1 Kilocycle (KC) control located?

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2. Below are the steps performed in this short demonstration. The order in which the steps are shown is not the correct order. Number the steps in the correct order.

- \_\_\_ Set Measure Non-Select switch to the Check 1 KC position.
- \_\_\_ Adjust the 1 kilocycle (KC) control.
- \_\_\_ Put the jack plug into the 1 kilocycle (KC) jack.
- \_\_\_ Slide the Test Panel forward in the mounting rack.

3. What is the sign that you have adjusted the 1 kilocycle (KC) control properly?

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CHECK YOUR ANSWERS ON PAGE 28.

## Section B

### Storing Information in Your Memory

After you have picked out the important information, you have to store it in your memory. One of the ways people remember things that is especially helpful with demonstrations is called visualizing. To "visualize" something means to picture it in your mind. It is like drawing a diagram or picture of a piece of equipment in your mind. The picture does not have to be complete in all details. You only need to put in the parts of the equipment you saw used in the demonstration.

Your goal while watching demonstrations is to learn how to operate the equipment. So, when you visualize the procedure, you will want to include:

- all knobs, switches, jacks, and dials you will have to position
- all meters you will have to look at

Now for some practice in visualizing.

#### Directions:

1. RESET THE TAPE COUNTER TO ZERO.
2. WATCH THE THIRD PART OF THE DEMONSTRATION ON THE VIDEOTAPE. (IT IS ABOUT CHECKING THE HF (HIGH FREQUENCY) CONTROL.)
3. WATCH THE TAPE UNTIL THE END. THEN TURN OFF THE VIDEOTAPE PLAYER WHEN THE TAPE TELLS YOU TO.
4. DO NOT TAKE NOTES.
5. ANSWER THE QUESTIONS ON THE NEXT PAGE.

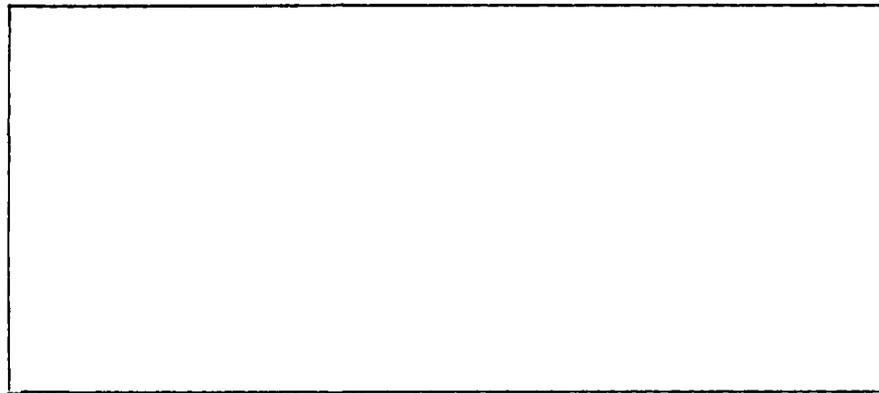
EXERCISE 3

1. Name all the switches, dials, controls, jacks, meters, etc. that the instructor used in this demonstration. (Just name them. You don't have to say what the instructor did with them.)

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2. This blank diagram represents the Test Panel that the instructor used in the demonstration. Draw on it each of the items you named in Question 1. (Your drawing should be very simple. Just draw a small circle to show a switch, dial, or control. Draw a larger circle if you want to show a meter.) Be sure to label each item you draw. The important thing in answering this question is to show the correct location on the Test Panel of the items the instructor used in this demonstration.



CHECK YOUR ANSWERS ON PAGE 29.

Here is another visualizing strategy that will help you to remember the order in which you must perform the steps in a procedure.

When you are watching the demonstration, notice where on the equipment panel the instructor starts. Then notice what part of the panel he goes to for the next step. Do the same for the next step, and so on. Then, when you visualize the procedure, you will remember the movement the instructor made from one part of the equipment to another part. Here is some practice in visualizing the instructor's movements.

Directions:

1. REWIND THE VIDEOTAPE TO THE BEGINNING.
2. WATCH THE FIRST PART OF THE TAPE (UNTIL THE SCREEN GOES BLANK).
3. TURN OFF THE VIDEOTAPE PLAYER.
4. DO NOT TAKE NOTES.
5. ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 4

1. How many steps did the instructor do? \_\_\_\_\_
2. On the diagrams below, write the number 1 to show the place where the instructor started the procedure. Then write a number 2 to show where the instructor moved for the next step, and so on.



TEST PANEL



POWER SUPPLY

CHECK YOUR ANSWERS ON PAGE 30.

Another method for remembering information presented in demonstrations is the use of Organizers. The use of organizers was presented in Unit III, Lesson 1. If you took that lesson, this next section will be something of a review for you.

When you have a lot of information to remember it is helpful if you can gather or organize the information into a few groups of related items.

Here's an example from everyday life of this kind of organizing.

If you went to the store to buy the following items, you might find it hard to remember them all.

hamburger	lettuce	pork chops
milk	steak	tomatoes
celery	eggs	butter

But if you grouped these items so that related items were together, you would have little trouble remembering them.

(Meat)	(Vegetables)	(Dairy)
hamburger	celery	milk
steak	lettuce	butter
pork chops	tomatoes	eggs

In this example, you already know the names of the groups (Meat, Vegetables, Dairy) and you know which items belong to which groups. With the information in the 3M course, grouping is a bit harder.

Earlier in this lesson you saw one example of the use of Organizers. The lesson discussed the most important types of information to remember from demonstrations. The most important information is organized into a few different types. That helps you to remember it more easily. This section will use some of the types of information that were talked about earlier. And it will add one or two more types of Organizers.

Here are some of the Organizers you will need to use in learning from demonstrations.

NAMES -

- a. of the whole system (for example, AN/TCC-7)
- b. of components or units (for example, Power Supply)
- c. of switches, meters, etc. (for example, Measure Switch)

LOCATIONS -

Where on the equipment the various switches, etc. are located.

NOTE: It will help you if you notice which switches and controls are located close together. Often you will do adjustments to a group of switches that are located together, one right after the other.

PROCEDURES -

This has two major parts:

- a. Name of the whole procedure (for example, Doing Presets on the Power Supply).
- b. The steps in the procedure:
  - . What switch, meter, etc. you use (for example, 200 volt control)
  - . What you do with it (for example, turn it clockwise)
  - . Sign that you did it correctly (for example, the Test Meter will read zero)

Now for some practice in organizing information you see in a demonstration.

Directions:

1. RESET THE TAPE COUNTER TO ZERO.
2. WATCH THE NEXT (THE SECOND) PART OF THE TAPE. (IT IS ABOUT SETTING THE 1 KILOCYCLE (KC) CONTROL.)
3. AT THE FADEOUT (THE SCREEN WILL GO BLANK), TURN OFF THE VIDEOTAPE PLAYER.
4. DO NOT TAKE NOTES.
5. ANSWER THE QUESTION ON THE NEXT PAGE.

START THE TAPE NOW.

EXERCISE 5

1. For each Organizer below fill in all the items of information you remember from the demonstration you just saw. (Fill in at least two items for each Organizer.)

a. NAMES

b. PROCEDURES (For each procedure, include name of switch, control, etc., the action and, if appropriate, the sign that the action was done correctly.)

c. LOCATIONS

CHECK YOUR ANSWER ON PAGE 31.

One way people use to help them remember what they have seen and heard is to say it to themselves in their own words. This is a good method but it must be done in the right way or it will not be helpful. Here are some points to follow when using this method.

#1 Use your own words. Do not just repeat exactly what the instructor said.

You can do this silently while watching the demonstration.

Once you have described in your own words what the instructor said and did, do not repeat it. Watch for the next thing the instructor does.

After the demonstration is over you can repeat your descriptions to yourself (out loud if no one will be disturbed) to help you remember them.

This method is called "paraphrasing" (saying the same thing in your own words). Here is an example of paraphrasing.

The instructor said: "Slowly adjust the Fine Tune Control until you get a maximum right hand deflection on the Test Meter. That means the indicator needle on the meter goes as far to the right as possible."

The student said (silently): "Turn the Fine Tune Control slowly until the needle on the test meter is all the way to the right."

Notice that the student said the same thing but used different words to say it.

Here's another example of paraphrasing:

The instructor said: "A front panel meter on the Voltage Regulator indicates the regulated alternating current - or AC - output voltage applied to the receiver and transmitter."

The student said (silently): "A meter on the front of the Voltage Regulator shows how much voltage is going to the receiver and transmitter."

Now for some practice in paraphrasing what you have seen in a demonstration.

Directions:

1. RESET THE TAPE COUNTER TO ZERO.
2. WATCH THE NEXT (THE THIRD) PART OF THE TAPE. (IT IS ABOUT CHECKING THE HF OR HIGH FREQUENCY CONTROL.)
3. WATCH THE TAPE UNTIL THE END. THEN TURN OFF THE VIDEOTAPE PLAYER WHEN THE TAPE TELLS YOU TO.
4. DO NOT TAKE NOTES.
5. ANSWER THE QUESTION BELOW.

START THE TAPE NOW.

EXERCISE 6

1. Describe in your own words the steps (or actions) you just saw the instructor demonstrate. (To help you remember, the demonstration showed how to check the HF (or High Frequency) control. There were four steps.

Step 1.

Step 2.

Step 3.

Step 4.

CHECK YOUR ANSWER ON PAGE 32.

Different people use different methods for remembering information. No single method is "correct." However, some methods of remembering are more helpful for certain kinds of information than for other kinds. For example, if you have a written list of steps in front of you, you could read the list over a couple of times, then repeat (either out loud or silently) the steps over and over until you could say them by heart.

Here's another example: If you have just watched a demonstration of a procedure, you could visualize the steps the instructor did. Try visualizing the whole procedure a couple of times until you are sure you have a mental picture of all the steps.

You can probably see that visualizing would not be too helpful in remembering a printed list of steps.

Another helpful method for remembering what happened in a demonstration is to paraphrase what the instructor said. Paraphrasing was explained earlier in this lesson.

Still another way that is helpful in remembering what the instructor said in a demonstration is to ask yourself questions. Turn the things the instructor said into questions. For example, let's say the instructor said this:

"Turn the Coarse Tune control until the assigned channel (Channel 37) appears in the oscillator window."

You could make up these questions from that information:

Question 1. What control do I turn?

Question 2. When do I stop turning it?

Question 3. What is the assigned channel?

There are two other very important methods. These were taught right at the beginning of this lesson. They are:

- . Choose the most important points and learn them first.
- . Organize the information into a few groups.

Here is a list of types of information you will have to learn in the 31M course:

- . Order of steps in a procedure (including actions and signs that tell you when a step is correctly done)
- . Facts about the equipment (for example, its function, its capabilities)
- . Names of items (like units, switches, meters, etc.)
- . Locations of equipment parts

Here is a list of methods of remembering that were taught in this lesson:

- . visualizing
- . organizing
- . selecting the important points
- . repeating
- . paraphrasing
- . making up questions

Here are the two lists combined. This list shows which remembering methods are most helpful for the different types of information you will have to learn in the 31M course.

<u>Method of Remembering</u>	<u>Types of Information</u>
. visualizing	- order of steps in a procedure - locations of equipment parts
. organizing	- facts about equipment - names of items
. selecting important points	- facts about equipment
. repeating	- lists of names - lists of any sort (like facts about equipment)
. paraphrasing	- facts about equipment - order of steps in a procedure
. making up questions	- facts about equipment - locations of equipment parts - order of steps in a procedure

These are not the only correct methods to use for the given types of information. But these methods have been proven helpful for these types of information.

Some people have their own very special and unusual methods for remembering things. If you have one and if it works well for you, continue to use it. But you will probably find that it doesn't work well with all types of information. If you are prepared to use the methods taught in this lesson, your chances of success in the 31M course will be greater.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 7

Directions: You may look back at the list on the previous page.

1. Is there one particular method of remembering that is helpful in all types of situations with all types of information?

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2. What is a helpful method for remembering the list that is on the previous page?

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3. What are some helpful methods for remembering the order of steps in a procedure?

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4. When you need to remember facts about the equipment, what are some methods you can use?

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5. You will need to remember locations of pieces of equipment in the 31M course. What are some methods of remembering that you can use?

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CHECK YOUR ANSWERS ON PAGE 33.

## Section C

### Recalling What You Stored in Memory

Once you have information stored in your memory, you want to be able to remember or recall it when you need it. There are a few simple methods that can help you do this.

Some people recall things by using a word as a cue. This word can often be a name of a unit or section of a unit, or of a switch or whatever. When you have used Grouping and Repetition to store information in your memory, using a word to recall the information is helpful.

For example, by recalling the name of a particular switch you can recall where it is located and what action you do with the switch.

Other words you can use to cue recall of information are the Organizers you need to learn the information. For example: Location, order of steps, sign that a step has been performed correctly.

If you used the question method (Making up your own questions) to help store information in your memory, you can use those questions to help recall the information. For example, while you are adjusting a control, you can ask yourself, "How do I know when the adjustment is done right?"

If you used the visualizing method to learn the steps in a procedure, you should find it helpful to look at the spot on the equipment where you started your visualizing in order to recall the order of the next steps.

These methods for recalling information are related to the methods you used to put the information into your memory. It is important to notice which recall method goes with which learning (or remembering) method.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 8

NOTE: You may reread Section C to help in answering these questions:

1. If you have used repetition to remember a list of names of switches and their locations, what is a good method for recalling the location of a particular switch?

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2. If you used the visualizing method to remember the steps in a procedure, what would you do to recall a particular step?

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3. Let's say you used the question method (making up your own questions) to learn facts about a piece of equipment (like its range). What method is recommended for recalling the range of the equipment?

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CHECK YOUR ANSWERS ON PAGE 34.

ANSWER KEYS TO EXERCISES IN UNIT III, LESSON 2

Unit III  
Lesson 2

25

206

ANSWER TO EXERCISE 1

1. a. The purpose of the procedure being demonstrated.

. Transmit Line-Up for AN/TCC-7 telephone terminal

. Setting the 200 Volt Adjust Control (on the Power Supply)

Explanation: Your answer can be just one of these. If you have both, that is better.

- b. Names of switches, controls, meters, etc.

200 Volt Adjust Control

AC Power switch, Alarm, Measure switch

Measure Selective switch

Measure Non-Selective switch

Explanation: If you got any one of the above, that is a good answer. The more names you remembered, the better your answer is.

- c. Actions you perform on the equipment.

Set the 115 Volt Power switch to ON. Set Measure switch to 200  
Volt Adjust position. Check that the Measure Selective switch  
and Measure Non-Selective switch are OFF. Use a screwdriver to  
turn the 200 Volt Adjust control clockwise. Set the Measure  
switch to the Transmission position.

Explanation: If you got any one of the above, that is a good answer. The more actions you remembered, the better your answer is.

d. Sign of when a step is done correctly.

An alarm will sound (when you set the AC Power switch to ON)

Explanation: Your answer does not have to include the part in parentheses. If you included it, that is good.

IF YOU DID NOT DO WELL ON THIS QUESTION,  
REWIND THE TAPE AND WATCH THE DEMONSTRATION AGAIN.  
LOOK FOR INFORMATION YOU MISSED.

IF YOU GOT THE ANSWER, GO ON WITH THE LESSON.

ANSWERS TO EXERCISE 2

1. The 1 kilocycle control is on the inside top of the Test Panel.

Explanation: If you just wrote "Inside" but not "top," that is O.K. If you wrote just "top" but not "inside," that is only partly correct. It is important to notice that this control is inside the Test Panel. That is why the Test Panel has to be pulled forward.

2. Number the steps in the correct order.

2 Set Measure Non-Select switch to the Check 1 KC position.  
4 Adjust the 1 kilocycle (KC) control.  
3 Put the jack plug into the 1 kilocycle (KC) jack.  
1 Slide the Test Panel forward in the mounting rack.

3. The Test Meter reads zero.

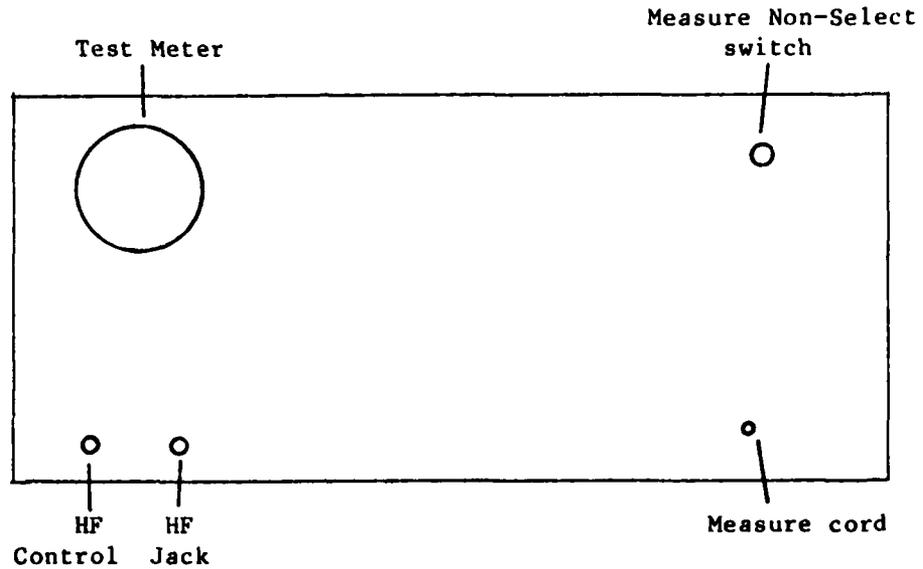
IF YOU DO NOT UNDERSTAND ANY OF THESE ANSWERS,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL OF THESE ANSWERS,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 3

1. Measure Non-Select switch, measure cord, HF jack, HF control, Test Meter



IF YOU DID NOT DO WELL ON THESE QUESTIONS,  
REWIND THE TAPE UNTIL THE TAPE COUNTER REACHES ZERO.  
THEN WATCH THE DEMONSTRATION AGAIN.

LOOK FOR EACH ANSWER AS IT COMES UP IN THE DEMONSTRATION.

IF YOU GOT THESE ANSWERS RIGHT,  
GO ON WITH THE LESSON.

ANSWERS TO EXERCISE 4

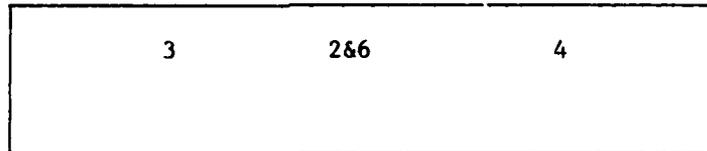
1. There were six (6) steps.

Explanation: The six steps were:

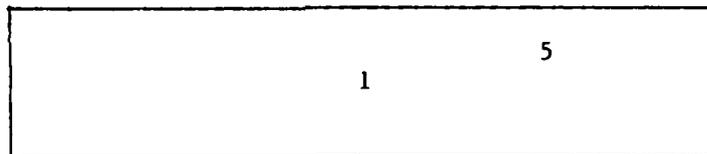
- 1) Set the AC power switch to ON.
- 2) Set the Measure switch to 200 volt position.
- 3) Set the Measure Select switch to OFF.
- 4) Set the Measure Non-Select switch to OFF.
- 5) Adjust the 200 volt control.
- 6) Return the Measure switch to the TRANSMISSION position.

NOTE: You did not have to say what the steps were. The question only asked for the number of steps. If you combined steps 3 and 4 and counted them as only one step, and wrote 5 as the answer, that is O.K.

- 2.



TEST PANEL



POWER SUPPLY

IF YOU DID NOT DO WELL ON THESE QUESTIONS,  
WATCH THE DEMONSTRATION AGAIN.

REWIND THE TAPE TO THE BEGINNING.

LOOK FOR THE POSITION OF EACH STEP AS IT COMES UP IN THE DEMONSTRATION.  
AFTERWARD, CORRECT YOUR ANSWER.

IF YOU GOT THIS ANSWER RIGHT, GO ON WITH THE LESSON.

ANSWER TO EXERCISE 5

NOTE: You were required to list at least two items for each Organizer. If you had more than two, that is fine. All the possible answers are given below.

1. a. NAMES

- . AN/TCC-7 (name of system)
- . 1 kilocycle (or 1 KC) control
- . Test Panel
- . Measure Non-Select switch
- . jack plug
- . 1 KC jack

b. PROCEDURES

- . Slide Test Panel forward in rack until you can get at controls inside.
- . Set Measure Non-Select switch to Check 1 KC position.
- . Connect the Test Panel jack plug into the 1 KC jack.
- . (Use a screwdriver to) adjust the 1 kilocycle (or 1 KC) control until the Test Meter reads zero.
- . Push the Test Panel back in its rack.

c. LOCATIONS

- . The 1 kilocycle (or 1 KC) control is inside the Test Panel on the left.
- . The Measure Non-Select switch is at the upper right of the front panel.
- . The 1 KC jack is at the lower left of the front panel.

IF YOU DID NOT GET AT LEAST TWO ITEMS FOR EACH ORGANIZER,  
REWIND THE TAPE TO ZERO.

WATCH THE DEMONSTRATION AGAIN. NOTICE WHEN THE ANSWERS OCCUR.  
CORRECT YOUR ANSWERS.

IF YOU GOT THIS ANSWER RIGHT, GO ON WITH THE LESSON.

---

ANSWER TO EXERCISE 6

1. NOTE: Your answers do not have to be in these words. But they must say the same thing.

Step 1. Set the Measure Non-Select switch to the Check HF position

Step 2. Put the measure cord plug into the HF jack

Step 3. Turn the HF control until the meter reads zero

Step 4. Put the Measure Non-Select switch back to OFF.

IF YOU DID NOT GET THIS ANSWER RIGHT,  
REWIND THE TAPE TO ZERO.

WATCH THE DEMONSTRATION AGAIN.  
LOOK FOR THE ANSWER IN THE DEMONSTRATION. CORRECT YOUR ANSWER.

IF YOU GOT THIS ANSWER RIGHT,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 7

1. No.
2. Repetition  
Explanation: Repetition is a good method for learning lists of all sorts.
3. Visualizing, paraphrasing, making up questions
4. Selecting important points, organizing, repeating, paraphrasing, making up questions
5. Visualizing, making up questions

SINCE YOU WERE ALLOWED TO LOOK BACK AT THE LIST,  
YOU SHOULD HAVE GOTTEN ALL THESE ANSWERS CORRECT.

IF YOU DID, GO ON TO THE NEXT PART OF THE LESSON.

IF YOU DID NOT, REREAD THE SECTION STARTING ON PAGE 19.

ANSWERS TO EXERCISE 8

NOTE: Your answers do not have to be in these words. But your answers should agree with these on the methods used.

1. Use a word (the name of a switch) to recall its location.
2. Look at the spot on the equipment where you started the first step, then go on to the next steps until you come to the step you want.
3. Ask the question: What is the range of this equipment?

SINCE YOU WERE ALLOWED TO REREAD SECTION C TO HELP IN ANSWERING THESE QUESTIONS, YOUR ANSWERS WILL PROBABLY BE RIGHT.  
IF THEY ARE NOT, SEE YOUR INSTRUCTOR FOR HELP.

IF YOUR ANSWERS ARE RIGHT,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A/B  
IN UNIT III - LESSON 2.

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT III**  
**LISTENING SKILLS**

**LESSON 3**  
**RECOGNIZING WHEN IMPORTANT INFORMATION IS MISSING**

**PREREQUISITE: None**  
**MATERIALS REQUIRED: Audiotape & Videotape**  
**TYPE OF LESSON: Self-Paced**

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STUDENT GUIDE

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UNIT III. LISTENING SKILLS

Lesson 3. Recognizing When Important Information Is Missing

INTRODUCTION:

In the 31M course, you will get much of the information you need to know from lectures and demonstrations. When you listen to a lecture, it is often easy to miss an important point. Occasionally, the instructor may leave out a point that is important for you to know. You can always stop and ask a question to get the missing information. But before you can do that, you must be able to recognize that a piece of important information is missing. That is not always obvious. This lesson will show you how to recognize when necessary information is missing.

LEARNING GOALS:

In this lesson, you will learn to:

- A. Tell when information is missing (p. 2).
- B. Practice listening for missing information (p. 8).
- C. Practice watching for missing information (p. 14).

On the pages that follow, you will find material to read and questions to answer. You will also listen to an audiotape and answer questions on it (Section B). And you will watch a videotape and answer questions on that (Section C).

Most of the time, you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

When you finish the lesson, your instructor will give you a checkpoint. When you finish the checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

GO ON TO THE NEXT PAGE TO BEGIN THE LESSON.

## Section A

### Identifying Gaps in Information

It is easy to miss important information when listening to a lecture or watching a demonstration. If you know you missed something important, you can stop the instructor and ask him to repeat it. But if you are not aware that there is a gap in your information, you will not be able to ask for the missing point.

You can't expect to get all the details from a demonstration or lecture. But you can, with practice, get most of the important points.

Earlier lessons in this unit gave some Organizers for identifying what types of information are the most important in the 31M course. Here is a summary of those Organizers that will help you identify the most important kinds of information in the 31M course.

- . PURPOSE of the procedure being demonstrated
- . NAMES of units, switches, meters, etc.
- . LOCATIONS of units, switches, meters, etc.
- . ORDER of steps
- . SIGNS that tell you when a step IS DONE CORRECTLY

These are the kinds of information you should especially listen and watch for because you will need to use this information. The aim of this lesson is to give you practice in listening and watching for these kinds of information. Sometimes, some of this important information will be left out. Your job is to spot when it is missing.

Your goal in the 31M course is to learn to operate radio equipment. After you see a procedure demonstrated, always ask yourself this question:

#### CAN I DO THAT PROCEDURE?

Go over in your mind what you need to know to do the procedure. If you come to a point where you don't know what to do next, then you are missing some important information. Ask a question about it.

Here are some examples of how this works.

Example #1.

Let's say you have these instructions in your notes.

"First increase the voltage to 25. Next, decrease it to 10. When the voltage reaches 50, turn the XYZ switch to ON."

The first two steps are clear enough.

1. Increase the voltage to 25.
2. Decrease the voltage to 10.

Then comes the next step:

3. When the voltage reaches 50, turn the XYZ switch to ON.

Something seems to be missing. How does the voltage increase to 50 after you have decreased it to 10? Do you have to do something to make it increase? Or will it increase by itself? That is missing information which you need to find out before you do the procedure.

Example #2. Let's say these are the instructions as you heard them.

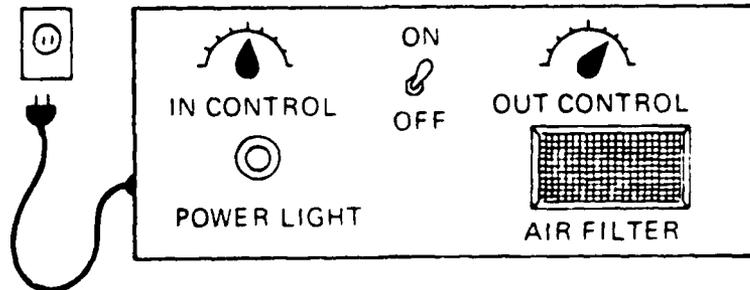
Attach one guy wire between the 9th and 10th mast sections and the other between the 19th and 20th mast sections.

Guy wires are colored - one red, one green. Make sure colors are in right places on mast. Add 5 more mast sections after second guy wire is attached.

Ask yourself: Can I do those steps now?

Well, there is at least one piece of information you still need to know before you could do these steps. You need to know which color guy wire goes where.

Example #3. You are working with a piece of equipment that looks like this:



You are told to carry out the following instructions.

1. Plug the power plug into the outlet.
2. Check to see whether the power light is on.
3. Make sure that both controls are correctly adjusted.  
The IN control should be set at zero.  
The OUT control should be set at +2.
4. Place the ON-OFF switch in the OFF position.

Do you have all the information to do these four steps?

Yes. All the necessary information is there.

Since it is often easy to miss important information, you need practice in recognizing when something important is missing, so you can ask questions about it. In this lesson, important information is sometimes deliberately left out to give you practice in recognizing when it is missing.

Now you will get some practice in recognizing when important information is missing (and when it is not).

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 1

1. You have been learning to operate a piece of equipment called the TX-13. In class, the following announcement is made:

"Tomorrow, you will take a test to see how well you can operate the TX-13. The test will have four parts, each 15 minutes long.

The whole test will count 100 points, with 25 points for each part.

If you pass, you will go on to learn about the ZY-133. If you don't pass, you will spend another week learning the TX-13."

Which important piece of information was left out?

- a. How long the test will take.
  - b. The purpose of the test.
  - c. What will happen to students who fail the test.
  - d. How many points are needed to pass the test.
  - e. All of the above were included in the announcement.
2. You are working on a piece of equipment with three switches and two meters. You are given the following instructions:

1. Set POWER switch to ON.
2. Turn SELECTOR switch to MULT.
3. Check MULTIMETER. Reading should be 50 or more.
4. Turn SELECTOR switch to AFC.
5. Check AFC Meter. Reading should be greater than zero.

Which piece of information was not included in the instructions?

- a. The correct reading on both meters.
- b. What to do with the POWER switch.
- c. When to check the MULTIMETER.
- d. How to set the third of the three switches.
- e. All of the above were included in the announcement.

3. Here are the steps in grounding a mobile van.

1. Remove 6-foot ground rod, 10-foot ground strap, and sledge hammer from the mobile van.
2. Ground location must be within 6 feet of the power entrance box.
3. Dig a hole approximately 6 inches deep at the grounding location.
4. Drive the ground rod into the hole until the top of the rod is about 3 inches above the bottom of the hole.
5. Connect one end of the ground strap to the ground rod thumbscrew and the other end to the lower ground terminal of the power entrance box. Insure connections are tight.

Which of the following pieces of information was not included in the above instructions?

- a. How deep a hole to dig.
- b. What connections to make with the ground strap.
- c. Where to find the ground rod.
- d. Where to put the ground location.
- e. All of the above were included in the directions.

4. Here are the steps in presetting the Test Panel controls on a piece of radio equipment.
  1. Slide the Test Panel forward in the mounting rack for ease in getting at the internal controls.
  2. Adjust the 12, 28, and 68 kilocycle controls and Coarse Tune control with a screwdriver. Except for the Coarse Tune control, all the screwdriver-adjusted controls are turned  $3/4$  of a turn from the full counterclockwise position.
  3. Adjust the Coarse Tune control.
  4. The Coarse Tune control will be readjusted as necessary during the line-up procedure.
  5. Push the Test Panel back in the mounting rack.

Which of the following pieces of information is not included in these directions?

- a. How to adjust the 12, 28, and 68 kilocycle controls.
- b. How to adjust the Coarse Tune control.
- c. When the Coarse Tune control will be readjusted.
- d. What to do to get at the internal controls.
- e. All of the above were included in the directions.

CHECK YOUR ANSWERS ON PAGE 20.

## Section B

### Listening for Missing Information

The principles in this section are the same as for Section A. But now you will get some practice listening to some short lectures on tape and identifying when important information is missing.

Here is a review of the kinds of important information to listen for:

- . Purpose of the procedure
- . Names (of units, switches, meters, etc.)
- . Location (of units, switches, meters, etc.)
- . Order of steps
- . Signs that tell you when a step is done correctly

That last point (Signs that tell you when a step is done correctly) may need some explanation. Here are some examples of what that means.

Example #1

- . Turn the Selector switch to the AFC position.  
The AFC meter reading should be greater than zero.

(After you position the Selector switch, you look at the AFC meter. If it shows a reading above zero, that step is O.K. If the meter is not above zero, something is wrong. You would check the position of the Selector switch to make sure you set it correctly.)

Example #2

- . Drive the ground rod into the hole until the top of the rod is about 3 inches above the bottom of the hole.

(The last part of the sentence "until the top of the rod is about 3 inches above the bottom of the hole" tells you when you have driven the ground rod into the hole correctly.)

Example #3

- Set the Multimeter Selector switch to the 68 KC MOD position. The multimeter should be in the green area.

(The step is done correctly if the multimeter gives a reading in the green area.)

Now you are ready to listen.

Directions:

- TELL YOUR INSTRUCTOR YOU ARE READY FOR THE AUDIOTAPE FOR UNIT III, LESSON 3 - PRACTICE EXERCISES 1.
- LISTEN TO EXERCISE 1 ON THE AUDIO CASSETTE TAPE.
- TURN OFF THE TAPE WHEN YOU ARE INSTRUCTED TO DO SO.
- AFTER YOU TURN OFF THE TAPE, ANSWER THE QUESTIONS BELOW.

START THE TAPE NOW.

EXERCISE 2

- Did the instructions say what the purpose of the procedure was?

\_\_\_\_\_

If so, what was the purpose? \_\_\_\_\_

\_\_\_\_\_

- Put a check in front of each of the following organizers only if that kind of information was mentioned in the instructions.

- \_\_\_\_\_ a. Names of meters, switches, etc.
- \_\_\_\_\_ b. Locations of units, switches, meters, etc.
- \_\_\_\_\_ c. Order of steps
- \_\_\_\_\_ d. Signs that tell you when a step is done correctly.

3. Which of the following pieces of information was not stated in the instructions?
- a. Put the Remote-Local switch in the Local position.
  - b. What is the correct setting for the Voltage Selector switch.
  - c. How far out to pull the choke control.
  - d. All of the above were included in the instructions.
4. Which of the following pieces of information was not stated in the instructions?
- a. Place the circuit breaker in the OFF position.
  - b. Press the Start/Stop switch until the engine starts.
  - c. Turn the voltage adjusting knob all the way to the left.
  - d. All of the above were included in the instructions.

CHECK YOUR ANSWERS ON PAGE 21.

Directions:

1. RESET THE TAPE COUNTER TO ZERO.
2. LISTEN TO EXERCISE 2 ON THE AUDIO CASSETTE TAPE.
3. TURN OFF THE TAPE WHEN YOU ARE INSTRUCTED TO DO SO.
4. AFTER YOU TURN OFF THE TAPE, ANSWER THE QUESTIONS BELOW.

START THE TAPE NOW.

EXERCISE 3

1. Which of the following statements was not included in the directions?
  - a. Fold the corners of the loose end of the paper to make a point.
  - b. Pull the lever at the left of the patent all the way toward you.
  - c. Push the lever away from you till it locks.
  - d. All of the above were included in the directions.
  
2. Which of the following pieces of information was not stated in the directions?
  - a. How much paper to unroll.
  - b. Where the paper slot is located.
  - c. Where the lever you must pull is located.
  - d. All of the above were included in the directions.
  
3. Did the instructions state the purpose of the procedure? \_\_\_\_\_  
If so, what was it?  
\_\_\_\_\_  
\_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 22.

Directions:

1. RESET THE TAPE COUNTER TO ZERO.
2. LISTEN TO EXERCISE 3 ON THE AUDIO CASSETTE TAPE.
3. TURN OFF THE TAPE WHEN YOU ARE INSTRUCTED TO DO SO.
4. AFTER YOU TURN OFF THE TAPE, ANSWER THE QUESTIONS BELOW.

START THE TAPE NOW.

EXERCISE 4

1. Which of the following pieces of information was not included in the instructions?
  - a. What to do if the alarm doesn't stop after several seconds.
  - b. What position the Measure switch goes to at the end of the procedure.
  - c. The name of the unit (piece of equipment) being adjusted.
  - d. All of the above were included in the instructions.
  
2. Which of the following pieces of information was not included in the directions?
  - a. Turn the 150 Volt Adjust control clockwise.
  - b. The Measure switch should be set to the 150 Volt position.
  - c. The Power switch should be ON.
  - d. All of the above were included in the instructions.
  
3. Did the instructions state the purpose of the procedure? \_\_\_\_\_  
If so, what was it?  
\_\_\_\_\_  
\_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 22.

Directions:

1. RESET THE TAPE COUNTER TO ZERO.
2. LISTEN TO EXERCISE 4 ON THE AUDIO CASSETTE TAPE.
3. TURN OFF THE TAPE WHEN YOU ARE INSTRUCTED TO DO SO.
4. AFTER YOU TURN OFF THE TAPE, ANSWER THE QUESTIONS BELOW.

START THE TAPE NOW.

EXERCISE 5

1. Which of the following pieces of information was not included in the instructions?
  - a. When it is necessary to adjust the Input Level control.
  - b. What position to put the transmitter multimeter Selector switch.
  - c. Request a test signal from the distant terminal.
  - d. All of the above were included in the instructions.
  
2. Which of the following pieces of information was not included in the instructions?
  - a. What indication on the meter shows that the step is done correctly.
  - b. The name of the meter being used.
  - c. The name of the switch that is being used.
  - d. All of the above were included in the instructions.
  
3. Did the instructions name the piece of equipment that is being adjusted? \_\_\_\_\_  
If so, what is it? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 23.

Section C

Watching for Missing Information

The principles in this section are the same as in the other two sections. But now you will get some practice in watching demonstrations and identifying missing information.

Directions:

1. TELL YOUR INSTRUCTOR YOU ARE READY FOR THE VIDEOTAPE FOR UNIT III, LESSON 3 - PRACTICE EXERCISES II.
2. WATCH DEMONSTRATION 1 ON THE TAPE. YOU WILL BE TOLD WHEN TO STOP THE TAPE.
3. AFTER YOU STOP THE TAPE PLAYER, ANSWER THE QUESTIONS BELOW.

START THE VIDEOTAPE NOW.

EXERCISE 6

1. Which of the following pieces of information was not included in the demonstration?
  - a. Purpose of the demonstration.
  - b. What position the 115 Volt AC switch should be in.
  - c. What the reading should be on the AC Volts meter.
  - d. All of the above were included in the demonstration.
2. Did the instructor mention the name of the piece of equipment being adjusted? \_\_\_\_\_  
If so, what was it? \_\_\_\_\_
3. Did the instructor say the name of the system? \_\_\_\_\_  
If so, what was it? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 23.

Directions:

1. RESET THE TAPE COUNTER TO ZERO.
2. WATCH DEMONSTRATION 2.
3. STOP THE TAPE WHEN YOU ARE DIRECTED TO DO SO.
4. AFTER YOU STOP THE TAPE, ANSWER THE QUESTIONS BELOW.

START THE TAPE NOW.

EXERCISE 7

1. Did the instructor say the name of the piece of equipment on which you do the adjustments? \_\_\_\_\_  
If so, what is it? \_\_\_\_\_
  
2. Which of the following pieces of information was not stated in the demonstration?
  - a. You need a screwdriver to adjust the Threshold Adjust control.
  - b. The indicator lamp goes on when the Threshold Adjust control adjustment is made.
  - c. Which direction to turn the Threshold Adjust control.
  - d. All of the above were stated in the demonstration.
  
3. Did the instructor say the sign that tells you when the Plate control is adjusted correctly? \_\_\_\_\_  
If so, what was it? (Note: The Plate Control is adjusted once, then readjusted later. This question is asking about the first time it is adjusted.)  
\_\_\_\_\_  
\_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 24.

Directions:

1. RESET THE TAPE COUNTER TO ZERO.
2. WATCH DEMONSTRATION 3.
3. STOP THE TAPE WHEN YOU ARE DIRECTED TO DO SO.
4. AFTER YOU STOP THE TAPE, ANSWER THE QUESTIONS BELOW.

START THE TAPE NOW.

EXERCISE 8

1. Did the instructor state the purpose of this demonstration? \_\_\_\_\_  
If so, what is it?  
\_\_\_\_\_  
\_\_\_\_\_
  
2. Which of the following pieces of information was not stated in the demonstration?
  - a. What position to set the Crystal Select switch to.
  - b. What direction to turn the Radio Frequency Channel Tune control.
  - c. What the reading should be on the Measure Meter after the channel is tuned correctly.
  - d. All of the above were stated in the demonstration.

CHECK YOUR ANSWERS ON PAGE 25.

Directions:

1. RESET THE TAPE COUNTER TO ZERO.
2. WATCH DEMONSTRATION 4.
3. STOP THE TAPE WHEN YOU ARE DIRECTED TO DO SO.
4. AFTER YOU STOP THE TAPE, ANSWER THE QUESTIONS BELOW.

START THE TAPE NOW.

EXERCISE 9

1. Did the instructor say the sign that tells you when you have correctly adjusted the Amplifier Output Coupling control? \_\_\_\_\_  
If so, what is it?  
\_\_\_\_\_  
\_\_\_\_\_
2. Which of the following pieces of information was not included in the demonstration?
  - a. Set the Test Switch to the forward Power position.
  - b. Adjust the Plate control until you get a maximum reading on the Test Meter.
  - c. When to stop repeating steps 2 and 3.
  - d. All of the above were included in the demonstration.

CHECK YOUR ANSWERS ON PAGE 25.

Directions:

1. RESET THE TAPE COUNTER TO ZERO.
2. WATCH DEMONSTRATION 5.
3. STOP THE TAPE WHEN YOU ARE DIRECTED TO DO SO.
4. AFTER YOU STOP THE TAPE, ANSWER THE QUESTIONS BELOW.

START THE TAPE NOW.

EXERCISE 10

1. Did the instructor say the name of the piece of equipment on which the adjustments are being made? \_\_\_\_\_  
If so, what is it? \_\_\_\_\_
2. Which of the following pieces of information was not included in the demonstration?
  - a. Set the 750 Volt Adjust switch to Position 2.
  - b. Set the 750 Volt DC switch to the ON position.
  - c. Check the voltmeter; it should read about 750 volts.
  - d. All of the above were included in the demonstration.

CHECK YOUR ANSWERS ON PAGE 26.

ANSWERS TO EXERCISES IN UNIT III, LESSON 3

Unit III  
Lesson 3

19

ANSWERS TO EXERCISE 1

1. d. How many points are needed to pass the test.
2. e. All of the above were included in the announcement.

Explanation: If you chose c, when to check the Multimeter, this is not correct. The order the steps makes it clear that you check it after Step 2.

3. e. All of the above were included in the directions.
4. b. How to adjust the Coarse Tune control.

Explanation: Step 2 says that except for the Coarse Tune control, all screwdriver-adjusted controls are to be turned  $3/4$  of a turn from the full counterclockwise position. Step 3 says to adjust the Coarse Tune control but doesn't tell you how to do it.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 2

1. Yes. To start a generator.
2.  a. Names of meters, switches, etc.  
 b. Locations of units, switches, meters, etc.  
 c. Order of steps  
 d. Signs that tell you when a step is done correctly

Explanation: a) Of course, there were names of several switches, meters, etc. b) No locations were mentioned. For example, you were not told where the circuit breaker was located. c) The steps were numbered in the order you have to do them. d) Step six was: Press the Start-Stop switch to Start, until the engine starts, then release. The underlined words are a sign that let you know when the step is completed correctly.

3. b. What is the correct setting for the Voltage Selector switch.

Explanation: The instructor on the tape just said, "Set the Voltage Selector switch to the correct setting." But he didn't say what the correct setting is. (Of course, an instructor would not usually leave out such information. The instructor on the tape omitted this information for the purposes of this question.)

4. d. All of the above were included in the instructions.

IF YOU GOT TWO OR MORE OF THESE QUESTIONS WRONG,  
REWIND THE TAPE TO THE BEGINNING AND LISTEN TO EXERCISE 1 AGAIN.  
LISTEN FOR WHEN THE INFORMATION COMES UP (OR FAILS TO COME UP).

IF YOU GOT THE ANSWERS RIGHT,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 3

1. c. Push the lever away from you till it locks.
2. d. All of the above were included in the directions.
3. Yes. Loading a roll of paper in the teletype machine.

IF YOU DID NOT GET THESE ANSWERS RIGHT,  
REWIND THE TAPE TO THE ZERO. LISTEN TO THE EXERCISE AGAIN.  
LISTEN FOR THE MOMENT WHEN THE INFORMATION COMES UP  
(OR FAILS TO COME UP).

IF YOU GOT THE ANSWERS RIGHT,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 4

1. c. The name of the unit (piece of equipment) being adjusted.  
Explanation: The switches and meters are named but not the equipment itself.
2. d. All of the above were included in the instructions.
3. No.

IF YOU DID NOT GET THESE ANSWERS RIGHT,  
REWIND THE TAPE TO ZERO. LISTEN TO THE EXERCISE AGAIN.  
LISTEN FOR THE MOMENT WHEN THE INFORMATION COMES UP  
(OR FAILS TO COME UP).

IF YOU GOT THE ANSWERS RIGHT,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 5

1. a. When it is necessary to adjust the Input Level control.

Explanation: The instructor just said: "If necessary, adjust the Input Level control ...". He did not say how you know when it is necessary.

2. d. All of the above were included in the instructions.

3. Yes. The transmitter.

IF YOU DID NOT GET THESE ANSWERS RIGHT,  
REWIND THE TAPE TO ZERO. LISTEN TO THE EXERCISE AGAIN.  
LISTEN FOR THE MOMENT WHEN THE INFORMATION COMES UP  
(OR FAILS TO COME UP).

IF YOU GOT THE ANSWERS RIGHT,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 6

1. c.

Explanation: The narrator said to "check to AC Volts meter. But he did not say what the reading should be. Without that information, you won't know if the equipment is working correctly or not.

2. Yes. The power supply.

3. Yes. The AN/TRC-24 (pronounced Antrack 24 - or sometimes Track 24, for short.)

IF YOU MISSED THESE QUESTIONS,  
REWIND THE TAPE TO THE BEGINNING AND WATCH THE DEMONSTRATION AGAIN.  
WATCH FOR WHEN THE INFORMATION COMES UP (OR FAILS TO COME UP).

IF YOU GOT THESE QUESTIONS RIGHT,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 7

1. Yes. The transmitter.

Explanation: If you said the AN/TRC-24 transmitter, that is O.K. too. If you said just the AN/TRC-24, that is not correct. The AN/TRC-24 is the system. The transmitter is the piece of equipment being adjusted.

2. b. The indicator lamp goes on when the Threshold Adjust control adjustment is made.

Explanation: The instructor did not say this. The indicator light did go on, and you probably noticed that it did. An instructor normally would point this out to draw your attention to it. (The instructor in the videotape deliberately omitted this information for the purposes of this lesson.)

3. Yes. Adjust the Plate control until the Test meter reads about 10.

Explanation: If you said "Adjust it until the Test meter shows a maximum reading," you were thinking of the second time the Plate Control is adjusted.

IF YOU MISSED THESE QUESTIONS,  
REWIND THE TAPE TO THE ZERO. THEN WATCH THE DEMONSTRATION AGAIN.  
WATCH FOR WHEN THE INFORMATION IN THESE ANSWERS COMES UP  
(OR FAILS TO BE MENTIONED).

IF YOU GOT THESE QUESTIONS RIGHT,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 8

1. Yes. Setting the RF Channel Tune control for the nearest Unit Channel.

Explanation: Your answer does not have to be in exactly these words.

2. b. What direction to turn the Radio Frequency Channel tune control

Explanation: The instructor mentions turning this control but does not say in which direction.

IF YOU MISSED THESE QUESTIONS,  
REWIND THE TAPE TO ZERO. THEN WATCH THE DEMONSTRATION AGAIN.  
WATCH FOR WHEN THE INFORMATION COMES UP  
(OR FAILS TO COME UP).

IF YOU GOT THESE QUESTIONS RIGHT,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 9

1. Yes. Turn the control until you get a maximum reading on the test meter.
2. d. All of the above were included in the demonstration.

IF YOU MISSED THESE QUESTIONS,  
REWIND THE TAPE TO ZERO. THEN WATCH THE DEMONSTRATION AGAIN.  
WATCH FOR WHEN THE INFORMATION COMES UP  
(OR FAILS TO COME UP).

IF YOU GOT THESE QUESTIONS RIGHT,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 10

1. Yes. The power supply.

Explanation: If you wrote "AN/TRC-24 power supply," that is O.K. too. If you wrote just AN/TRC-24, that is not correct.

2. c. Check the voltmeter; it should read about 750 volts.

Explanation: The instructor did not say anything about checking the voltmeter. Normally he would, of course. The instructor omitted this necessary information for the purposes of this question.

IF YOU MISSED THESE QUESTIONS, REWIND THE TAPE TO ZERO.  
THEN WATCH THE DEMONSTRATION AGAIN.  
WATCH FOR WHEN THE INFORMATION IN THIS ANSWER COMES UP  
(OR FAILS TO COME UP).

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS LESSON,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A/B  
IN UNIT III - LESSON 3.

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT IV**  
**NOTE-TAKING FOR DEMONSTRATIONS**

**LESSON 1**  
**BASIC NOTE-TAKING SKILLS**

**PREREQUISITE:** None  
**MATERIALS REQUIRED:** Videotape, Blank Paper  
**TYPE OF LESSON:** Self-Paced

UNIT IV. NOTE-TAKING FOR DEMONSTRATION

Lesson 1. Basic Note-Taking Skills

INTRODUCTION:

You already know how to listen for main points and remember important things from lectures and demonstrations. But sometimes just listening and watching won't work, because

- . there is too much material
- . there are too many details
- . there are too many numbers or names
- . there are too many steps in a procedure

In these cases, you will have to take notes to help you remember the information. Later on, you will use these notes in several ways:

- . to help you do a procedure in the lab
- . to help you answer questions on a written test
- . to check yourself when you are doing a procedure during the end-of-course test.

This lesson will teach you some skills that will help you take good notes.

LEARNING GOALS:

In this lesson, you will learn how to improve your note-taking skills by:

- A. Deciding what you should write down in your notes (p. 3).
- B. Writing notes that are brief but complete (p. 5).
- C. Using common abbreviations and symbols (p. 7).
- D. Marking your notes to show where things are missing or where you don't understand something (p. 11).
- E. Taking notes and then answering questions on videotaped demonstrations (p. 20).

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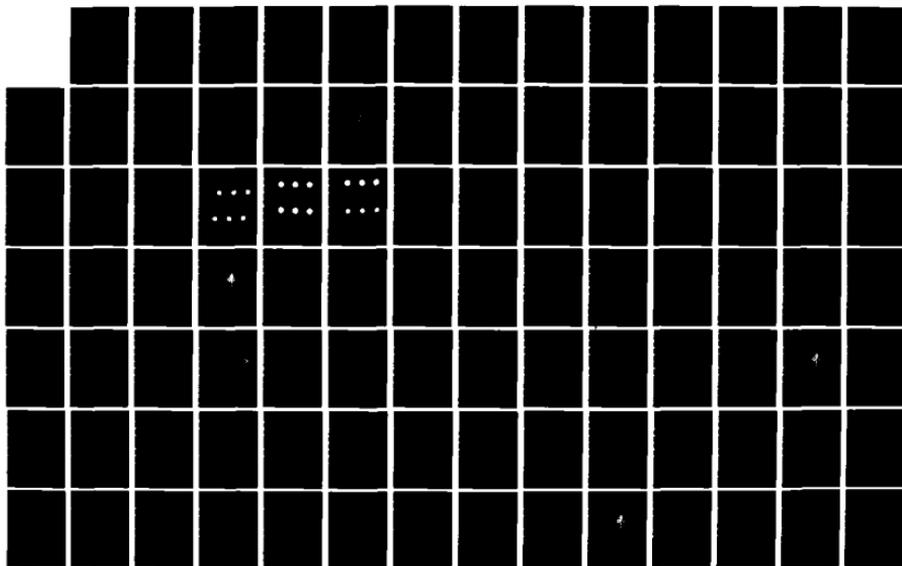
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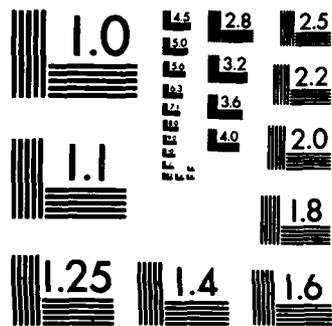
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MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

On the pages that follow, you will find material to read and questions to answer. Sometimes there may be more than one "right" answer to an exercise. Instead of checking your own answer, you will show it to the instructor. At other times, you will check your own answers. If you need help at any time, ask your instructor.

In the second part of the lesson, you will take notes on videotaped demonstrations, and then use your notes to answer questions about the demonstrations. When you finish this part of the lesson, your instructor will give you a checkpoint. When you finish the checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

GO TO THE NEXT PAGE TO BEGIN THE LESSON.

## Section A

### Recognizing Important Information

- . Before the demonstration, you should ask yourself these questions:

- What is the purpose of this demonstration?
- What will I be expected to do with the information later?
- How will I be using my notes?

If you don't know the answers, ask the instructor. This will help you decide what should be included in your notes.

It's also a good idea to look over the printed materials, like your Soldier's Manual or Technical manuals, that cover the equipment or procedures to be demonstrated. Often, you will just have to write down things that add to what is in the manuals. You can do this by writing in the margins of the page. If you want to take more complete notes, you can use a notebook, or the blank pages in the back of the Soldier's Manual.

- . During the demonstration, you should learn to recognize things that don't need to be written down, and things that do need to be written down. Remember, you may already have decided not to write down some things that are in your manuals. But there are other things that should not be in your notes because they have nothing to do with performing the task. For example, instructors often use jokes and stories to make the lecture or demonstration more interesting. You don't need to write these things in your notes.

Learn to listen and watch for signals that will help you recognize what's important. The instructor will often give you signals like these:

- . Repeating information
- . Changing his tone of voice or speaking louder
- . Pausing before or after an important point
- . Making comments such as, "Now pay attention to this," or "You'll need to know this."

## EXERCISE 1

### DIRECTIONS:

Below is part of a transcript of a lecture/demonstration on operating a vehicle in the sand. (A transcript is a written version of everything the instructor said.)

1. Cross out (draw a line through) any words or phrases that should not be written in your notes.
2. Underline any words or phrases that tell you something important is coming.

### TRANSCRIPT:

I'm going to give you some rules for operating a vehicle in sandy field conditions. Then you'll see a film illustrating these rules. Now if you expect to be stationed in Alaska, you might be planning to sleep through this demonstration. But sometimes soldiers who expect to go to Alaska end up in New Mexico, so pay attention. The first rule is to select the proper gear to prevent wheel spinning. You'll have to learn this from experience, but remember that if you feel the wheels starting to spin, you should shift to a lower gear. It's very important to accelerate gradually. If you try to gain speed too fast, your wheels will start to spin and dig into the sand. Once you've gotten started, maintain a steady, even rate of movement. Don't shift gears unnecessarily - remember, slow and steady does it. Be alert for difficult spots ahead. Try to go around them if you can. Approach windward slopes at a 90 degree angle. You'll see what I mean by this in the film. You'll have to decide whether to follow the vehicle in front of you, or break new tracks. You'll see this in the film, too. The last rule has to do with tire pressure. Usually you'll go better in the sand if you reduce the tire pressure. But be careful not to reduce it so much that the tire will slip on the rim. Now I'll show you the film and you can see how to apply these rules.

CHECK YOUR ANSWER ON PAGE 36.

## Section B

### Writing Brief but Complete Notes

If you were sending an important message by telegram, you would try to use as few words as possible, so the telegram wouldn't cost too much. But you wouldn't want to leave out anything that was really important. When you're taking notes, you don't have to worry about money. You do have to try to get everything written down without getting too far behind the instructor. One way to do this is to use a style of writing something like a telegram. When you take notes, you should:

- . Leave out words that aren't important (a, an, the; other words that aren't essential to the meaning).
- . Use phrases rather than complete sentences.
- . Use figures (2, 3, etc.) rather than writing out numbers.

Suppose a friend was giving you directions to her house. This is how you might write down the directions:

Right on Elm St., right at 2nd traffic light (6th St).  
Go 3 blocks on 6th, watch for Gulf Station on left.  
Turn left at Gulf, 1/2 block to 325 Walnut (on right side).

These are the words that have been left out.

(Turn) right on Elm St. (Then turn) right at (the) second traffic light. (This is) Sixth St. Go three blocks on Sixth, (and) watch for (a) Gulf Station on (the) left. Turn left at (the) Gulf (Station), (and go) one-half block to 325 Walnut. (The house is) on (the) right side.

Note: Sometimes the instructor will tell you to write something down word for word. In that case, of course, you should follow his instructions.

## EXERCISE 2

### DIRECTIONS:

Below is the important information from the transcript in Exercise 1. Rewrite it, following the rules you have learned. That is, leave out unimportant words, use phrases instead of sentences, and use figures for numbers.

### TRANSCRIPT:

I'm going to give you some rules for operating a vehicle in sandy field conditions. Then you'll see a film illustrating these rules. The first rule is to select the proper gear to prevent wheel spinning. You'll have to learn this from experience, but remember that if you feel the wheels starting to spin, you should shift to a lower gear. It's very important to accelerate gradually. If you try to gain speed too fast, your wheels will start to spin and dig into the sand. Once you've gotten started, maintain a steady, even rate of movement. Don't shift gears unnecessarily - remember, slow and steady does it. Be alert for difficult spots ahead. Try to go around them if you can. Approach windward slopes at a 90 degree angle. You'll see what I mean by this in the film. You'll have to decide whether to follow the vehicle in front of you, or break new tracks. You'll see this in the film, too. The last rule has to do with tire pressure. Usually you'll go better in the sand if you reduce the tire pressure. But be careful not to reduce it so much that the tire will slip on the rim.

WRITE YOUR ANSWER HERE:

CHECK YOUR ANSWER ON PAGE 37.

## Section C

### Using Common Abbreviations and Symbols

Another way to get the information down quickly is to use abbreviations and symbols. Here are some suggestions.

- . Use abbreviations and symbols you already know. For example, almost everyone uses the symbol "&" for "and."
- . Learn and use the abbreviations that are used throughout the 3IM course. Some common ones are:

cps = cycles per second  
amp = ampere  
AC = alternating current  
DC = direct current  
LV = low voltage  
HV = high voltage  
AUX = auxiliary  
KW = kilowatt

- . Learn and use standard symbols. Here are some that you may find useful:

= equals, equal to  
> greater than  
< less than  
w/ with  
w/o without  
↑ increase, higher, up  
↓ decrease, lower, down

. Make up your own abbreviations. There are several methods you can use:

- Use the first syllable of the word:

cal = calibrate

neg = negative

- Use the first syllable plus the first letter of the second syllable:

vert = vertical

ind = indicator, indication

- Leave out the vowels (and possibly some consonants)

bkgd = background

pstng = positioning

chnl = channel

pwr = power

- Use an apostrophe:

am't = amount

cont'd = continued

A word of caution. When you use standard abbreviations and symbols, you'll know what they mean when you read the notes later. But when you make up your own abbreviations, you should remember that the same abbreviation can stand for more than one word. For example:

comp - component? compartment? compound?

inst - instrument? instructor?

chg - change? charge?

pos - positive? position?

If you make up your own abbreviations, it's a good idea to look over your notes after class, while the information is still fresh in your mind. If you see an abbreviation that might confuse you later, write the word out.

- . For names of controls, etc., use initials after you have written it out once. The first time you write the term in your notes, write it out. After that, just use the initials. Here are some examples:

FT = fine tune  
CT = coarse tune  
O/O - on/off

### EXERCISE 3

#### DIRECTIONS:

Rewrite these sentences. Use any of the standard abbreviations and symbols listed in this section. Make up your own abbreviations for other words.

1. This control is used to switch from alternating current to direct current.

---

---

2. The reading on the meter should be greater than 4, but less than 6. The reading should increase as you adjust this switch.

---

---

3. This readout will tell you the frequency in cycles per second. It should be equal to the frequency you are counting.

---

---

4. Set the MEASURE switch to the 200 volt position. After you complete the line-up, return the MEASURE switch to the TRANSMISSION position.

---

---

---

CHECK YOUR ANSWERS ON PAGE 38.

Section D

Indicating Omissions and Questions

During the demonstration:

- . If you know you have missed something, leave enough space so that you can fill it in later.
- . If you aren't sure of a word or phrase, write down what you think you heard. Circle the word and mark a big question mark in the margin.
- . Ask the instructor about the missing material or words you aren't sure of as soon as you can - before the class is over, if possible.

EXAMPLE:

PVT Jordan is taking notes on a demonstration of how to thread a movie projector. He was so busy taking notes on the first step that he missed the second step entirely. A little later, he wasn't sure of one of the words. Here are his notes:

Step 1 - turn motor-lamp switch to fwd. pos. - #1

Step 2

? Step 3. Push autolow lever fwd - #3

When the instructor paused and asked if there were any questions, PVT Jordan had two questions to ask:

1. Would you please repeat Step 2?
2. What's the name of the lever you push in Step 3?

After the demonstration:

- . Go over your notes. Do you see anything else that you left out, or that doesn't make sense? Make a big question mark in the margin, and a few words to help you remember what you want to ask about.
- . Check your notes with the information in the manual. Is there anything that doesn't agree? Make a big question mark in the margin, and jot down the page number from the manual. (If it's obvious from looking at the manual that you made a mistake in your notes, correct them.) Ask your instructor about these things as soon as you get a chance. Correct your notes if necessary.

EXAMPLE 1:

Here are PVT Beam's notes from a demonstration on initial tuning procedures for the AN/TRC-24 radio set:

Init. Tuning - AN/TRC-24

2 parts - starting, calibration

Starting -

- . Turn on AC Power. (wait for receiver to warm up)
- . Check reading on MEASURE meter - between 29-31 (see TM if not)
- . Go to MEASURE switch - turn to 2nd LIM pos.
- . Hold AFC/OFF/CAL switch in CAL position
- . Adjust FINE TUNE - for 0 on FREQ DRIFT meter, max. on MEASURE meter
- . Set INDEX control to red line over assigned channel
- . Release AFC/OFF/CAL switch (be sure it returns to OFF)
- . Disconnect antenna jack

When she looked over her notes, she realized that there are supposed to be two parts to the procedure, but her notes don't show where the calibration part of the procedure began. So she made a big question mark in the margin and made a note to remind herself what to ask: This is what her notes looked like:

Init. Tuning - AN/TRC-24

2 parts - starting, calibration

Starting -

- . Turn on AC Power. (wait for receiver to warm up)
- . Check reading on MEASURE meter - between 29-31 (see TM if not)
- . Go to MEASURE switch - turn to 2nd LIM pos.
- ? . Hold AFC/OFF/CAL switch in CAL position
- Calibra- . Adjust FINE TUNE - for 0 on FREQ DRIFT meter, tion max. on MEASURE meter
- . Set INDEX control to red line over assigned channel
- . Release AFC/OFF/CAL switch (be sure it returns to OFF)
- . Disconnect antenna jack

She could either look up the procedure in her manual, or ask the instructor about it. When she gets the correct information, she will correct her notes. In this case, she found that the calibration starts after the second step, so she would make this change in her notes. Her corrected notes look like this:

Init. Tuning - AN/TRC-24

2 parts - starting, calibration

Starting -

- . Turn on AC Power. (wait for receiver to warm up)
- . Check reading on MEASURE meter - between 29-31 (see TM if not)

Calibration -

- . Go to MEASURE switch - turn to 2nd LIM pos.
- . Hold AFC/OFF/CAL switch in CAL position
- . Adjust FINE TUNE - for 0 on FREQ DRIFT meter, max. on MEASURE meter
- . Set INDEX control to red line over assigned channel
- . Release AFC/OFF/CAL switch (be sure it returns to OFF)
- . Disconnect antenna jack

EXAMPLE 2:

Here are PVT Henderson's notes from a demonstration on adjusting the Transmitter Amplifier Gain Control (37 KC) on the AN/TCC-7.

- (1) On Test Panel, put MEASURE SELECTIVE switch in 37 KC pos.
- (2) Go to MODEM 2, CH. 2 - put SEND-MEAS switch in SEND pos.
- (3) Test Panel - check FINE TUNE adj. (max. right-hand deflection)
- (4) Slide out Subgroup Panel
- (5) Adjust TR AMP GAIN control (with screwdriver) for 0 dB on test meter
- (6) Slide Subgroup Panel back in
- (7) Test Panel - put MEAS. SEL. switch in OFF pos.
- (8) Disconnect test cord from Subgroup Panel

After class, he checked his notes with the manual. The page from the manual is reproduced on the next page.

You will notice that there are some minor differences in terms. The only major difference is in the last step, where PVT Henderson's notes say to remove the test cord from the Subgroup Panel. Since the drawing clearly shows the cord attached to the Group Panel, either the instructor or PVT Henderson must have goofed. In this case, he would simply correct his notes. In other cases, there may still be a discrepancy between the notes and the printed material. ALWAYS ASK THE INSTRUCTOR if something doesn't make sense.

CONTINUE WITH THE LESSON ON THE PAGE AFTER NEXT.

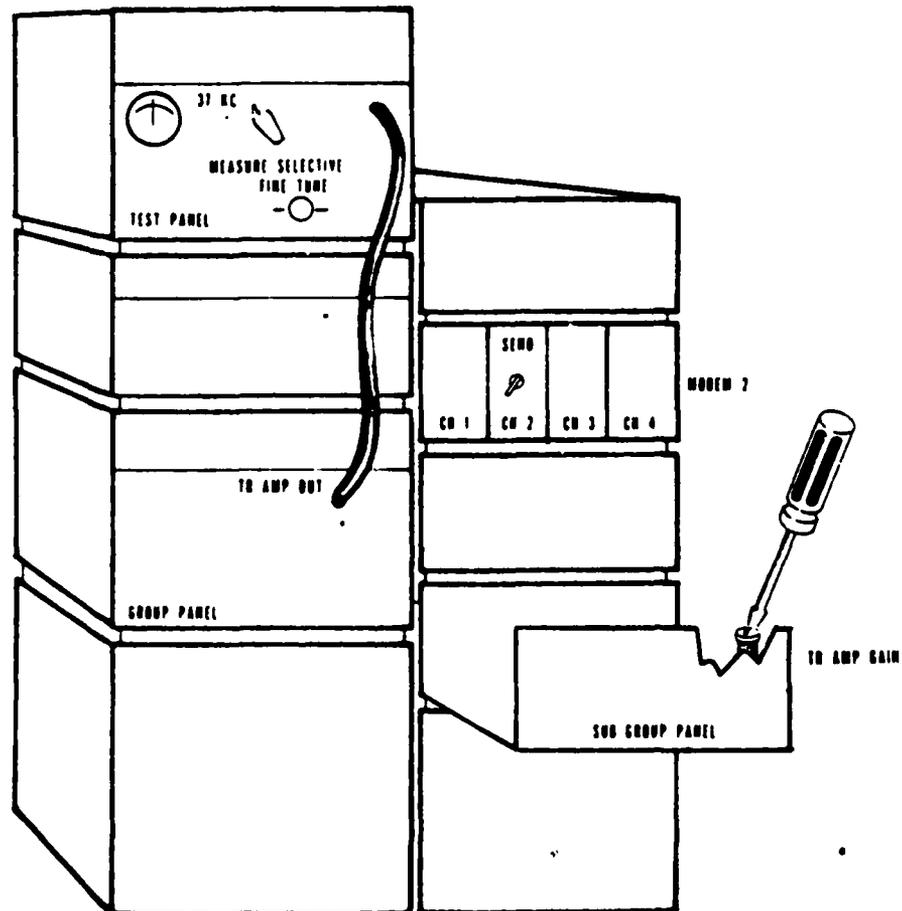
## Transmit Line-Up (Cont)

### TR AMP GAIN (37 KC) Adjustment.

- Set the MEASURE SELECTIVE switch on the Test Panel to the 37 KC position.
- Set the SEND-MEAS switch on CHAN MODEM 2 to the SEND position.
- Check the FINE TUNE adjustment (page 28).
- Slide the Sub Group Panel forward in the mounting rack to access the TR AMP GAIN control.
- Adjust the TR AMP GAIN control for 0 dB (zero dB) on the test meter.
- Secure the panel back in its mounting rack.
- Reset the MEASURE SELECTIVE switch to OFF.
- Remove the Test Panel measure cord plug from the TRAMPOUT jack on the Group Panel.

#### NOTE:

This completes the Transmit Line-Up procedures.



EXERCISE 4, Part 1

DIRECTIONS:

Below is an excerpt from a student's notes on a demonstration of the Heimlich maneuver.

- (1) Mark each place where the student should ask a question.
- (2) Write out the questions the student should ask.

STUDENT'S NOTES:

Clearing an Airway

If person chokes on food - turns blue- can't talk- clutches throat

- (1) 3 sharp blows on back - between shoulder blades - cupped hand
- (2) If still choking use HYMLIK ? maneuver.  
(if sitting or standing)
  - a. Stand behind victim
  - b. Wrap arms around victim's waist, under his arms
  - c. Make fist with one hand - put it on victim's stomach - below ribs, above navel.
  - d.
  - e. Press fist into victim's stomach - upward thrust - fast, forceful
  - f. Wait for victim to inhale
  - g. Repeat if necessary

YOUR QUESTIONS:

CHECK YOUR ANSWER ON PAGE 39.

## EXERCISE 4, Part 2

### DIRECTIONS:

Use this transcript to find the answers to your questions. Go back to page 16 and correct the notes.

Today I'm going to show you how to clear a person's airway when he is choking. This usually happens when the person is eating. If he doesn't chew his food properly, or if he has difficulty swallowing, a chunk of food may become stuck in his throat and block his windpipe. The person's face will start to turn blue, and he won't be able to talk. He may clutch at his throat. The first thing to do if you see a person in this situation is to strike three sharp blows on the victim's back, right between his shoulder blades. You do this with your hand cupped, like this. If that doesn't work, you use a procedure called the Heimlich maneuver. I'll show you how it works. Here's a balloon filled with air. There's a cork in the end of the balloon, holding the air in. If I squeeze the balloon hard, like this, the cork pops out and the balloon goes down. When you perform the Heimlich maneuver, you squeeze the air out of the victim's lungs, and this air pushes out the food or whatever it is that is blocking the airway.

First, I'll show you how to do it when the victim is sitting or standing. You stand behind him, and wrap your arms around his waist, under his arms. Be sure your arms are below his ribs. Now, make a fist with one hand and put it on the victim's stomach. Be sure it is below the ribs but above the navel. It's very important to have your arms in the right position. If they're too high, you could break the person's ribs. If they're too low, you could damage his abdominal organs. Next grab your fist with your other hand, like this. Now press your fist into the victim's stomach with an upward thrust, like this. You must do this fast and forcefully. Give the victim time to inhale and get air into his lungs. If nothing happens, the obstruction is still there. Repeat the upward thrusts until the victim stops choking. Now I'll show you how to do the Heimlich maneuver when the victim is lying on his back...

NOW CHECK YOUR CORRECTED NOTES WITH THE ANSWER ON PAGE 40.

EXERCISE 4, Part 3

DIRECTIONS:

Now look at the excerpt from the Soldier's Manual, on the next page.  
Compare it with the transcript of the demonstration (page 17).

If there are any other questions you would like to ask the instructor,  
write them below. (Don't try to answer the questions.)

QUESTIONS:

NOW CHECK YOUR ANSWER ON PAGE 40.

## PERFORMANCE MEASURES

Steps to clear the airway:

1. When soldier is sitting or standing.
  - a. Stand behind soldier.
  - b. Wrap your arms around soldier's waist under his arms as shown.



- c. Make a fist with one hand and put it on the soldier's stomach just below the ribs and above the navel.
- d. Grab your fist with your other hand.
- e. Press fist into the soldier's stomach, with a forceful fast, upward thrust. Allow the soldier time to inhale in order to get air in the lungs; then, repeat if necessary.
- f. Do step e until the soldier stops choking.

**NOTE:** If the victim vomits, turn his head to the side and wipe his mouth so he will not choke on his vomit.

## Section E

### Taking Notes on Videotaped Demonstrations

The techniques you learned in Section A, B, C, and D are general rules that you can use for any kind of note-taking. Now we're going to look more closely at taking notes on the kind of demonstration you'll be seeing in the 31M course. The important information in these demonstrations may include;

**NAMES:** Of a whole system (e.g., AN/TRC-24)  
Of components or units (e.g., transmitter)  
Of dials, meters, switches (e.g., test meter)

**FUNCTIONS:** What the system (or component, or meter, etc.) does

**LOCATION:** Where a piece of equipment is located in the van  
Where a component or unit is located in the system  
On which component a particular, dial, meter, switch is located  
Where the dial, meter, switch, etc. is located on the component

**PROCEDURES:** What you do with the equipment  
a. What switch or control you use  
b. What you do with it  
c. What happens after you do it

In this lesson, you will practice taking notes on demonstrations that cover the first three kinds of information: names, functions, and locations. Your notes should always include all this information. In order to show location in your notes, it is helpful to make a simple drawing of the equipment, so you can label the parts as you watch the demonstration. This is especially helpful if the equipment has a great many parts. For a smaller, simpler piece of equipment, you can just describe the location in words (upper left, lower right, center, etc.).

#### EXAMPLE:

In the transcript on the next page all the names (of systems, components, switches, dials, etc.) have been circled. The functions (what they do) have been underlined. The locations have been underlined with a double line.

TRANSCRIPT:

You remember that Amplifier-Converter AM-1955/GRC is the low band tuning unit for Radio Receiver 1148(P)/GRC and it fits into an opening in the lower left side of the receiver. Now we'll look at some of the features of this unit. Here at the upper left is the WAVEMETER control. This is used to set the wavemeter to the desired frequency. In the center of the unit is the REC SIG-1 control. This tunes the amplifier-converter to the desired channel.

If you were taking notes on this transcript, all the information that is circled or underlined should be in your notes.

## EXERCISE 5

### DIRECTIONS:

Below is a transcript from a demonstration introducing a piece of equipment. Read the transcript, then complete the exercise on the next page.

### TRANSCRIPT:

Today I'm going to demonstrate the operation of Radio Set AN/GRC-50(V)1. This set provides multichannel, line-of-sight, two-way communication in the ultrahigh frequency range. There are 399 operating channels in the low band range and 500 channels in the high band range.

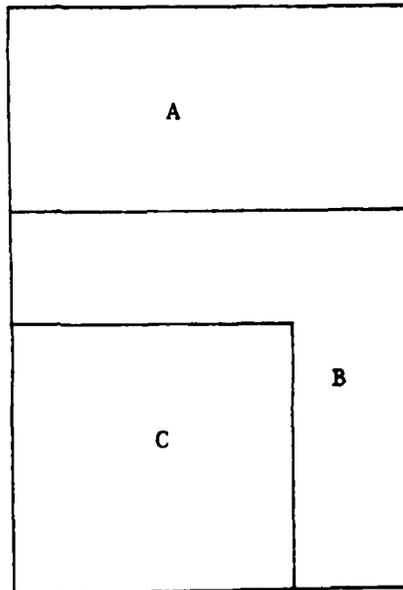
First let's look at the transmitting equipment. This includes the radio transmitter, amplifier-oscillator, and power supply. For low-band operation, we will be using Amplifier-Oscillator AM-1957/GRC. For high-band operation, we would use AM-1958/GRC. As you can see, the amplifier-oscillator fits into this square opening at the lower left of Radio Transmitter T-893(P)/GRC. Power Supply PP-2054/GRC is stacked on top of the transmitter.

Now we'll look more closely at each of these components. First, the power supply. The major controls and indicators that you need to know are all here on the right side of the power supply. First, along the top, is the FIL indicator. When this is lit, it indicates that 115 volts ac is supplied to the primary of the filament transformer. Moving to the right, we have the LV indicator. When this is lit, it shows that 115 volts ac is applied to the primary of the low-voltage transformer. And finally, the HV indicator, which light when 115 volts ac is applied to the primary of the high-voltage transformer. To the right of these three indicators is the AC POWER switch, which turns the transmitter ac power on and off. It also swerves as a circuit breaker to automatically turn off the transmitter if it overloads. Just below the AC POWER switch is the OPERATE/STAND BY switch. When in the OPERATE position, it applies high voltage to the transmitter.

Next, we'll look at ...

ANSWER THE QUESTIONS ON THE NEXT PAGE.

1.



The rough sketch above shows the three components mentioned in the transcript. Fill in the name and designation of each component shown in the sketch. (Assume low band operation.)

A \_\_\_\_\_  
B \_\_\_\_\_  
C \_\_\_\_\_

2. Fill in all the information you can find in the transcript.

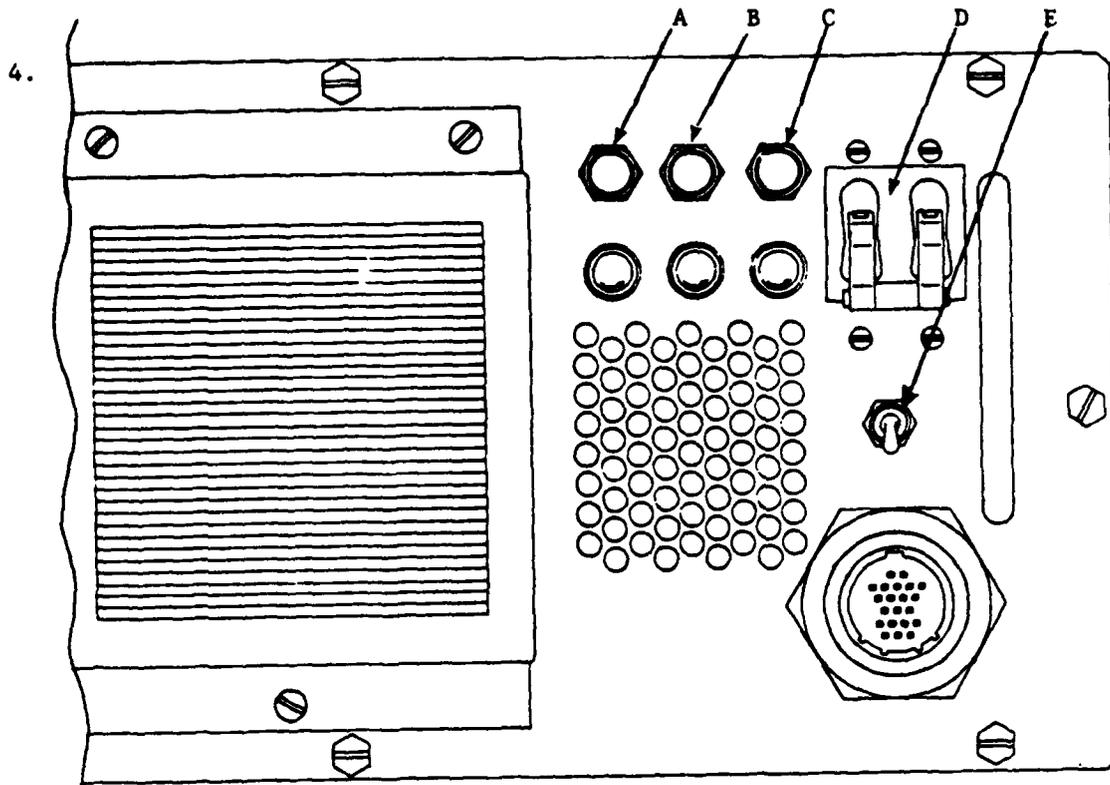
a. Name (designation) of radio set: \_\_\_\_\_

b. Capabilities of radio set: \_\_\_\_\_  
\_\_\_\_\_

c. Number of operating channels: \_\_\_\_\_ low-band  
\_\_\_\_\_ high-band

3. Fill in the chart for the controls and indicators on the power supply.

Name	Function



On the sketch of POWER SUPPLY PP-2054,

the part labeled B is the \_\_\_\_\_

the part labeled E is the \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 41.

Now, believe it or not, you're ready to practice taking notes on a real, live demonstration. Well, not exactly live, but live on videotape. Just remember all the rules you have learned:

- . Write down everything you will need to perform the task (for this lesson, concentrate on names, locations, and functions).
- . Leave out anything that is not related to performing the task.
- . Omit unimportant words; use phrases rather than sentences.
- . Use abbreviations and symbols (but be sure you'll understand them later).
- . Leave room for additions and corrections.

One more thing - try to write legibly, so you'll be able to read your notes later. When you look over your notes, fix up any words that you think you won't be able to read later on.

#### NOTES ON VIDEOTAPED DEMONSTRATIONS:

Some of the videotaped demonstrations in this lesson were done especially for the FBSEP course. They are very much like the demonstrations you will see in the 3IM course. That is, the instructor often repeats important information, pauses to give you time to write things down, etc. Since you won't be able to ask the instructor questions, you will have a chance to watch the demonstration again to fill in anything you missed the first time.

Other demonstrations were taken from existing videotapes that are used in other training settings. These tapes move at a faster pace. You may have to watch them several times in order to get a complete set of notes.

You should know that most instructors do not sound out the individual letters in the designation of a piece of equipment. They say the letters as though they spelled a word. If you hear the instructor refer to the "Anteek 7," he means the AN/TCC-7. If he refers to the "Antrak 26," he means the AN/TRC-26.

For the next exercise, you will take notes as you watch a demonstration on the vertical controls of the AN/USM-281A Oscilloscope. Then you will answer questions about the demonstration by referring to your notes. Your notes should include name, location, and function of each control.

READ THESE INSTRUCTIONS BEFORE YOU DO ANYTHING ELSE:

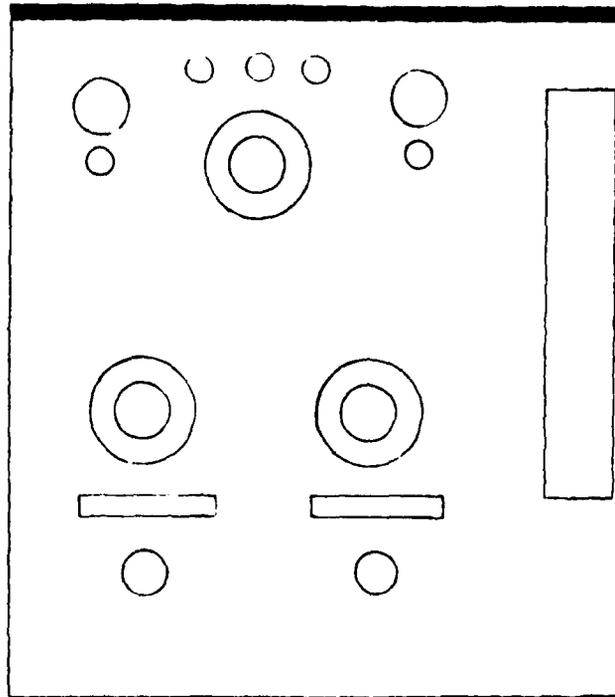
1. Take notes on a separate sheet of paper. On the next page, you will find a sketch of the lower left part of the equipment where the vertical controls are located. Use it to label the controls as you watch the demonstration.
2. Ask the instructor for the videotape for Unit IV, Lesson 1, Practice Exercises.
3. The instructor will show you how to operate the videotape equipment. Because you will probably have to watch each demonstration more than once, you have to learn how to rewind the videotape without damaging it. The instructor will show you how to do this.
4. Follow the narrator's instructions at the beginning and end of the demonstration, except that you do not have to ask the instructor to rewind the tape. You can do this yourself.
5. Show your notes to the instructor. He will point out any important information that you have missed, and tell you whether you should watch the demonstration again.
6. Leave the tape in the machine when you are finished. You will be using it again for the next exercise.
7. When the instructor tells you your notes are complete, go on to page 29.

NOW WATCH THE DEMONSTRATION AND TAKE NOTES.

VERTICAL CONTROLS OF THE AN/USM-281A OSCILLOSCOPE

DIRECTIONS:

Label the controls as you watch the demonstration. Also take notes on a separate piece of paper.



EXERCISE 6

DIRECTIONS:

Use your notes and the labeled sketch to help you answer these questions. Use a check (✓) to mark the correct answer for each question.

1. Most of the vertical controls are duplicated for the A and B channels. However, there is only one:  
 a. vertical attenuator switch.  
 b. vertical selector switch.  
 c. AC-DC selector switch.  
 d. continuously variable amplitude control.
  
2. Which switch controls the height of the vertical display in steps?  
 a. Vertical selector switch.  
 b. AC-DC selector switch.  
 c. Vertical positioning switch.  
 d. Vertical attenuator switch.
  
3. In order to get an accurate voltage indication vertically, you must:  
 a. be sure the continuously variable amplitude control is turned fully clockwise.  
 b. turn the vertical attenuator switch to the highest setting.  
 c. set the vertical selector switch to display both A and B channels at the same time.  
 d. be sure the vertical positioning control is turned fully counterclockwise.
  
4. The controls for the A channel are on the:  
 a. right.  
 b. left.

CHECK YOUR ANSWERS ON PAGE 43.

For the next exercise, you will take notes as you watch a demonstration on the features and preliminary starting procedure of the AN/TSM-16 Frequency Meter. Then you will answer the questions about the demonstration by referring to your notes. Your notes should include:

- names and capabilities of the equipment
- names, locations, and functions of parts
- the settings for each of the controls at the end of the preliminary starting procedure.

READ THESE INSTRUCTIONS BEFORE YOU DO ANYTHING ELSE:

- . Take notes on a separate piece of paper.
- . This demonstration is on the same videotape as the demonstration you just watched. Before starting the tape, set the counter to zero.
- . Follow the narrator's instructions, except that you do not have to ask the instructor to rewind the tape. If you want to watch the demonstration again, rewind the tape to zero.
- . When you are satisfied that your notes are complete, answer the questions on the next few pages.
- . Tell the instructor when you are finished with the tape.

NOW WATCH THE DEMONSTRATION AND TAKE NOTES.

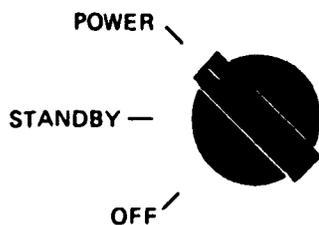
THEN GO ON TO THE NEXT PAGE.

EXERCISE 7, Part 1

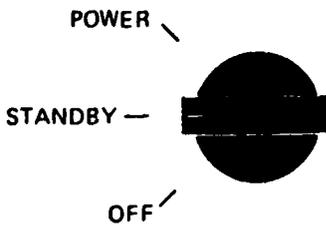
USE YOUR NOTES TO ANSWER THESE QUESTIONS.

For each control, select the drawing that shows the correct position of that control after you have performed the preliminary starting procedure. Check the correct answer for each item.

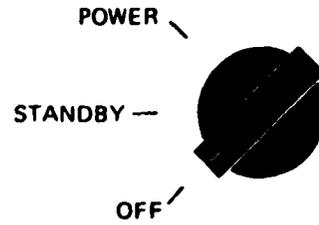
1.



\_\_\_ A

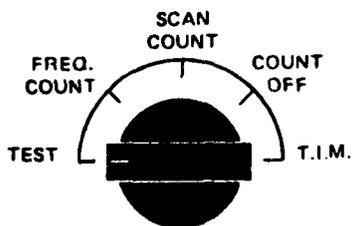


\_\_\_ B



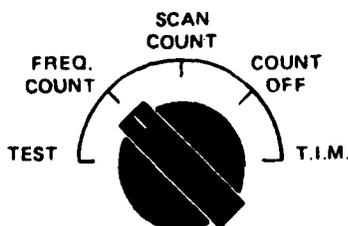
\_\_\_ C

2.



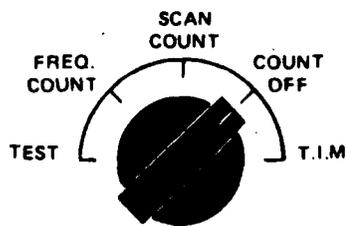
FUNCTION

\_\_\_ A



FUNCTION

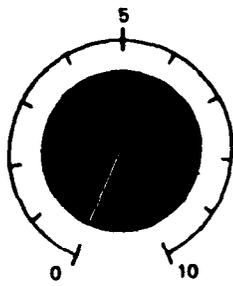
\_\_\_ B



FUNCTION

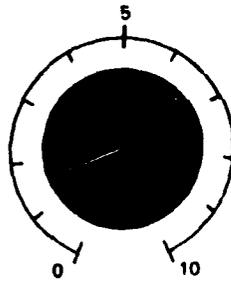
\_\_\_ C

3.



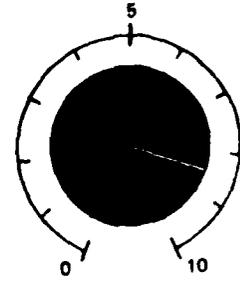
DISPLAY TIME

\_\_\_\_\_ A



DISPLAY TIME

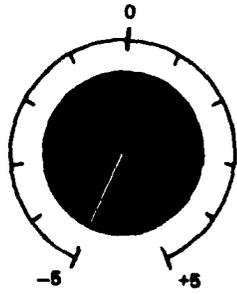
\_\_\_\_\_ B



DISPLAY TIME

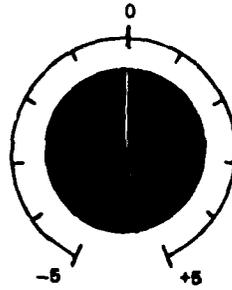
\_\_\_\_\_ C

4.



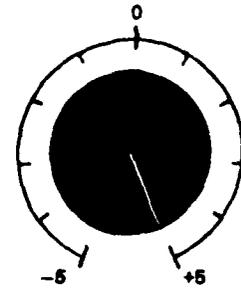
TRIGGER VOLTAGE

\_\_\_\_\_ A



TRIGGER VOLTAGE

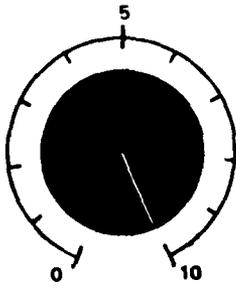
\_\_\_\_\_ B



TRIGGER VOLTAGE

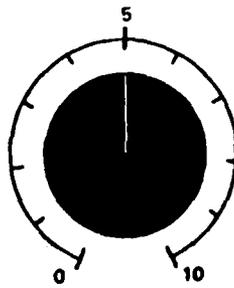
\_\_\_\_\_ C

5.



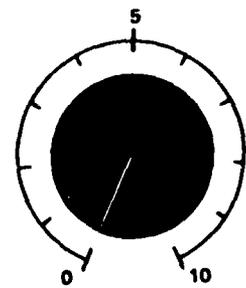
**SENSITIVITY**

\_\_\_\_\_ A



**SENSITIVITY**

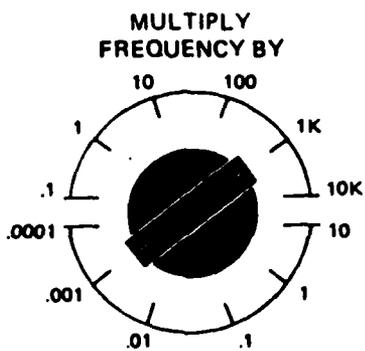
\_\_\_\_\_ B



**SENSITIVITY**

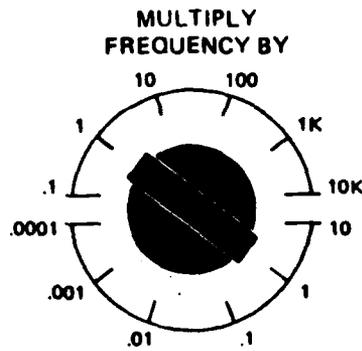
\_\_\_\_\_ C

6.



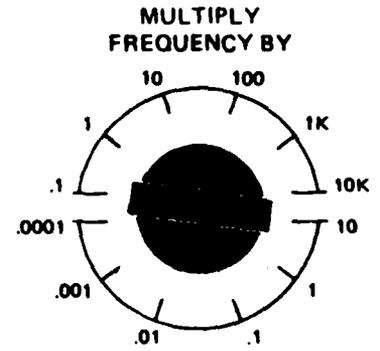
**TIME-SECONDS**

\_\_\_\_\_ A



**TIME-SECONDS**

\_\_\_\_\_ B



**TIME-SECONDS**

\_\_\_\_\_ C

Unit IV  
Lesson 1

EXERCISE 7, Part 2

1. The AN/TSM-16 Frequency Meter can be used to measure frequencies from:

- a. 200 cps to 1 million cps.
- b. 2 cps to 20 million cps.
- c. 20 cps to 1 million cps.

2. Check each way the AN/TSM-16 can be used.

- To measure an unknown frequency automatically.
- To measure a very high unknown frequency manually.
- To measure a very low unknown frequency manually.
- To measure the time interval between two successive pulses.

CHECK YOUR ANSWERS ON PAGE 44.

ANSWER TO EXERCISE 1

YOUR ANSWER SHOULD LOOK SOMETHING LIKE THIS:

Note: In this part of the lesson, your answers do not have to be exactly like the answers in the booklet.

I'm going to give you some rules for operating a vehicle in sandy field conditions. Then you'll see a film illustrating these rules. ~~Now if you expect to be stationed in Alaska, you might be planning to sleep through this demonstration. But sometimes soldiers who expect to go to Alaska end up in New Mexico,~~ so pay attention. The first rule is to select the proper gear to prevent wheel spinning. You'll have to learn this from experience, but remember that if you feel the wheels starting to spin, you should shift to a lower gear. It's very important to accelerate gradually. If you try to gain speed too fast, your wheels will start to spin and dig into the sand. Once you've gotten started, maintain a steady, even rate of movement. Don't shift gears unnecessarily - remember, slow and steady does it. Be alert for difficult spots ahead. Try to go around them if you can. Approach windward slopes at a 90 degree angle. You'll see what I mean by this in the film. You'll have to decide whether to follow the vehicle in front of you, or break new tracks. You'll see this in the film, too. The last rule has to do with tire pressure. Usually you'll go better in the sand if you reduce the tire pressure. But be careful not to reduce it so much that the tire will slip on the rim. ~~Now I'll show you the film and you can see how to apply these rules.~~

IF YOUR ANSWER DOESN'T LOOK LIKE THE ANSWER ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND HOW TO RECOGNIZE IMPORTANT INFORMATION,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWER TO EXERCISE 2

YOUR NOTES SHOULD LOOK SOMETHING LIKE THIS:

To operate vehicle in sand - (1) Select proper gear - prevent wheel spinning. (learn from experience - if wheels start to spin, downshift) (2) Accelerate gradually - if too fast, wheels will spin and dig in. (3) Once moving, keep steady, even rate of movement. (4) Don't shift gears unless you have to - slow and steady. (5) Watch for difficult spots - go around if possible. (6) Approach windward slopes at 90° angle (see film). (7) Follow tracks of vehicle in front, or break new tracks (see film). (8) Reduce tire pressure - not enough to let tire slip on rim.

IF YOUR NOTES DON'T LOOK MUCH LIKE THESE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND HOW TO WRITE NOTES IN THE RECOMMENDED STYLE,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 3

YOUR SENTENCES SHOULD LOOK SOMETHING LIKE THESE:  
You may have used different abbreviations.

1. This control is used to switch from AC to DC.
2. Reading on the meter should be  $> 4$  but  $< 6$ . Reading should  
as you adjust this switch. ↑
3. Readout will tell you the freq. in cps. It should be = the freq.  
you are counting.
4. Set MEASURE sw. to 200 V pstn. After you complete line-up, return  
MEAS. sw. to TRANSMISSION pstn.

Now look over your sentences again, and look for any abbreviations that  
might confuse you later on. If you find any, write out the words.  
Remember, it really doesn't matter what abbreviations and symbols you  
use, just as long as you know what they stand for.

IF YOU DO NOT UNDERSTAND HOW TO USE COMMON ABBREVIATIONS AND SYMBOLS,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND HOW TO USE COMMON ABBREVIATIONS AND SYMBOLS,  
GO ON TO THE NEXT PART OF THE LESSON.

ANSWER TO EXERCISE 4, Part 1

This is how the notes should look:

STUDENT'S NOTES:

Clearing an Airway

If person chokes on food - turns blue- can't talk- clutches throat

- (1) 3 sharp blows on back - between shoulder blades - cupped hand
- ? (2) If still choking use HYMLIK ? maneuver.  
(if sitting or standing)
- a. Stand behind victim
  - b. Wrap arms around victim's waist, under his arms
  - c. Make fist with one hand - put it on victim's stomach - below ribs, above navel.
  - ? d.
  - e. Press fist into victim's stomach - upward thrust - fast, forceful
  - f. Wait for victim to inhale
  - g. Repeat if necessary

These are the questions the student should ask:

1. What is the name of the maneuver?  
(or, How do you spell the name of the maneuver?)
2. Please repeat the fourth step. (or, what do you do after you make a fist and put it on the victim's stomach?)

---

NOW CONTINUE WITH PART 2 OF THE EXERCISE.

ANSWER TO EXERCISE 4, Part 2

This is how the notes should look after you have corrected them:

Clearing an Airway

If person chokes on food - turns blue- can't talk- clutches throat

- (1) 3 sharp blows on back - between shoulder blades - cupped hand
- (2) If still choking use ~~Heimlich~~ <sup>Heimlich</sup> maneuver.  
(if sitting or standing)
  - a. Stand behind victim
  - b. Wrap arms around victim's waist, under his arms
  - c. Make fist with one hand - put it on victim's stomach - below ribs, above navel.
  - d. Grab fist with other hand.
  - e. Press fist into victim's stomach - upward thrust - fast, forceful
  - f. Wait for victim to inhale
  - g. Repeat if necessary

---

NOW CONTINUE WITH PART 3 OF THE EXERCISE.

ANSWER TO EXERCISE 4, Part 3

YOUR LIST OF QUESTIONS MIGHT INCLUDE:

1. Why doesn't the Soldier's Manual talk about the three back blows?
2. Does it matter which hand you use to make a fist?

You may have thought of other questions you want to ask the instructor. If your questions are not the same as these, show them to the instructor.

IF YOU DO NOT UNDERSTAND HOW TO INDICATE OMISSIONS AND QUESTIONS,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND HOW TO INDICATE OMISSIONS AND QUESTIONS,  
GO ON TO THE NEXT PART OF THE LESSON.

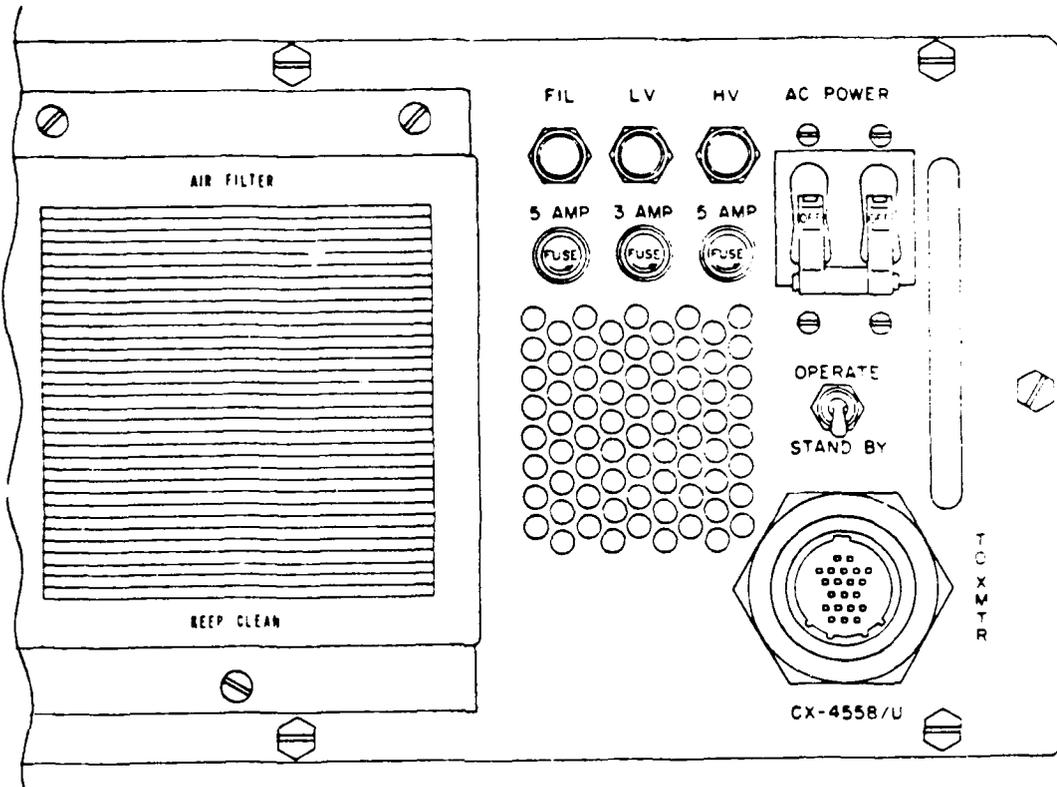
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ANSWERS TO EXERCISE 5

1. A - Power Supply PP-2054/GRC  
B - Radio Transmitter T-893(P)/GRC  
C - Amplifier-Oscillator AM-1957/GRC
  
2. a. AN/GRC-50(V)1  
b. multichannel, line-of-sight, two-way communication in ultra-high frequency range  
c. 399  
d. 500

Name	Function
FIL indicator	when lighted, indicates 115 volts ac applied to primary of filament transformer
LV indicator	when lighted, indicates 115 volts to LV transformer
HV indicator	when lighted, indicates 115 volts to HV transformer
AC POWER switch	turns transmitter power on/off
OPERATE STAND by switch	in OPERATE position, applies high voltage to transmitter

4. B - LV indicator  
E - OPERATE/STANDBY switch



IF YOU MISSED ANY OF THESE QUESTIONS,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON WITH THE LESSON.

IF YOU ANSWERED THESE QUESTIONS CORRECTLY,  
CONTINUE WITH THE LESSON.

ANSWERS TO EXERCISE 6

1. b.
2. d.
3. a.
4. b.

IF YOU HAD TROUBLE ANSWERING THESE QUESTIONS FROM YOUR NOTES,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU ANSWERED THE QUESTIONS CORRECTLY,  
OR IF YOU UNDERSTAND WHY YOU HAD TROUBLE,  
GO ON TO THE NEXT EXERCISE ON PAGE 30.

---

ANSWERS TO EXERCISE 7

Part 1.

1. C
2. A
3. B
4. A
5. C
6. B

Part 2.

1. c.
2. To measure an unknown frequency automatically.  
To measure a very low unknown frequency manually.  
To measure the time interval between two successive pulses.

IF YOU MISSED MORE THAN ONE OF THESE QUESTIONS,  
COMPARE YOUR NOTES WITH THE SET OF NOTES ON THE NEXT PAGE.

Did you leave out necessary information?

Did you write down wrong information?

Did you have trouble understanding what the instructor was saying?  
If necessary, watch the demonstration again, so that you can see what  
you missed.

IF YOU ARE STILL HAVING TROUBLE ANSWERING QUESTIONS FROM YOUR NOTES,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU ANSWERED MOST OF THESE QUESTIONS CORRECTLY,  
TELL YOUR INSTRUCTOR YOU ARE READY FOR CHECKPOINT 1, FORM A/B  
IN UNIT IV - LESSON 1.

## Demonstration Notes for Exercise 7

### AN/TSM-16 Frequency Meter

#### Features of the Equipment/Preliminary Starting Procedure

##### I. Features

- A. Used to measure frequencies from 20 to 1 million cps.
- B. Can be used to measure:
  - 1. An unknown frequency automatically
  - 2. A very low frequency manually
  - 3. The time interval between two successive pulses
- C. Technical information can be found in TM 11-6625-218-12.

##### II. Support Equipment

- A. AN/URM 127 signal generator, preset for an output of 500,000 cps.

##### III. Preliminary Starting Procedure

- A. Set POWER/STANDBY/OFF switch to OFF position.
- B. Set FUNCTION switch to TEST Position.
- C. Rotate DISPLAY TIME control almost fully counterclockwise.
- D. Rotate TRIGGER VOLTAGE control fully counterclockwise.
- E. Rotate SENSITIVITY control fully counterclockwise.
- F. Set AUTO/MANUAL switch to AUTO position.
- G. Set TIME-SECONDS switch to 1 (lower scale).

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT IV**  
**NOTE-TAKING FOR DEMONSTRATIONS**

**LESSON 2**  
**TAKING NOTES TO SHOW SEQUENCE**

**PREREQUISITE:** Unit IV, Lesson 1  
**MATERIALS REQUIRED:** Videotape, Card Sets 1 & 2, Blank Paper  
**TYPE OF LESSON:** Self-Paced

---

STUDENT GUIDE

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UNIT IV. NOTE-TAKING FOR DEMONSTRATION

Lesson 2. Taking Notes to Show Sequence

INTRODUCTION:

Many of the demonstrations you will see in the 31M course will show you how to do certain procedures. To do these procedures correctly, you will have to do the steps in the right order. Sometimes, if you try to do a step in the wrong order, it just won't work because you didn't do the steps that are supposed to come first. Sometimes, it can be dangerous to try to do a step in the wrong order. Even when it really doesn't matter which step you do first, it's better to always do the steps in the procedure in the same sequence, or order. That way you will build up a chain of associations in your mind.

In order to perform the steps in the right order, it's important to take notes that show the steps in the right order. This lesson will show you some ways to take notes that show the correct sequence for performing a procedure.

LEARNING GOALS:

In this lesson, you will learn to:

- A. Use a two-column format to show steps and key points.
- B. Show the correct sequence when inserting additional material in your notes.
- C. Take notes, and then answer questions on videotaped demonstrations that show a series of steps.

On the pages that follow, you will find material to read and questions to answer. Sometimes, there may be more than one "right" answer to an exercise. Instead of checking your own answer, you will show it to the instructor. At other times, you will check your own answer. If you need help at any time, ask your instructor.

In the second part of the lesson, you will take notes on videotaped demonstrations, and then use your notes to answer questions about the demonstrations.

GO ON TO THE NEXT PAGE TO BEGIN THE LESSON.

## Section A

### Ways to Show Sequence

You already know several ways to show things that have to be done in a certain sequence, or order. The easiest way is to number them in order. Another way is to use letters of the alphabet. A third way is to simply list them in the right order, with a dot or a dash in front of each step.

Examples:

#### Steps in Changing a Diaper

1. Place baby on changing table.
2. Place clean diaper under baby.
3. Remove soiled diaper.
4. Clean baby's bottom.
5. Sprinkle with baby powder.
6. Fasten clean diaper.

#### How to Start a Car

- a. Fasten seat belt.
- b. Adjust rear-view mirror.
- c. Place gear shift in PARK or NEUTRAL.
- d. Insert key in ignition.
- e. Depress accelerator pedal.
- f. Turn key fully clockwise.
- g. Release accelerator pedal.

#### Recipe for Chocolate Cake

- . Preheat oven to 350°.
- . Grease and flour two 9-inch cake pans.
- . Cream butter and sugar.
- . Beat in eggs one at a time.
- . Stir in melted chocolate.
- . Mix flour with salt and baking powder.
- . Add flour mixture alternately with milk.
- . Pour batter into prepared pans.
- . Bake for 35-40 minutes.
- . Cool on rack for 10 minutes.
- . Remove from pan.

Using a Two-Column Format

One way to take notes on procedures is to list the steps in the left-hand column and use the right-hand column for key points. A step is defined as "a logical segment of the operation, in which something is done to advance the work." Key points are directions or bits of information that might make the work go more smoothly. They might include tips on how to avoid mistakes. Here is an example using the two-column format to show the procedure for setting up a movie projector.

STEPS	KEY POINTS
1. Place on level, sturdy surface.	
2. Plug into power outlet.	
3. Extend both reel arms.	3. Click indicates arm is locked in place.
4. Place film on front reel arm.	4. (Lens is at front). End of film should come off front of reel. Reel will snap into place. Be sure it is secure.
5. Place empty reel on other arm.	
6. Turn volume control to ON.	6. Near front, at bottom.

DO EXERCISE 1 ON THE NEXT PAGE.

## EXERCISE 1, Part 1

### DIRECTIONS:

If you plan to use the two-column format, you probably need some practice in deciding, what is a step and what is a key point. Here is a transcript from a demonstration on how to disinfect drinking water. Underline the phrases or sentences that you would list under "steps." Draw a double line under the words or phrases you would list under "key points."

### TRANSCRIPT:

Today I'm going to show you how to disinfect drinking water when safe water isn't available. You'll need a one-quart canteen, a cup, and iodine tablets. First, inspect the iodine tablets to make sure they are usable. They should be steel gray in color. They should not be stuck together or crumbly. Then, fill the canteen with the cleanest water available. Be sure to leave an air space of 1 inch below the neck of the canteen. Then, if the water is clear, add one iodine tablet. If the water is cloudy, add two tablets. Place the cap on the canteen loosely. Wait five minutes, then shake the canteen well. The water that leaks out will rinse the threads around the neck of the canteen. Tighten the cap and wait another 20 minutes before using the water for any purpose.

CHECK YOUR ANSWER ON PAGE 18.

EXERCISE 1, Part 2

DIRECTIONS:

Now write your notes for the demonstration. Use the two-column format. List the steps on the left and the key points on the right. Use any method (numbers, letters, dashes, or dots) to show the sequence of steps.

STEPS	KEY POINTS

CHECK YOUR ANSWER ON PAGE 19.

## Section B

### Making Additions or Correcting Notes

When you are depending on your notes to show the right sequence, you have to be especially careful about making additions or corrections to your notes.

If you know that you have missed something during the demonstration, all you have to do is leave a blank space and fill it in later (after you have asked the instructor to repeat the information). If you do this, your notes should be in the right order.

Sometimes, however, you don't know until later that something has been left out. Here's an example:

At the beginning of the demonstration, the instructor said there were five steps in setting the 1KC control on the AN/TCC-7. But when you look over your notes, you see only four steps:

1. Slide Test Panel forward.
2. Set MEASURE NON-SELECTIVE switch to CHECK 1 KC position.
3. Adjust 1 KC screwdriver control (inside Panel) for 0 dB on test meter.
4. Slide panel back in mounting rack.

You check with the instructor, and learn that you have left out the third step, which is "Connect Test Panel measure cord plug into 1 KC jack." How will you make this correction in your notes? It's not enough to write the step at the end of your notes. You have to show where it should be, so that you will be able to do all the steps in the right order.

Here's a good way to make the correction:

1. Slide Test Panel forward.
2. Set MEASURE NON-SELECTIVE switch to CHECK 1 KC position.
- 4 X Adjust 1 KC screwdriver control (inside Panel) for 0 dB on test meter.
- 5 X Slide panel back in mounting rack.
3. Connect Test Panel measure cord plug into 1 KC jack.

This shows where the missing steps should go, and it also corrects the numbering.

To insert a word, you can use a mark like this: ^

Example: PVT. Benjamin is <sup>not</sup> ^ a man.

DO EXERCISE 2 ON THE NEXT PAGE.

## EXERCISE 2

### DIRECTIONS:

Here are the notes one student took on the demonstration of how to disinfect drinking water. (See Practice Exercise #1.) Look over the notes; if the student has made any mistakes, correct them.

STEPS	KEY POINTS
. Inspect tablets.	Should be steel gray - not stuck together - not crumbly
. Fill canteen with cleanest water available.	Leave air space of 1" below neck of canteen
. Add 1 iodine tablet (if water is clear)	If water is cloudy, add 2 tablets.
. After 5 minutes, shake canteen well.	Water that leaks will rinse threads around neck
. Tighten cap.	
. Wait 20 minutes before using.	

CHECK YOUR ANSWER ON PAGE 20.

## Section C

### Taking Notes on Videotaped Demonstrations

In Lesson 1, you learned that your notes should include information on:

Names  
Functions  
Locations  
Procedures

The demonstrations in Lesson 1 focused on the first three kinds of information (names, functions, and locations). The demonstrations in this lesson will focus on procedures, or what you do with the equipment. Your notes should include:

- . What switch or control you use.
- . What you do with it.
- . What happens after you do it.

Of course, you also need to write down the names of the switches and controls involved in the procedure. Sometimes it's also important to write down the location of the various switches and other controls. Often a procedure involves several components in a system. If you have to move back and forth from one component to another as you perform the steps in a procedure, you need to know exactly where (that is, on which component) each step is performed. The instructor will usually tell you each time he moves to a different component (if not, you'll have to watch very closely). The instructor may say something like this:

First, go to the Test Panel. Set the MEASURE switch to the 200 V position. Set the MEASURE SELECT switch to OFF. Next, go to the Receiver and adjust the FINE TUNE control until you get a maximum right-hand deflection on the TEST METER.

One way to get all this information into your notes is to use a three-column format.

EXAMPLE:

<u>Location</u>	<u>Action</u>	<u>Indication</u>
Test Panel	Set MEASURE switch to 200 V.	
	Set MEASURE SELECT switch to OFF	
Receiver	Adjust FINE TUNE control	TEST METER goes all the way to the right

Notice that the second column tells you what control you use and what you do with it. The first column tells you where it is located. The third column tell you what happens after you do it.

As you learned in Section A and B, it's important to write down all the steps, in the right order. Sometimes, the instructor will help you by saying: "First, you ...," "The second step is ...," "Next you ...." If he doesn't, just write down each step as he demonstrates it.

#### TAKING NOTES ON VIDEOTAPED DEMONSTRATIONS

For the rest of this lesson, you will be taking notes on videotaped demonstrations. Some of the demonstrations were done especially for the FBSEP course. They are similar to demonstrations you will see in the 3!M course. That is, the instructor often repeats important information, pauses to give you time to write things down, etc. Since you won't be able to ask the instructor questions, you will have a chance to watch the demonstration again to fill in anything you missed the first time.

Other demonstrations were taken from existing videotapes that are used in other training settings. These tapes move at a faster pace. You may have to watch them several times in order to get a complete set of notes.

You should know that most instructors do not sound out the individual letters in the designation of a piece of equipment. They say the letters as though they spelled a word. If you hear the instructor refer to the "Anteek 7," he means the AN/TCC-7. If he refers to the "Antrack 26," he means the AN/TRC-26.

In the next exercise, you will take notes as you watch a videotaped demonstration on how to adjust the gain control in the AN/TCC-7 telephone terminal. Then you will answer some questions by referring to your notes.

Be sure your notes list all the steps, in the right order. These steps are all performed on one panel, so you don't need to worry about moving from one component to another. (You should note the name of the panel.)

READ THESE INSTRUCTIONS BEFORE YOU DO ANYTHING ELSE

- . Take notes on a separate piece of paper.
- . Ask the instructor for the videotape for Unit IV, Lesson 2, Practice Exercise.
- . The instructor will show you how to operate the videotape equipment. Because you will probably have to watch each demonstration more than once, you have to learn how to rewind the videotape without damaging it. The instructor will show you how to do it.
- . Follow the narrator's instructions at the beginning and end of the demonstration, except that you do not have to ask the instructor to rewind the tape. You can do this yourself.
- . Show your notes to the instructor. He will point out any important information that you have missed, and tell you whether you should watch the demonstration again.
- . Leave the tape in the machine when you are finished. You will be using it again for the next exercise.
- . When the instructor tells you your notes are complete, go on to the next page.

EXERCISE 3

SET THEM ASIDE AND CONTINUE WITH PART 2.

Part 1. Check the right answer to this question.

The test meter shows two different indications during this procedure. Which of the following lists the indications in the right order?

- a. Maximum, then zero
- b. Zero, then maximum

Part 2. ASK THE INSTRUCTOR FOR CARD SET #1

These cards show the five steps in the procedure. Each card includes a short description of the step. Use your notes to help you arrange the cards in the right order, with the first step on top and the last step on the bottom. DO IT NOW.

WHEN YOU HAVE ARRANGED THE CARDS IN THE RIGHT ORDER,

CHECK YOUR ANSWERS ON PAGE 21.

In the next exercise, you will take notes as you watch a demonstration on how to adjust the Orderwire Transmit Amplifier Output on the AN/TCC-7. Your notes should include all the steps, in the right order. Some steps will be done on the Test Panel and some on the Orderwire Panel. Be sure your notes indicate where each step is performed. This demonstration is longer than the first one. Again, you will use your notes to answer questions.

READ THESE INSTRUCTIONS BEFORE YOU DO ANYTHING ELSE.

- . Study the drawing on the next page before you watch the demonstration.
- . Take notes on a separate sheet of paper.
- . This demonstration is on the same videotape as the demonstration you just watched. Before starting the tape, set the counter to zero. You will need this reading if you want to watch the demonstration again.
- . Follow the narrator's instructions, except that you do not have to ask the instructor to rewind the tape. If you want to watch the demonstration again, rewind the tape to zero.
- . When you are satisfied that your notes are complete, continue with the exercise.
- . Tell the instructor when you are finished with the tape.

NOW WATCH THE DEMONSTRATION AND TAKE NOTES.  
THEN GO ON TO PAGE 14.



EXERCISE 4, Part 1

DIRECTIONS: Use your notes to answer these questions.

1. Which ATTENUATOR buttons do you hold down?  
 a. 5 dB and 10 dB  
 b. 5 dB, 10 dB, and 20 dB  
 c. 10 dB and 20 dB
  
2. When you adjust the GAIN control, what reading should you see on the test meter?  
 a. -.5 dB  
 b. Zero  
 c. +.5 dB
  
3. Which panel do you work on first?  
 a. Test Panel  
 b. Orderwire Panel
  
4. The GAIN control is located on the inside of the:  
 a. Test Panel.  
 b. Orderwire Panel.

EXERCISE 4, Part 2

DIRECTIONS: ASK THE INSTRUCTOR FOR CARD SET #2.

These cards show the nine steps in the procedure. Use your notes to help you arrange the cards in the right order, with the first step on the top and the last step on the bottom. DO IT NOW.

CHECK YOUR ANSWERS ON PAGE 22.

ANSWER KEYS TO EXERCISES IN UNIT III, LESSON 2, REVIEW EXERCISE

Unit IV  
Lesson 2

17

ANSWER TO EXERCISE 1, Part 1

Your answer should look something like this:

Today I'm going to show you how to disinfect drinking water when safe water isn't available. You'll need a one-quart canteen, a cup, and iodine tablets. First, inspect the iodine tablets to make sure they are usable. They should be steel gray in color. They should not be stuck together or crumbly. Then, fill the canteen with the cleanest water available. Be sure to leave an air space of 1 inch below the neck of the canteen. Then, if the water is clear, add one iodine tablet. If the water is cloudy, add two tablets. Place the cap on the canteen loosely. Wait five minutes, then shake the canteen well. The water that leaks out will rinse the threads around the neck of the canteen. Tighten the cap and wait another 20 minutes before using the water for any purpose.

You probably saw that it's not always easy to decide which goes where: (for example, the part about adding the iodine tablets to the water). Actually, the step is "add iodine tablet(s)." The key points would be "one if water is clear," "two if water is cloudy." The really important thing is to be sure your left-hand column lists every step that you have to do in order to perform the procedure. You'll also find that instructors, and manuals, sometimes combine two or more steps into one step. For example, the Soldier's Manual counts this as one step: "Place the cap on the canteen loosely; wait five minutes; then shake the canteen well." Something like this can be confusing if the total number of steps in your notes doesn't agree with the number of steps in the manual. But if you have all the necessary steps written down in the right order, you will be able to do the procedure.

IF YOU AREN'T SURE WHETHER YOUR ANSWER IS CORRECT,  
ASK YOUR INSTRUCTOR FOR HELP.  
THEN CONTINUE WITH PART 2 OF THE EXERCISE.

ANSWER TO EXERCISE 1, Part 2

Your notes should look something like this.

STEPS	KEY POINTS
a. Inspect tablets.	- should be steel gray - not stuck together - not crumbly
b. Fill canteen.	- use cleanest water available - leave air space of 1" below neck of canteen
c. Add iodine tablet(s).	- one if water is clear, two if water is cloudy
d. Put cap on loosely.	
e. Wait 5 minutes.	
f. Shake canteen well.	- water that leaks will rinse threads around neck
g. Tighten cap.	
h. Wait 20 minutes before using.	

Your notes do not have to be exactly like these. For example, you might have combined steps e. and f. Just be sure you have every step listed, in the right order.

IF YOU DO NOT UNDERSTAND HOW TO USE THE TWO-COLUMN FORMAT,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND HOW TO USE THE TWO-COLUMN FORMAT,  
GO ON TO THE NEXT PART OF THE LESSON.

ANSWER TO EXERCISE 2

This student left out an important step.  
Your corrected notes should look something like this.

STEPS	KEY POINTS
. Inspect tablets.	Should be steel gray - not stuck together - not crumbly
. Fill <sup>1 qt.</sup> canteen with cleanest water available.	Leave air space of 1" below neck of canteen
. Add 1 iodine tablet (if water is clear)	If water is cloudy, add 2 tablets.
. After 5 minutes, shake canteen well.	Water that leaks will rinse threads around neck
. Tighten cap.	
. Wait 20 minutes before using.	
. Put cap on loosely	

IF YOU DO NOT UNDERSTAND HOW TO MAKE ADDITIONS AND CORRECTIONS TO YOUR NOTES, ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND HOW TO MAKE ADDITIONS AND CORRECTIONS TO YOUR NOTES, GO ON TO THE NEXT PART OF THE LESSON.

ANSWERS TO EXERCISE 3

Part 1. The test meter indications are:

- a. Maximum, then zero

Part 2.

The correct order of steps is:

1. Set MEASURE SEL switch to CHECK GAIN
2. Adjust FINE TUNE
3. Adjust GAIN
4. Remove jack
5. Set MEASURE SEL switch to OFF

If you were not able to put the steps in the right order, or if you missed the Part 1 question, look at your notes and try to figure out why.

Did you leave out a step?

Did you write down a step in the wrong order?

Did you have trouble reading your notes?

Did you use an abbreviation or symbol that you couldn't figure out?

IF YOU DO NOT UNDERSTAND WHY YOU HAD TROUBLE ANSWERING THE QUESTIONS,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU ANSWERED THE QUESTIONS CORRECTLY,  
OR IF YOU UNDERSTAND WHY YOU HAD TROUBLE,  
GO ON TO THE NEXT EXERCISE.

ANSWERS TO EXERCISE 4

Part 1.

1. c. 10 dB and 20 dB
2. c. +.5
3. a. Test Panel
4. b. Orderwire Panel

Part 2. The correct order of steps is:

1. Set MEASURE NON-SEL switch to OW TR AMP OUT
2. Connect measure jack
3. Slide panel out
4. Hold ATTENUATOR buttons down
5. Set SEND OW switch to ON, andust GAIN
6. Set SEND OW switch to OFF
7. Release ATTENUATOR buttons
8. Slide panel back
9. Set MEASURE NON-SEL switch to OFF

IF YOU HAD TROUBLE ANSWERING THESE QUESTIONS,  
ASK THE INSTRUCTOR TO LOOK AT YOUR NOTES AND HELP YOU FIGURE OUT  
WHY YOU'RE HAVING A PROBLEM.

IF YOU ANSWERED THE QUESTIONS CORRECTLY,  
TELL THE INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A/B  
IN UNIT IV - LESSON 2.

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT IV**  
**NOTE-TAKING FOR DEMONSTRATIONS**

**LESSON 3**  
**TAKING NOTES TO SHOW RELATIONSHIPS**

**PREREQUISITE:** Unit IV, Lesson 1  
**MATERIALS REQUIRED:** Videotape, Blank Paper  
**TYPE OF LESSON:** Self-Paced

UNIT IV. NOTE-TAKING FOR DEMONSTRATION

Lesson 3. Taking Notes to Show Relationships

INTRODUCTION:

You already know how to take notes that include all the important information and that show steps in the right sequence. Some of the demonstrations you will see in the 31M course show procedures that have two or more major parts. Under each of these parts there may be any number of steps. Some of the steps may be broken down into smaller parts, or substeps. In order to perform the procedure, you have to be able to take notes that show the relationship between the major parts, the steps, and the substeps.

In this lesson, you will learn some ways to show these relationships in your notes. Then you will have a chance to practice taking notes on demonstrations that have more than one major part.

LEARNING GOALS:

In this lesson, you will learn to:

- A. Take notes on a procedure that has two major parts, and several steps in each part (p. 2).
- B. Take notes on a procedure that has three major parts, several steps in each part, and substeps under one of the steps (p. 6).
- C. Take notes on videotaped demonstrations of procedures with two or more major parts, several steps in each part, and some substeps (p. 10).

On the pages that follow, you will find material to read and questions to answer. Sometimes, there may be more than one "right" answer to an exercise. Instead of checking your own answer, you will show it to the instructor. At other times, you will check your own answers. If you need help at any time, ask your instructor.

In the second part of the lesson, you will take notes on videotaped demonstrations, and then use your notes to answer questions about the demonstrations.

BEGIN THE LESSON.

Section A

Taking Notes on Demonstrations with More than One Part

If you took Lesson 2, you practiced taking notes on demonstrations with one major part and a series of steps. Some demonstrations have two or more major parts, and a series of steps under each part. You already know how to list the steps for each part in the right order. Now you need to learn how to show what the major parts are, and what steps belong under each part.

The instructor will often tell you at the beginning of the lecture: "There are two (or three, or four) parts to this procedure." Or he may say something like: "This demonstration will cover setting up, operating, and dismantling the equipment." That would tell you that there are three major parts to the demonstration. It's a good idea to jot down this information at the beginning of your notes. Then when the demonstration is over, you can check your notes to make sure all the major parts are there.

There are several ways to show the relationship between main ideas and supporting details (in this case, steps). You probably learned (and hated) outlining in school. This method uses Roman numerals, capital letters, arabic numbers, lower case letters, etc., to show the various levels of information. In a demonstration with more than one part and a series of steps under each part, you could use some variation of this system.

Example 1:

- I. First Main Idea
  - A. Step 1
  - B. Step 2
  - C. Step 3
  
- II. Second Main Idea
  - A. Step 1
  - B. Step 2
  - etc.

Example 2:

- A. First Main Idea
  - 1. Step 1
  - 2. Step 2
  - 3. Step 3
  
- B. Second Main Idea
  - 1. Step 1
  - 2. Step 2
  - etc.

Another method is to underline the main ideas, and indent the steps. You can use numbers or letters for the steps, or just list them in order.

Example 3:

First Main Idea

1. Step 1
2. Step 2
3. Step 3

Second Main Idea

1. Step 1
  2. Step 2
- etc.

The next exercise will give you some practice in recognizing main ideas, or parts of a procedure, and the steps that are included in each part.

EXERCISE 1 (Part 1)

DIRECTIONS:

On the next page is a transcript from a demonstration.

Underline the words that tell you what the major parts are, and number the steps under each part. Write the number next to the verb (action word) for each step. Examples of verbs are fill, heat, take, etc.). The first major part and the first step have been done for you.

TRANSCRIPT:

I am going to show you some ways to disinfect drinking water for your canteen when safe water is not available. You already know how to use iodine tablets, so today I'm going to show you how to disinfect water by using calcium hypochlorite or by boiling the water. First, I'll show you how to disinfect water using calcium hypochlorite. First,<sup>1</sup> fill your canteen with the clearest water available. Be sure to leave an air space of one inch below the neck of the canteen. Then fill a canteen cup half full of water. Add the calcium hypochlorite from one ampule. Stir the water with a clean stick until the powder is dissolved. Next, take the cap of a plastic canteen and fill it half full with the calcium hypochlorite solution. Add this solution to the water in the canteen. Place the cap on the canteen and shake it thoroughly. Now loosen the cap slightly and turn the canteen upside down. This will let the treated water leak onto the threads around the neck of the canteen. Now tighten the cap on the canteen and wait at least 30 minutes before using the water. The other method I'm going to show you is how to disinfect water by boiling it. Heat the water, using whatever fuel is available, until it comes to a full rolling boil. Let it boil for at least 15 seconds. Let the water cool before you drink it. This concludes the demonstration of how to disinfect drinking water.

CHECK YOUR ANSWER ON PAGE 18.

EXERCISE 1 (Part 2)

DIRECTIONS:

Now that you have identified the major parts and the steps in the procedure for disinfecting drinking water, use this page to write up your notes. Use any of the methods for showing relationship that you read about in the lesson.

NOTES:

CHECK YOUR ANSWER ON PAGE 19.

## Section B

### Taking Notes on Demonstrations with Steps and Sub-steps

Sometimes a step in a procedure can be broken down into substeps. For example, in setting up a movie projector, one step is "place reels on reel arms." This step actually involves several actions.

1. Place reel of film on front reel arm.
2. Rotate reel until it snaps into place.
3. Place empty reel on back reel arm.
4. Rotate reel until it snaps into place.

These actions are what we call substeps. Sometimes it is hard to tell, in a demonstration, which are steps and which are substeps. If you aren't sure, just list each action as a separate step, and then you'll be sure to have everything you need to do the procedure.

The instructor may say something like this: "The next step is to adjust the FINE TUNE control. You do this by..." and then proceed to tell you how to adjust the FINE TUNE control. In this case, your notes would show, "Adjust FINE TUNE control" as a step, and list the substeps under it. (Of course, if you already know how to adjust the FINE TUNE control, you may not need to write down the substeps. This often happens when a new procedure includes steps that you have already learned.)

Example 1:

"First you rotate the TIME-SECONDS switch to the desired sampling period, and then you adjust the DISPLAY TIME control for a suitable display time between counts."

In this example, the two underlined actions are steps.

Example 2:

"Next you translate the reading on the frequency counter into cycles per second. To do this you take the reading on the counter, then see what number the TIME-SECONDS switch is pointing to on the "MULTIPLY BY" scale. Multiply the counter reading by that number."

In this example, the three underlined actions are substeps.

If you do want to show substeps in your notes, you can use any of these methods:

Example 1:

- I. Main Idea
  - A. Step 1
  - B. Step 2
    - 1 Substep 1
    - 2 Substep 2
  - C. Step 3

Example 2:

- A. Main Idea
  - 1. Step 1
  - 2. Step 2
    - a Substep 1
    - b Substep 2
  - 3. Step 3

Example 3

Main Idea

- Step 1
- Step 2
  - Substep 1
  - Substep 2
- Step 3

However, the first two examples are probably better. There's less chance of getting mixed up if you show by letters or numbers that some actions are steps and others are substeps.

EXERCISE 2 (Part 1)

DIRECTIONS:

On the next page is part of a transcript from a demonstration on operating a movie projector. There are seven steps in Phase 2. Two of those steps have substeps. Find the substeps and underline them.

TRANSCRIPT:

Now for Phase 2. Phase 2 is Threading the Projector. This is an automatic-threading machine which simplifies the threading.

Phase 2 has 7 steps.

Step 1. Turn on the motor-lamp switch to Forward Position.

Step 2. Trim the leader. This white part is called the leader. If the end is ragged, or cut at an angle, the leader won't thread through the machine properly. To trim the leader just insert it in this slot and press the cutter. The leader is now ready for threading.

Step 3. Push the Auto Load lever. That is the lever here. It's marked with the Number 3. Push it forward.

Step 4. Insert the film here where you see the Number 4. It will automatically thread through the machine.

Step 5. Allow at least 3 feet of leader to run through the end of the machine.

Step 6. Turn off the motor-lamp switch.

Step 7. Attach the leader to the take-up reel. Insert the end into the slot on the reel. Tighten it by turning the reel.

CHECK YOUR ANSWER ON PAGE 20.

EXERCISE 2 (Part 2)

DIRECTIONS:

Now try writing notes on this part of the demonstration, using a variation of the outline format to show the steps and substeps. The first part of the outline has been done for you. (The notes start with "B," since Threading the Projector is the second phase of the procedure being demonstrated.)

NOTES:

B. Phase 2 - Threading the Projector

1. Turn motor-lamp switch to FORWARD position.

CHECK YOUR ANSWER ON PAGE 21.

## Section C

### Taking Notes on Videotaped Demonstrations

For the rest of this lesson, you will be taking notes on videotaped demonstrations with two or more main parts, one or more steps in each part, and possibly some substeps. In order to answer the questions about the demonstrations, you should include in your notes:

- . The main parts in the right order.
- . The steps under each main part, in the right order.
- . The substeps (if any) under each step, in the right order.

For each step or substep, your notes should also include the following information, if it is given:

- . What switch or control you use.
- . Where it is located (on which component).
- . What you do with it.
- . What happens after you do it (e.g., a reading on a meter).

#### NOTES ON VIDEOTAPED DEMONSTRATIONS:

Some of these demonstrations were done especially for the FBSEP course. They are similar to demonstrations you will see in the 31M course. That is, the instructor often repeats important information, pauses to give you time to write things down, etc. Since you won't be able to ask the instructor questions, you will have a chance to watch the demonstration again to fill in anything you missed the first time.

Other demonstrations were taken from existing videotapes that are used in other training settings. These tapes move at a faster pace. You may have to watch them several times in order to get a complete set of notes.

You should know that most instructors do not sound out the individual letters in the designation of a piece of equipment. They say the letters as though they spelled a word. If you hear the instructor refer to the "Anteek 7," he means the AN/TCC-7. If he refers to the "Antrack 26," he means the AN/TRC-26.

In the next exercise, you will take notes on a demonstration of the initial tuning procedure for the AN/TRC-24 radio set. Be sure your notes include all the steps and substeps, in the right order, and what should happen after you do each step. Then you will answer some questions about the demonstration by referring to your notes.

READ THESE INSTRUCTIONS BEFORE YOU DO ANYTHING ELSE.

1. Take notes on a separate piece of paper.
2. Ask the instructor for the videotape for Unit IV, Lesson 3, Practice Exercise.
3. The instructor will show you how to operate the videotape equipment. Because you will probably have to watch each demonstration more than once, you have to learn how to rewind the videotape without damaging it. The instructor will show you how to do it.
4. Follow the narrator's instructions at the beginning and end of the demonstration, except that you do not have to ask the instructor to rewind the tape. You can do this yourself.
5. Show your notes to the instructor. He will point out any important information that you have missed, and tell you whether you should watch the demonstration again.
6. Leave the tape in the machine when you are finished. You will be using it again for the next exercise.
7. When the instructor tells you that your notes are complete, go on to the next page.

There is one thing more you should know about this demonstration. The instructor does not tell you when he is starting the calibration part of the procedure. If you looked up the procedure in the manual, you would see that the first step in calibration is setting the MEASURE switch to 2nd LIM position. This should help you organize your notes.

NOW WATCH THE DEMONSTRATION AND TAKE NOTES.

THEN GO ON TO THE NEXT PAGE.

### EXERCISE 3

#### DIRECTIONS:

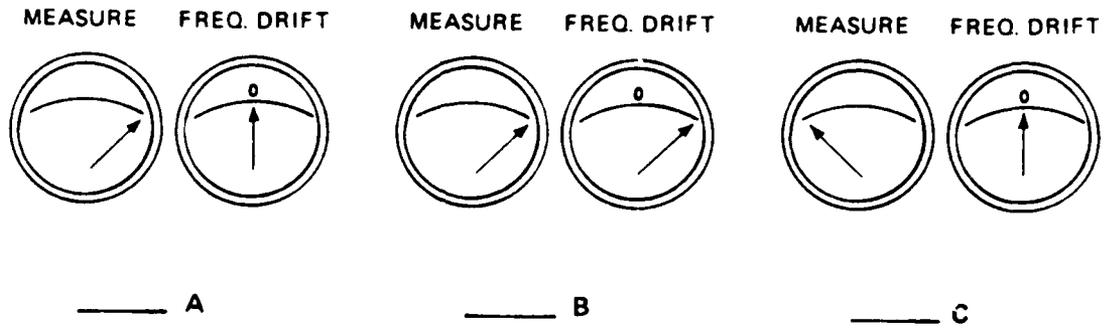
Now use your notes to help you answer these questions about the procedure that was demonstrated.

1. What is the second step in the calibration part of the initial tuning procedure?
  - a. Check the reading on the MEASURE meter
  - b. Hold the AFC/OFF/CAL switch in the CAL position
  - c. Adjust the RF AMP tuning control
  
2. Check each step that do you do while the AFC/OFF/CAL switch is in the CAL position.
  - Turn the MEASURE switch to 2nd LIM position
  - Adjust FINE TUNE control
  - Set INDEX control over red line nearest assigned channel
  - Disconnect antenna jack
  
3. What is the last step in the starting part of the procedure?
  - a. Turn on the POWER switch
  - b. Wait for the receiver to warm up
  - c. Check the MEASURE meter
  - d. Turn off the POWER switch
  
4. What is the last step in calibration?
  - a. Release the AFC/OFF/CAL switch
  - b. Disconnect the antenna jack
  - c. Turn off the POWER switch
  
5. Which of the two main parts of this procedure has more steps?
  - a. Starting
  - b. Calibration

6. After the receiver warms up, you get a reading of 27 on the MEASURE meter. What would you do?

- a. Consult the Technical Manual.
- b. Proceed to calibration.

7. Which drawing below shows the correct readings after you have done the third step in calibration?



CHECK YOUR ANSWERS ON PAGE 22.

In the next exercise, you will take notes as you watch a demonstration of the final tuning procedure for the AN/TRC-24. Be sure your notes include the main parts, steps, and substeps, and what should happen after you do each step. Then you will answer some questions on the demonstration by referring to your notes.

READ THESE INSTRUCTIONS BEFORE YOU DO ANYTHING ELSE.

- . Take notes on a separate sheet of paper.
- . This demonstration is on the same videotape as the demonstration you just watched. Before starting the tape, set the counter to zero.
- . Follow the narrator's instructions, except that you do not have to ask the instructor to rewind the tape. If you want to watch the demonstration again, rewind the tape to zero.
- . When you are satisfied that your notes are complete, continue with the exercise.
- . Tell the instructor when you are finished with the tape.

NOW WATCH THE DEMONSTRATION AND TAKE NOTES.

THEN GO ON TO THE NEXT PAGE.

EXERCISE 4

DIRECTIONS:

Use your notes to help you answer these questions on the demonstration.

1. Check each phrase that describes one of the main parts of the final tuning procedure.

- Tuning to the assigned channel
- Adjusting the FINE TUNE control
- Filter installation
- AFC check
- Check MEASURE METER
- SQUELCH adjustment

2. Connecting the dummy antenna and setting the MEASURE SWITCH are steps in:

- a. Tuning to the assigned channel.
- b. SQUELCH adjustment.

3. What is the first step in the AFC check?

- a. Set the AFC/CAL switch to the AFC position
- b. Set the AFC/CAL switch to the CAL position
- c. Set the MEASURE switch to SIG LEVEL position
- d. Connect the dummy antenna to the antenna jack

4. Which part of the procedure includes tuning the dials to get a loud clear tone on the handset?

- a. Tuning to the assigned channel
- b. Filter installation
- c. SQUELCH adjustment

5. Which part of the procedure involves turning a control counter-clockwise until a buzzer sounds and an indicator light comes on?

- a. Filter installation
- b. AFC check
- c. SQUELCH adjustment

6. How many steps are there in the AFC check?

- a. One
- b. Two
- c. Three
- d. Four

CHECK YOUR ANSWERS ON PAGE 23.

ANSWER KEYS TO EXERCISES IN UNIT IV, LESSON 3

Unit IV  
Lesson 3

17

ANSWER TO EXERCISE 1 (Part 1)

YOUR ANSWER SHOULD LOOK SOMETHING LIKE THIS.

I am going to show you some ways to disinfect drinking water for your canteen when safe water is not available. You already know how to use iodine tablets, so today I'm going to show you how to disinfect water by using calcium hypochlorite or by boiling the water. First, I'll show you how to disinfect water using calcium hypochlorite. First,<sup>1</sup> fill your canteen with the clearest water available. Be sure to leave an air space of one inch below the neck of the canteen. Then<sup>2</sup> fill a canteen cup half full of water. <sup>3</sup>Add the calcium hypochlorite from one ampule. <sup>4</sup>Stir the water with a clean stick until the powder is dissolved. Next,<sup>5</sup> take the cap of a plastic canteen and fill it half full with the calcium hypochlorite solution. <sup>6</sup>Add this solution to the water in the canteen. <sup>7</sup>Place the cap on the canteen and <sup>8</sup>shake it thoroughly. Now<sup>9</sup> loosen the cap slightly and turn the canteen upside down. This will let the treated water leak onto the threads around the neck of the canteen. Now<sup>10</sup> tighten the cap on the canteen and <sup>11</sup>wait at least 30 minutes before using the water. The other method I'm going to show you is how to disinfect water by boiling it. <sup>1</sup>Heat the water, using whatever fuel is available, until it comes to a full rolling boil. <sup>2</sup>Let it boil for at least 15 seconds. <sup>3</sup>Let the water cool before you drink it. This concludes the demonstration of how to disinfect drinking water.

You might have numbered your steps differently. For example, you might have numbered "place the cap on the canteen and shake it" as one step. This is O.K. However, you should not have numbered anything that tells you how or why you do a step. "Be sure to leave an air space" is not a step in itself; it tells you how to do Step 1. And "this will let the treated water leak onto the threads" is not a step; it tells you why you should loosen the cap and turn the canteen upside down.

If you made any mistakes in numbering or underlining, correct them. Then go on to Part 2 of the exercise.

ANSWER TO EXERCISE 1 (Part 2)

Your notes should look something like this:

How to Disinfect Drinking Water:

Using Calcium Hypochlorite

1. Fill canteen with clearest water (leave 1 inch air space) available
2. Fill canteen cup half full of water
3. Add calcium hypochlorite from one ampule
4. Stir with clean stick until dissolved
5. Fill cap of plastic canteen 1/2 full with solution
6. Add solution to water in canteen
7. Place cap on canteen
8. Shake thoroughly
9. Loosen cap slightly
10. Turn canteen upside down
11. Tighten cap
12. Wait 30 minutes before using

By Boiling

1. Heat to full rolling boil (use whatever fuel is available)
2. Boil for at least 15 seconds
3. Let cool before drinking

IF YOU DO NOT UNDERSTAND HOW TO IDENTIFY MAJOR PARTS  
AND THE STEPS THAT GO WITH EACH PART,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND HOW TO IDENTIFY MAJOR PARTS  
AND THE STEPS THAT GO WITH EACH PART,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWER TO EXERCISE 2 (Part 1)

Did you find the substeps? They are in Steps 2 and 7.

Now for Phase 2. Phase 2 is Threading the Projector. This is an automatic-threading machine which simplifies the threading.

Phase 2 has 7 steps.

Step 1. Turn on the motor-lamp switch to Forward Position.

Step 2. Trim the leader. This white part is called the leader. If the end is ragged, or cut at an angle, the leader won't thread through the machine properly. To trim the leader just <sup>a</sup>insert it in this slot and <sup>b</sup>press the cutter. The leader is now ready for threading.

Step 3. Push the Auto Load lever. That is the lever here. It's marked with the Number 3. Push it forward.

Step 4. Insert the film here where you see the Number 4. It will automatically thread through the machine.

Step 5. Allow at least 3 feet of leader to run through the end of the machine.

Step 6. Turn off the motor-lamp switch.

Step 7. Attach the leader to the take-up reel. <sup>a</sup>Insert the end into the slot on the reel. <sup>b</sup>Tighten it by turning the reel.

Step 7 is a little harder, because the instructor didn't say: "To attach the leader, insert the end into the slot and then tighten it by turning the reel."

ANSWER TO EXERCISE 2 (Part 2)

Your notes should look like this:

B. Phase 2 - Threading the Projector

1. Turn motor-lamp switch to FORWARD position.
2. Trim leader
  - a. Insert leader in slot
  - b. Press cutter
3. Push AUTO LOAD lever
4. Insert film at No. 4
5. Allow 3 ft. of leader to run through
6. Turn motor-lamp switch to OFF
7. Attach leader to take-up reel
  - a. Insert end into slot on reel
  - b. Tighten by turning reel

IF YOU DO NOT UNDERSTAND HOW TO TAKE NOTES THAT SHOW RELATIONSHIPS,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND HOW TO TAKE NOTES THAT SHOW RELATIONSHIPS,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 3

1. b. Hold the AFC/OFF/CAL switch in the CAL position
2.   ✓   Adjust FINE TUNE control  
  ✓   Set INDEX control over red line nearest assigned channel
3. c. Check the MEASURE meter
4. b. Disconnect the antenna jack
5. b. Calibration
6. a. Consult the Technical Manual.
7. A (MEASURE meter at maximum right-hand deflection, FREQUENCY DRIFT meter at zero.)

If you missed any of these questions, look at your notes and try to figure out why.

Did you clearly show all the major parts and all the steps under each part?

Did you show the major parts and the steps in the right order?

Did you include what happens after you do the step?

Are your notes legible?

Can you figure out what your abbreviations and symbols mean?

IF YOU STILL DO NOT UNDERSTAND WHY YOU HAD TROUBLE  
ANSWERING THE QUESTIONS,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU ANSWERED THE QUESTIONS CORRECTLY,  
OR IF YOU UNDERSTAND WHY YOU HAD TROUBLE,  
GO ON TO THE NEXT EXERCISE.

---

ANSWERS TO EXERCISE 4

1.  Tuning to the assigned channel  
 Filter installation  
 AFC check  
 SQUELCH adjustment
2. a. Tuning to the assigned channel
3. a. Set the AFC/CAL switch to the AFC position
4. b. Filter installation
5. c. SQUELCH adjustment
6. b. Two

IF YOU HAD TROUBLE ANSWERING THESE QUESTIONS,  
COMPARE YOUR NOTES WITH THE SET OF NOTES ON THE NEXT PAGE.  
THIS MAY GIVE YOU A BETTER IDEA OF WHAT WAS WRONG WITH YOUR NOTES.

IF YOU STILL DON'T UNDERSTAND WHY YOU ARE HAVING TROUBLE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU WERE ABLE TO ANSWER THESE QUESTIONS CORRECTLY,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A  
IN UNIT 1 - LESSON 3.

Notes on Demonstration of Final Tuning Procedure for AN/TRC-24.

Four parts - Tune to assigned channel, filter installation,  
AFC check, squelch adjustment

I. Tune to assigned channel (137)

1. Connect dummy antenna to ANT JACK
2. Set MEAS switch to SIG LEVEL position
3. Adjust FINE TUNE until 137 appears under hairline  
Should get maximum indication on MEASURE meter, zero  
indication on FREQ DRIFT meter

II. Filter installation

1. Select proper filter (C-band)
2. Set dials on filter to 137
3. Remove dummy filter (use screwdriver)
4. Install bandpass filter
5. Tune dials to get loud clear tone on handset

III. AFC check

1. Put AFC/CAL switch in AFC position
2. Check AFC control for + 2 reading

IV. SQUELCH adjustment

1. Turn SQUELCH adjustment counterclockwise until
  - a. Buzzer sounds
  - b. Indicator light comes on
2. Turn SQUELCH adjustment back to right until
  - a. Buzzer stops
  - b. Light goes off
3. Check MEASURE meter for maximum indication

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT V**  
**RECOGNIZING A PART OF A WHOLE**

**LESSON 1**  
**RECOGNIZING A PART OF A WHOLE**

**PREREQUISITE:** None  
**MATERIALS REQUIRED:** None  
**TYPE OF LESSON:** Self-Paced

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STUDENT GUIDE

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UNIT V. RECOGNIZING A PART OF A WHOLE

Lesson 1. Recognizing a Part of a Whole

INTRODUCTION:

As you read through your Soldier's Manual and Technical Manuals (TMs), you will find that much of the information is shown in photographs and drawings of pieces of equipment and their various parts. In the 3IM course, you will need to locate parts of equipment or parts of systems that you see pictures of in these manuals. At times, the procedure of locating a particular part may seem confusing, especially when the piece of equipment or system is large and contains many parts. This lesson will help you to recognize the part you are looking for by discussing several helpful steps you can use in the process. These steps tell you about certain relevant features to look for, and also about several irrelevant features that you do not need to look for.

LEARNING GOALS:

In this lesson, you will learn to recognize a part of a piece of equipment or a part of a system by:

- A. Reading the labels (p. 2).
- B. Observing how the parts are arranged (p. 7).
- C. Checking the forms - shape and design - of the parts (p. 12).
- D. Checking the relative size of the parts (p. 21).
- E. Ignoring irrelevant features (p. 26).

On the pages that follow, you will find material to read and questions to answer. Most of the time, you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

When you finish the lesson, your instructor will give you a checkpoint. When you finish the checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

GO TO THE NEXT PAGE TO BEGIN THE LESSON.

Unit V  
Lesson 1

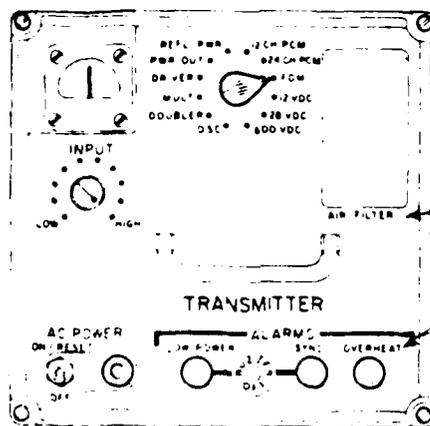
1

Section A

Reading the Labels

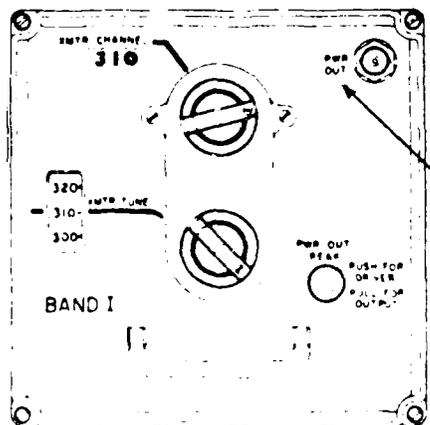
As you read through your TMs, you will see that many pieces of equipment have labels. A label is used to identify, or name, a part of the equipment and, at times, the piece of equipment itself. Labels are usually attached either (a) directly above the part, (b) directly below the part, or (c) beside the part - either to the immediate left or right of the part.

Below are some examples of positions in which labels are found.



AIR FILTER label is directly below the part.

OVERHEAT label is directly above the part.



POWER OUT label is beside the part.

There is a second type of label which is used in pictures of pieces of equipment. These labels are not attached to the piece of equipment itself. Rather, these labels use arrows that point to the particular parts they identify. We can call such labels unattached labels. Notice the difference in Figures 1 and 2 below. In Figure 1, the label is attached (directly on) to the piece of equipment. The label in Figure 2, however, uses an arrow to identify the part.

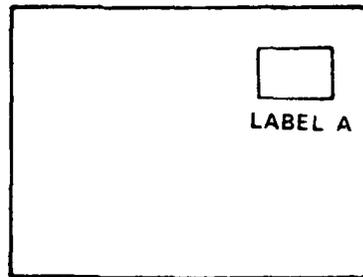


Figure 1. Attached Label

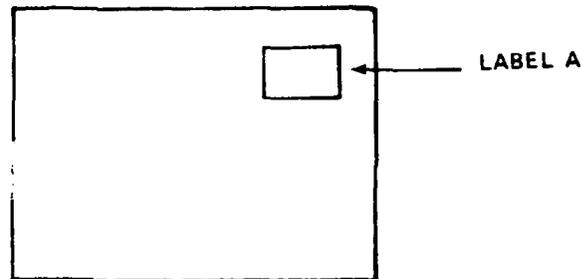


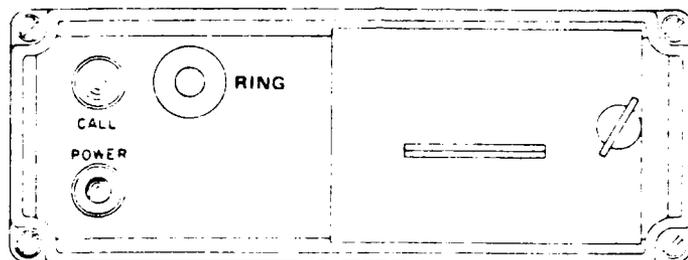
Figure 2. Unattached Label

Whenever parts of equipment are labeled, a safe rule to follow in locating the parts you are looking for is to read the labels.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 1

1. Labels that are found directly on the equipment are called attached labels.
  - a. True
  - b. False
  
2. Unattached labels use arrows to identify parts of the equipment.
  - a. True
  - b. False



3. Above is a drawing of a particular piece of equipment. On this piece of equipment, which of the labels is attached below the part?
  - a. RING label
  - b. POWER label
  - c. CALL label

AD-A134 334

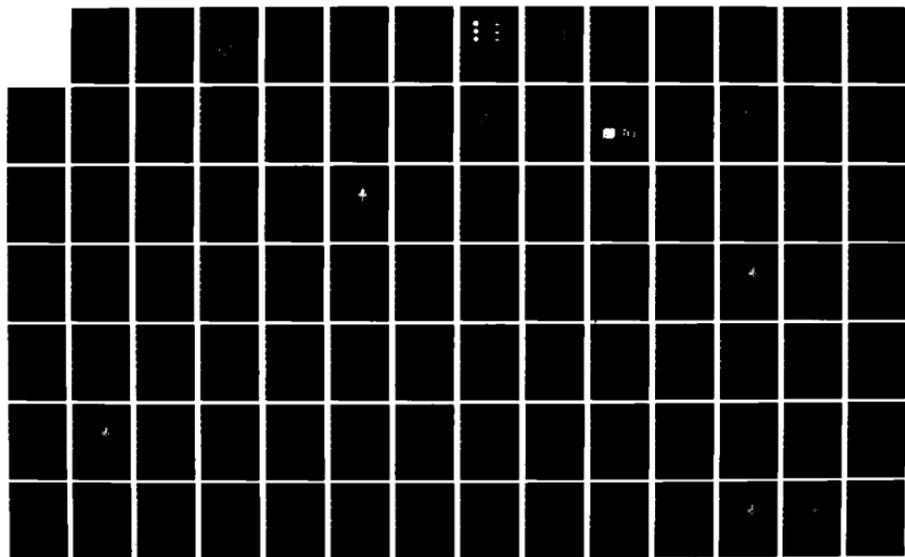
31M10 FUNCTIONAL BASIC SKILLS EDUCATION PACKAGE(U)  
APPLIED SCIENCE ASSOCIATES INC PITTSBURGH PA SEP 82  
DABT60-81-C-0006

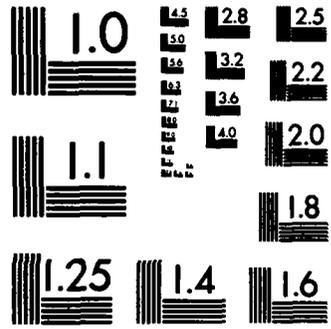
29/32

UNCLASSIFIED

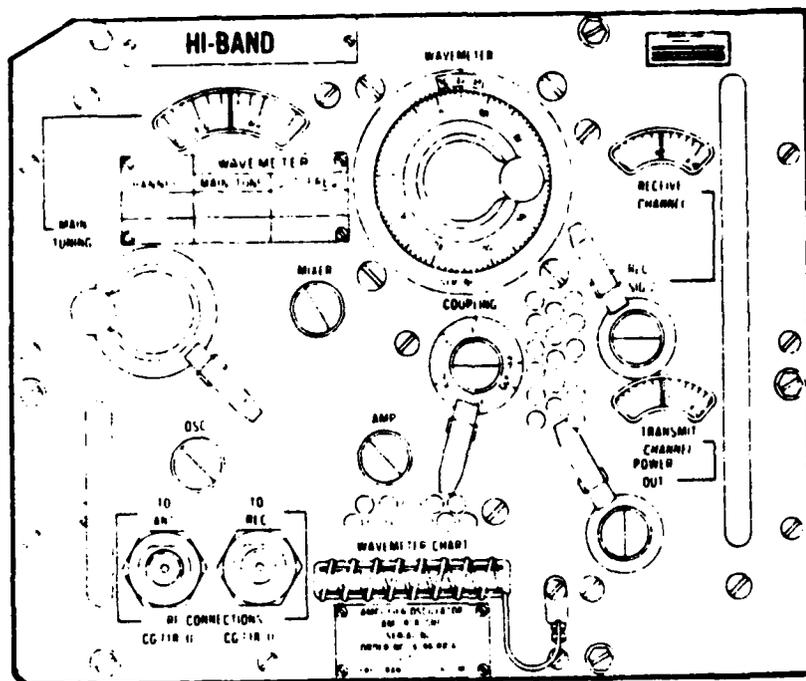
F/G 5/9

NL



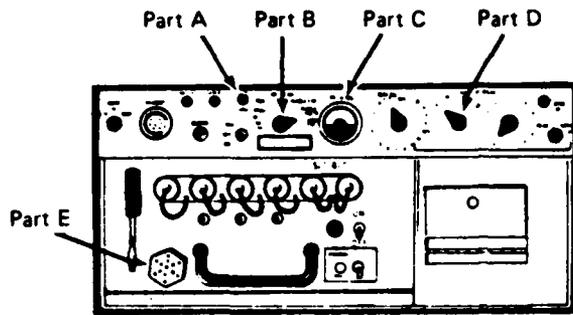


MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A



On the left is a drawing of an amplifier-oscillator. Use it to answer the next two questions.

4. The WAVEMETER label is located:
- a. On the left side of the part.
  - b. On the right side of the part.
  - c. Above the part.
  - d. Below the part.
5. Which of the following labels is located below a part?
- a. WAVEMETER
  - b. RECEIVE CHANNEL
  - c. MIXER
  - d. OSC

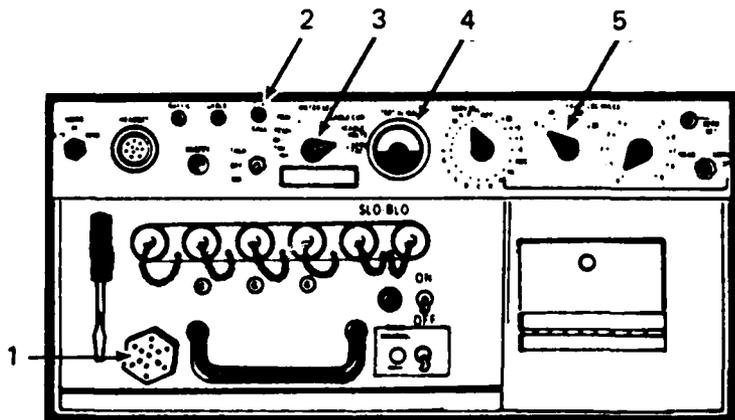


On the left is a drawing of a piece of equipment. Look over the labeled parts. Then answer the question below.

6. The piece of equipment shown below is identical to the one above, except that the parts have numbers instead of labels. When answering the question, you may refer to the drawing above.

Part D is number:

- a. 1
- b. 3
- c. 4
- d. 5



CHECK YOUR ANSWERS ON PAGE 32.

## Section B

### Observing How the Parts Are Arranged

Reading the labels is not always the quickest way of locating the part you are looking for. This is especially the case when the system or piece of equipment is large and contains many labels. If you were to read each label, you would lose a lot of time. For this reason, this lesson presents additional features to look for that should help you to recognize parts much more quickly.

It is helpful to know "what goes where" on the equipment or in the system. Look at the various controls, indicators, meters, receptacles, etc. to see how they are arranged. You can identify the part you are looking for by knowing its general location on the piece of equipment and by becoming familiar with what other parts are above and below it, or on either side of it. Knowing the location of the part in relation to other parts is especially important if parts are not labeled and/or there are several parts that are similar in form and size.

On the next page are drawings of two pieces of equipment. They are both identical except that the parts of the top piece are labeled and the parts of the bottom piece are not.

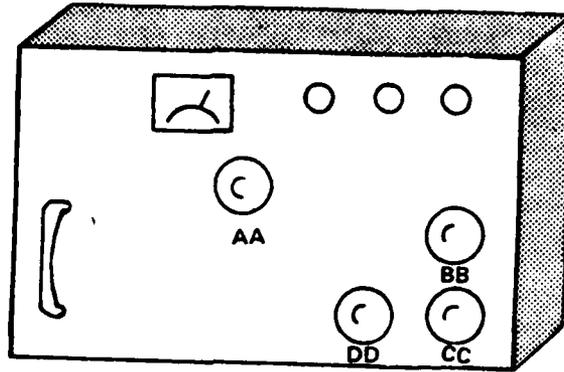


Figure 1

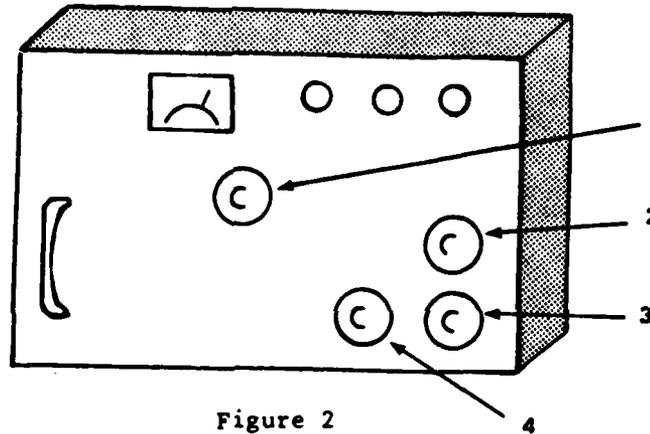
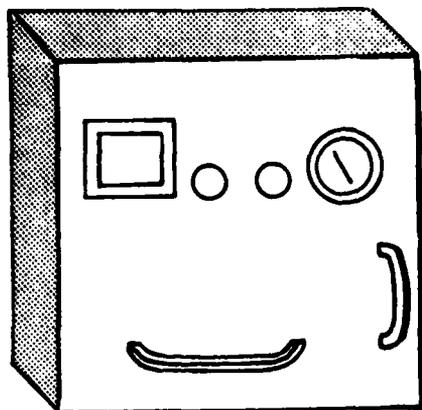


Figure 2

Suppose you need to locate Part CC on the bottom piece of equipment (Figure 2). Part CC is not labeled on Figure 2, so how can it be identified? The four numbered parts all look the same: they are circular in shape, and they are the same size in relation to each other. Now that you know what the similarities are (how the parts are alike), you must look for dissimilarities (what makes the parts different). The feature that will help you to distinguish the four numbered parts is their spatial relationships - the location of the parts in relation to the other parts.

EXERCISE 2



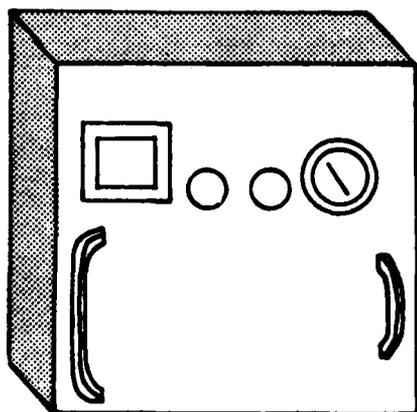
On the left is a drawing of a fake piece of equipment. Use it to answer the next two questions.

1. Which of the three drawings shown below does the above piece of equipment match?

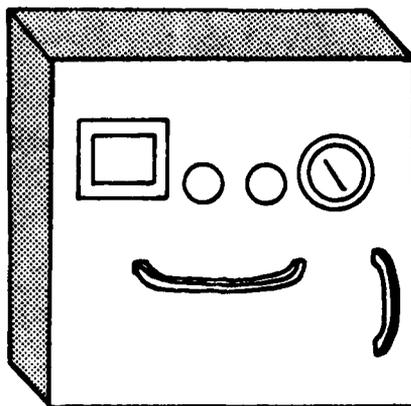
- a. A
- b. B
- c. C

2. Which feature of the above piece of equipment makes it different from the other pieces of equipment?

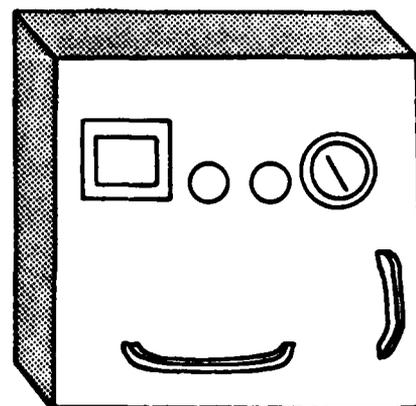
- a. The location of the controls.
- b. The color of the controls.
- c. The location of the smaller handle.
- d. The location of the larger handle.



A

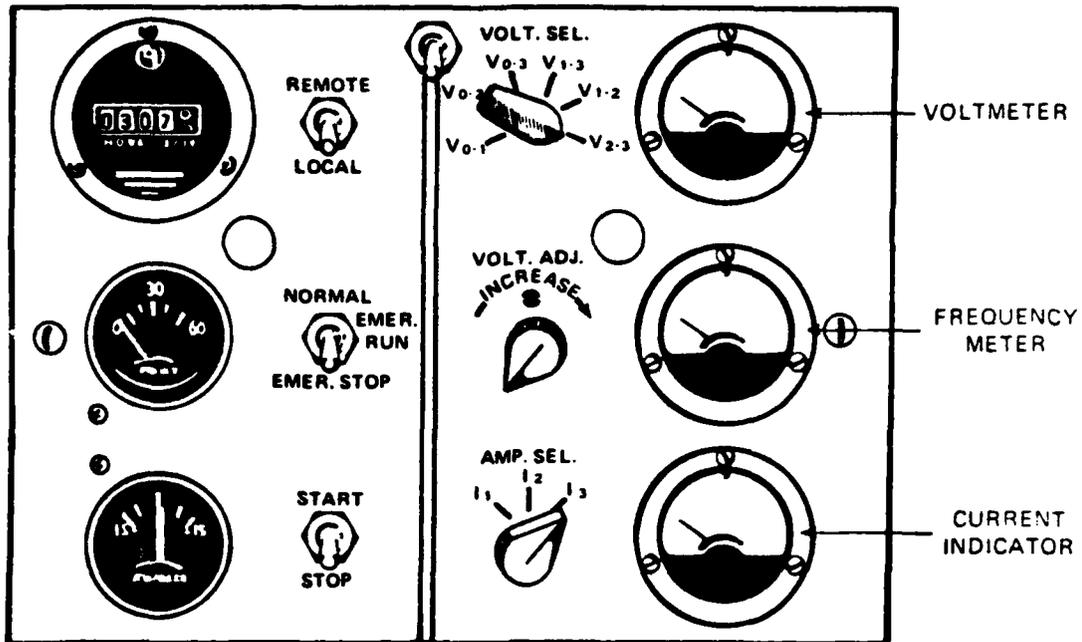


B



C

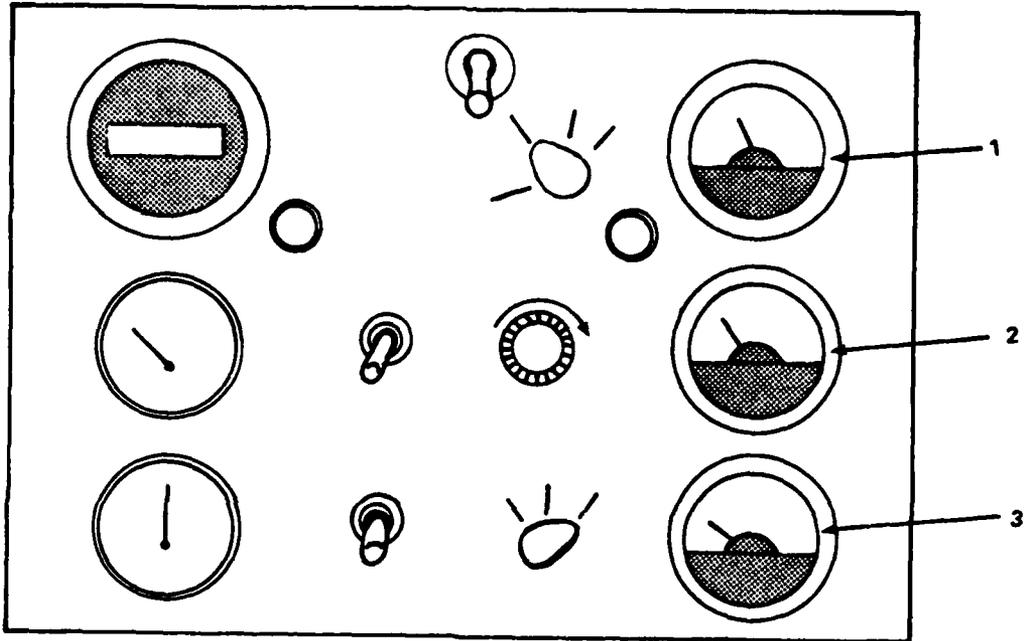
Below is a drawing of a generator control panel. Notice how the various meters and controls are arranged. Study the drawing closely, then answer the questions that follow.



On the following page is a drawing of a generator control panel that is similar to the above drawing. Use the drawing to answer the next two questions. You may refer back to the drawing above to help you answer the questions.

3. On the next page, which of the numbered parts is the frequency meter?
  - a. 1
  - b. 2
  - c. 3
  
4. The frequency meter can best be identified by its:
  - a. size.
  - b. color.
  - c. location
  - d. shape

CHECK YOUR ANSWERS ON PAGE 33.



Unit V  
Lesson 1

Section C

Checking the Forms

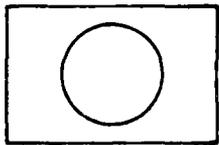
When checking the forms of various parts and pieces of equipment, it is important to look for two features: (1) the external form or shape of the part, and (2) the internal form or design of the part.

Shape. By knowing the shape of the part, you can narrow your search considerably and save a great deal of time. For example, if you see that the part is square-shaped, then you need to pay close attention to parts that are shaped like squares. On the other hand, if the part is circular, then you must look for parts that are shaped like circles.

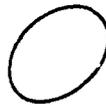
EXERCISE 3

Directions: On the left there is a box with a shape inside of it. Match this shape with one of the four shapes on the right. Circle the correct answer.

Example:



a.



b.

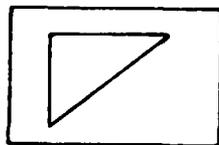


c.



d.

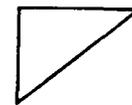
Example:



a.



b.

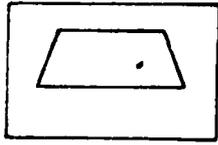


c.



d.

1.



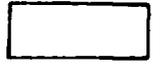
a.



b.

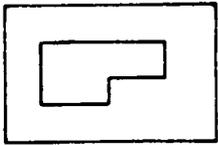


c.



d.

2.



a.



b.

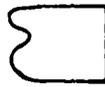
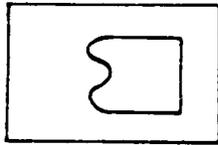


c.



d.

3.



a.



b.

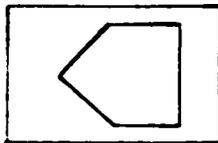


c.

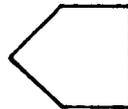


d.

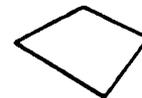
4.



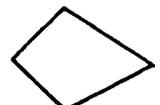
a.



b.



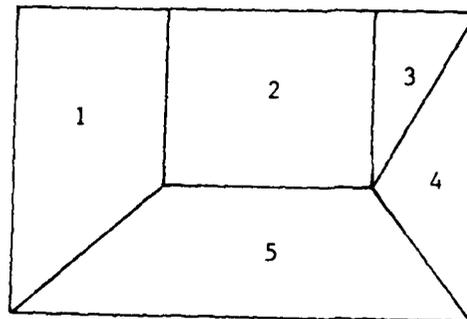
c.



d.

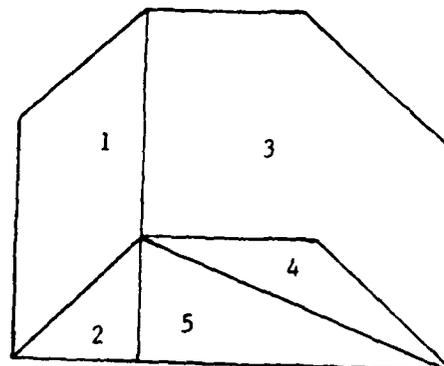
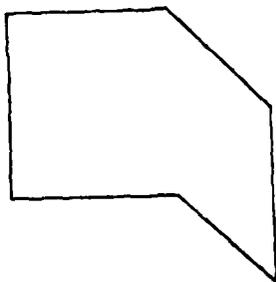
Unit V  
Lesson 1

Directions: On the left there is a drawing of a shape. On the right there is a drawing that looks like a puzzle. Match the shape with one of the numbered shapes of the drawing on the right.



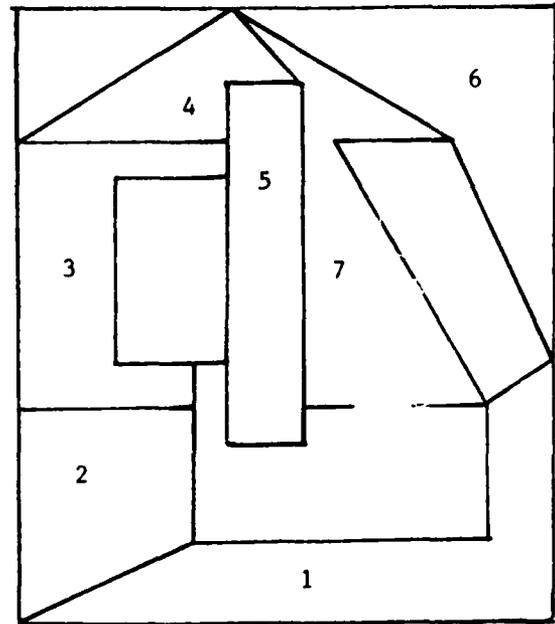
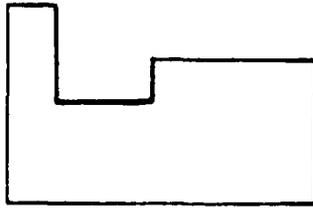
5. On the drawing above, the shape on the left matches shape number:

- a. 1
- b. 2
- c. 4
- d. 5



6. Look at the drawing above. Which of the numbered parts on the right matches the shape on the left?

- a. 2
- b. 3
- c. 4
- d. 5

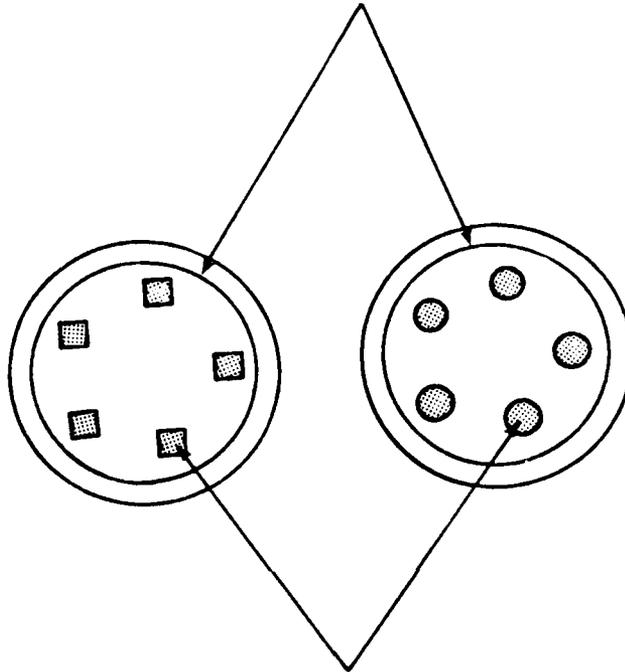


7. On the drawing above, the shape shown on the left matches number:
- a. 1
  - b. 3
  - c. 5
  - d. 8

CHECK YOUR ANSWERS ON PAGE 33.

Design. Sometimes you will find that two or more parts have the same shape. When this is the case, you can sometimes identify the part by going one step further. This step involves checking the internal form, or design, of the part.

The EXTERNAL FORM (shape) of these two parts is identical. Both are circular in shape.



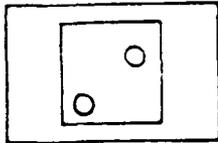
The INTERNAL FORM (design) of these two parts is different. The design of the right part is made of circular forms; square-shaped forms are part of the design on the left.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

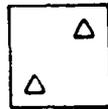
EXERCISE 4

Directions: On the left there is a box with a form inside of it. Match this form with one of the four forms on the right. Be sure to pay attention to the internal form or design of the parts. Circle the correct answer.

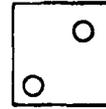
Example:



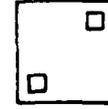
1.



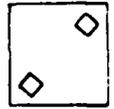
a.



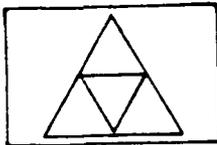
**b.**



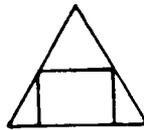
c.



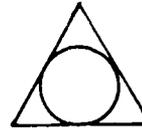
d.



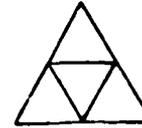
2.



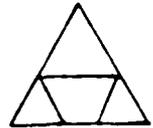
a.



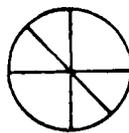
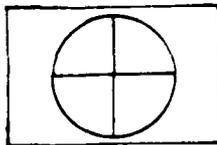
b.



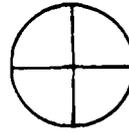
c.



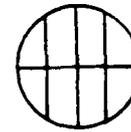
d.



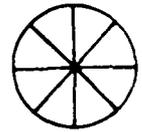
a.



b.

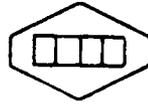
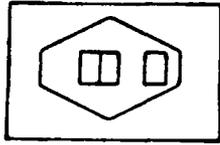


c.

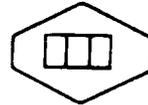


d.

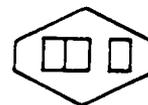
3.



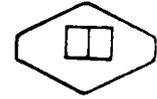
a.



b.

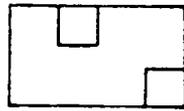
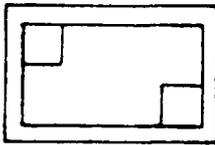


c.

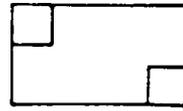


d.

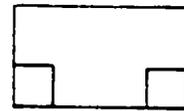
4.



a.



b.

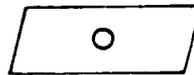
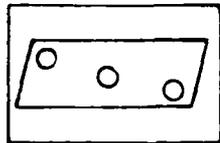


c.



d.

5.



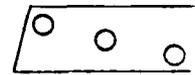
a.



b.

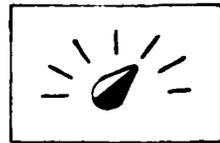


c.



d.

6.



a.



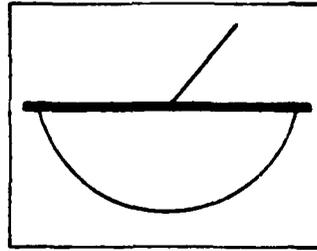
b.



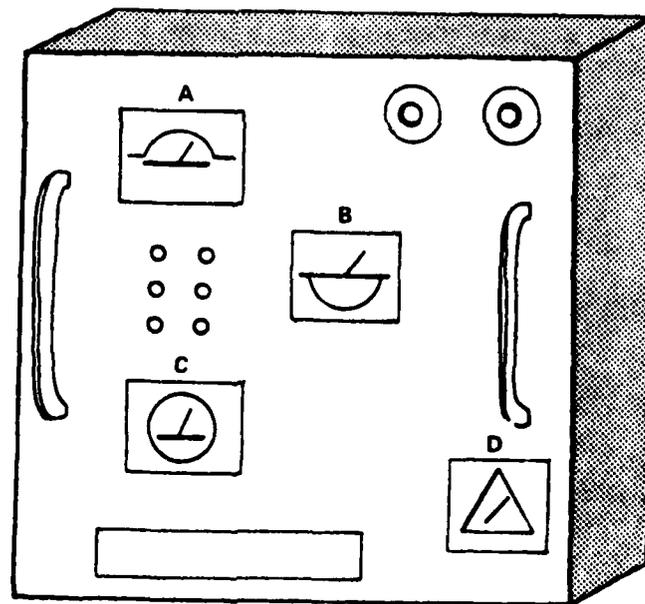
c.

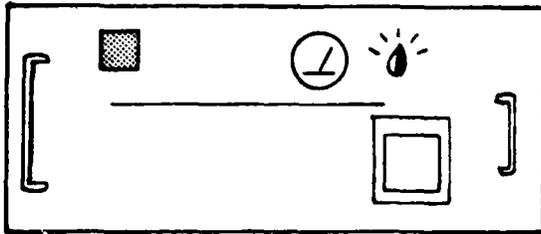


d.

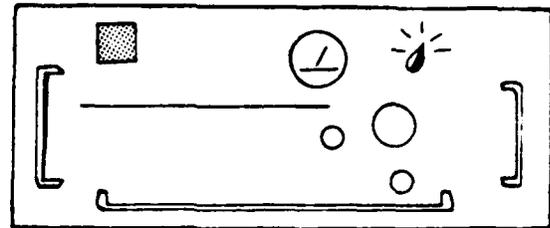


7. The drawing above is one part of the piece of equipment shown below. Which part is it?
- a. A
  - b. B
  - c. C
  - d. D

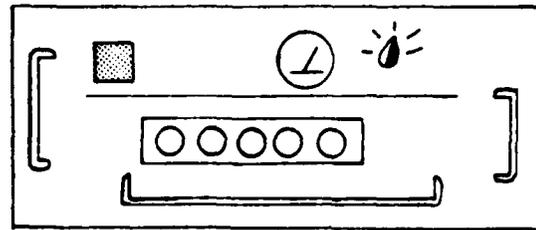




A



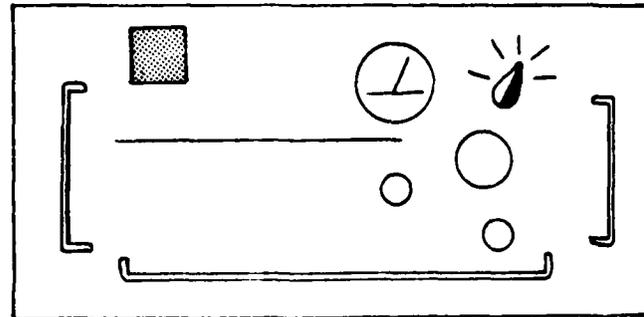
B



C

8. Which of the three drawings above matches the piece of equipment shown below?

- a. A
- b. B
- c. C



CHECK YOUR ANSWERS ON PAGE 34.

## Section D

### Checking the Relative Size

If the shapes and designs are identical or very similar on more than one part, then there is an additional feature you should consider. This feature involves checking the relative size of the part. This means that you should check the size of the part in relation to the whole piece of equipment and to the other parts on that same piece of equipment. In other words, compare the size of the part you are looking for with the sizes of the other parts.

Ask yourself:

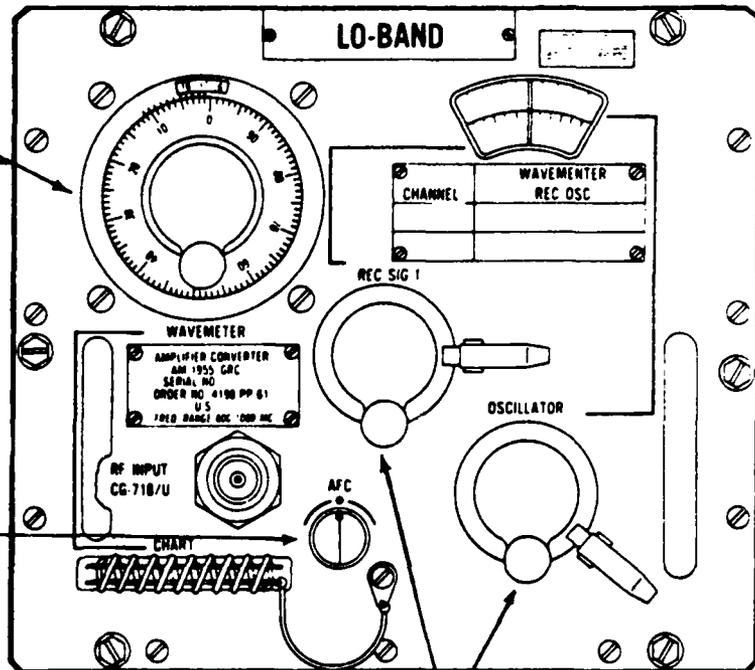
- . Is the part larger than all or most of the other parts?
- . Is it smaller?
- . Is it larger than some and smaller than others?

If it is identical or similar in size to many of the other parts, this feature (checking relative size) will probably not help you to identify it.

Look at the following example of a front panel of a particular piece of equipment. Do you see any part that is larger than the others? Smaller than the others?

Notice that the WAVEMETER is by far the largest control on this panel.

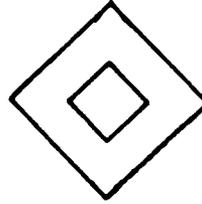
Notice that the AFC control is much smaller than either the WAVE-METER or the OSCILLATOR controls.



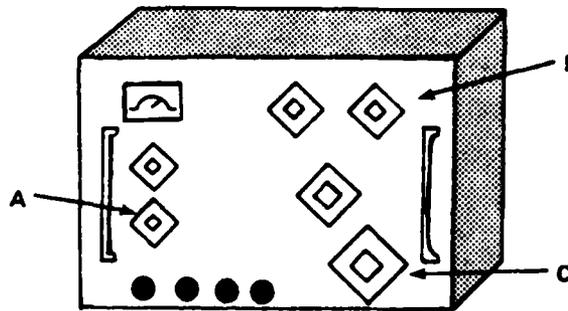
These 2 parts are identical in size. Therefore, to distinguish between the two parts, we need to examine features other than relative size.

Identifying a part by its relative size is not always possible, however, because the part is not always shown together with other parts of the same piece of equipment (or same system if comparing pieces of equipment). Let's look at the example below.

On the right, you are given one part of a piece of equipment.



The above part is one part of the piece of equipment shown below. Are you able to identify this part?

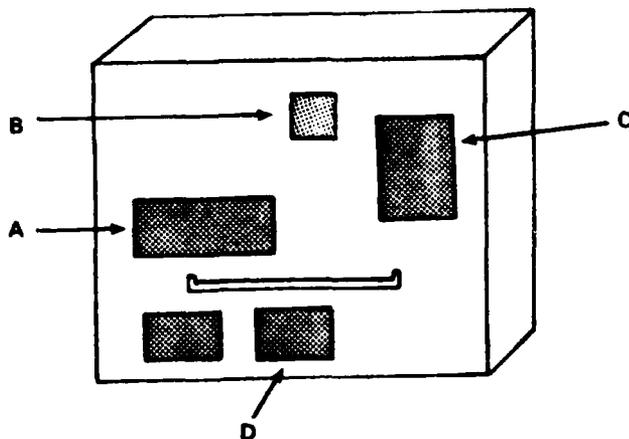


There are three parts that look identical, except for their size (A, B, C). Since the individual part above was not shown together with the other two parts of different sizes, there is no way of identifying it on the piece of equipment. We cannot tell whether it is Part A, Part B, or Part C. When a part is shown alone, there is no way of knowing its actual size by just looking at a picture of it. A photograph or a drawing of a part will usually make it either larger or smaller than it really is. It is only when the part is seen next to other parts that you can identify by its relative size.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

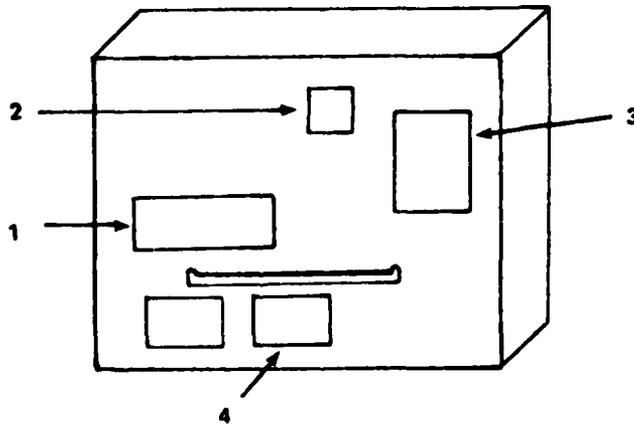
EXERCISE 5

1. The best time to identify a part by its relative size is when it is the same size as some of the other parts.
  - a. True
  - b. False
  
2. You can know the relative size of a part by looking at a picture of it.
  - a. True
  - b. False

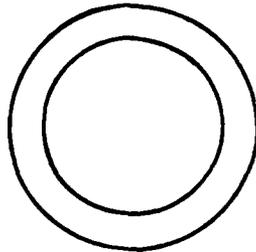
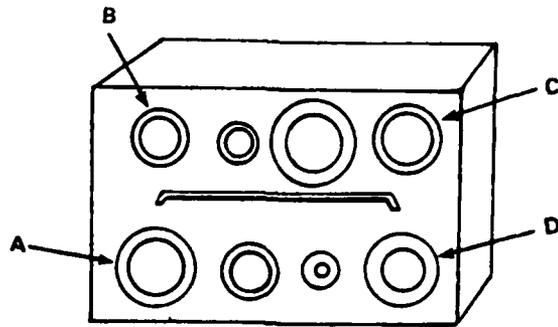


On the left is a piece of equipment. Look over the parts. Then answer the following question.

3. In the drawing below, which of the numbered parts is Part C?
  - a. 1
  - b. 2
  - c. 3
  - d. 4



On the right is a piece of equipment. Look over the parts, then answer the question below.



4. On the left is a drawing of one of the labeled parts in the piece of equipment shown above. Which part is it?

- a. A
- b. B
- c. C
- d. D.
- e. Cannot tell which part.

CHECK YOUR ANSWERS ON PAGE 35.

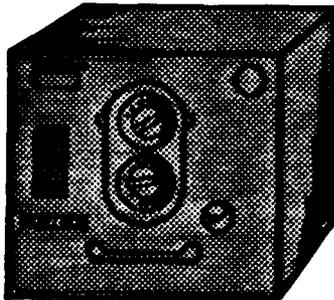
## Section E

### Ignoring Irrelevant Features

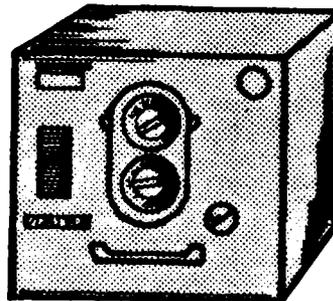
There are certain features that you should consider irrelevant when trying to identify a part of a whole. These irrelevant features will not help you to distinguish the part you are looking for from the other parts of the same piece of equipment or from other parts of the same system.

#### Color

Most of the pictures you see in your manuals are black, white, and various shades of grey. Most of the time, the color you see in the manuals is not the true color of the part. For this reason alone, you will not be able to distinguish different parts by the color you see in the manuals. Also, in your manuals, the same part is made to look lighter in some pictures and darker in other pictures. Remember, these are not true colors that you see. Do not make the mistake of thinking the parts are different because the shading or color is different. Whether or not the color is different, the part remains the same. It is only the color that makes the same part look like different parts. Below are two pieces of equipment. At first glance, they may look like two different pieces of equipment because of the difference in color. The one on the left is shaded darker than the one on the right. If you look closer, however, you will see that they are identical. Always keep in mind that the color you see in pictures of the part may not be its true color.



DARKER COLOR



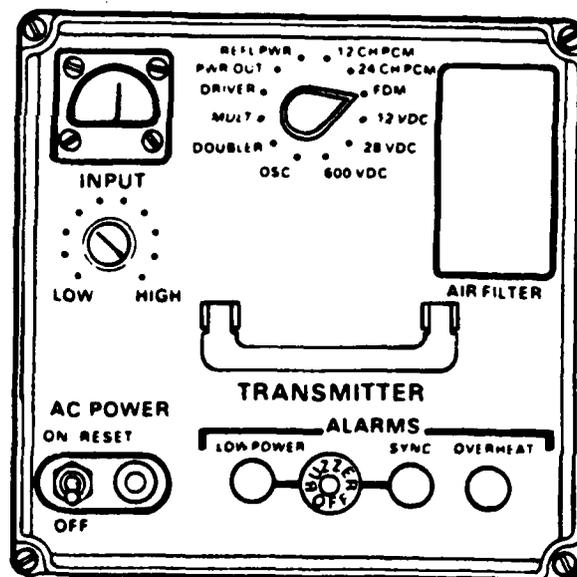
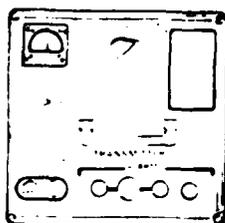
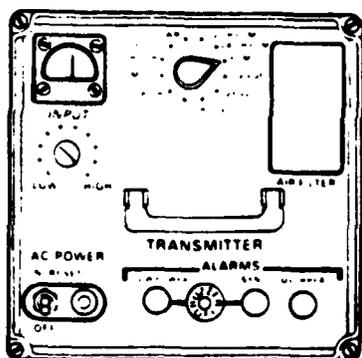
LIGHTER COLOR

## Size

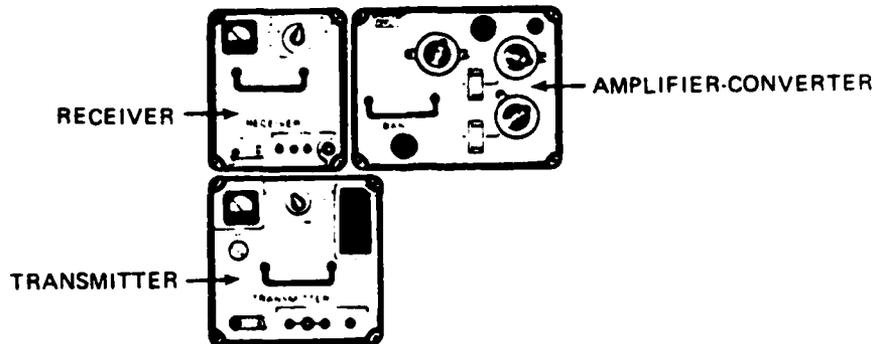
You have already learned in Section D that the size of parts may not always help you to identify the part you are looking for. Even relative size will not be useful if the part you are looking for is identical or similar in size to the other parts of the whole.

In this case, you will have to examine other features - the shapes, designs, labels, location, and arrangement of the parts. Secondly, when a part is shown individually (by itself), then there is no way of determining its true size or its relative size. In order to determine the relative size of a part, it has to be seen together with the other parts of the whole. In this way, the sizes of the parts can be compared. Otherwise, you will not be able to distinguish parts that look alike.

Below are three drawings of the same transmitter. Just by looking at these drawings we cannot determine the actual size of the transmitter, or how large or small it is in relation to other pieces of equipment. We can only determine the relative size of the transmitter if we compare it to other pieces of equipment that are a part of the same system.



The drawing below does tell us something about the relative size of the transmitter. We can see that it is larger than the receiver but smaller than the amplifier-converter.



### Orientation

Orientation means the point from which you look at a part. When looking at equipment, you do not always see a part in the same way. Because of this, you may mistake the same part as being two different parts. The reason the part looks different is because you are looking at it from different positions. When you stand to the left of a part, it will look a little different than when you stand to the right. The same thing is true for the other positions. For example, when you look down at a part it will look different than when you look up at it.

Figures 1 and 2 on the next page show two different orientations of looking at a part called a rocker arm cover. In Figure 1, you are looking at the rocker arm covers from directly in front. In Figure 2, however, you are standing to the left of the rocker arm covers and looking to the right. Although the position from which you look at a part - the point of orientation - may change, the part remains the same.

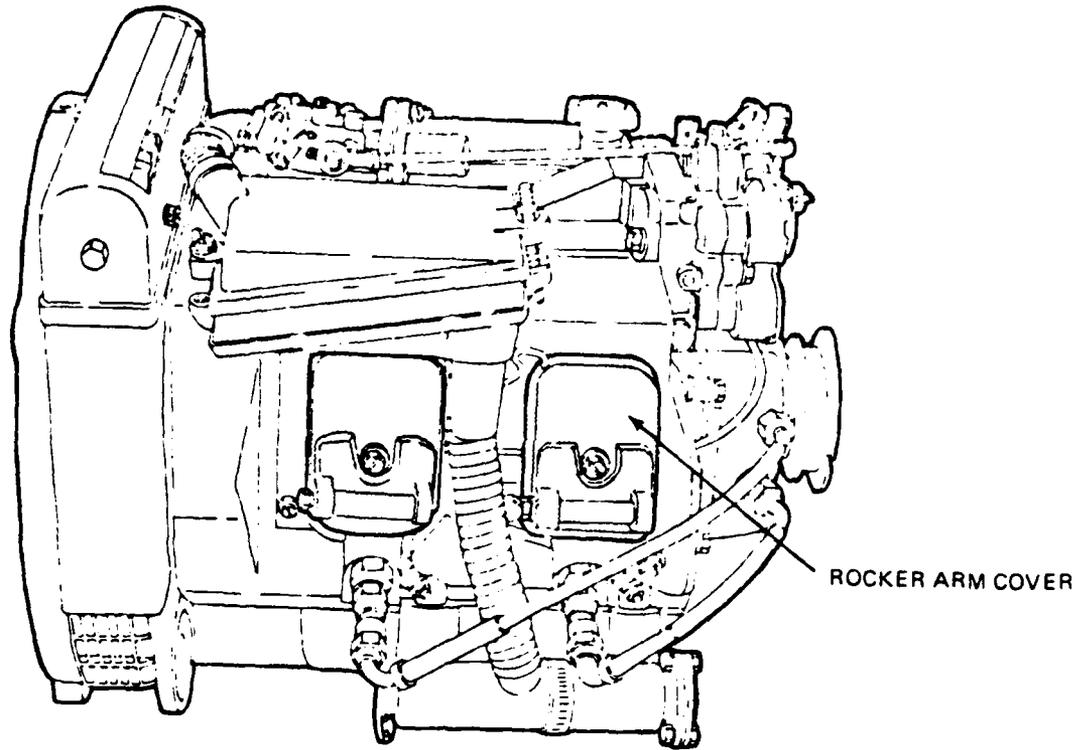


Figure 1

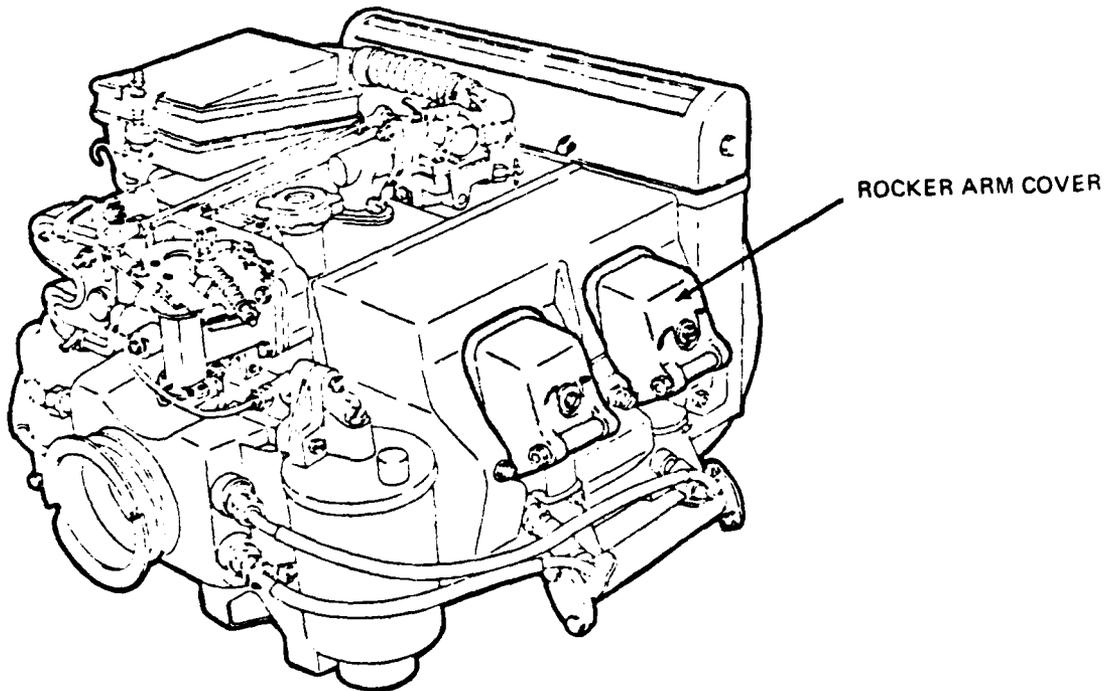


Figure 2

Unit V  
Lesson 1

IF YOU DO NOT UNDERSTAND ANY OF THE MATERIAL IN THIS LESSON,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS LESSON,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A  
IN UNIT V - LESSON 1

ANSWER KEYS TO EXERCISES IN UNIT V, LESSON 1

Unit V  
Lesson 1

31

ANSWERS TO EXERCISE 1

1. True
2. True
3. c.  
Explanation: The CALL label is attached below the part. The POWER label is attached above the part, and the RING label is attached to the immediate right of the part.
4. c.  
Explanation: The WAVEMETER label is located above the part.
5. b.  
Explanation: The RECEIVE CHANNEL label is located below a part. The other labels are all located above their respective parts.
6. d.

IF YOU DO NOT UNDERSTAND ANY OF THE ABOVE ANSWERS,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON WITH THE LESSON.

IF YOU UNDERSTAND ALL OF THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 2

1. c. C
2. d. The location of the larger handle.
3. b. 2 If you look at the photograph, you will see that the frequency meter is located directly below the voltmeter and directly above the current indicator.
4. c. Location

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL OF THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 3

1. c.
2. d.
3. a.
4. b.
5. a.
6. b.
7. d.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE GOING ON WITH THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 4

1. c.
2. b.
3. c.
4. b.
5. d.
6. c.
7. b.
8. b.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 5

1. False  
When a part is the same size as other parts, it cannot be identified by its relative size alone. Additional features must be used.
2. False  
Many times a picture makes a part look either larger or smaller. The only way of knowing the relative size of a part is if it is seen together with other parts of the same piece of equipment or the same system.
3. c. 3
4. e. Cannot tell which part.  
If a part is shown by itself, there is no way of knowing its relative size. The individual part can be any one of the four labeled parts (A, B, C, or D).

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

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**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**

**MOS 31M10**  
**STUDENT GUIDE**



**UNIT VI**  
**LOCATING INFORMATION IN TABLES**

**LESSON 1**  
**THE STRUCTURE OF TABLES AND DIAGRAMS**

**PREREQUISITE: None**  
**MATERIALS REQUIRED: None**  
**TYPE OF LESSON: Self-Paced**

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STUDENT GUIDE

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UNIT VI. LOCATING INFORMATION IN TABLES

UNIT VII. READING CABLING DIAGRAMS

Lesson 1. The Structure of Tables and Diagrams

INTRODUCTION:

Much of the information in the 31M course is found in diagrams or tables. A diagram is a drawing that shows how things are arranged and how their parts go together. Some diagrams look just like the things they represent. Others are more like charts which show you how to make equipment connections. These are called cabling diagrams. This lesson teaches you about how cabling diagrams are set up.

Tables are logical arrangements of information for ready reference. Tables usually have the information arranged in rows and columns. In the 31M course, tables are used for troubleshooting, maintenance, and other things.

As a 31M, you must be able to get the correct information from these diagrams and tables if you are to do your job. To do this, you must know how the 31M tables and diagrams are set up. This lesson teaches you about the basic set-ups of cabling diagrams and tables in the 31M course.

LEARNING GOALS:

In this lesson, you will learn:

- A. How to use rows and columns in cabling diagrams and tables (p. 2).
- B. How to use cabling diagrams for two or more systems (p. 7).
- C. The structure of tables in 31M materials (p. 12).

On the pages that follow, you will find material to read and questions to answer. Most of the time, you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

When you finish the lesson, your instructor will give you a checkpoint. When you finish the checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

GO ON TO THE NEXT PAGE TO BEGIN THE LESSON.

Section A

Rows and Columns in Diagrams and Tables

31M tables and cabling diagrams are set up with rows and columns. Rows are sections of the diagram or table which go straight across the page, as you see in Figure 1 below.



Figure 1. Row

Columns, on the other hand, divide the diagram or table into sections which go up and down, as in Figure 2.

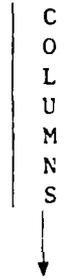


Figure 2. Column

When the rows and columns are combined, you get a diagram or table. Figure 3 is a drawing of one kind of diagram or table.

	Column 1	Column 2	Column 3	Column 4
Row 1				
Row 2				
Row 3				

Figure 3. Drawing of a diagram or table

Notice that this diagram or table has 3 rows and 4 columns.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE :

1. Columns are sections which go \_\_\_\_\_.
2. Which arrow below best shows you the direction rows go in?  
(Circle one)  
A.            B.            C.            D.
3. How many rows are in this drawing?



- A. 0            B. 2            C. 4            D. 5

4. How many columns are in this drawing?



- A. 0            B. 2            C. 3            D. 6

CHECK YOUR ANSWERS ON PAGE 16.

The titles at the top of the columns are called column headings. The titles at the beginning of each row are called row headings. Look at the table below. It contains directions for doing things with potatoes.

The column headings are "Baked," "French Fried," and "Hash Browns." They tell you some types of potatoes you can make - baked potatoes, french fried potatoes, and hash brown potatoes. For example, everything about french fried potatoes is in column 2. The arrow going down goes through everything about french fried potatoes.

The row headings are "Preparing," "Cooking," and "Serving." They tell you three things you can do with potatoes: preparing, cooking, and serving. For example, everything in row 3 is about serving potatoes. The arrow going across goes through everything about serving potatoes.

If you want to find the directions for serving french fried potatoes, find the place where the "French Fried" column, and the "Serving" row meet. The correct place is marked with an X.

Table 1.

	Baked	French Fried	Hash Browns
Preparing	A		
Cooking	B	D	E
Serving	C	X	

↓

→

Here are some more things that are true of Table 1. Find these things on the table. Make sure you understand them before you go on with the lesson.

The letters in column Baked are A, B, and C.

The letters in row Cooking are B, D, and E.

The letter E is about cooking hash browns.

If you want to find out about preparing baked potatoes, look at A in the table.

Sometimes, tables have rows and columns which are not so definite. Lines may not be used to separate the rows from each other. Look at the example below:

Table 2.

	A	B	C
1	x		
2		x	x
3	x		x

Notice how it is not so easy to determine where the columns and rows meet. In cases like this, use your finger or something else, like a pencil or pen, to help you find the point where a row and column meet.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 2

Use this table to answer the next two fill-in-the-blank questions.

	X	Y	Z
A	1	2	3
B	4	5	6

1. Which number is at the point where row A and column Z meet? \_\_\_\_\_
2. Number 4 is located in row \_\_\_\_\_ and column \_\_\_\_\_.

Use this table to answer questions 3, 4, and 5

	FAT	HAT	CAT	RAT
1	A	D	G	J
2	B	E	H	K
3	C	F	I	L

3. What letters are in row 2? \_\_\_\_\_
4. Letter I is located in column \_\_\_\_\_ and row \_\_\_\_\_.
5. What letter is in row 1, column HAT? \_\_\_\_\_
6. The letters J, K. and L are all in \_\_\_\_\_.

CHECK YOUR ANSWERS ON PAGE 16.

Section B

Cabling Diagrams for Two or More Systems

Cabling diagrams in the 3IM course tell you about connecting different pieces of equipment in two or more systems together. Usually, each system contains the same components. And each component contains connectors for cables.

Here is a cabling diagram for something called a video patch panel.

VIDEO PATCH						
System 1		System 2		System 3		
	CAT	DOG	CAT	DOG	CAT	DOG
RED			T			
BLUE	R		O	U	X	Y
GREEN		W			N	Z
YELLOW	S		P	V		

Look at the diagram above while you read the information below.

The title of the diagram is at the top. The title is VIDEO PATCH. VIDEO PATCH is not a column heading.

Notice that the diagram has two levels of column headings. Just below VIDEO PATCH, you see the following column headings:

System 1	System 2	System 3
----------	----------	----------

Under each system, you see two more column headings:

CAT	DOG
-----	-----

Headings which are under other headings are called subheadings. So we have:

Column Numbers:	1	2	3	4	5	6
Headings----->	System 1		System 2		System 3	
Subheadings----->	CAT	DOG	CAT	DOG	CAT	DOG

Notice that each column heading contains the same two subheadings. This means that each system has the same two components, CAT and DOG.

There are six columns in the table. Everything in column 1 is about System 1, CAT. Everything in column 2 is about System 1, DOG, etc.

### EXERCISE 3

1. What is column 5 about? \_\_\_\_\_
2. Which column is about System 2, DOG? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 17.

Suppose that you want all the information about System 1. In the diagram below, the circle shows all the information about System 1. Notice that System 1 contains the letters R, S, and W.

VIDEO PATCH						
System 1		System 2		System 3		
	CAT	DOG	CAT	DOG	CAT	DOG
RED			T			
BLUE	R		O	U	X	Y
GREEN		W			N	Z
YELLOW	S		P	V		

#### EXERCISE 4

1. In the diagram above, draw a circle around all the information about System 3.
2. What letters are in System 3? \_\_\_\_\_

CHECK YOUR ANSWER ON PAGE 17.

Suppose that you want all the information about DOG. In the diagram below, all the information about DOG is circled. Notice that, to find all the information about DOG, you must look in three columns. The letters in DOG are W, U, V, Y, and Z.

VIDEO PATCH						
System 1		System 2		System 3		
CAT	DOG	CAT	DOG	CAT	DOG	
RED		T				
BLUE	R	O	U	X	Y	
GREEN				N	Z	
YELLOW	S	P	V			

### EXERCISE 5

What letters are in CAT? \_\_\_\_\_

CHECK YOUR ANSWER ON PAGE 17.

Sometimes you need to find all the information in combinations of rows and columns. This is a little more complicated in a table or diagram with subheadings than one without subheadings. For example, suppose that you need to know everything that is in System 2, YELLOW. You must look in Row YELLOW and both of the columns under System 2. The circle below shows the information in System 2, YELLOW. System 2, YELLOW contains the letters P and V.

VIDEO PATCH							
		System 1		System 2		System 3	
		CAT	DOG	CAT	DOG	CAT	DOG
RED				T			
BLUE	k			O	U	X	Y
GREEN		w				N	Z
YELLOW	S			P	V		

EXERCISE 6

- In the diagram above, list all the letters in CAT: \_\_\_\_\_
- The letters in System 1, CAT are: \_\_\_\_\_
- System 3, BLUE contains the letters: \_\_\_\_\_
- The letters T and X are both in: \_\_\_\_\_
- The letters in CAT, BLUE are: \_\_\_\_\_
- What letter is in System 1, Dog, Green? \_\_\_\_\_
- The letter Z is in: \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 18.

## Section C

### The Structure of Tables in 31M Materials

Most of the tables you will use in the 31M course tell how to carry out procedures, such as preventive maintenance or troubleshooting. A procedure often consists of several steps that must be carried out in a certain order. In many tables, each row is one step in a procedure. Here is an example:

Step	Unit	Action	Result
1		A	
2		B	
3	E	C	G
4		D	

In this case, the step numbers are the row headings. For example, E, C, and G are all parts of Step 3.

Each column tells something about what is happening at all the steps. For example, A, B, C, and D are all actions, one for each step. G is the result at Step 3.

In some tables, instead of a step number, the row headings are item numbers, as in the table below:

Item No.	Item to be Inspected	Procedure	Reference
1			
2		K	
3			
4			

In this table, each Item No. contains an item to be inspected, a procedure, and a reference. For example, K is the procedure in Item No. 2.

In some tables, item numbers or steps consist of several parts. An example is shown below.

Item No.	Symptom	Probable cause	Corrective measure
1	Light does not go on.	a. Switch b. Connector	a. Do M b. Do P
2	Buzzer sounds.	a. Cable X b. Meter Z c. ABC	a. Do Q b. Do R c. Do S

Notice that, for each Item No., the table lists two or more Probable causes, labeled a, b, etc., and two or more Corrective measures, also labeled a, b, etc. For example, Item No. 1 has two Probable causes:

Probable cause a. Switch  
Probable cause b. Connector

It also has two Corrective measures:

Corrective measure a. Do M.  
Corrective measure b. Do P.

When reading a table like this, the letters a, b, etc. are often attached to the Item No., as though they were listed alongside the Item No. For example, when we refer to the Probable cause in Item No. 1b, we mean Probable cause b. in Item No. 1. Find it in the table.

As you can see, the Probable cause in Item No. 1b is Connector.

Now find the Corrective measure in Item No. 2b. \_\_\_\_\_

The corrective measure in Item No. 2b is Do R.

Here are some more examples of things the table tells you. Study them carefully while looking at the table, and make sure you understand them:

Item No. 2 has three corrective measures. They are: Do Q, and Do R, and Do S.

The Probable cause in Item No. 2b is: Meter Z.

"Do S" is the Corrective measure in Item No. 2c.

"Cable X" is the Probable cause in Item No. 2a.

EXERCISE 7

USE THE TABLE BELOW TO ANSWER THE FOLLOWING QUESTIONS:

Step No.	Procedure	Reference
1	M	R
2	a. N	a. S
	b. O	b. T
3	a. P	a. U
	b. Q	b. V

- Both M and R are in \_\_\_\_\_.
- The Reference in Step No. 3a is \_\_\_\_\_.
- The Procedure in Item No. 2b is \_\_\_\_\_.
- T is the \_\_\_\_\_ in Step No. \_\_\_\_\_.
- Q and V are both in Step No. \_\_\_\_\_.
- S and T are both \_\_\_\_\_ in Step No. \_\_\_\_\_.

Put your answers to questions 7 to 9 in the table below.

Item No.	Switch	Function
1	a.	a.
	b.	b.
2	a.	a.
	b.	b.
	c.	c.
3	a.	a.
	b.	b.

- Place an X in Item No. 3b, Function.
- Place a Y in Item No. 2a, Switch.
- Place a Z in Item No. 1b, Switch.

CHECK YOUR ANSWERS ON PAGE 19.

ANSWER KEYS TO EXERCISES IN UNIT VI, LESSON 1

Unit VI  
Lesson 1

15

ANSWERS TO EXERCISE 1

1. Columns are sections which go up and down.
2. Letter C is the correct answer. Rows go straight across the page in a horizontal direction.
3. There are no rows in this drawing, only columns. So, letter A is the right answer.
4. If you picked letter B as the answer, you are correct.

---

CONTINUE WITH THE LESSON.

ANSWERS TO EXERCISE 2

1. 3.
2. row B and column X.
3. B, E, H, K.
4. column CAT and row 3.
5. D.
6. column RAT. (If you wrote just "RAT," that is O.K.)

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 3

1. System 3, CAT
2. Column 4.

---

CONTINUE WITH THE LESSON.

ANSWERS TO EXERCISE 4

1.

VIDEO PATCH							
		System 1		System 2		System 3	
		CAT	DOG	CAT	DOG	CAT	DOG
RED				T			
BLUE		R		O	U	X	Y
GREEN			W			N	Z
YELLOW		S		P	V		

2. The letters in Systems 3 are X, N, Y, and Z.

---

CONTINUE WITH THE LESSON.

ANSWER TO EXERCISE 5

The letters in CAT are R, S, T, Q, P, X, and N.

---

CONTINUE WITH THE LESSON.

ANSWERS TO EXERCISE 6

1. R, S, T, O, P, X, N (in any order)
2. R, S
3. X, Y
4. CAT
5. R, O, X
6. W
7. System 3, DOG, GREEN

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 7

1. Step No. 1
2. U
3. 0
4. Reference in Step No. 2b
5. Step No. 3b
6. References in Step No. 2
7. to 9. The table should look like this:

Item No.	Switch	Function
1	a.	a.
	b. Z	b.
2	a. Y	a.
	b.	b.
	c.	c.
3	a.	a.
	b.	b. X

IF YOU DO NOT UNDERSTAND ANY OF THESE ANSWERS,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS LESSON,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A  
IN UNIT VI - LESSON 1.

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT VI**  
**LOCATING INFORMATION IN TABLES**

**LESSON 2**  
**INTERPRETING TABLE HEADINGS**

**PREREQUISITE: None**  
**MATERIALS REQUIRED: None**  
**TYPE OF LESSON: Self-Paced**

UNIT VI. LOCATING INFORMATION IN TABLES

Lesson 2. Interpreting Table Headings

In the 31M course, you will often use tables in technical manuals (TMs) for maintenance and troubleshooting. Most TMs contain many tables. So the first thing you will have to do is find the correct table for the task you are performing. Once you have found the correct table, you must locate the information you need within the table. In order to do this, you must understand the column headings which tell you what is in each column. This lesson teaches you to use table titles and column headings to find the information you need.

LEARNING GOALS:

In the lesson, you will learn to:

- A. Use titles of tables to identify the table you need (p. 2).
- B. Interpret column headings in tables used for troubleshooting (p. 4).
- C. Interpret column headings in preventive maintenance tables (p. 11).

On the pages that follow, you will find material to read and questions to answer. Most of the time, you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

When you finish the lesson, your instructor will give you a checkpoint. When you finish the checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

GO ON TO THE NEXT PAGE TO BEGIN THE LESSON.

## Section A

### Identifying Tables by Title

The Army has a technical manual (TM) for each piece of equipment or system used in the 31M MOS. For example, one TM contains information about a low-capacity radio terminal set called the AN/TRC-145. Another TM has information about the medium-capacity radio called the AN/GRC-50. Each TM contains many tables. Some tables are for maintenance, others for troubleshooting. There may even be several tables for one kind of task. Suppose you are troubleshooting an AN/TRC-145. You will need one table if the equipment is being used as a radio repeater and a different table if it is being used as a radio terminal. It is important to be able to find the right table.

Each table has a title across the top which names the task for which the table is used. By checking the table title before you start to use it, you can be sure you are using the right table.

For example, suppose you need to troubleshoot a cable-to-radio conversion in an AN/TRC-145. You look in the table of contents and find that information about troubleshooting is in Chapter 5. When you turn to Chapter 5, you find several troubleshooting tables. Which one do you need?

If you look at the top of each table, you will see a title. For example, the first table has the following title:

#### Table 5-2. Cable Terminal Troubleshooting

You are troubleshooting a cable-to-radio conversion not a cable terminal. So Table 5-2 is not the right table.

Here is a list of all the titles of tables for troubleshooting in an AN/TRC-145. See if you can find the right table for a cable-to-radio conversion.

- Table 5-2 Cable Terminal Troubleshooting
- Table 5-3 Cable Repeater Troubleshooting
- Table 5-4 Radio Terminal Troubleshooting Chart
- Table 5-5 Radio Repeater Troubleshooting
- Table 5-6 Cable-to-Radio Conversion Troubleshooting
- Table 5-7 TSEC/KG-27 Troubleshooting (TSEC/KG-27 in Alarm, Multiplexer Not in Alarm)
- Table 5-8 TSEC/KG-27 Troubleshooting (TSEC/KG-27 Not in Alarm, Multiplexer in Alarm)
- Table 5-9 TSEC/KG-27 Troubleshooting (TSEC/KG-27 Not in Alarm, Multiplexer Not in Alarm)
- Table 5-10 Loopback Checks
- Table 5-11 Assemblage Troubleshooting

Which table must you use? \_\_\_\_\_

You must use Table 5-6, because it is the table for troubleshooting a cable-to-radio conversion.

#### EXERCISE 1

USE THE LIST OF TABLES ABOVE TO FILL IN THE LAST COLUMN BELOW.

Question	Equipment	Table Used for Troubleshooting
1	Radio terminal	
2	Assemblage	
3	TSEC/KG-27 (not in alarm, but multiplexer in alarm)	
4	Cable repeater	
5	TSEC/KG-27 (not in alarm, and multiplexer not in alarm)	

CHECK YOUR ANSWERS ON PAGE 16.

## Section B

### Interpreting Column Headings in Equipment Performance Checklists and Troubleshooting Charts

Some kinds of tables are used to check out a piece of equipment to find out whether anything is wrong. These tables are called equipment performance checklists. Other kinds of tables are used after something has already gone wrong, and you need to find out why and how to fix it. These are called troubleshooting charts. We will deal first with equipment performance checklists, then with troubleshooting charts.

#### Interpreting Column Headings in Checklists

Below, you will find part of two checklists (Checklist I and Checklist II). Do not try to read the checklists. Just look at the column headings. The column headings tell you what kind of information is in each column. You must understand all the column headings in order to use the checklist correctly.

Checklist I

Step	Unit	Action	Normal indication	Corrective measures
75	R-1148/F: GRC or R-1141 (+) (E) 1-2.	Set multimeter selector switch to ORDER WIRE.  For 12-24/dm channel operation only	Multimeter indicates in green area of meter scale.	are useful in other circuits. Check V7 and V8 in base-band assembly 3A3.

Checklist II

Step	Action	Normal result	Fault symptom	Suggested remedy
1	Attempt restart.  a Set TSEC/KG-27 ON-OFF/RESET switch to OFF/RESET pause then to ON	TD-660A/G and TSEC/KG-27 not in alarm; system operational. Proceed to step 7	MONITOR lamp out, TSEC/KG-27 still in alarm	Proceed to step 2

Look at Checklist I. Here are definitions of the column headings:

Unit - The piece of equipment or component that is being checked.

Action - What the operator must do to check the equipment.

Normal indication - What should happen if the equipment is working properly.

Corrective measures - What the operator should do if the equipment is not working properly. Sometimes, this column tells the operator to perform some additional checks. At other times, it tells how to fix the equipment.

If you are using a checklist like Checklist I and you want to know what you (the operator) should do, you must look in the "Action" column. If you want to know how to fix something, what column should you look in?

Write your answer here. \_\_\_\_\_

If you wrote "Corrective measures," you are correct.

Now look at the column headings in Checklist II. Some of them are the same or almost the same as in Checklist I.

Action - the same as in Checklist I - What the operator must do to check the equipment. 2-5

Normal result - the same as "Normal indication" in Checklist I - What should happen if the equipment is working properly.

Fault symptom - a sign that the equipment is not working properly; a malfunction.

Suggested remedy - the same as "Corrective measures" in Checklist I - What the operator should do if the equipment is not working properly.

Here is a list of all the column headings from both checklists and their definitions.

Column Heading	Definition
Action	What the operator must do to check the equipment.
Corrective measures	What the operator should do if the equipment is not working properly.
Fault symptom	A sign that the equipment is not working properly; a malfunction.
Normal indication	What should happen if the equipment is working properly.
Normal result	What should happen if the equipment is working properly (same as "Normal indication").
Suggested remedy	What the operator should do if the equipment is not working properly (same as "Corrective measures").
Unit	The piece of equipment or component that is being checked.

Do the following:

1. Read each heading and its definition. Go over them several times until you are sure that you know them.
2. Cover the definitions (the second column) with a piece of paper. Read each column heading and give its definition from memory. Then check to see how many you got right.
3. Cover the column headings (the first column) with a piece of paper. Read each definition and give the column heading from memory. Then check to see how many you got right.
4. If you missed any, review them.
5. When you are sure that you know what all these column headings mean, turn the page.

EXERCISE 2

HERE ARE THE COLUMN HEADINGS FROM CHECKLISTS I AND II. USE THEM TO ANSWER THE FOLLOWING QUESTIONS. DO NOT GO BACK TO THE DEFINITIONS.

Checklist I

Step	Unit	Action	Normal indication	Corrective measures
------	------	--------	-------------------	---------------------

Checklist II

Step	Action	Normal result	Fault symptom	Suggested remedy
------	--------	---------------	---------------	------------------

1. You are using Checklist I. You want to know how the equipment should behave. Which column should you look in?  
\_\_\_\_\_
2. In Checklist II, which column tells you how to fix something that goes wrong? \_\_\_\_\_
3. Which column in Checklist II tells you something that is not included in Checklist I? \_\_\_\_\_
4. In Checklist I, which column tells you what piece of equipment is being checked? \_\_\_\_\_
5. Which column tells you what the operator must do to check the equipment? \_\_\_\_\_
6. Which column in Checklist I gives the same kind of information as the "Suggested remedy" column in Checklist II?  
\_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 16.

## Interpreting Column Headings in Troubleshooting Charts

Troubleshooting charts are used in the following way: While operating equipment, you notice something wrong. This is called a symptom or malfunction. You go to the appropriate troubleshooting chart to find out what caused the problem and how to fix it. Below are parts of two troubleshooting charts. Do not try to read the charts. Just look at the column headings.

### Troubleshooting Chart I

Item No.	Malfunction	Probable cause	Corrective action
5	ALARMS TRAFFIC indicator and ALARMS NO CABLE CURRENT indicator of TD-204/U or TRAFFIC and CABLE CUR indicator of TD-754/G light and buzzer sounds. No order wire available.	Open transmission cable (both directions) in cable link.	response: Send person to distant terminal or repeater. Troubleshoot cable link (para 5-4).
6	ALARMS NO CABLE CURRENT indicator on TD-204/U or CABLE CUR indicator of TD-754/G lights and buzzer sounds. Order wire is normal.	a. Momentary overcurrent or undercurrent in cable link. b. Defective TD-204/U or TD-754/G.	a. Operate CABLE POWER switch of TD-204/U or cable CURRENT switch of TD-754/G to OFF and then to ON. b. Troubleshoot TD-204/U or TD-754/G (para 5-5).

### Troubleshooting Chart II

Item No.	Symptom	Possible trouble	Corrective measure
11	Switchboard operator reports high noise level, distortion or hum on all channels, but all local indications are normal.	d. Defective field wire in line. e. Defective TD-352/U or CV-1548/G at distant terminal. a. Defective TD-352/U	d. Check and repair as required. e. Request distant terminal troubleshooting. a. Troubleshoot TD-352/U (app A).
12	Order wire garbled and noisy; all other indications normal.	b. Defective TD-352/U at distant terminal. Defective TD-204/U	b. Request distant terminal troubleshooting. Troubleshoot TD-204/U (app A).
13	No indication on TEST ALI-V meter of TD-352/U with METER SELECT switch at PCM FROM AUX (secure operation only).	a. Defective cables between TSEC/KG-5 and TD-352/U. b. Defective TSEC/KG-5	a. Check and replace if necessary. b. Troubleshoot TSEC/KG-5.

Though the column headings of the two charts look a little bit different, both charts contain the same kind of information. On the next page are definitions of column headings in both charts:

Chart I	Chart II	Definition
Malfunction	Symptom	A sign that something is wrong. This column contains descriptions of the different things that can go wrong.
Probable cause	Possible trouble	The defect in the equipment that probably caused the symptom or malfunction.
Corrective action	Corrective measure	What the operator should do if something has gone wrong. Sometimes, this column tells the operator to perform some additional checks. At other times, it tells how to fix the equipment.

Notice that:

Malfunction means the same thing as Symptom.

Probable cause means the same thing as Possible cause.

Corrective action means the same thing as Corrective measure.

Do the following:

1. Read each pair of headings and their definition. Go over them several times until you are sure you know them.
2. Cover the definitions (column 3) with a piece of paper. Read each pair of column headings and give the definition from memory. Then check to see how many you got right.
3. Cover the Chart II column headings. Read each Chart I heading and give the Chart II heading that means the same thing. Then check to see how many you got right.
4. Cover the Chart I column headings. Read each Chart II heading and give the Chart I heading that means the same thing. Then check to see how many you got right.
5. Cover both the Chart I and Chart II column headings. Read each definition and give both column headings from memory. Then check to see how many you got right.
6. When you are sure that you know what all the column headings mean, turn the page.

Unit VI  
Lesson 2

EXERCISE 3

HERE ARE THE COLUMN HEADINGS OF TWO TROUBLESHOOTING CHARTS:

Chart I

Item No.	Malfunction	Probable cause	Corrective action
----------	-------------	----------------	-------------------

Chart II

Item No.	Symptom	Possible trouble	Corrective measure
----------	---------	------------------	--------------------

USE THE CHARTS TO ANSWER THE FOLLOWING QUESTIONS. DO NOT GO BACK TO THE DEFINITIONS ON THE PREVIOUS PAGE.

1. In Chart I, which column tells you why something went wrong?  
\_\_\_\_\_
2. Which column in Chart II tells you the same thing as the Malfunction column in Chart I? \_\_\_\_\_
3. Which column in Chart II tells you the same thing as the Probable cause column in Chart I? \_\_\_\_\_
4. You want to know how to fix something that has gone wrong.
  - a. Which column should you use in Chart I? \_\_\_\_\_
  - b. Which column should you use in Chart II? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 17.

Section C

Interpreting Column Headings in Maintenance Tables

Maintenance tables tell the operator how to carry out preventive maintenance checks and services (PMCS) on equipment. Here is part of a table used for daily PMCS of equipment called the AN/TRC-117. Do not try to read it. Just look at the column headings.

Maintenance Table I

Sequence No.	Item to be inspected	Procedures	References
		<b>EXTERIOR</b>	
1	External condition -----	Check for skin punctures, cracks, or open seams that could permit moisture to enter wall.	None.
2	Grounding system -----	a. Check grounding system to see that it is properly installed. b. Tighten loose ground lead connections.	a. Para 2-3. b. None.
3	Sling assembly (if installed in truck).	Tighten turnbuckles to remove slack in sling assembly.	Fig. 2-3.

In this table, Sequence No. means the same thing as Step. Here are definitions of the rest of the column headings:

Item to be inspected - The equipment component that is being checked by the operator.

Procedures - What the operator must do.

References - Places to get more information, like paragraphs or figures in TMs.

For example, suppose Pvt. Jane Jones is inspecting a generator. She must look in the Procedures column to find out what to do at each sequence number (step). If she needs additional information about any sequence number, she should look in the References column.

Here is part of another maintenance table: Maintenance Table II

Item No	Interval				Item to be Inspected	Procedures Check and have repaired or adjusted as necessary	For readiness reporting, equipment is <u>not</u> ready/available if:
	B	D	A	W			
1				*	AN/TRC-145	Check for completeness of the AN/TRC-145	Upon completion of PMCS checks, available equipment is insufficient to support the unit mission
2					Generator Set	<p><b>WARNING</b></p> <p>Wheels must be blocked, brakes set, and leg support down in support position before attempting to roll up the tarpaulin and before starting to assemble or set up the equipment for operation</p> <p>a. Inspect unit for oil leaks and broken or missing parts</p> <p>b. Periodically monitor the engine oil pressure gage for low or fluctuating reading</p>	b. Excessive loss of oil due to burn or leakage
		*	*		Lubrication		

The column headings, "Item to be Inspected" and "Procedures," are the same as in Maintenance Table I on the previous page.

Look at the last column heading on the right. It says "For readiness reporting, equipment is not ready/available if:" This column lists symptoms that may show up at each Item No. If any of the things listed in the last column happen, this means that the equipment is not ready or available for use; the equipment must be repaired first.

Let us look at the "Interval" section of the column headings in Maintenance Table II more closely. Just this part of the table is shown below.

Interval				
B	D	A	W	

Interval means how often something is supposed to be done. But what are the subheadings B, D, A, and W? Sometimes, when you are reading a table, you will see column headings that do not make sense by themselves, like letters or numbers. Whenever this happens, there will be an explanation of the headings somewhere close by. An explanation of the column headings is called a key. In Maintenance Table II, the key is above the table. Turn back to Maintenance Table II on the previous page and find the key.

The key tells you that B means Before operation, D means During operation, A means After operation, and W means Weekly.

Here is a summary of all the column headings from both Maintenance Tables I and II and their definitions.

Column Heading	Definition
For readiness reporting equipment is <u>not</u> ready/available if:	This column lists symptoms (malfunctions). If any of these symptoms occurs, the equipment is <u>not</u> ready/available for use.
Interval	How often something is supposed to be done. (Use the table key to explain the subheadings under "Interval.")
Item to be Inspected	The equipment component that is being checked by the operator.
Procedures	What the operator must do.
References	Places to get more information, like paragraphs or figures in TMs.

Do the following:

1. Read each heading and its definition. Go over them several times until you are sure that you know them.
2. Cover the definitions (the second column) with a piece of paper. Read each column heading and give its definition from memory. Then check to see how many you got right.
3. Cover the column headings (the first column) with a piece of paper. Read each definition and give the column heading from memory. Then check to see how many you got right.
4. If you missed any, review them.
5. When you are sure that you know what all these column headings mean, turn the page.

EXERCISE 4

USE THE HEADINGS BELOW TO ANSWER QUESTIONS 1 TO 3.  
DO NOT GO BACK TO THE DEFINITIONS.

Item No.	Interval				Item to be Inspected	Procedures Check and have repaired or adjusted as necessary	For readiness reporting equipment is not ready/available if
	B	D	A	W			

1. Pvt. Art Smith is performing weekly PMCS. Which column should he look in to find out what has to be done weekly? \_\_\_\_\_
2. The column labeled A tells \_\_\_\_\_  
\_\_\_\_\_
3. If something happens that is listed in the last column of the table, this means that \_\_\_\_\_

USE THE TABLE BELOW FOR QUESTIONS 4 TO 7.  
DO NOT GO BACK TO THE DEFINITIONS.

H - Helper  
O - Operator  
T - Team Chief

Item to Be Inspected			Procedure	References
H	O	T		

4. Which column tells what must be done to check the equipment?  
\_\_\_\_\_
5. Pvt. Calvin Jones is helping Pvt. Sally Smith, the equipment operator. Which column will tell Pvt. Jones what items he should inspect. (Hint: Did you find the Key?) \_\_\_\_\_
6. In which column should Pvt. Jones and Pvt. Smith look to find out where to get additional information? \_\_\_\_\_
7. Which column heading means "the equipment component that is being checked?" \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 17.

ANSWER KEYS TO EXERCISES IN UNIT VI, LESSON 2

Unit VI  
Lesson 2

15

ANSWERS TO EXERCISE 1

Question	Equipment	Table Used for Troubleshooting
1	Radio terminal	5-4
2	Assemblage	5-11
3	TSEC/KG-27 (not in alarm, but multiplexer in alarm)	5-8
4	Cable repeater	5-3
5	TSEC/KG-27 (not in alarm, and multiplexer not in alarm)	5-9

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CONTINUE WITH THE NEXT PART OF THE LESSON.

ANSWERS TO EXERCISE 2

1. Normal indication
2. Suggested remedy
3. Fault symptom
4. Unit
5. Action
6. Corrective measures

---

IF YOU MISSED ANY OF THE QUESTIONS, REVIEW THE DEFINITIONS  
BEFORE YOU CONTINUE WITH THE LESSON.

ANSWERS TO EXERCISE 3

1. Probable cause
2. Symptom
3. Possible trouble
4. a. Corrective action  
b. Corrective measure

IF YOU MISSED ANY OF THESE QUESTIONS,  
REVIEW THE DEFINITIONS AGAIN.

WHEN YOU ARE SURE THAT YOU KNOW ALL THE COLUMN HEADINGS  
YOU HAVE LEARNED SO FAR, GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 4

1. Column W. W stands for "Weekly."
2. The column labeled A tells what maintenance procedures should be carried out after operation.
3. If something happens that is listed in the last column, this means that The equipment is not ready or available for use.
4. Procedure
5. Column H. The key on the upper right explains that H stands for "Helper."
6. References
7. Items to be Inspected

IF YOU MISSED ANY OF THE QUESTIONS ABOVE,  
REVIEW THE DEFINITIONS AGAIN.

WHEN YOU ARE SURE THAT YOU KNOW ALL THE COLUMN HEADINGS IN THIS LESSON,  
TELL YOUR INSTRUCTOR YOU ARE READY FOR CHECKPOINT 1, FORM A  
IN UNIT VI - LESSON 2.

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT VI**  
**LOCATING INFORMATION IN TABLES**

**LESSON 3**  
**LOCATING INFORMATION IN 31M TABLES**

**PREREQUISITE: None**  
**MATERIALS REQUIRED: None**  
**TYPE OF LESSON: Self-Paced**

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STUDENT GUIDE

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UNIT VI. LOCATING INFORMATION IN TABLES

Lesson 3. Locating Information in 31M Tables

Tables are used in the 31M course for maintaining, checking, and troubleshooting equipment. Many parts of your job as a 31M will depend upon your finding information in tables and using it correctly. This lesson is about locating information in 31M tables.

LEARNING GOALS:

In this lesson, you will learn to find information in 31M tables.

On the pages that follow, you will find material to read and questions to answer. Most of the time, you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

When you finish the lesson, your instructor will give you a checkpoint. When you finish the checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

GO ON TO THE NEXT PAGE TO BEGIN THE LESSON.

Tables are organized by rows and columns. Rows go across, like this: <----->, while columns go up and down. In 31M tables, each row is usually one step in a step-by-step procedure, or one item number. Each column includes a different kind of information about each step or item number. The column headings at the top of the table tell what kind of information is in each column.

Many tables used in the 31M MOS are several pages long, like the one on the next three pages. It is part of an equipment performance checklist used for checking a radio called an AN/GRC-50. As you can see, the steps are listed along the left of each page. The columns tell the Unit, Action, Normal indication, and Corrective measures for each step. In order to find a particular piece of information for a particular step, you must find the place where the step (row) and column meet. For example, to find out what the operator must do in Step 89, you must locate the place where the Step 89 row and the Action column meet. Can you find it? The answer is: Set multimeter selector switch to ORDER WIRE.

Here are four questions about the checklist on the next three pages with answers and explanations. In each one look at that step in the table and make sure that you understand the answers that are given.

1. Look at Step 82 in the checklist. In Step 82, what equipment component is being checked?

Answer: Equipment components are listed in the Unit column. In Step 82, the unit is the T-893(P)/GRC.

Look at Step 86 in the checklist. If the equipment is working properly in Step 86, what should happen?

Answer: Look in the Normal indication column to find out what should happen if the equipment is operating properly. In Step 86, the Normal indication is: Multimeter indicates in the green area.

3. Look at Step 70. What should the operator do in Step 70?

Answer: The Action column tells what the operator should do. The Action in Step 70 is: Readjust REC SIG-1 control for maximum indication on multimeter.

4. Look at step 77. Suppose that the equipment is not working properly in Step 77. What should the operator do?

Answer: To find out what to do if the equipment is not operating properly, look in the Corrective measures column. The corrective measure in Step 77 is: Check V4 in baseband assembly 2A3.

Step	Unit	Action	Normal indication	Corrective measures
EQUIPMENT PERFORMANCE	GRC, AM-1956A/ GRC or AM-1956B/ GRC.	trol for peak indication on multimeter. Release AFC DIS- ABLE switch.		
	68 AM-1955(*)/GRC or AM-1956(*)/ GRC.	Detune REC SIG-1 control for minimum indication on multimeter.	Multimeter indicates minimum level.	
	69 R-1148(P)/GRC or R-1331(*)/P/ GRC.	Rotate SQUELCH INCR SENS control counter clockwise until squelch alarms operate.	NO SIGNAL indicator lights and buzzer sounds. Depress SQUELCH BUZZER OFF pushbutton.	Check V12 on second IF assembly 3A5. If buzzer sounds but indicator does not light, change indicator lamp.
	70 AM-1955(*)/GRC or AM-1956(*)/GRC.	Readjust REC SIG-1 control for maximum indication on multimeter.	NO SIGNAL indicator extinguishes and buzzer sounds. Depress SQUELCH BUZZER OFF pushbutton.	
	71 Fdm multiplex equipment.	<i>For 4-channel fdm operation only</i>		
		Connect spiral-4 cable from multiplex equipment to RCVR OUT terminals (fig. 6-3). Have multiplex terminal transmit 1-kc test tone at 0 dbm.		
	72 T-893(P)/GRC	Set multimeter selector switch to 1 KC IN and adjust FDM INPUT LEVELS control for indication within green area of multimeter scale.	Multimeter indicates in green area of meter scale.	Check V4 in baseband assembly 2A3.
	73 T-893(P)/GRC	Set multimeter selector switch 1 KC MOD.	Multimeter indicates in green area of meter scale.	Check V1 and V2 on baseband assembly 2A3. Check V5 on afc assembly 2A4. Check all tubes on modulator assembly 2A5.
74 R-1148(P)/GRC or P-1331(*)/P)/GRC.	Set multimeter selector switch to 1 KC OUT and adjust FDM OUTPUT LEVEL control for indication within green area of multimeter scale.	Multimeter indicates green area of meter scale.	Check V7, V8, and V9 in second IF assembly 3A5. Check tubes V5, V6, and V9 in baseband assembly 3A3. If meter indication obtained is not in green area, replace V9 until requirement is met. Do not discard unsatisfactory tubes; they	

## EQUIPMENT PERFORMANCE

Step	Unit	Action	Normal indication	Corrective measures
75	R-1148(P)/GRC or R-1331(*) (P)/GRC.	Set multimeter selector switch to ORDER WIRE. <i>For 12/24 fdm channel operation only</i>	Multimeter indicates in green area of meter scale.	are useful in other circuits. Check V7 and V8 in baseband assembly 3A3.
76	Fdm multiplex equipment.	Connect spiral-4 cable from multiplex equipment to RCVR OUT terminals (fig. 6-3). Have multiplex terminal transmit 1-kc test tone at 0 dbm.		
77	T-893(P)/GRC	Set multimeter selector switch to 1 KC IN and adjust FDM INPUT LEVELS control for indication within green area of multimeter scale.	Multimeter indicates in green area of meter scale.	Check V4 in baseband assembly 2A3.
78	T-893(P)/GRC	Set multimeter selector switch to 1 KC MOD and 68 KC MOD.	Multimeter indicates in green area of meter scale.	Check V1 and V2 on baseband assembly 2A3. Check V5 on afc assembly 2A4. Check all tubes on modulator assembly 2A5.
79	R-1148(P)/GRC or R-1331(*) (P)/GRC.	Set multimeter switch to 1 KC OUT and 68 KC OUT and adjust FDM OUTPUT LEVEL control for indication within green area of multimeter scale.	Multimeter indicates in green area of meter scale.	Check V7, V8, and V9 in second IF assembly 3A5. Check tubes V5, V6, and V9 in baseband assembly 3A3. If meter indication obtained is not in green area, replace V9 until requirement is met. Do not discard unsatisfactory tubes; they are useful in other circuits.
80	R-1148(P)/GRC or R-1331(*) (P)/GRC.	Set multimeter selector switch to ORDER WIRE.	Multimeter indicates in green area of meter scale.	Check V7 and V8 in baseband assembly 3A3. If necessary, replace V8 until meter indicates in green area. Do not discard unsatisfactory tubes; they are useful in other circuits.
81	Transmit and receive pcm equipment.	<i>For Pcm channel operation only</i> Connect three cables to PCM IN, PCM OUT, and PCM (order wire) (fig. 6-3). The pcm terminal should make required adjustments of its equipment	Required indications are obtained	Perform applicable corrective measures at pcm terminal.
82	T-893(P)/GRC	Set multimeter selector switch to PCM IN and adjust PCM INPUT LEVELS for multi-	Multimeter indicates in green area.	Check connections of pcm transmit cable at PCM IN on transmitter and at pcm terminal.

Unit VI  
Lesson 3

## EQUIPMENT PERFORMANCE

Step	Unit	Action	Normal Indication	Corrective measure
83	R-1148(P)/GRC or R-1331 (*) (P)/GRC.	meter indication in green area. Set multimeter selector switch to PCM OUT. Adjust PCM INPUT LEVELS control on the transmitter for indication in green area on receiver multimeter.	Receiver multimeter indicates in green area.	Check V1, V2, and V3 in baseband assembly 2. Check V6, V7, V8, V9, and V12 in second IF assembly 3A5. Check V1, V2, and V3 in baseband assembly 3A3. Proceed to step 84.
84	Pcm receive terminal.	The pcm terminal should make required adjustments of the received signal.	Required indications are obtained.	Check connections of pcm receive cable at PCM OUT on receiver and at pcm terminal. Perform required corrective measures at pcm terminal.
85	R-1148(P)/GRC or R-1331 (*) (P)/GRC.			If required indications are obtained at pcm terminal, check V4 in baseband assembly 3A3. Do not discard unsatisfactory tubes. If tube replacement results in meter indications consistently in the same meter area, refer receiver to higher maintenance services for adjustment of R23 in assembly 3A3.
86	R-1148(P)/GRC or R-1331 (*) (P)/GRC.	Set multimeter selector switch to TEST TONE CAL and TEST TONE switch to ON. Adjust TEST TONE control for indication in green area of multimeter scale (approximately 0 dbm).	Multimeter indicates in green area.	Check V2 in signaling unit 3A6.
87	T-893(P)/GRC	Set multimeter selector switch to 1 KC MOD.	Multimeter indicates in green area.	Check V5 (metering tube) in afc assembly 2A4.
88	Pcm receive terminal.	Adjust level of test tone	Required indications are obtained.	Perform required corrective measures.
89	R-1148(P)/GRC or R-1331 (*) (P)/GRC	Set multimeter selector switch to ORDER WIRE.	Multimeter indicates in green area.	Check connection of pcm order wire cable at PCM on receiver and at pcm terminal. Check V7 and V8 in baseband assembly 3A3. If necessary, replace V8 until meter indicates in green area. Do not discard unsatisfactory tubes; they are useful in other circuits.
90	R-1148(P)/GRC or R-1331 (*) (P)/	Operate RING switch and listen on handset.	a. 1,600-cps ringing tone should be heard.	a. Check V2 in signaling unit 3A6.

EXERCISE 1

NOW USE THE CHECKLIST TO ANSWER THE FOLLOWING QUESTIONS:

1. In Step 75, if the equipment is not operating properly, what should the operator do?

\_\_\_\_\_

2. What component is being checked in Step 88? \_\_\_\_\_

3. Step 68 tells the operator to \_\_\_\_\_

\_\_\_\_\_

4. What result do you expect in Step 83 if the equipment is working properly?

\_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 21.

Some tables have several parts within each step or item. The troubleshooting chart for a radio repeater on the next page is an example. Look at the chart while you read this section of the lesson.

Notice that there is one malfunction listed at each Item No. But most item numbers have two or more probable causes, numbered a, b, etc. Most also have two or more corrective actions, numbered a, b, etc. This is because most equipment malfunctions can be caused by several causes, and each probable cause has a different corrective action. Here is how you locate information in a table like this one. We will use Item No. 1 as an example. Look at Item No. 1 while you read this. The malfunction at Item No. 1 is:

No indication on R-1329(P)/GRC-103(V) meter with meter selector switch at RCVR SIG, 12 CH PCM, or OW. High indication on T-983(P)/GRC-103(V) meter with meter selector switch at REFL PWR.

If this malfunction occurs, it is caused by one of three things (probable causes). The first probable cause is:

- a. Defective cable between R-1329(P)/GRC-103(V) ANT connector and associated SYSTEM connector on VIDEO AND ANTENNA ENTRANCE BOX.

The second probable cause of Malfunction No. 1 is:

- b. Defective antenna cable or antenna.

The third probable cause of Malfunction No. 1 is:

- c. Defective R-1329(P)/GRC-103(V).

Each of the three probable causes has a different corrective action associated with it. The corrective action for Probable cause a is Corrective action a. The corrective action for Probable cause b is Corrective action b. And the corrective action for Probable cause c is Corrective action c.

For example, suppose that Malfunction No. 1 is caused by Probable cause b: a defective antenna cable or antenna. In that case, the operator should do Corrective action b: Check and replace if necessary. That is, he should check the defective antenna cable or antenna and replace it if necessary.

So you see that each malfunction can have several probable causes. For each probable cause, there is one corrective action. To find the right corrective action, look straight across from the probable cause. The corrective action for a probable cause always has the same letter (a, b, c, etc.) as the probable cause.

Table 5-5 Radio Repeater Troubleshooting

Item No	Malfunction	Probable cause	Corrective action
1	No indication on R-1329(P)/GRC-103(V) meter with meter selector switch at RCVR SIG, 12 CH PCM, or OW. High indication on T-983(P)/GRC-103(V) meter with meter selector switch at REFL PWR.	a. Defective cable between R-1329(P)/GRC-103(V) ANT connector and associated SYSTEM connector on VIDEO AND ANTENNA ENTRANCE BOX b. Defective antenna cable or antenna c. Defective R-1329(P)/GRC-103(V)	a. Check and replace if necessary b. Check and replace if necessary c. Troubleshoot R-1329(P)/GRC-103(V)
2	No indication on R-1329(P)/GRC-103(V) meter with meter selector switch at 12 CH PCM. Associated T-983(P)/GRC-103(V) has no indication on meter with meter selector switch at 12 CH PCM. All other indications are normal.	a. Defective R-1329(P)/GRC-103(V) b. Defective T-983(P)/GRC-103(V) at distant terminal or repeater c. Defective PCM component at distant terminal	a. Troubleshoot R-1329(P)/GRC-103(V) b. Request distant terminal or repeater troubleshooting c. Request distant terminal troubleshooting
3	No indication on T-983(P)/GRC-103(V) meter with meter selector switch at 12 CH PCM. All other indications are normal.	a. Defective cable between R-1329(P)/GRC-103(V) PCM connector and PCM RCVR connector of VIDEO patch panel b. Defective cable between T-983(P)/GRC-103(V) VIDEO connector and VIDEO TR XMTR connector of VIDEO patch panel c. Defective patch cable between PCM RCVR connector on one VIDEO patch panel and VIDEO TR XMTR connector on other VIDEO patch panel d. Defective T-983(P)/GRC-103(V) e. Defective R-1329(P)/GRC-103(V)	a. Check and replace if necessary b. Check and replace if necessary c. Check and replace if necessary d. Troubleshoot T-983(P)/GRC-103(V) (para 5-5) e. Troubleshoot R-1329(P)/GRC-103(V) (para 5-5)
4	No indication on R-1329(P)/GRC-103(V) meter with meter selector switch at OW. All other indications are normal except that no order wire signal is available.	a. Defective associated CX-10673/GRC-103(V) cable b. Defective associated RT-773/GRC-103(V)	a. Check and replace if necessary b. Troubleshoot RT-773/GRC-103(V)
5	Distant terminal or repeater reports all indications are normal except for order wire reception.	a. Defective associated CX-10673/GRC-103(V) cable b. Defective T-983(P)/GRC-103(V)	a. Check and replace if necessary b. Troubleshoot T-983(P)/GRC-103(V) (para 5-5)
6	All indications normal except for order wire reception.	a. Defective CX-10673/GRC-103(V) b. Defective R-1329(P)/GRC-103(V) c. Defective T-983(P)/GRC-103(V) at distant terminal or repeater	a. Check and replace if necessary b. Troubleshoot R-1329(P)/GRC-103(V) (para 5-5) c. Request distant terminal or repeater troubleshooting
7	Order wire communications normal through each radio link from associated RT-773/GRC-103(V), but no order wire communications between local RT-773/GRC-103(V)'s.	a. Defective cable between RT-773/GRC-103(V) PATCH THRU connector and ORDER WIRE PATCH THRU connector on patch panel b. Defective patch cable between ORDER WIRE PATCH THRU connectors on patch panels	a. Check and replace if necessary b. Check and replace if necessary
8	No indication on T-983(P)/GRC-103(V) or R-1329(P)/GRC-103(V) meters with meter selector switch at REFL PWR. Distant terminal loss of reception.	a. Defective CG-3444/U cable between PWR OUT connector of T-983(P)/GRC-103(V) and FROM XMTR connector of R-1329(P)/GRC-103(V) b. Defective T-983(P)/GRC-103(V) c. Defective R-1329(P)/GRC-103(V)	a. Check and replace if necessary b. Troubleshoot T-983(P)/GRC-103(V) (para 5-5) c. Troubleshoot R-1329(P)/GRC-103(V) (para 5-5)

EXERCISE 2

USE THE TROUBLESHOOTING CHART ON THE PREVIOUS PAGE TO ANSWER THE FOLLOWING QUESTIONS:

1. In Item No. 6, the malfunction is \_\_\_\_\_  
\_\_\_\_\_
2. In Item No. 3, one of the probable causes is a defective T-983(P)/GRC-103(V). Write the corrective action for this probable cause: \_\_\_\_\_  
\_\_\_\_\_
3. The third probable cause of the malfunction in Item No. 2 is \_\_\_\_\_  
\_\_\_\_\_
4. You are operating a radio repeater. The distant terminal reports all indications are normal except for order wire reception. What is the first probable cause of this malfunction?  
\_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 21.

Tables are often used for maintenance of equipment. Maintenance tables tell you what maintenance procedures to perform and how often. Maintenance Table A is an example of a table which describes maintenance of a 5 KW generator.

Maintenance Table A

INTERVAL					ORG	ITEM TO BE INSPECTED	PROCEDURE	REFERENCE
OPERATOR				M				
DAILY					M	Q	ITEM TO BE INSPECTED	PROCEDURE
B	D	A	W					
1	X		X			Oil level gage	Add oil to full mark on gage	LO 5 2805 258 12
2	X	X	X			Restriction indicator	Observe restriction indicator for indication that air cleaner element is clogged. Clean or replace element if indicator shows red.	TM 5 2805 258 14
3				X		Fuel filter	Inspect for accumulation of water or sediment. Clean element.	TM 5 2805 258 14
4	X		X			Fuel supply	Add fuel as required.	Appendix C
5	X	X				Ground terminal	Inspect for a proper ground both at the ground terminal of the unit and also at the ground rod or other point where the ground connection is made.	Para 2 3
6			X			Battery and cables	Tighten loose connections or mountings and remove corrosion. Inspect for cracks and leaks. Fill cells with distilled water to a level 3/8 inch above the top of plates. Make certain the vent holes in the filler caps are free of obstructions. In freezing weather run the engine a minimum of one hour after adding water.	Para 2 2
7	X	X	X			Controls and instruments	Inspect for damage and insecure mounting with the unit operating. Check for proper operation. Normal readings for instruments are as follows:  Battery charging ammeter: ... should read on plus side of scale Oil pressure gage: 20 to 80 ps Frequency meter: 60 cps (Hertz) Model MEP 017A; 400 cps (Hertz) Model MEP 022A; Current indicator meter: Not to exceed 100% load current (maximum).	Para 2 9

Note: The numbers along the left side of the table are item numbers.

This table describes seven maintenance operations. For each one, it tells how often the operation is to be performed (Interval), the equipment to be checked (Item to be Inspected), the Procedure to carry out on the equipment, and References (places to find additional information).

This table is similar to checklists and troubleshooting charts in some ways. But one thing is different: the columns under "Interval." Let us look at this part of the table more closely.

The Interval part of the table tells the operator when to perform each maintenance operation. The columns contain X's under the letters B, D, A, and W. What do B, D, A, W, M, and Q mean? Notice that definitions are given at the top of the table. Take a moment to read the definitions before you go on.

As you can see, B means "Before Operation," D means "During Operation," A means "After Operation," W means "Weekly," M means "Monthly," and Q means "Quarterly." Here is how you use the Interval columns to locate information in the table:

Every maintenance operation that has an X beside it in the B column must be done daily before operation.

Every maintenance operation with an X in the D column must be done daily during operation.

Every maintenance operation with an X in the A column must be done daily after operation.

Every maintenance operation with an X in the W column must be done weekly.

Here are some examples. Look at the table while you read the examples.

1. The maintenance operations in Item No. 1, 2, 4, 5, and 7 must be done daily before operation.  
Explanation: All of these items have an X beside them in the B column.
2. The operation in Item No. 3 must be done weekly.  
Explanation: In Item No. 3, the X is under the W column.

3. The items that must be inspected during operation are the following:

Restriction indicator  
Ground terminal.  
Controls and instruments.

Explanation: To answer this question, you must look for all the items with an X in the D column.

4. Item No. 4 tells you to inspect the fuel supply and add fuel if required, before and after operation.

Explanation: In Item No. 4, the item to be inspected is "Fuel supply," the procedure (what you should do) is "Add fuel as required," and the X's in the Interval column are under B (before operation) and A (after operation).

IF YOU DO NOT UNDERSTAND ANY OF THESE EXAMPLES,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE EXAMPLES,  
ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 3

USE MAINTENANCE TABLE A TO ANSWER THE FOLLOWING QUESTIONS:

1. List the item numbers which must be carried out daily, during operation? \_\_\_\_\_
2. When is the operation in Item No. 4 to be performed?  
\_\_\_\_\_
3. Which item numbers should be performed before and after, but not during operation? \_\_\_\_\_
4. Look at Item No. 7, and answer the following questions:
  - a. What piece of equipment is checked in Item No. 7?  
\_\_\_\_\_
  - b. When should it be checked? \_\_\_\_\_
  - c. What should be done to the equipment? \_\_\_\_\_  
\_\_\_\_\_
  - d. Where can you get more information? \_\_\_\_\_
5. When should the ground terminal be inspected? \_\_\_\_\_
6. What procedure should you carry out on the restriction indicator?  
\_\_\_\_\_
7. Where can you get more information about maintenance procedures for the fuel filter? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 22.

Some maintenance tables are several pages long. Maintenance Table B on the next two pages is an example. Notice that most Item Numbers include several items to be inspected. For each item to be inspected, there may be more than one procedure. For example, look at Item No. 10. It lists two items to be inspected: Heater 1 and Heater 2. The procedure for inspecting Heater 1 includes three steps, labeled a, b, and c.

This table looks more complicated than some of the others in this lesson. But you locate information in it just the same way. You find the row and column that you need, then find the place where the row and column meet.

Maintenance Table B

NOTE: THE CHECKS IN THE "INTERVAL" COLUMN ARE TO BE PERFORMED IN THE ORDER LISTED

B-BEFORE OPERATION D-DURING OPERATION A-AFTER OPERATION W-WEEKLY

Item No.	Interval				Item to be inspected	Procedures: Check and have repaired or adjusted as necessary	For readiness reporting equipment not ready available
	B	D	A	W			
2	•	•	•		Cleanliness	1 Remove all dirt and oily deposits with a soft cloth.	
	•	•			Grounding	2 Check grounding system for proper installation. Inspect the ground stud threads, bonding straps, and shock mounts. Tighten loose ground connections.	Unable to ground properly
					Generator trailer	<p style="text-align: center;"><b>CAUTION</b></p> Place all tags describing conditions of the trailer in a conspicuous location so that they will not be overlooked.	
	•				Tires	a Gauge tires for correct air pressure. Remove penetrating objects. Note apparent loss or air, unusual wear, or missing valve caps.	
	•				Wheels	b Inspect wheel stud nuts and hub cover screws to see that they are present and secure.	
	•				Inter-vehicular hose	c Inspect hose to see that it is in good condition and securely connected.	
	•				Inter-vehicular cable	d Inspect cable to see that it is in good condition and that all connectors are correctly assembled and secured in the mounting clips.	
	•				Hydraulic tubes and hoses	e Look under the trailer and inspect hydraulic tubes, hoses, and connections for indication of brake fluid leaks.	
	•				Basic issue items	f Check to see that all basic issue items are on the trailer and properly stowed.	
	•				Lights	g Operate taillights (if tactical situation permits) observe for proper functioning. Visually inspect reflectors for breaks or cracks.	
	•				Frame	h Visually inspect frame, towing lunette and safety chains.	
		•			General	i Be alert for unusual noises or improper operation of any item listed above.	
			•		Operating faults	j Investigate and correct, or report any faults noted during operation.	
			•		Suspension system	k Inspect suspension system and associated mounting parts for damage.	
			•		Lubrication	l Lubricate items specified on lubrication chart.	
		•		Miscellaneous assemblies	m Inspect assemblies such as air filter, air chamber, and master cylinder, swivel caster with hub or retractable support, handbrake lever for looseness of mounting or connection.		
		•		Electric wiring	n Check wiring harnesses to see that they are securely connected and supported, and that insulation is not cracked or chaffed.		
3					<i>OUTSIDE</i>		
	•	•	•	•	Shelter	a Check for skin punctures, cracks, or open seams that could permit moisture to enter the shelter.	Excessive moisture enters the shelter causing a potential shock hazard
	•	•			Grounding	b Check grounding to see that it is properly installed. Tighten loose ground connections.	Ground system connections cannot be properly tightened
	•			•	Slings (if installed in truck)	c Tighten turnbuckles to remove slack in sling assemblies. Do not overtighten.	
	•	•			Power and signal cables	d Tighten loose connections and adjust cable grips so that they relieve the connector of weight of cable.	
	•	•			Exhaust blower vent covers.	e Be sure the exhaust blower vent covers are open and the air flow is not obstructed.	
	•			Door air filter cover	f Be sure the entrance door air filter vent cover is open and unobstructed. Clean filter weekly.		

Table 4-1 Operator/Crew Preventive Maintenance Checks and Services - Continued

NOTE: THE CHECKS IN THE "INTERVAL" COLUMN ARE TO BE PERFORMED IN THE ORDER LISTED

Item No.	Interval				Item to be inspected	Procedures: Check and have repaired or adjusted as necessary	For readiness reporting equipment is not ready/available if:
	B	D	A	W			
4	•	•			INTERIOR Walls, ceiling, and floors.	Check for holes, open seams, or signs of water seepage or leaks that may present a shock hazard	A shock hazard exists.
5	•	•	•	•	Completeness.	Check to see that all items are complete and intact. All missing or damaged parts must be replaced or be on a valid requisition.	
6	•	•		•	POWER INDICATOR neon lamp and AC VOLTS METER on POWER DISTRIBUTION PANEL.	Apply power to the assemblage by starting generator set or turning on central power source. POWER INDICATOR neon lamp lights and AC VOLTS meter on POWER DISTRIBUTION PANEL indicates 115 vac $\pm$ 6 volts.	Voltage is less than 109 volts or more than 121 volts.
7	•			•	POWER DISTRIBUTION PANEL	a. Operate MAIN circuit breaker to ON; AMPERES AC meter indicates zero. b. Sequentially operate each circuit breaker to ON; the associated indicator should light.	High current reading is noted
8	•	•		•	Lighting	<b>NOTE</b> Ensure that the BLACKOUT-BYPASS switch is in the BYPASS position.	
	•	•		•	Fluorescent lights.	a. Operate LIGHTS 1 and LIGHTS 2 switches to ON. Fluorescent lamps should light. Replace lamps or starters for lamps that fail to light.	Fluorescent lights do not light regardless of the position of LIGHTS 1, LIGHTS 2, or BLACKOUT-BYPASS switch
	•	•		•	Incandescent cold-start lights.	b. Operate INCANDESCENT COLD-START LIGHTS switch to ON; incandescent ceiling lights should light. Replace defective lamps.	
	•	•		•	Door microswitch.	<b>CAUTION</b> Under blackout conditions this check may be made only if the curtains are closed. After testing, operate the BYPASS BLACKOUT switch to the BLACKOUT position.	
	•	•		•	BYPASS BLACKOUT switch	c. Operate the BYPASS BLACKOUT switch to BLACKOUT and open the door. Ceiling lights should go out.	Lights do not go out when the door is open.
	•	•		•	Exhaust blowers.	d. Operate the switch to the BYPASS position with the door open. Ceiling lights should light. Operate BLOWER switch associated with each exhaust blower to ON. Exhaust blower should operate.	
9	•	•		•	Heater 1	a. Operate HEAT-OFF-FAN switch to HEAT, operate TEMPERATURE control and note that warm air blows from the front of the heater. b. Operate HEAT-OFF-FAN switch to FAN; fan blows air and heating element ceases to glow. c. Operate HEAT-OFF-FAN switch to OFF; fan should stop.	Heater fails to heat, fan does not blow, or excessive current causes circuit breaker to trip.
10	•	•		•	Heater 2	Repeat procedure in item 10 above for heater 2.	
	•	•		•	Knobs and switches	<b>NOTE</b> Perform the following items on each system. If the AN/TCC-60 or AN/TCC-69 is in continuous use, perform only those items that do not interfere with the operation of the equipment. Check knobs and switches on front panels for cracks or breaks. Operate each switch and check for binding. All switches should operate smoothly.	

Here are some questions and answers with explanations, based on Maintenance Table B. Make sure that you understand them before you do the exercise which follows.

Question: Look at Item No 3. In Item No. 3, what item should be checked after operation?

Answer: Shelter. (Only Shelter has a dot beside it in the A column.)

Question: Look at Item No. 9. In Item No. 9, what should the operator do?

Answer: Operate BLOWER switch associated with each exhaust blower to ON. Exhaust blower should operate. (To find out what the operator should do at a particular Item No., look in the Procedure column across from the number.)

Question: Look at Item No. 8. In Item No. 8, the door microswitch is not ready/available for use if: \_\_\_\_\_

---

Answer: If lights do not go out when the door is open. (First find Door microswitch in the "Item to be Inspected" column. Then go across to the last column: For readiness reporting equipment is not ready/available if:)

Question: When should the lighting be checked?

Answer: The lighting should be checked before and during operation and weekly. (Find "Lighting" in the Item to be Inspected column. Notice that there are dots beside Lighting in the B, D, and W columns.)

EXERCISE 4

USE MAINTENANCE TABLE B TO ANSWER THE FOLLOWING QUESTIONS:

1. In Item No. 3, when should the exhaust blower vent covers be checked?

---

2. In Item No. 2, which items should be checked after operation?

---

---

3. You are doing the maintenance operation at Item No. 7. You operate the MAIN circuit breaker of the POWER DISTRIBUTION PANEL to ON. A high current reading is noted. Is the equipment ready/available for use? \_\_\_\_\_

4. Write the second maintenance procedure listed for Heater 1 here:

---

CHECK YOUR ANSWERS ON PAGE 23.

ANSWER KEYS TO EXERCISES IN UNIT VI, LESSON 3

Unit VI  
Lesson 3

ANSWERS TO EXERCISE 1

1. Check V7 and V8 in baseband assembly 3A3.
2. Pcm receive terminal.
3. Detune REC SIG-1 control for minimum indication on multimeter.
4. Receiver multimeter indicates in green area.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
WITH THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 2

1. All indications normal except for order wire reception.
2. Troubleshoot T-983(P)/GRC-103(V) (para 5-5).
3. c. Defective PCM component at distant terminal.
4. Defective associated CX-10673/GRC-103(V) cable.  
(In order to answer this question, you must first find the malfunction at Item No. 5. Therefore, the first probable cause is Probable cause 5a.)

IF YOU DO NOT UNDERSTAND THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE GOING ON WITH THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 3

1. Item No. 2, 5, 7
2. Daily, before and after operation
3. Item No. 1 and 4
4.
  - a. Controls and instruments
  - b. Daily, before, during, and after operation
  - c. Inspect for damage and insecure mounting with the unit operating; check for proper operation.
  - d. Para 2-9
5. Daily, before and during operation
6. Observe restriction indicator for indication that air cleaner element is clogged. Clean or replace element if indicator shows red.
7. TM 5-2805-258-14

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON WITH THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 4

1. Before and during operation
2. Operating faults, Suspension system, Lubrication, Miscellaneous assemblies, Electric wiring.
3. No
4. b. Operate HEAT-OFF-FAN switch to FAN.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS LESSON,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A  
IN UNIT VI - LESSON 3.

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT VII**  
**READING CABLING DIAGRAMS**

**LESSON 1**  
**THE STRUCTURE OF TABLES AND DIAGRAMS**  
**(SAME AS UNIT VI, LESSON 1)**

**PREREQUISITE:** None  
**MATERIALS REQUIRED:** None  
**TYPE OF LESSON:** Self-Paced

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT VII**  
**READING CABLING DIAGRAMS**

**LESSON 2**  
**IDENTIFYING CONNECTIONS IN SIMPLE AND**  
**COMPLEX CABLING DIAGRAMS**

PREREQUISITE: None  
MATERIALS REQUIRED: None  
TYPE OF LESSON: Self-Paced

UNIT VII. READING CABLING DIAGRAMS

Lesson 2. Identifying Connections in Simple and  
Complex Cabling Diagrams

INTRODUCTION:

Much of the information in the 3IM course is found in diagrams. A diagram is a drawing that shows how things are arranged and how their parts go together. Some diagrams look just like the things they represent. Others are more like charts which show you how to make equipment connections. These are called cabling diagrams. Cabling diagrams tell you about connecting different pieces of equipment in two or more systems together. This lesson teaches you: (1) how to identify the cable connections on these diagrams and (2) how to identify the system or systems in which the connections are to be found or made.

LEARNING GOALS:

In this lesson, you will learn:

- A. The structure of cabling diagrams (p. 2).
- B. How to identify the system(s) in which cable connections are found (p. 6).
- C. How to identify cable connections using a 5-step procedure (p. 9).
- D. How to apply the 5-step procedure to a simple and a complex cabling diagram (p. 19).

On the pages that follow, you will find material to read and questions to answer. Most of the time, you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

When you finish the lesson, your instructor will give you a checkpoint. When you finish the checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

GO ON TO THE NEXT PAGE TO BEGIN THE LESSON.

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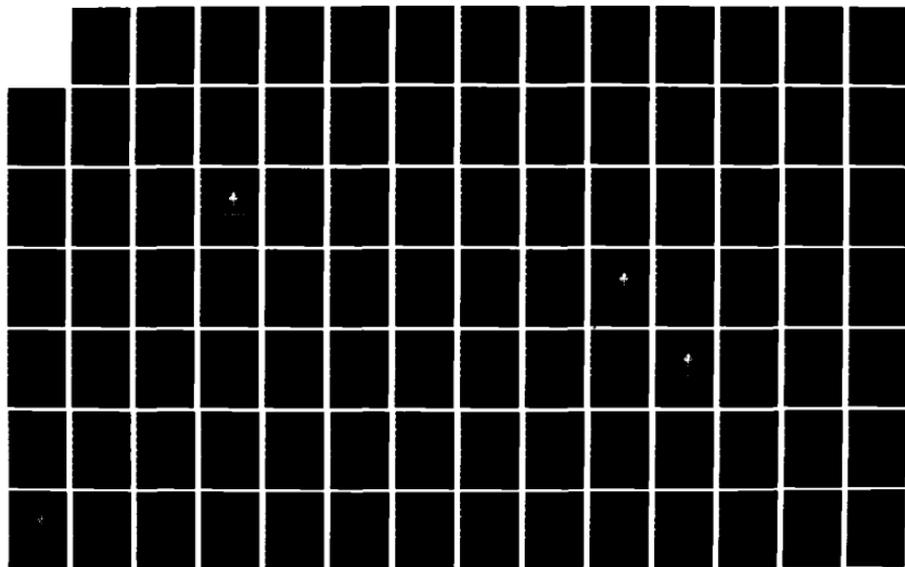
31M10 FUNCTIONAL BASIC SKILLS EDUCATION PACKAGE(U)  
APPLIED SCIENCE ASSOCIATES INC PITTSBURGH PA SEP 82  
DABT60-81-C-0006

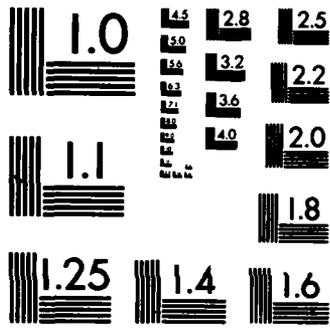
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MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

## Section A

### The Structure of Cabling Diagrams

#### Rows and Columns

31M cabling diagrams are set up with columns and rows. Columns divide the diagram into sections which go up and down, as you see in Figure 1 below.

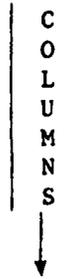


Figure 1. Columns

Rows, on the other hand, are sections of the diagram which go straight across, as in Figure 2.

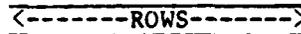


Figure 2. Rows

When the columns and rows are combined, you get a diagram. Figure 3, shown below, is a drawing of one kind of cabling diagram. It is called a video patch diagram.

V I D E O P A T C H				
	Column A		Column B	
	Column A1	Column A2	Column B1	Column B2
Row 1				
Row 2				
Row 3				

Figure 3. Video Patch Cabling Diagram

Column and Row Headings

The titles at the top of the column are called column headings. The titles at the beginning of each row are called row headings.

There are two levels of column headings in cabling diagrams. As shown below in Figure 4, the top level column headings tell you about the systems. The next level, directly below the system headings, contains the component headings. The components are pieces of equipment, such as the TD-660 and the TD-204. Usually, the same two or three components are found within each system on the cabling diagrams. For example, in the diagram below (Figure 4), components TD-660 and TD-204 are found in both systems. Because the same components are contained in different systems, you should always name both the system and the component when you identify a particular cable connection.

V I D E O P A T C H				
	System 1		System 2	
	TD-660	TD-204	TD-660	TD-204

Top level column headings  
 <----are the systems.

<----Second level column  
 headings are the components.

Figure 4. Column Headings

The row headings name the different cable connector points. In each row these connector points are represented by a circle, as you can see in Figure 5. For example, notice that every cable connecting point in Row 1 is PCM IN, in Row 2 PCM OUT, and TIM OUT in Row 3. In this lesson, we will simply call them connectors.

Row headings name the cable connecting points (connectors). Each connecting point is represented by a circle.

V I D E O P A T C H						
PCM IN	o	o	o	o	o	o
PCM OUT	o	o	o	o	o	o
TIM OUT	o	o	o	o	o	o

Figure 5. Row Headings

ANSWER THE QUESTIONS ON THE NEXT PAGE.

## EXERCISE 1

1. Columns are sections of the diagram which go \_\_\_\_\_.
2. Sections of the diagram which go straight across are \_\_\_\_\_.
3. One kind of cabling diagram is called a \_\_\_\_\_.
4. There are \_\_\_\_\_ levels of column headings in cabling diagrams.
5. The component headings are located on the:
  - a. top column level.
  - b. second column level.
6. Most of the time, the same components are found in different systems of a cabling diagram.
  - a. True
  - b. False
7. On the cabling diagram, the circles represent:
  - a. cables.
  - b. connectors.
  - c. components.
  - d. systems.

VIDEO PATCH				
	A		A	
	B	B	B	B
C	D	D	D	D
C	D	D	D	D
C	D	D	D	D
C	D	D	D	D

8. Which part of the above cabling diagram is letter A?
- Connector
  - System
  - Component
  - Cable
9. The components in the above diagram are represented by the letter:
- A
  - B
  - C
  - D

CHECK YOUR ANSWERS ON PAGE 26.

## Section B

### How to Identify the System or Systems in Which Cable Connections Are Found

Whether you need to make cable connections or just identify them, it is important that you distinguish between the different systems. The first thing you should find out is how many systems there are. Some cabling diagrams contain only two systems. These we will call simple cabling diagrams. Others contain three-, four-, or even more systems. We will call these complex cabling diagrams. You have already learned where the system headings are located. These headings will tell you the numbers of the different systems.

Secondly, it is important to determine the number of components within each system. There are usually two or three components within each system. These components are the same in the different systems.

Look at the cabling diagrams below and on the next page. Diagram 1 includes two systems, Diagram 2 includes three systems, and Diagram 4 includes 4 systems. The only difference between the three diagrams is the number of systems included in each. In all other respects, the diagrams are the same. Each system contains the same two components: A and B, and there are four cable connectors on each diagram: Red, White, Blue, and Green. The three- and four-system diagrams are more complex because they contain more columns that you need to examine.

V I D E O P A T C H				
	System 1		System 2	
	A	B	A	B
Red	o	o	o	o
White	o	o	o	o
Blue	o	o	o	o
Green	o	o	o	o

Diagram 1

V I D E O P A T C H						
	System 1		System 2		System 3	
	A	B	A	B	A	B
Red	o	o	o	o	o	o
White	o	o	o	o	o	o
Blue	o	o	o	o	o	o
Green	o	o	o	o	o	o

Diagram 2

V I D E O P A T C H								
	System 1		System 2		System 3		System 4	
	A	B	A	B	A	B	A	B
Red	o	o	o	o	o	o	o	o
White	o	o	o	o	o	o	o	o
Blue	o	o	o	o	o	o	o	o
Green	o	o	o	o	o	o	o	o

Diagram 3

Everything about System 1 can be found in the first two columns, under Components A and B. Columns 3 and 4 are all about System 2. Everything about System 3 can be located in Columns 5 and 6. And lastly, columns 7 and 8 include everything about System 4.

Within each system, each column is about one component. For example, the second column in all three diagrams is about Component B in System 1 only. If you want to know about Component B in Systems 2, 3, and 4, you must look in Columns 4, 6, and 8.

Once you have found out how many systems and components there are, you can go ahead and determine which system(s) is being used. A system is being used when it is cabled.

How do you know that a system is cabled? You can tell whether or not a system is cabled by looking at the columns or components within each system. When you see solid dark lines attached to one or more of the circles, you know that a system is cabled. The solid dark lines represent the cables. The cable connectors are represented by the circles. Figure 6 shows you what the cables and connectors look like in a cabling diagram.

V I D E O P A T C H						
	System 1		System 2		System 3	
	A	B	A	B	A	B
Red	o	o	o	o	o	o
White	o	o	o	o	o	o
Blue	o	o	o	o	o	o
Green	o	o	o	o	o	o

Solid dark line is the cable.

Circles are the connectors.

Figure 6. Cables and Connectors

V I D E O P A T C H						
	System 1		System 2		System 3	
	A	B	A	B	A	B
Red	o	o	o	o	o	o
White	o	o	o	o	o	o
Blue	o	o	o	o	o	o
Green	o	o	o	o	o	o

Let's review the lesson so far, using the above diagram as a guide.

1. Determine how many systems there are. We look at the top level column heading and find out there are three systems: System 1, System 2, and System 3.
2. Determine how many components there are within each system. We look at the second level column headings and find out there are two components: A and B.
3. Determine which system or systems are being used, that is, cabled.
  - a. Look under components A and B (Columns 1 and 2) within System 1. We find there are no cable connections (solid dark lines attached to circles) in these first two columns.
  - b. Check components A and B within System 2. We find no connections when we look at these next two columns (Columns 3 and 4).
  - c. Look under components A and B within System 3. Here, we see that cables (solid dark lines) are attached to connectors (circles). Therefore, we know System 3 is being used.
4. Our next step is to identify the cable connections.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 2

1. What is the difference between simple and complex cabling diagrams?
  - a. Number of components
  - b. Number of cables
  - c. Number of systems
2. In cabling diagrams, the solid black lines are called \_\_\_\_\_.
3. What do cable connectors look like in cabling diagrams? \_\_\_\_\_

V I D E O P A T C H				
	System 1		System 2	
	M	N	M	N
	o	o	o	o
	o	o	o	o
	o	o	o	o
	o	o	o	o

On the left is a cabling diagram. Use it to answer the following questions.

4. How many systems are there in the above cabling diagram? \_\_\_\_\_
5. The components M and N are located in:
  - a. System 1 only.
  - b. System 2 only.
  - c. Both Systems 1 and 2.
  - d. Neither System 1 nor 2.
6. How many components are there in System 2? \_\_\_\_\_
7. When a system is cabled, it is being used. Which system is being used? \_\_\_\_\_

V I D E O P A T C H												
	System 1			System 2			System 3			System 4		
	R	S	T	R	S	T	R	S	T	R	S	T
I	o	o	o	o	o	o	o	o	o	o	o	o
II	o	o	o	o	o	o	o	o	o	o	o	o
III	o	o	o	o	o	o	o	o	o	o	o	o
IV	o	o	o	o	o	o	o	o	o	o	o	o

Above is a cabling diagram. Use it to answer the following questions.

8. There are \_\_\_\_\_ systems in the cabling diagram.
9. How many components are there in System 1? \_\_\_\_\_
10. Which of the above systems have cable connections? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 27.

Section C

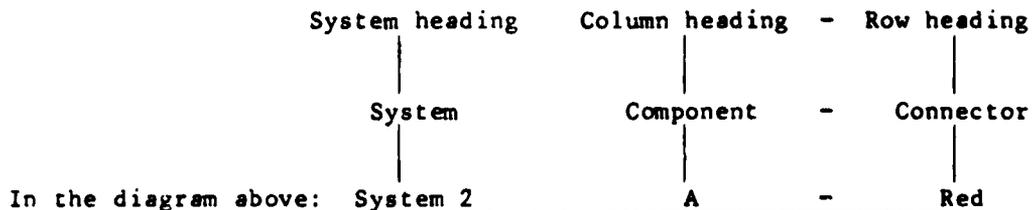
How to Identify Cable Connections: A Five-Step Procedure

Step 1. Locate and identify the system or systems that are being used.  
Remember: When you see a solid line attached to one or more of the circles, you know that the system is being used, i.e., cabled.

V I D E O P A T C H				
	System 1		System 2	
	A	B	A	B
Red	o	o	o	o
White	o	o	o	o
Blue	o	o	o	o

Look at the cabling diagram above, the cable connections (solid dark lines) are located in System 2 only. We know, therefore, that System 2 is being used. System 1, on the other hand, has no cable connections and is therefore not being used. In order to identify the connections, we need to examine System 2 only.

Step 2. Identify one end of a connection at a time. In order to identify cable connections, you need to apply some of the things you learned about the structure of cabling diagrams. It takes three things to identify one end of a cable connection. First, you must identify the System. This is taken care of in Step 1. Next, you need to identify the component (column) and connector (row) in which the connected end (circle) is located. In the above diagram, we begin by looking in the first column within System 2 (under component A). We find that there is a circle with a solid dark line attached to it. To identify the connector, look straight across to the left. There you will find the row heading. We identify the connector as Red. At this point, we know the system, the component, and the connector of the connecting end. We state it in the following way:

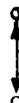


So, in this way we have identified one end of the cable connection. Our next step is to locate the other end of the connection.

**Step 3. Locate the other end of the connection.** Trace the cable (the solid dark line) with your finger or follow it with your eye from one end of the connection to where it connects with the other connector (circle).

Cabling connections run in different directions. On video patch diagrams, cables usually run in three general directions:

1. vertically: straight up and down



2. horizontally: straight across o ← → o

3. diagonally: slanted



There are, however, variations within these three general directions. Let's examine them in more detail.

a. Vertical connections: straight up and down.

1. As shown in Figure 7 below, some cable connections run straight up and down. these connections stay within the same system and within the same component of that system. Vertical connections always run between connectors (between rows).

V I D E O   P A T C H				
	System 1		System 2	
	A	B	A	B
	o	o	o	o
	o	o	o	o
	o	o	o	o

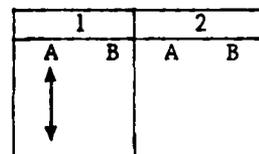


Figure 7. Vertical Connections

- b. Horizontal connections: straight across. Horizontal connections run straight across between components within the same system or between the same or different components of different systems (see Figures 8-11 below). In video patch diagrams, horizontal connections always have the same cable connector.

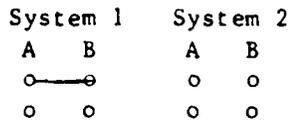


Figure 8. Between Components Within Same System

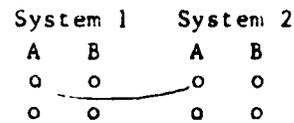


Figure 9. Between Same Components of Different Systems

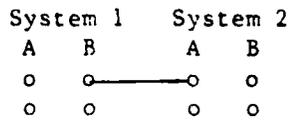


Figure 10. Between Different Components of Different Systems

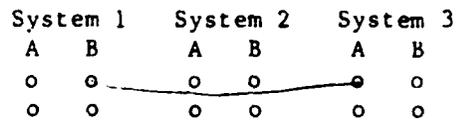


Figure 11. Across Systems

- c. Diagonal connections: slanted down and across (↘) or slanted up and across (↗). Diagonal connections always run between connectors (between rows). In this way they are similar to vertical connections. The difference is that diagonal connections do not run straight up and down, but rather are slanted.

- Some cable connections run diagonally between two components that are part of the same system. Notice in Figure 12 below the cable runs from Component A down and across to Component B.

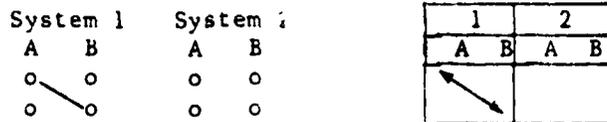


Figure 12. Diagonal Connections (down and across within a system)

2. Some cables run diagonally between two components of two different systems. Figure 13 below shows how the cable connections run from a connector under Component B for System 1 down and across to a connector under Component A for System 2. This procedure applies to both adjacent and non-adjacent systems. Adjacent systems are directly next to one another; non-adjacent systems have one or more systems in between one another.

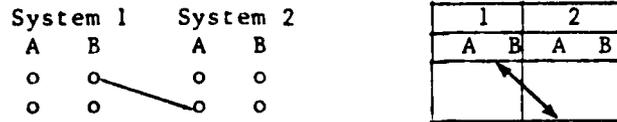


Figure 13. Diagonal Connections (in adjacent systems)

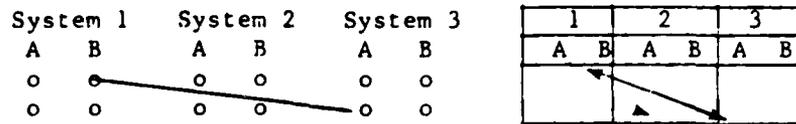


Figure 13. Diagonal Connections (in non-adjacent systems)

When we trace the cable connection from A - Red, we find that it runs diagonally down and across.

- Step 4. Identify the second end of the cable connection using the same procedure as presented in Step 2 above. We have traced the cable from the first column and first row to the second column and second row. We can now identify the other connecting end as B - White.

- Step 5. In order to identify the entire cable connection, combine Steps 3 and 4 in the following way:

In our example:

System Component-Connector is connected to System Component-Connector  
 System 2 A - Red is connected to System 2 B - White

Since the systems are the same, we can state the connection as follows:

For System 2, A - Red is connected to B - White.

If the System is the same, you do not have to mention it twice. On the other hand, if the systems are interconnected, both systems must be mentioned. Two systems are interconnected when a cable connection starts in one system and ends in another system.

Look at the cable connection in the diagram below. The cable connection starts in System 1, M-Red. When we trace the line to the other end of the connection, we find that it is located in System 2. Since the cable runs between these two systems, we know that the two systems are interconnected.

V I D E O P A T C H						
	System 1		System 2		System 3	
	M	N	M	N	M	N
Red	o	o	o	o	o	o
White	o	o	o	o	o	o

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 3

V I D E O P A T C H						
	System 1		System 2		System 3	
	Y	Z	Y	Z	Y	Z
Green	o	o	o	o	o	o
Brown	o	o	o	o	X	o
Gold	o	o	o	o	o	o

Use the cabling diagram above to answer the following three questions.

1. Which systems are being used in the cabling diagram shown above?

\_\_\_\_\_

2. On the diagram above, locate the following end of a cable connection: System 2, Component Y - Connector Green. Using your pencil, darken the circle (o) at which this connected end is located.

3. In order to identify one end of a cable connection, you must locate and name the system, the component, and the connector. Identify the end of the connection which has an X over it.

System \_\_\_\_\_ Component \_\_\_\_\_ - Connector \_\_\_\_\_

V I D E O P A T C H						
	System 1		System 2		System 3	
	M	N	M	N	M	N
I	o	o	o	o	o	o
II	o	o	o	o	o	o
III	o	o	o	o	o	o

Use the cabling diagram above to answer the following three questions.

4. The cable connection located in System 1 runs in a:
  - a. vertical direction.
  - b. diagonal direction.
  - c. horizontal direction.
  
5. System 2, Component M - Connector I is connected to System \_\_\_\_\_, Component \_\_\_\_\_ - Connector \_\_\_\_\_.
  
6. Identify the cable connection in System 3. For System 3, \_\_\_\_\_ is connected to \_\_\_\_\_.

Look closely over the cable connections in the diagram below. Then answer the question.

Remember: When a cable connection starts in one system and ends in another system, it means the two systems are interconnected.

V I D E O P A T C H									
	System 1			System 2			System 3		
	A	B	C	A	B	C	A	B	C
Red	o	o	o	o	o	o	o	o	o
White	o	o	o	o	o	o	o	o	o
Blue	o	o	o	o	o	o	o	o	o
Green	o	o	o	o	o	o	o	o	o

7. In the cabling diagram above, System 2 is connected to System \_\_\_\_\_.

V I D E O P A T C H						
	System 1		System 2		System 3	
	Y	Z	Y	Z	Y	Z
	o	o	o	o	o	o
	o	o	o	o	o	o
		o		o	o	o
	o		o		o	

8. Which systems are interconnected in the above cabling diagram?

---

CHECK YOUR ANSWERS ON PAGE 28.

Section D.

How to Apply the Five-Step Procedure in a Simple and a Complex Diagram

Simple Cabling Diagrams

V I D E O P A T C H				
	System 1		System 2	
	A	B	A	B
Red	o	o	o	o
White	o	o	o	o
Blue	o	o	o	o

- Step 1. Look to see which system or systems are cabled. In our example above, the only system that has cable connections is System 1. Therefore, we can mentally block out System 2. To show this, System 2 has been shaded. Since, at this time, there are no connections in System 2, it does not concern us.
- Step 2. Starting with the first column (Component A) in System 1, we see that the first circle (connecting point) with a solid dark line (cable) attached to it is where the first column and first row meet: A - Red.
- Step 3. We follow the solid dark line (cable) from A - Red down and across to the second column and second row of System 1.
- Step 4. We identify that end of the cable connection as B - White.
- Step 5. At this point, the two ends of the cable connection have been identified. Now we have all the information to identify the entire connection: A - Red is connected to B - White.

The entire procedure is repeated for the next cable connection in the system, until we have identified all the connections.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 4

ANSWER THE FOLLOWING QUESTIONS CONCERNING THE CABLING DIAGRAM BELOW:

V I D E O P A T C H				
	System 1		System 2	
	X	Z	X	Z
Blue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Green	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Brown	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gold	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

1. Which system or systems are cabled? \_\_\_\_\_
2. For System 1, X-Brown has a cable attached to it.
  - a. True
  - b. False
3. For System 1, Z-Brown has a cable attached to it.
  - a. True
  - b. False
4. For System 2, X-Blue is connected to Z-Blue.
  - a. True
  - b. False
5. For System 2, X-Green is connected to Z-Green.
  - a. True
  - b. False
6. Using the above diagram, draw in the following cable connection:  
Connect X-Brown to Z-Gold for System 2.

7. Use the cabling diagram below to draw in the following cable connections:

- a. Connect K - Blue to K - Black for System 1.
- b. Connect J - Blue to L - Black for System 2.
- c. Connect System 1, L - Brown to System 2, J - Brown

V I D E O P A T C H						
	System 1			System 2		
	J	K	L	J	K	L
Blue	o	o	o	o	o	o
Black	o	o	o	o	o	o
Brown	o	o	o	o	o	o

CHECK YOUR ANSWERS ON PAGE 29.

Complex Cabling Diagrams

V I D E O P A T C H								
	System 1		System 2		System 3		System 4	
	X	Z	X	Z	X	Z	X	Z
Green	o	o	o	o	o	o	o	o
Blue	o	o	o	o	o	o	o	o
Gold	o	o	o	o	o	o	o	o
Brown	o	o	o	o	o	o	o	o

- Step 1. In the above complex cabling diagram, we see that there are four systems. Of these four systems, only Systems 2 and 4 have cable connections. Therefore, in order to identify these connections, we will concentrate on Systems 2 and 4 only.
- Step 2. Starting with the first column (Component X) in System 2, we can see that the first connected end is located at the point where the first column and the second row meet: X - Blue.
- Step 3. We follow the solid dark line from X-Blue down and across to the second column and third row of System 2.
- Step 4. We identify the second end of the cable connection as Z-Gold.
- Step 5. At this point, we have identified the two ends of the connection:

For System 2, X-Blue is connected to Z-Gold.

We repeat this procedure for the remaining connections in Systems 2 and 4.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 5

ANSWER THE QUESTIONS CONCERNING THE FOLLOWING COMPLEX CABLING DIAGRAM:

V I D E O P A T C H								
	System 1		System 2		System 3		System 4	
	AA	BB	AA	BB	AA	BB	AA	BB
Blue	o	o	o	o	o	o	o	o
Green	o	o	o	o	o	o	o	o
Brown	o	o	o	o	o	o	o	o
Gold	o	o	o	o	o	o	o	o

1. There are \_\_\_\_\_ systems in the above cabling diagram.
2. Which of the above systems are being used? \_\_\_\_\_
3. for System 3, AA-Brown is connected to BB-Gold.
  - a. True
  - b. False
4. For System 3, AA-Gold is connected to BB-Brown.
  - a. True
  - b. False
5. Which system has AA-Blue connected to BB-Green? \_\_\_\_\_
6. Make the following connection in System 1:  
Connect AA-Brown to BB-Gold.

7. Use the cabling diagram below to draw in the following cable connections:

- a. Connect A - R3 to A - R6 for System 1.
- b. Connect A - R1 to B - R3 for System 2.
- c. Connect B - R5 for System 2 to B - R5 for System 4.

V I D E O P A T C H								
	System 1		System 2		System 3		System 4	
	A	B	A	B	A	B	A	B
R1	o	o	o	o	o	o	o	o
R2	o	o	o	o	o	o	o	o
R3	o	o	o	o	o	o	o	o
R4	o		o		o		o	
R5		o		o		o		o
R6	o		o		o		o	

CHECK YOUR ANSWERS ON PAGE 30.

ANSWER KEYS TO EXERCISES IN UNIT VII, LESSON 2

Unit VII  
Lesson 2

25

ANSWERS TO EXERCISE 1

1. up and down
2. rows
3. video patch
4. 2. Top level column headings identify the systems. The second level column headings identify the components.
5. b. second column level. The second column level is located
6. True
7. b. connectors
8. b. System
9. b. B

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
GO TO YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 2

1. c. Number of systems
2. cables
3. circles
4. 2
5. c. Both Systems 1 and 2
6. 2
7. System 1
8. 4
9. 3. In fact, there are the same three components (R,S,T) in each system.
10. Systems 1, 3, and 4.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 3

1. Systems 2 and 3

2.

V I D E O P A T C H						
	System 1		System 2		System 3	
	Y	Z	Y	Z	Y	Z
Green			●	○		
Brown					★	○
Gold						

3. System 3, Component Y - Connector Brown

4. b. diagonal direction. The cable runs down and across.

5. System 2, Component N - Connector II.

6. For System 3, M-II is connected to N-III.

7. System 1

8. Systems 2 and 3

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL OF THE ANSWERS ABOVE,  
GO ON WITH THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 4

1. System 1 and System 2
2. b. False
3. a. True
4. b. False
5. a. True
- 6.

V I D E O P A T C H				
	System 1		System 2	
	X	Z	X	Z
Blue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Green	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Brown	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gold	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7.

V I D E O P A T C H						
	System 1			System 2		
	J	K	L	J	K	L
Blue	<input type="radio"/>					
Black	<input type="radio"/>					
Brown	<input type="radio"/>					

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON WITH THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

ANSWERS TO EXERCISE 5

1. 4
2. Systems 1, 3, and 4
3. b. False
4. a. True
5. System 1
- 6.

VIDEO PATCH								
	System 1		System 2		System 3		System 4	
	AA	bb	AA	Bb	AA	Bb	AA	BB
Blue	<input type="radio"/>							
Green	<input type="radio"/>							
Brown	<input type="radio"/>							
Gold	<input type="radio"/>							

7.

VIDEO PATCH								
	System 1		System 2		System 3		System 4	
	A	B	A	B	A	B	A	B
R1	<input type="radio"/>							
R2	<input type="radio"/>							
R3	<input type="radio"/>							
R4	<input type="radio"/>							
R5	<input type="radio"/>							
R6	<input type="radio"/>							

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS LESSON,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A  
IN UNIT VII - LESSON 2.

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT VIII**  
**DIAGNOSING EQUIPMENT MALFUNCTIONS**

**LESSON 1**  
**DECIDING WHETHER AN INDICATION IS NORMAL**

**PREREQUISITE: None**  
**MATERIALS REQUIRED: None**  
**TYPE OF LESSON: Self-Paced**

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STUDENT GUIDE

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UNIT VIII. DIAGNOSING EQUIPMENT MALFUNCTIONS

Lesson 1. Deciding Whether an Indication is Normal

INTRODUCTION:

In the 31M course, you will often need to troubleshoot. Troubleshooting means that you notice something wrong with your equipment, find out what is wrong, and fix it. Whenever you troubleshoot, you will have a troubleshooting checklist to guide you. Figure 1 on the next page shows one type of troubleshooting checklist.

The first column, labeled "Unit," identifies the equipment being worked on. The second column, the "Action" column, tells you what to do to see if your equipment is working properly. You already know how to read and follow directions like this. Column 3 is labeled "Normal indication." It tells you what your equipment should do, if it is working properly. When you use a checklist such as the one shown, you must compare what the checklist tells you with what is happening on your equipment and decide whether something is wrong. In this lesson, you will learn some of these comparing skills.

LEARNING GOALS:

In this lesson, you will learn to:

- A. Correctly use the terms indicator, indication, and normal indication (p. 3).
- B. Decide whether something is wrong with your equipment when you compare what it says in the "Normal indication" column with what is happening on your equipment (p. 7).

On the pages that follow, you will find material to read and questions to answer. Most of the time, you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

When you finish the lesson, your instructor will give you a checkpoint. When you finish the checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

GO ON TO THE PAGE AFTER THE FIGURE TO BEGIN THE LESSON.

EQUIPMENT PERFORMANCE

Step	Unit	Action	Normal indication	Corrective measures
31	CN-514 GRC	Set POWER circuit breaker to ON.	POWER ON indicator light.	Check power source output and power cable connections. Check fuse F2 (20 amp) (fig. 5-11). Check POWER ON indicator lamp.
32	CN-514 GRC	Set MANUAL RAISE-LOWER switch to RAISE then to LOWER.	MANUAL indicator lights. Meter indicates raise in voltage then decrease in voltage.	Check MANUAL indicator lamp. Check MOTOR 1 AMP fuse
33	CN-514 GRC	Set MANUAL-AUTOMATIC switch to AUTOMATIC.	Meter indicates 115 volts. MANUAL indicator goes out.	
34	CN-514 GRC	Set MANUAL-AUTOMATIC switch to MANUAL and MANUAL RAISE-LOWER switch to LOWER until meter indicates approximately 105 volts. Then set MANUAL-AUTOMATIC switch to AUTOMATIC. Repeat above except operate switch to RAISE until meter indicates approximately 120 volts.	Voltage indication on meter changes back to 115 volts in both operations.	Check V1 and V2. Replace plug-in regulator assembly.
35	PP-2054(*)/GRC	Set AC POWER circuit breaker to ON. Allow equipment to warm up for 5 minutes.	Blower motor operates. FIL indicator lights.	Check 5 AMP FIL fuse. Check FIL indicator lamp. Check silicon rectifiers in PP-2054 (*)/GRC. If they are blistered or discolored, higher maintenance services are required.
			Blower motor in T-893(P)/GRC operates.	Check cable connection between TO XMTR on PP-2054 (*)/GRC and TO PWR SUP on T-893(P)/GRC.
36	PP-2054 (*)/GRC	Set OPERATE-STANDBY switch to OPERATE.	The LV and HV indicators light. Target bolt (interlock switch (fig. 1-4)) is tight; also all bolts holding amplifier-oscillator are tight.	If LV indicator does not light, check 3 AMP LV fuse. Check LV lamp. If HV indicator does not light, check HV fuse. (This fuse, whether equipment is marked with 5 AMP or 3 AMP should be replaced with 3 amp, time-delay fuse in all equipments (para

Figure 1. A Troubleshooting Chart

## Section A

### Indicators, Indications, and Normal Indications

Your equipment has lights, buzzers, and meters which tell you how the equipment is working. Each of these is called an indicator, because it indicates what is happening in the equipment. It tells you what condition the equipment is in. For example, when the POWER-ON light is lit, that tells you there is power going into the equipment. When the POWER-ON light is not lit, that tells you no power is going into the equipment. So the POWER-ON light is an indicator, because it indicates what is happening inside the equipment.

Here are some more examples:

The voltmeter on the generator is an indicator, because it tells you how many volts are being generated. It indicates what is happening inside the generator.

The CALL indicator is an indicator, because it tells you when a call is coming in to your terminal.

REMEMBER: An indicator is something that tells you what is happening in the equipment.

The information that you get from an indicator is called an indication. Look at the following examples of indications:

The POWER-ON light is lit.  
The POWER-ON light is not lit.  
The buzzer sounds.  
The voltmeter reads 75 volts.  
The LOAD meter reads zero.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 1

FILL IN THE BLANKS BELOW:

An indicator is something that tells you \_\_\_\_\_  
\_\_\_\_\_.

The information you get from an indicator is called an \_\_\_\_\_.  
If you want to find out what condition your equipment is in, you should  
check an \_\_\_\_\_.

Suppose your LOAD meter reads 100%. The LOAD meter is an \_\_\_\_\_.  
100% is the \_\_\_\_\_ on the LOAD meter.

Sometimes, the buzzer on your equipment sounds. In this example, the  
indicator is the \_\_\_\_\_, and the indication is the  
\_\_\_\_\_.

CHECK YOUR ANSWERS ON PAGE 14.

Most indicators will give you one indication when the equipment is working properly, and a different indication when it is not. For example, if you set the ON/OFF switch at ON, the POWER-ON light should light. If the light does go on, this is an indication that the equipment is working properly and is in good condition. However, if the POWER-ON light does not light with the ON/OFF switch at ON, this is an indication that there is something wrong. It tells you that the equipment is not working properly.

The indication which should happen when the equipment is working properly is called a normal indication, because normal means that nothing is wrong. So if the POWER-ON light goes on when the ON/OFF switch is set at ON, this is a normal indication. If it does not go on, this is not a normal indication.

When you use a checklist to troubleshoot, it sometimes tells you what should happen, if the equipment is working properly. That is, it describes a normal indication. For example, suppose that the checklist includes the following normal indication: "multimeter indicates peak deflection." This means that, if the equipment is working properly, the multimeter should show a peak deflection. Look at the following examples:

Normal Indication Listed  
in the Checklist

Blower motor operates.

Multimeter indicates in  
green area.

What Should Happen  
on the Equipment

The blower motor should  
operate.

The multimeter should  
indicate in the green area.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 2

Directions: For each normal indication in the first column below, write what should happen on the equipment in the second column.

<u>Normal Indication Listed in the Checklist</u>	<u>What Should happen on the Equipment</u>
1. AFC meter moves back toward center.	1. _____ _____
2. LOW POWER indicator lights.	2. _____ _____
3. LOW POWER indicator extinguishes.	3. _____ _____

CHECK YOUR ANSWERS ON PAGE 15.

## Section 2

### Deciding Whether Something is Wrong with Your Equipment

When you troubleshoot using a checklist that lists normal indications, you must compare the normal indications in the checklist with the indications you get on your equipment. At each step in the checklist, you must read the normal indication and decide whether or not you are getting a normal indication on your equipment.

For example, suppose the checklist normal indication says, "Buzzer sounds." You listen to your equipment and the buzzer buzzes. This means that you are getting a normal indication on your equipment. But if the buzzer does not sound, then you are not getting a normal indication on your equipment.

In other words, at each step in the checklist, you must decide whether the checklist "Normal indication" and the indication you are getting on your equipment are the same or different. If they are the same, you are getting a normal indication; if they are different, you are not getting a normal indication.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

### EXERCISE 3

In each item below, you are given a normal indication from a checklist in the first column, and what happens on your equipment in the second column. You must decide whether you are getting a normal indication or not. In the third column write "Yes" if the equipment is showing a normal indication and "No" if it is not.

<u>Normal Indication Listed in the Checklist</u>	<u>The Indication on Your Equipment</u>	<u>Are You Getting a Normal Indication?</u>
1. Multimeter indicates in green area.	The multimeter needle is not in the green area.	_____
2. Voltmeter increases, then decreases.	Voltmeter reading goes from 10 to 50 and stays there.	_____
3. Multimeter indicates peak or off scale.	Multimeter needle goes off the scale.	_____
4. Voltmeter increases, then decreases.	Voltmeter goes from 10 to 50, then back to 10.	_____
5. NO SIGNAL indicator lights.	NO SIGNAL indicator does not light.	_____
6. Voltmeter increases, then decreases.	Voltmeter goes from 50 to 10, then back to 50.	_____

CHECK YOUR ANSWERS ON PAGE 16.

If you get a normal indication on your equipment, this means that your equipment is working properly and there is nothing wrong. However, if you do not get a normal indication on your equipment, this means that your equipment is not working properly and something is wrong. In other words, in order to find out whether there is anything wrong at each step of the troubleshooting procedure, you must do the following:

1. Read the checklist normal indication.
2. Compare your equipment indication with the checklist normal indication, just like you did in the last exercise, to see whether they are the same or different.
3. If your equipment indication is the same as the checklist normal indication, there is nothing wrong.
4. If your equipment indication is different from the checklist normal indication, there is something wrong with your equipment.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 4

FILL IN THE BLANKS BELOW:

The first thing you should do is \_\_\_\_\_ the checklist normal indication.

After you read the checklist normal indication, you should compare the checklist normal indication with the \_\_\_\_\_

If the checklist normal indication and the equipment indication are the same, this means that \_\_\_\_\_

If the checklist normal indication and the equipment indication are different, this means that \_\_\_\_\_

You know that there is something wrong with your equipment if the checklist normal indication and the equipment indication \_\_\_\_\_

There is nothing wrong if the checklist normal indication and the equipment indication \_\_\_\_\_

If your equipment is working properly, then the indication on your equipment should \_\_\_\_\_

One way you can tell that there is something wrong with your equipment is that the indication on your equipment \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 18.

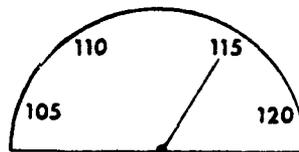
EXERCISE 5

Here is part of a checklist for troubleshooting radio equipment. Do not try to read it now, but use it to answer the questions below.

<u>Step</u>	<u>Action</u>	<u>Normal Indication</u>
1	Set POWER circuit breaker to ON.	POWER ON indicator lights.
2	Set MANUAL RAISE-LOWER switch to RAISE then LOWER.	Meter indicates raise in voltage then decrease in voltage.
3	Set MANUAL-AUTOMATIC switch to AUTOMATIC.	Meter indicates 115 volts.
4	Rotate coupling control to obtain higher DA-189/GRC meter indication.	DA-189/GRC meter indicates more than 8 watts.
5	Set multimeter selector switch to 1 KC MOD.	Multimeter indicates in green area of meter scale.

Questions:

1. You do Action No. 1 (Set POWER circuit breaker to ON). The POWER ON indicator lights. Does this mean that there is something wrong with your equipment? \_\_\_\_\_
2. You do Action No. 2. The meter reading goes from 110 to 120, then back to 110. Does this indicate that there is something wrong?  
\_\_\_\_\_
3. You do Action No. 3. Here is what the meter looks like:



Does this indicate that there is something wrong? \_\_\_\_\_

4. You do Action No. 4. The DA-189/GKC meter reads 6 watts. Does this mean that there is something wrong? \_\_\_\_\_
  
5. You do Action No. 5. The multimeter needle is not in the green area. Does this indicate that there is something wrong? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 19.

ANSWER KEYS TO EXERCISES IN UNIT VIII, LESSON 1

Unit VIII  
Lesson 1

13

ANSWERS TO EXERCISE 1

An indicator is something that tells you what is happening inside the equipment.

The information you get from an indicator is called an indication.  
If you want to find out what condition your equipment is in, you should check an indicator.

Suppose your LOAD meter reads 100%. The LOAD meter is an indicator.  
100% is the indication on the LOAD meter.

Sometimes, the buzzer on your equipment sounds. In this example, the indicator is the buzzer, and the indication is the sound.

---

CONTINUE WITH THE NEXT PART OF THE LESSON.

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ANSWERS TO EXERCISE 2

<u>Normal Indication Listed in the Checklist</u>	<u>What Should Happen on the Equipment</u>
1. AFC meter moves back toward center.	1. <u>AFC meter should move back toward center.</u>
2. LOW POWER indicator lights.	2. <u>LOW POWER indicator should light.</u>
3. LOW POWER indicator extinguishes.	3. <u>LOW POWER indicator should extinguish (go out).</u>

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

---

### ANSWERS TO EXERCISE 3

1. No, you are not getting a normal indication.  
Explanation: The normal indication in the checklist is "Multimeter indicates in the green area." On your equipment, the meter needle is not in the green area. The indication on the equipment is different from the checklist "normal indication." Therefore, you are not getting a normal indication.
2. No, you are not getting a normal indication.  
Explanation: The checklist normal indication is "Voltmeter increases, then decreases." On your equipment, the voltmeter first goes from 10 to 50. That is, it increases. But then it does not decrease; it stays at 50. Instead of increasing then decreasing, it increases and then remains the same. The indication on the equipment is different from the checklist normal indication. Therefore, you are not getting a normal indication.
3. Yes, you are getting a normal indication.  
Explanation: The checklist tells you that the indication is normal either if the multimeter indicates peak or if the multimeter indicates off scale. On your equipment, the multimeter indicates off scale. This is the same as the checklist normal indication. Therefore, you are getting a normal indication on your equipment.
4. Yes, you are getting a normal indication.  
Explanation: The checklist normal indication is "Voltmeter increases, then decreases." On your equipment, the voltmeter first goes from 10 to 50; it increases. Then it goes back down to 10; it decreases. That is, it first increases then decreases, just like the checklist normal indication. Therefore, you are getting a normal indication on your equipment.
5. No, you are not getting a normal indication.  
Explanation: The checklist normal indication is "NO SIGNAL indicator lights." On your equipment, the NO SIGNAL indicator does not light. The equipment indication is different from the checklist normal indication. Therefore, you are not getting a normal indication on your equipment.

6. No, you are not getting a normal indication.  
Explanation: The checklist tells you that the normal indication is "Voltmeter increases, then decreases." On your equipment, the voltmeter first goes down from 50 to 10 (decreases), then goes back up to 50 (increases). That is, it first decreases, then increases. This is different from the checklist normal indication. Therefore, you are not getting a normal indication on your equipment.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
WITH THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 4

The first thing you should do is read the checklist normal indication.

After you read the checklist normal indication, you should compare the checklist normal indication with the equipment indication.

If the checklist normal indication and the equipment indication are the same, this means that there is nothing wrong with your equipment.

If the checklist normal indication and the equipment indication are different, this means that there is something wrong with your equipment.

You know that there is something wrong with your equipment if the checklist normal indication and the equipment indication are different.

There is nothing wrong if the checklist normal indication and the equipment indication are the same.

If your equipment is working properly, then the indication on your equipment should be the same as the checklist normal indication.

One way you can tell that there is something wrong with your equipment is that the indication on your equipment is different from the checklist normal indication.

ANSWERS TO EXERCISE 5

1. No.  
Explanation: The equipment indication is the same as the checklist normal indication. This means that there is nothing wrong.
2. No.  
Explanation: First, the meter went from 110 to 120, a raise in voltage. Then it went back to 110, a decrease in voltage. This is the same as the normal indication. Therefore, there is nothing wrong.
3. No.  
Explanation: The equipment meter indication is 115 volts, which is the same as the normal indication. This means that there is nothing wrong.
4. Yes.  
Explanation: The DA-189/GRC reading, 6 watts, is less than 8 watts. The normal indication is more than 8 watts. The normal indication and the equipment indication are different. This means that there is something wrong.
5. Yes.  
Explanation: The multimeter indication is not in the green area. This is different from the normal indication. Therefore, something is wrong.

IF YOU DO NOT UNDERSTAND ANY OF THESE ANSWERS,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS LESSON,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A  
IN UNIT VIII - LESSON 1.

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT VIII**  
**DIAGNOSING EQUIPMENT MALFUNCTIONS**

**LESSON 2**  
**DECIDING WHETHER THERE IS SOMETHING WRONG**  
**BASED ON 2 OR MORE INDICATORS**

**PREREQUISITE: None**  
**MATERIALS REQUIRED: None**  
**TYPE OF LESSON: Self-Paced**

UNIT VIII. DIAGNOSING EQUIPMENT MALFUNCTIONS

Lesson 2. Deciding Whether Something is Wrong  
Based on Two or More Indicators

INTRODUCTION:

In the 31M course, you will often need to troubleshoot. Troubleshooting means that you notice something wrong with your equipment, find out what is wrong, and fix it. Whenever you troubleshoot, you will have a troubleshooting checklist to guide you. Figure 1 on the next page shows one type of troubleshooting checklist.

You already know how to decide whether something is wrong when the checklist normal indication tells you what should happen on just one equipment indicator, like one meter or one light. However, sometimes a checklist normal indication tells you what should happen on two or more indicators at the same time. In this lesson, you will learn how to decide whether something is wrong with your equipment when you must compare equipment indications with a normal indication on two or more indicators.

LEARNING GOALS:

In this lesson, you will learn to:

- A. Decide whether something is wrong with your equipment, when you are told the normal indication and the equipment indications for one indicator (a review) (p. 3).
- B. Compare normal indications describing two or more indicators with equipment indications and decide whether something is wrong with your equipment (p. 6).

On the pages that follow, you will find material to read and questions to answer. Most of the time, you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

When you finish the lesson, your instructor will give you a checkpoint. When you finish the checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

GO ON TO THE PAGE AFTER THE TABLE TO BEGIN THE LESSON.

EQUIPMENT PERFORMANCE

Step	Unit	Action	Normal indication	Corrective measures
31	CN-514 GRC	Set POWER circuit breaker to ON.	POWER ON indicator light.	Check power source output and power cable connections. Check fuse F2 (20 amp) (fig. 5-11). Check POWER ON indicator lamp.
32	CN-514 GRC	Set MANUAL RAISE-LOWER switch to RAISE then to LOWER.	MANUAL indicator lights. Meter indicates raise in voltage then decrease in voltage.	Check MANUAL indicator lamp. Check MOTOR 1 AMP fuse
33	CN-514 GRC	Set MANUAL-AUTOMATIC switch to AUTOMATIC.	Meter indicates 115 volts. MANUAL indicator goes out.	
34	CN-514 GRC	Set MANUAL-AUTOMATIC switch to MANUAL and MANUAL RAISE-LOWER switch to LOWER until meter indicates approximately 105 volts. Then set MANUAL-AUTOMATIC switch to AUTOMATIC. Repeat above except operate switch to RAISE until meter indicates approximately 120 volts.	Voltage indication on meter changes back to 115 volts in both operations.	Check V1 and V2 Replace plug-in regulator assembly.
35	PP-2054(*)/GRC	Set AC POWER circuit breaker to ON. Allow equipment to warm up for 5 minutes.	Blower motor operates. FIL indicator lights.	Check 5 AMP FIL fuse. Check FIL indicator lamp. Check silicon rectifiers in PP-2054 (*)/GRC. If they are blistered or discolored, higher maintenance services are required.
			Blower motor in T-893(P)/GRC operates. and TO PWR SUP on T-893(P)/GRC.	Check cable connection between TO XMTR on PP-2054 (*)/GRC and TO PWR SUP on T-893(P)/GRC.
36	PP-2054 (*)/GRC	Set OPERATE-STANDBY switch to OPERATE.	The LV and HV indicators light. Target bolt (interlock switch (fig. 1-4)) is tight; also all bolts holding amplifier-oscillator are tight.	If LV indicator does not light, check 3 AMP LV fuse. Check LV lamp. If HV indicator does not light, check HV fuse. (This fuse, whether equipment is marked with 5 AMP or 3 AMP should be replaced with 3 amp, time-delay fuse in all equipments (para

Figure 1. A Troubleshooting Checklist

Section A

Review of Procedure for One Indicator

When a checklist normal indication gives you information about just one equipment indicator, you use the following procedure to decide whether there is something wrong with your equipment:

1. Read the checklist normal indication.
2. Compare your equipment indication with the checklist normal indication to see whether they are the same or different.
3. If your equipment indication is the same as the checklist normal indication, there is nothing wrong.
4. If your equipment indication is different from the checklist normal indication, there is something wrong.

Study the following examples:

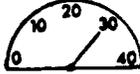
<u>Normal Indication Listed in the Checklist</u>	<u>Indication on Your Equipment</u>	<u>Is Something Wrong?</u>
Multimeter indicates in green area.	Multimeter needle is not in the green area.	Yes
Voltmeter increases then decreases.	Voltmeter goes from 100 to 125, then back to 100.	No
DA-189/GRC meter indicates more than 8 watts.	The reading on the DA-189/GRC meter is 6 watts.	Yes

1. Here is part of a checklist for troubleshooting radio equipment. Do not try to read it now, but use it to answer the following questions.

<u>Step</u>	<u>Action</u>	<u>Normal Indication</u>
1	Rotate AFC correction control.	AFC needle moves back toward center and stops near center.
2	Adjust REC SIG-1 for maximum indication on receiver multimeter.	Multimeter indicates peak or off scale.
3	Operate RING switch and listen on handset.	1,600-cps ringing tone should be heard.
4	Adjust AFC CORRECTION through its range.	AFC CORRECTION control is not over 10° from midrange.
5	Set multimeter selector switch to PWR OUT.	Multimeter indication is 20 or more.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 1

1. You do Action No. 1 (Rotate AFC correction control). The AFC meter moves from  to  and stays there. Is something wrong with your equipment? \_\_\_\_\_
2. You do Action No. 2. The multimeter needle goes off the scale. Is something wrong? \_\_\_\_\_
3. You do Action No. 3. You hear a ringing tone which sounds like about 1,600-cps. Is something wrong? \_\_\_\_\_
4. You do Action No. 4. The AFC CORRECTION control is about 30° from midrange. Is something wrong? \_\_\_\_\_
5. You do Action No. 5. The multimeter looks like this:  Is something wrong? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 12.

## Section B

### Procedure for Two or More Indicators

Sometimes, the checklist normal indication tells you what should happen on two or more indicators. Here are some examples:

<u>Normal Indication</u>	<u>Number of Indicators</u>
1. Meter indicates 115 volts. MANUAL indicator goes out.	2
2. Peak indication is obtained on DA-189/GRC meter. Multimeter indicates peak deflection.	2
3. AC POWER indicator lights. INCOMING CALL lamp lights momentarily. RING buzzer sounds momentarily. Blower motor operates.	4

As you did with one indicator, you must first compare your equipment indications with the checklist normal indication to see whether they are the same or different. However, with two or more indicators, you must compare the checklist and equipment indications, one at a time. For example, in No. 1 above, you must:

1. Compare your meter reading with the normal indication of 115 volts.
2. Check your MANUAL indicator to see whether it has gone out.

In No. 3 above, you must make four comparisons:

1. Check your AC POWER indicator to see whether it is on.
2. Check your INCOMING CALL lamp to see whether it lights momentarily (for a short time).
3. Listen for your RING buzzer to find out whether it sounds.
4. Listen for your blower motor to find out whether it is operating.

Next, you must decide whether all the equipment indications are the same as the normal indications. For example, suppose the following things happen: Your AC POWER indicator lights. Your INCOMING CALL lamp goes on, then off. Your RING buzzer does not sound. Your blower motor turns on. In this case, your RING buzzer indication is different from the normal indication. Your equipment indications are not all the same as the normal indication.

### EXERCISE 2

In each question below, you are told a checklist normal indication and your equipment indications. In the last column, write "Yes" if all the equipment indications are the same as the normal indication. Write "No" if any of the equipment indications are different from the normal indication.

<u>Checklist Normal Indication</u>	<u>Indications on Your Equipment</u>	<u>Are All the Equipment Indications the Same as the Checklist Normal Indication?</u>
1. Meter indicates 115 volts. MANUAL indicator goes out.	Meter reading: 115 volts. MANUAL indicator light goes out.	_____
2. Peak indication is obtained on DA-189/GRC meter. Multimeter indicates peak deflection.	DA-189/GRC meter does not register any voltage. Multimeter reading is at peak.	_____
3. AC POWER indicator lights. INCOMING CALL lamp lights momentarily. RING buzzer sounds momentarily. Blower motor operates.	AC POWER Indicator and blower motor are both on. INCOMING CALL lamp lights briefly. RING buzzer does not sound.	_____

Checklist Normal  
Indication

Indications on Your  
Equipment

Are All the  
Equipment  
Indications  
the Same as  
the Checklist  
Normal  
Indication?

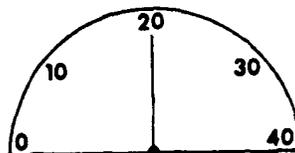
4. Indication on multimeter is more than 20. AFC CORRECTION control is not over 10° from midrange.

Multimeter reading is 10. AFC CORRECTION control is about 20° from midrange.

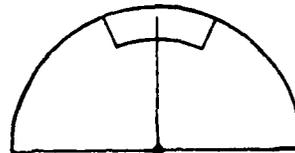
\_\_\_\_\_

5. Indication of more than 10 is obtained on multimeter and AFC meter indicates in center.

Readings on Meters:



MULTIMETER



AFC meter

\_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 13.

When the checklist normal indication describes two or more indicators, your equipment is working properly only if all the equipment indications are the same as the checklist normal indication. If one or more of the equipment indications are different from the normal indication, something is wrong. Here are rules to use to find out whether there is anything wrong with your equipment:

1. Read the checklist normal indication. This tells you which equipment indications you must check.
2. Compare your equipment indications, one at a time, with the checklist normal indication.
3. If all your equipment indications are the same as the checklist normal indication, there is nothing wrong.
4. If any (one or more) of your equipment indications are different from the checklist normal indication, there is something wrong with the equipment.

Use these rules to answer the questions on the next page.

### EXERCISE 3

Here is part of a checklist for troubleshooting radio equipment. Do not try to read it now. You will use it to answer the questions below.

<u>Step</u>	<u>Action</u>	<u>Normal Indication</u>
1	Set MANUAL-AUTOMATIC switch to AUTOMATIC.	Meter indicates 115 volts. MANUAL indicator goes out.
2	Set AC POWER switch to ON. Allow 5-minute warmup.	AC POWER indicator lights. INCOMING CALL lamp lights momentarily. RING buzzer sounds momentarily. Blower motor operates.

USE THE TABLE ABOVE TO ANSWER THE FOLLOWING QUESTIONS.

1. You do Action No. 1 (Set MANUAL-AUTOMATIC switch to AUTOMATIC). The meter indicates 115 volts. The MANUAL indicator stays on. Does this mean that there is something wrong? \_\_\_\_\_
2. You do Action No. 1. The MANUAL indicator goes out. The meter indicates 75 volts. Is something wrong? \_\_\_\_\_
3. You do Action No. 1. The meter indicates 90 volts. The MANUAL indicator stays on. Is something wrong? \_\_\_\_\_
4. You do Action No. 1. The meter indicates 115 volts. The MANUAL indicator goes out. Does this mean that there is something wrong? \_\_\_\_\_
5. You do Action No. 2. The AC POWER indicator lights. The INCOMING CALL lamp goes on, then off. The RING buzzer sounds briefly. The blower motor goes on. Is something wrong? \_\_\_\_\_
6. You do Action No. 2. The AC POWER indicator lights and the blower motor goes on. The INCOMING CALL lamp remains dark, and you do not hear the RING buzzer. Is something wrong? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 14.

ANSWER KEYS TO EXERCISES IN UNIT VIII, LESSON 2

Unit VIII  
Lesson 2

11

## ANSWERS TO EXERCISE 1

1. Yes. Explanation: The AFC meter moved from right of center to left of center and stayed there. It did not move back to the center as the normal indication said it should. Therefore, there is something wrong.
2. No.  
Explanation: The checklist normal indication tells you that there is nothing wrong if the multimeter either indicates peak or goes off scale. Your equipment multimeter went off scale. This is the same as the normal indication, so there is nothing wrong.
3. No.  
Explanation: The ringing tone which you hear is the same as the checklist normal indication. This means that there is nothing wrong.
4. Yes.  
Explanation: The checklist normal indication tells you that the AFC CORRECTION control should be  $10^\circ$  or less from midrange. Your AFC CORRECTION control is more than  $10^\circ$  from midrange. This is different from the normal indication. So something is wrong.
5. No.  
Explanation: The multimeter indication is more than 20. This is the same as the checklist normal indication. Therefore, nothing is wrong.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 2

1. Yes.
2. No.  
Explanation: The multimeter indication is the same, but the DA-189/GRC meter indication is different.
3. No.  
Explanation: The AC POWER indicator, the INCOMING CALL lamp, and the blower motor indication are all the same as the checklist normal indication. But the RING buzzer indication is different.
4. No.  
Explanation: The multimeter indication and the AFC CORRECTION control indication are both different from the checklist normal indication.
5. Yes.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

---

### ANSWERS TO EXERCISE 3

1. Yes.  
Explanation: The MANUAL indicator is different from the normal indication. This means that there is something wrong.
2. Yes.  
Explanation: The meter indication is different from the normal indication. Therefore, something is wrong.
3. Yes.  
Explanation: Both equipment indications are different from the normal indication. This means that something is wrong.
4. No.  
Explanation: Both equipment indications are the same as the normal indication. Therefore, nothing is wrong.
5. No.  
Explanation: All four equipment indications are the same as the normal indication. This means that there is nothing wrong.
6. Yes.  
Explanation: The INCOMING CALL lamp and the RING buzzer indications are different from the normal indication. This means that something is wrong.

IF YOU DO NOT UNDERSTAND THE ANSWERS TO ANY OF THESE QUESTIONS,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS LESSON,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A  
IN UNIT VIII - LESSON 2.

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**

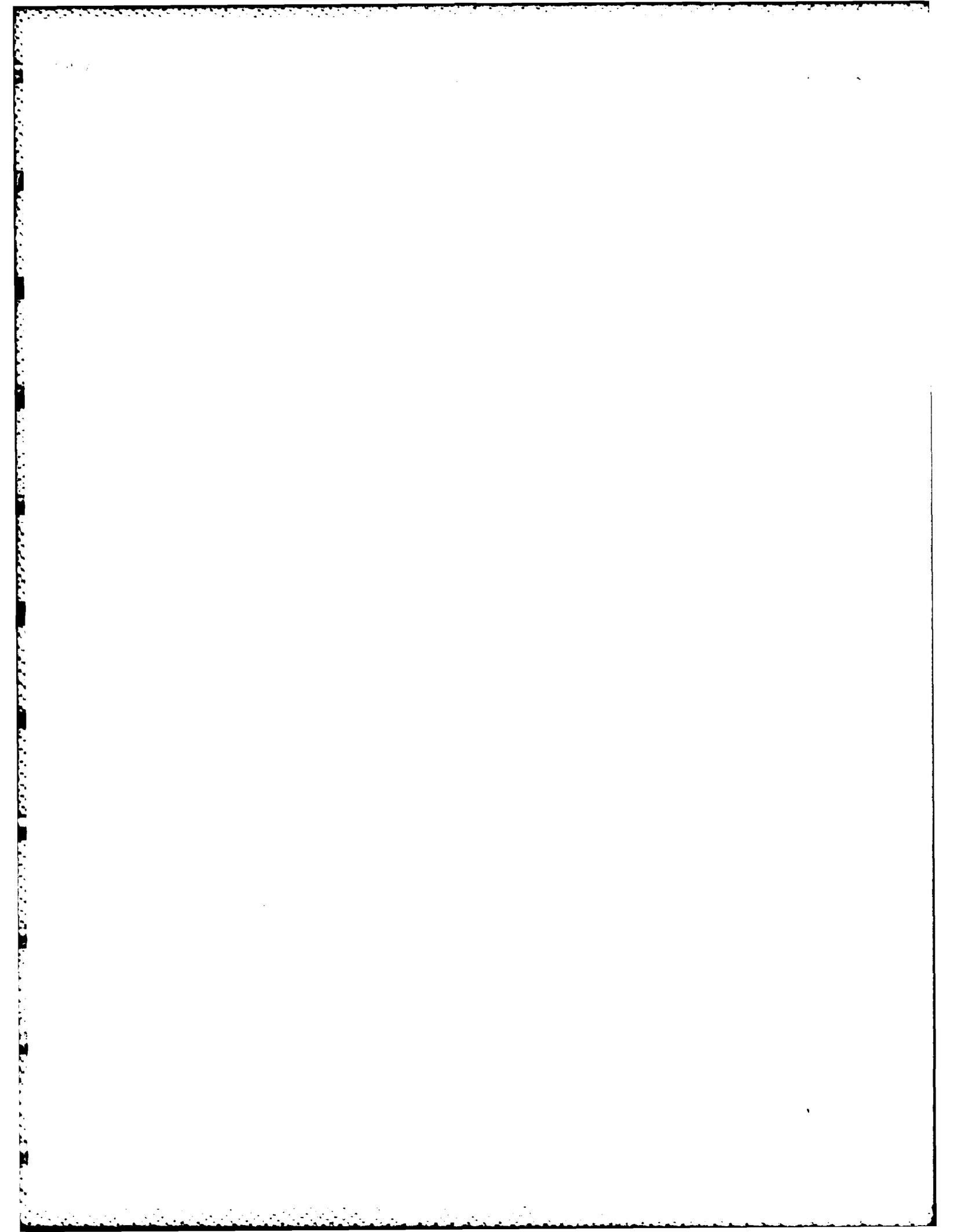
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT VIII**  
**DIAGNOSING EQUIPMENT MALFUNCTIONS**

**LESSON 3**  
**FINDING DESCRIPTIONS OF SYMPTOMS:**  
**ONE INDICATOR**

**PREREQUISITE: None**  
**MATERIALS REQUIRED: None**  
**TYPE OF LESSON: Self-Paced**



UNIT VIII. DIAGNOSING EQUIPMENT MALFUNCTIONS

Lesson 3. Finding Descriptions of Symptoms: One Indicator

INTRODUCTION:

You already know how to install and operate low-capacity radio and cable equipment. When you operate equipment, you set switches and controls and expect certain things to happen as a result. For example, when you set the AC POWER switch of the TD-204/U to ON, you expect the AC POWER indicator to light. When you set the transmitter selector switch to 12 VDC or 28 VDC or 600 VDC, you expect the meter to indicate in the green band. When your equipment does what you expect, you know that it is working properly.

However, sometimes something happens that is different from what you expect. For example, you set the AC POWER switch to ON, and the AC POWER light does not glow. Or you set the selector switch to 12 VDC, and the meter reading is not in the green band. When something happens that is not supposed to happen, this is called a symptom or malfunction. The meter failing to read in the green band with the selector switch at 12 VDC is a symptom. The AC POWER not lighting when the AC POWER switch is set at ON is a symptom.

When a symptom occurs, you have to troubleshoot, using a troubleshooting table. Figure 1 on page VIII 3-3 shows part of a troubleshooting table. The troubleshooting table lists symptoms (malfunctions) in Column 1. For each symptom, the table tells you what probably caused the problem (Column 2) and how to fix it (Column 3). You must be able to compare what is happening on your equipment with the symptoms listed in the troubleshooting table and find the symptom which matches what happened on your equipment. In this lesson, you will learn some of these important skills.

LEARNING GOALS:

In this lesson, you will learn to:

- A. Recognize symptoms (p. 4).
- B. Read descriptions of malfunctions (p. 5).
- C. Match descriptions of malfunctions in a troubleshooting table with symptoms on your equipment (p. 9).

On the pages that follow, you will find material to read and questions to answer. Most of the time, you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

When you finish the lesson, your instructor will give you a checkpoint. When you finish the checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

GO ON TO THE PAGE AFTER THE FIGURE TO BEGIN THE LESSON.

Table 5-11 Assemblage Troubleshooting

Item No.	Malfunction	Probable cause	Corrective action
1	POWER INDICATOR neon light fails to glow and no indication on AC VOLTS meter when power is applied to assemblage	<ul style="list-style-type: none"> <li>a. Defective power cable</li> <li>b. Defective POWER 115V AC IN receptacle J1</li> <li>c. Defective filters FL1 and FL2.</li> </ul> <p style="text-align: center;">NOTE</p> <p>If immediate operation is required, and POWER 115V AC OUT receptacle J2 is not used to power another assemblage, use POWER 115V AC OUT receptacle J2 for input power.</p>	<ul style="list-style-type: none"> <li>a. Check and repair or replace as required</li> <li>b. Repair assigned to higher category of maintenance</li> <li>c. Replacement assigned to higher category of maintenance.</li> </ul>
2	POWER INDICATOR neon light fails to glow when power is applied to assemblage. AC VOLTS meter indicates normal	<ul style="list-style-type: none"> <li>a. Defective lamp DS8</li> <li>b. Defective lamp socket XDS8 or defective wiring to lamp socket</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace lamp</li> <li>b. Repair assigned to higher category of maintenance</li> </ul>
3	AC VOLTS meter does not indicate when power is applied to assemblage. POWER INDICATOR neon light normal	Defective AC VOLTS meter M2	Replace meter.
4	No ac power available inside assemblage but POWER INDICATOR neon light and AC VOLTS meter are normal	Defective MAIN circuit breaker CB8	Replace circuit breaker
5	Glowlamp fails to glow when associated circuit breaker is operated to ON	<ul style="list-style-type: none"> <li>a. Defective associated glowlamp (DS1-DS7)</li> <li>b. Defective circuit breaker (CB1-CB7)</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace glowlamp</li> <li>b. Replace circuit breaker</li> </ul>
6	No ac power available at 115V AC receptacle in POWER ENTRANCE BOX. AC power available inside assemblage	<ul style="list-style-type: none"> <li>a. Defective CONV BREAKER circuit breaker CB9</li> <li>b. Defective receptacle J3</li> <li>c. Defective ac wiring</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace circuit breaker.</li> <li>b. Replace receptacle</li> <li>c. Repair assigned to higher category of maintenance</li> </ul>
7	Neither fluorescent nor incandescent ceiling lights light when FLUORESCENT LIGHTS and INCANDESCENT COLD START LIGHTS switches are operated to ON. BLACKOUT BYPASS switch is at BLACKOUT	<ul style="list-style-type: none"> <li>a. Defective LIGHTS circuit breaker CB1</li> <li>b. Defective interlock switch S1.</li> <li>c. Defective ac wiring</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace circuit breaker</li> <li>b. Replace interlock switch</li> <li>c. Repair assigned to higher category of maintenance</li> </ul>
8	Ceiling lights do not extinguish when door is opened and BYPASS BLACKOUT switch is at BLACKOUT	Defective interlock switch S1.	Replace interlock switch.
9	Fluorescent ceiling lights do not light when FLUORESCENT LIGHTS switch is operated to ON. Incandescent lights normal	<ul style="list-style-type: none"> <li>a. Defective FLUORESCENT LIGHTS switch S2</li> <li>b. Defective lamp, ballast transformer or ac wiring</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace switch</li> <li>b. Replace lamp only. Other repair assigned to higher category of maintenance.</li> </ul>
10	Incandescent ceiling lights do not light when INCANDESCENT COLD START LIGHTS switch is operated to ON. Fluorescent lights normal	<ul style="list-style-type: none"> <li>a. Defective INCANDESCENT COLD START LIGHTS switch S4 or lamp</li> <li>b. Defective ac wiring</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace switch or lamp.</li> <li>b. Repair assigned to higher category of maintenance</li> <li>c. Replace lamp</li> </ul>
11	Exhaust blower fails to operate when BLOWER switch is operated to ON.	<ul style="list-style-type: none"> <li>a. Defective exhaust blower</li> <li>b. Defective associated BLOWER switch (S6 or S7).</li> </ul>	<ul style="list-style-type: none"> <li>a. Check and repair or replace as required</li> <li>b. Replace switch.</li> </ul>

Figure 1. Part of a Troubleshooting Table

Section A

Recognizing Symptoms

When something happens that is not supposed to happen on your equipment, you know that there is something wrong. A sign that something is wrong with your equipment is called a symptom. Whenever something happens that is different from what you expect, you are getting a symptom, and you know that there is something wrong.

EXERCISE 1

1. When the HEATER switch is set at ON, the HEATER indicator should light. Suppose you set the HEATER switch at ON and the HEATER indicator does not light.
  - a. Are you getting a symptom? \_\_\_\_\_
  - b. Is something wrong with your equipment? \_\_\_\_\_
  
2. On the 3KW generator, the frequency meter should indicate 60 Hz. Suppose your frequency meter indicates 60 Hz.
  - a. Are you getting a symptom? \_\_\_\_\_
  - b. Is something wrong with your equipment? \_\_\_\_\_
  
3. The combined reading on the two load meters should not exceed 100%. Suppose the first meter reads 53% and the second reads 49%.
  - a. Are you getting a symptom? \_\_\_\_\_
  - b. Is something wrong with your equipment? \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 13.

Section B

Reading Malfunction Descriptions

When you get a symptom, you have to troubleshoot. Troubleshooting means that you find out what is causing the symptom and fix it, if possible. Troubleshooting is carried out by using a troubleshooting table in a TM. You will learn to find the cause and fix it in the 31M AIT course. But in order to do this, you must be able to read the descriptions of symptoms in the table, and you must find the one that matches what is happening on your equipment. This part of the lesson deals with reading symptom descriptions.

Here is an example of a description of a symptom from a troubleshooting table:

POWER INDICATOR neon light fails to glow when power is applied to assemblage.

Notice that the description really tells you three things:

1. What the symptom is.
2. What the operator did just before the symptom appeared (the operator action).
3. The equipment component that is being operated.

POWER INDICATOR neon light fails to glow	when power is applied
Symptom	Operator action
<u>to assemblage</u>	
Equipment being operated	

Thus, this symptom describes these three things:

- a. Equipment being operated: Assemblage.
- b. Operator action: Power is applied.
- c. Symptom that results: POWER INDICATOR neon light fails to glow.

Here is another example of a symptom description:

No indicator on TEST ALIGN meter of TD-352/U with METER SELECT switch at PCM FROM AUX.

This breaks down as follows:

- a. Equipment being operated: TD-352/U.
- b. Operator action: Set METER SELECT switch at PCM FROM AUX.
- c. Symptom that results: No indication on TEST ALIGN meter.

Sometimes, descriptions of symptoms in troubleshooting tables list only the equipment component and the symptom. But usually they tell you three things: the equipment being operated, the operator action, and the symptom that results. In order to read troubleshooting tables, you must be able to break a symptom description down into these three parts.

## EXERCISE 2

Directions: Each of the questions below gives a description of a symptom from a troubleshooting table. In the answer spaces, write a. the equipment being operated, b. the operator action, and c. the symptom that results.

1. CN-514/GRC POWER indicator does not light when POWER circuit breaker is operated to ON.
  - a. Equipment being operated: \_\_\_\_\_
  - b. Operator action: \_\_\_\_\_
  - c. Symptom that results: \_\_\_\_\_
  
2. Ceiling lights are not extinguished when assemblage door is opened and BYPASS BLACKOUT switch is at OFF.
  - a. Equipment being operated: \_\_\_\_\_
  - b. Operator action: \_\_\_\_\_
  - c. Symptom that results: \_\_\_\_\_

3. Incorrect indication on TD-204/U TEST ALIGN meter with METER SELECT switch at SERV FAC and SERV SEL switch at -10.
  - a. Equipment being operated: \_\_\_\_\_
  - b. Operator action: \_\_\_\_\_
  - c. Symptom that results: \_\_\_\_\_
  
4. T-983(P)/GRC-103(V) SYNC indicator does not extinguish within 10 seconds after AC POWER switch is operated to ON/RESET.
  - a. Equipment being operated: \_\_\_\_\_
  - b. Operator action: \_\_\_\_\_
  - c. Symptom that results: \_\_\_\_\_
  
5. TEST ALIGN meter fails to indicate yellow when selector switch I of TD-660A/G is at NOISE GEN.
  - a. Equipment being operated: \_\_\_\_\_
  - b. Operator action: \_\_\_\_\_
  - c. Symptom that results: \_\_\_\_\_
  
6. Incorrect or no indication on CV-1548/G TEST ALIGN meter with meter selector switch at 1600 .
  - a. Equipment being operated: \_\_\_\_\_
  - b. Operator action: \_\_\_\_\_
  - c. Symptom that results: \_\_\_\_\_

7. T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at OSC.

a. Equipment being operated: \_\_\_\_\_

b. Operator action: \_\_\_\_\_

c. Symptom that results: \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 14.

## Section C

### Matching Equipment Symptoms to Descriptions in Troubleshooting Tables

Suppose you get a symptom while you are operating your equipment. Now you must go to a troubleshooting table. In the "Malfunction" column, you must find the description that matches what happened on your equipment. You must find the description that includes:

- a. The equipment component you are working on.
- b. The action you performed just before the symptom occurred. (This is not always included in the description.)
- c. The symptom you got.

For example, suppose you are operating a TD-204/U. You set the METER SELECT switch at SERV FAC and the SERV SEL switch at SUM +3. There is no indication on the TEST ALIGN meter. In the table, you must find the description which includes:

- a. Equipment being operated: TD-204/U.
- b. Operator action: Set METER SELECT switch at SERV FAC and SERV SEL switch at SUM +3.
- c. Symptom that results: No indication on TEST ALIGN meter.

You go down the list of symptom descriptions in the table until you come to Item No. 3 which says:

<u>Item No.</u>	<u>Malfunction (Symptom)</u>
3	No indication on TD-204/U TEST ALIGN meter with METER SELECT switch at SERV FAC and SERV SEL switch at: a. -10 b. +10 c. SUM <u>+ 3</u> .

Item No. 3c matches the equipment you are working on, the action you performed, and the symptom you got. Therefore, Item No. 3c is the matching symptom description.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

### EXERCISE 3

Each question below describes an equipment symptom. You will find a list of symptoms from a troubleshooting table on the next page. Read each question, then find the matching symptom description in the table, and write its Item No. in the blank space.

- |   | Item<br>No. |
|---|-------------|
| 1. You are operating a TD-204/U. You set the METER SELECT switch at SERV FAC and the SERV SEL switch at +10. The TEST ALIGN meter registers zero. | _____       |
| 2. You are operating a R-1329(P)/GRC-103(V). You set the meter select switch at -12 VDC. The meter reading is below normal.                       | _____       |
| 3. You are operating a R-1329(P)/GRC-103(V). You set the AC POWER switch at ON. The SYNC indicator does not go out.                               | _____       |
| 4. You are operating a TD-660(*)/G. You set selector switch I at -4. The TEST ALIGN meter shows an incorrect indication.                          | _____       |
| 5. You are operating a T-983(P)/GRC-103(V). You set the meter selector switch at MULT. The meter reading is below normal.                         | _____       |

CHECK YOUR ANSWERS ON PAGE 16.

List of Symptoms from a Troubleshooting Table

<u>Item No.</u>	<u>Malfunction (Symptom)</u>
1	AC VOLTS meter does not indicate when power is applied to assemblage.
2	Exhaust blower fails to operate when BLOWER switch is operated to ON.
3	No indication on TD-204/U TEST ALIGN meter with METER SELECT switch at SERV FAC and SERV SEL switch at: a. -10. b. +10. c. SUM +3.
4	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at DOUBLE.
5	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at MULT.
6	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at PWR OUT.
7	R-1329(P)/GRC-103(V) SYNC indicator does not extinguish within 10 seconds after AC POWER switch is operated to ON.
8	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at +12 VDC.
9	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at -12 VDC.
10	Incorrect indication on TD-660(*)/G TEST ALIGN meter with selector switch I at: a. +12. b. +4. c. -12. d. -6. e. -4.

ANSWER KEYS TO EXERCISES IN UNIT VIII, LESSON 3

III,

ANSWERS TO EXERCISE 1

1. a. Yes.  
b. Yes.  
Explanation: The HEATER indicator should have lit with the HEATER switch at ON. But it did not. Something happened that was not supposed to happen. This is a symptom, and it tells you that something is wrong with your equipment.
  
2. a. No.  
b. No.  
Explanation: The frequency meter did what it was supposed to do. It registered 60 Hz. This is not a symptom. Your equipment is working properly, and there is nothing wrong.
  
3. a. Yes.  
b. Yes.  
Explanation: The combined reading of the two meters should be 100% or less. But your combined reading was more than 100% (because 53% + 49% is 102%). This is a symptom, and it tells you that something is wrong.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 2

1. a. Equipment being operated: CN-514/GRC
- b. Operator action: Set POWER circuit breaker to ON.
- c. Symptom that results: POWER indicator does not light.

2. a. Equipment being operated: Assemblage
- b. Operator action: Open door. Set BYPASS BLACKOUT switch at OFF.
- c. Symptom that results: Ceiling lights are not extinguished (do not go out).

Notice that there are two operator actions in this symptom description.

3. a. Equipment being operated: TD-204/U
- b. Operator action: Set METER SELECT switch at SERV FAC. Set SERV SEL switch at -10.
- c. Symptom that results: Incorrect indication on TD-204/U TEST ALIGN meter

Again there are two operator actions in the symptom description.

4. a. Equipment being operated: T-983(P)/GRC(V)
- b. Operator action: Set AC POWER switch to ON/RESET.
- c. Symptom that results: SYNC indicator does not extinguish (go out) within 10 seconds.

5. a. Equipment being operated: TD-660A/G
- b. Operator action: Set selector switch 1 at NOISE GEN.
- c. Symptom that results: TEST ALIGN meter does not indicate yellow.

6. a. Equipment being operated: CV-1548/G
- b. Operator action: Set meter selector switch at 1600 .
- c. Symptom that results: Incorrect indication or no indication on CV-1548/G TEST ALIGN meter.
  
7. a. Equipment being operated: T-983(P)/GRC-103(V)
- b. Operator action: Set meter selector switch at OSC.
- c. Symptom that results: T-983(P)/GRC-103(V) meter indicates below normal.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 3

	<u>Item No.</u>
1.	3b
2.	9
3.	7
4.	10e
5.	5

IF YOU DO NOT UNDERSTAND ANY OF THESE ANSWERS,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS LESSON,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A  
UNIT VIII - LESSON 3.

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**

**MOS 31M10**  
**STUDENT GUIDE**



**UNIT VIII**  
**DIAGNOSING EQUIPMENT MALFUNCTIONS**

**LESSON 4**  
**FINDING DESCRIPTIONS OF SYMPTOMS:**  
**TWO OR MORE INDICATORS**

**PREREQUISITE: None**  
**MATERIALS REQUIRED: None**  
**TYPE OF LESSON: Self-Paced**

UNIT VIII. DIAGNOSING EQUIPMENT MALFUNCTIONS

Lesson 4. Finding Descriptions of Symptoms  
When There are Two or More Indicators

INTRODUCTION:

In the 31M course and in your unit, you will often need to troubleshoot. Troubleshooting means that you notice something wrong with your equipment, find out what is wrong, and fix it. You know that something is wrong when one or more equipment indicators (lights, meters, buzzers) are not doing what they are supposed to do. An incorrect equipment indication is called a symptom or malfunction. A symptom tells you that something is wrong.

When you get a symptom on your equipment, you will need to refer to a troubleshooting table in a TM, such as Figure 1. Column 1 of the table is a list of symptoms or malfunctions. For each malfunction, the table tells you what probably caused the problem (Column 2) and how to fix it (Column 3). In order to use the table, you must be able to look down the list of symptoms and find the description which matches what happened on your equipment. This is sometimes difficult, especially when the symptom involves two or more indicators. In this lesson, you will learn to locate such complex symptoms in troubleshooting tables.

LEARNING GOALS:

In this lesson, you will learn to:

- A. Read symptom descriptions for one indicator (a review) (p. 3).
- B. Read symptom descriptions for two or more indicators (p. 7).
- C. In a troubleshooting table, find the symptom description which matches what happened on equipment (p. 15).

Table 5-11. Assemblage Troubleshooting

Item No.	Malfunction	Probable cause	Corrective action
1	POWER INDICATOR neon light fails to glow and no indication on AC VOLTS meter when power is applied to assemblage	<ul style="list-style-type: none"> <li>a. Defective power cable</li> <li>b. Defective POWER 115V AC IN receptacle J1</li> <li>c. Defective filters FL1 and FL2</li> </ul> <p style="text-align: center;"><b>NOTE</b></p> <p>If immediate operation is required, and POWER 115V AC OUT receptacle J2 is not used to power another assemblage, use POWER 115V AC OUT receptacle J2 for input power.</p>	<ul style="list-style-type: none"> <li>a. Check and repair or replace as required.</li> <li>b. Repair assigned to higher category of maintenance.</li> <li>c. Replacement assigned to higher category of maintenance.</li> </ul>
2	POWER INDICATOR neon light fails to glow when power is applied to assemblage. AC VOLTS meter indicates normal	<ul style="list-style-type: none"> <li>a. Defective lamp DS8</li> <li>b. Defective lamp socket XDS8 or defective wiring to lamp socket</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace lamp</li> <li>b. Repair assigned to higher category of maintenance</li> </ul>
3	AC VOLTS meter does not indicate when power is applied to assemblage. POWER INDICATOR neon light normal	Defective AC VOLTS meter M2	Replace meter
4	No ac power available inside assemblage but POWER INDICATOR neon light and AC VOLTS meter are normal	Defective MAIN circuit breaker CB8	Replace circuit breaker
5	Glowlamp fails to glow when associated circuit breaker is operated to ON	<ul style="list-style-type: none"> <li>a. Defective associated glowlamp (DS1-DS7)</li> <li>b. Defective circuit breaker (CB1-CB7)</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace glowlamp</li> <li>b. Replace circuit breaker</li> </ul>
6	No ac power available at 115V AC receptacle in POWER ENTRANCE BOX. AC power available inside assemblage	<ul style="list-style-type: none"> <li>a. Defective CONV BREAKER circuit breaker CB9</li> <li>b. Defective receptacle J3</li> <li>c. Defective ac wiring</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace circuit breaker</li> <li>b. Replace receptacle</li> <li>c. Repair assigned to higher category of maintenance</li> </ul>
7	Neither fluorescent nor incandescent ceiling lights light when FLUORESCENT LIGHTS and INCANDESCENT COLD START LIGHTS switches are operated to ON. BLACKOUT BYPASS switch is at BLACKOUT	<ul style="list-style-type: none"> <li>a. Defective LIGHTS circuit breaker CB1</li> <li>b. Defective interlock switch S1</li> <li>c. Defective ac wiring</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace circuit breaker</li> <li>b. Replace interlock switch</li> <li>c. Repair assigned to higher category of maintenance</li> </ul>
8	Ceiling lights do not extinguish when door is opened and BYPASS BLACKOUT switch is at BLACKOUT	Defective interlock switch S1	Replace interlock switch
9	Fluorescent ceiling lights do not light when FLUORESCENT LIGHTS switch is operated to ON. Incandescent lights normal	<ul style="list-style-type: none"> <li>a. Defective FLUORESCENT LIGHTS switch S2</li> <li>b. Defective lamp, ballast transformer or ac wiring</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace switch.</li> <li>b. Replace lamp only. Other repair assigned to higher category of maintenance</li> </ul>
10	Incandescent ceiling lights do not light when INCANDESCENT COLD START LIGHTS switch is operated to ON. Fluorescent lights normal	<ul style="list-style-type: none"> <li>a. Defective INCANDESCENT COLD START LIGHTS switch S4 or lamp</li> <li>b. Defective ac wiring</li> <li>c. Defective lamp</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace switch or lamp</li> <li>b. Repair assigned to higher category of maintenance</li> <li>c. Replace lamp</li> </ul>
11	Exhaust blower fails to operate when BLOWER switch is operated to ON	<ul style="list-style-type: none"> <li>a. Defective exhaust blower</li> <li>b. Defective associated BLOWER switch (S6 or S7)</li> </ul>	<ul style="list-style-type: none"> <li>a. Check and repair or replace as required</li> <li>b. Replace switch</li> </ul>

Figure 1. Part of a Troubleshooting Table

On the pages that follow, you will find material to read and questions to answer. Most of the time, you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

When you finish the lesson, your instructor will give you a checkpoint. When you finish the checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

---

BEGIN THE LESSON.

---

Section A

Review of Procedure for One Indicator

Descriptions of symptoms in troubleshooting tables usually include three parts:

- a. The equipment component that is being operated.
- b. The operator action (What the operator did just before the symptom appeared).
- c. The symptom that results.

Sometimes, the operator action is omitted from the description. But the other two parts are always there.

For example, here is a symptom description from a table:

POWER INDICATOR neon light fails to glow | when power is applied

Symptom

Operator action

to assemblage.

Equipment being operated

Here is another example:

TEST ALIGN meter fails to indicate yellow when selector switch I of TD-660(\*)/G is at NOISE GEN.

- a. Equipment being operated: TD-660(\*)/G.
- b. Operator action: Set selector switch I at NOISE GEN.
- c. Symptom that results: TEST ALIGN meter fails to indicate yellow.

If a symptom appears while operating equipment, the operator must look down the list of symptom descriptions in a troubleshooting table and find the one that matches what happened on the equipment. For example, suppose you are operating a TD-204/U. You set the METER SELECT switch to SERV FAC and the SERV SEL switch to B. The TEST ALIGN meter should indicate in the green area, but it does not. Something is wrong. To troubleshoot, you must look in the troubleshooting table and find the symptom description that includes:

- a. Equipment being operated: TD-204/U.
- b. Operator action: Set METER SELECT switch to SERV FAC and SERV SEL switch to B.
- c. Symptom that results: Incorrect indication on TEST ALIGN meter.

You look down the list of symptoms in the table until you come to one that says:

<u>Item No.</u>	<u>Symptom</u>
28	Incorrect indication on TD-204/U TEST ALIGN meter with METER SELECT switch at SERV FAC and SERV SEL switch at: a. A b. B c. C d. D e. E

The equipment component, operator action, and resulting symptom of Item No. 28b match what happened on your equipment. So you have found the matching symptom description.

EXERCISE !

Each question below describes something that went wrong while operating equipment. On the following page, you will find a list of symptoms from a troubleshooting table. Read the equipment symptom in each question. Then find the matching symptom description in the table, and write its Item No. in the space provided.

1. You are operating an R-1329(P)/GRC-103(V). You set the meter selector switch at +12 VDC. The meter reading is below normal. \_\_\_\_\_
2. You are operating a TD-204/U. You set the METEK SELECT switch at SERV FAC and the SERV SEL switch at SUM +3. There is no indication on the TEST ALIGN meter. \_\_\_\_\_
3. You are operating a T-983(P)/GRC-103(V). You set the meter selector switch to DOUBLE. The meter indication is below normal. \_\_\_\_\_
4. You are operating an R-1329(P)/GRC-103(V). You set the meter selector switch to -12 VDC. The meter reads below normal. \_\_\_\_\_
5. You are operating a TD-660(\*)/G. You set selector switch I at +4. The TEST ALIGN meter indication is incorrect. \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 20.

List of Symptoms from a Troubleshooting Table

<u>Item No.</u>	<u>Symptom</u>
1	AC VOLTS meter does not indicate when power is applied to assemblage.
2	Exhaust blower fails to operate when BLOWER switch is operated to ON.
3	No indication on TD-204/U TEST ALIGN meter with METER SELECT switch at SERV FAC and SERV SEL switch at: a. -10. b. +10. c. SUM <u>+3</u> .
4	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at DOUBLE.
5	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at MULT.
6	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at PWR OUT.
7	R-1329(P)/GRC-103(V) SYNC indicator does not extinguish within 10 seconds after AC POWER switch is operated to ON.
8	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at +12 VDC.
9	R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at -12 VDC.
10	Incorrect indication on TD-660(*)/G TEST ALIGN meter with selector switch I at: a. +12. b. +4. c. -12. d. -6. e. -4.

## Section B

### Reading Symptom Descriptions for Two or More Indicators

Symptom descriptions for two or more indicators include the same three parts as for one indicator:

- a. Equipment being operated.
- b. Operator action.
- c. Resulting symptom.

However, the resulting symptom describes what happens on two or more indicators instead of just one.

Here is an example from a troubleshooting table:

POWER INDICATOR neon light fails to glow and no indication on AC VOLTS meter when power is applied to assemblage.

This breaks down as follows:

- a. Equipment being operated: Assemblage.
- b. Operator action: Apply power.
- c. Resulting symptom: (1) POWER INDICATOR neon light fails to glow.  
(2) No indication on AC VOLTS meter.

In this case, the symptom includes indications on two indicators, the POWER INDICATOR and the AC VOLTS meter.

Here is another example:

T-983(P)/GRC-103(V) LOW POWER indicator lights, buzzer sounds, and blower operates, but AC POWER indicator does not light when AC POWER switch is operated to ON/RESET.

This breaks down into:

- a. Equipment being operated: T-983(P)/GRC-103(V).
- b. Operator action: Set AC POWER switch to ON/RESET.
- c. Resulting symptom:
  - (1) LOW POWER indicator lights.
  - (2) Buzzer sounds.
  - (3) Blower operates.
  - (4) AC POWER indicator does not light.

Notice that four equipment indications are included in this symptom.

ANSWER THE QUESTION ON THE NEXT PAGE.

EXERCISE 2

Now try breaking this symptom description down into its parts:  
(Hint: the resulting symptom includes three indicators.)

R-1329(P)/GRC-103(V) AC POWER and LOW SIGNAL indicators do not light, and buzzer is silent when AC POWER switch is operated to ON.

- a. Equipment being operated: \_\_\_\_\_
- b. Operator action: \_\_\_\_\_
- c. Resulting symptom: (1) \_\_\_\_\_  
(2) \_\_\_\_\_  
(3) \_\_\_\_\_

CHECK YOUR ANSWER ON PAGE 20.

Sometimes, a symptom description in a troubleshooting table includes operations and resulting symptoms on two equipment components at the same time. Here is an example:

T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at PWR OUT, and R-1329(P)/GRC-103(V) meter indicates normal with meter selector switch at XMTR DUPL.

- a. Equipment being operated: T-983(P)/GRC-103(V) and R-1329(P)/GRC-103(V)
- b. Operator action: Set T-983 meter selector switch at PWR OUT. Set R-1329 meter selector switch at XMTR DUPL.
- c. Resulting symptom: (1) T-983 meter indicates below normal.  
(2) R-1329 meter indicates normal.

### EXERCISE 3

Try the following symptom description.

R-1329(P)/GRC-103(V) meter indicates above normal with meter selector switch at REFL PWR. T-983(P)/GRC-103(V) meter indicates normal with meter selector switch at REFL PWR.

- a. Equipment being operated: \_\_\_\_\_
- b. Operator action: \_\_\_\_\_
- c. Resulting symptom: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

CHECK YOUR ANSWER ON THE PAGE 21.

EXERCISE 4

NOW BREAK DOWN EACH OF THE FOLLOWING EIGHT SYMPTOM DESCRIPTIONS:

1. POWER INDICATOR neon light fails to glow when power is applied to assemblage. AC VOLTS meter indicates normal.

a. Equipment being operated: \_\_\_\_\_

b. Operator action: \_\_\_\_\_

c. Resulting symptom: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. No order wire communications through cable link using TD-204/U. All other indications normal.

a. Equipment being operated: \_\_\_\_\_

c. Resulting symptom: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. T-983(P)/GRC-103(V) AC POWER and LOW POWER indicators do not light, buzzer is silent, and blower does not operate when AC POWER switch is operated to ON/RESET.

a. Equipment being operated: \_\_\_\_\_

b. Operator action: \_\_\_\_\_

c. Resulting symptom: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. T-983(P)/GRC-103(V) LOW POWER indicator does not extinguish within 60 seconds after AC POWER switch is operated to ON/RESET and meter indication is below normal with meter selector switch at 600 VDC.

(Hint: this symptom description includes just one equipment component but two operator actions.)

a. Equipment being operated: \_\_\_\_\_

b. Operator action: \_\_\_\_\_

c. Resulting symptom: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5. Incorrect indication on TD-754/G TEST ALIGN meter with METER SELECT switch at CABLE CUR. CABLE CUR indicator lights and buzzer sounds.

a. Equipment being operated: \_\_\_\_\_

b. Operator action: \_\_\_\_\_

c. Resulting symptom: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6. ALARMS FRAME indicator of TD-352/U lights, buzzer sounds, and TEST ALIGN meter indicates in green area with meter select switch at PCM IN and TIMING IN.

a. Equipment being operated: \_\_\_\_\_

b. Operator action: \_\_\_\_\_

c. Resulting symptom: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

7. ALARMS FRAME indicator of TD-352/U, ALARMS TRAFFIC indicator of TD-202/U, and R-1331(P)/GRC SQUELCH NO SIGNAL indicator light, buzzer sounds, and no order wire.

a. Equipment being operated: \_\_\_\_\_

b. Operator action: \_\_\_\_\_

c. Resulting symptom: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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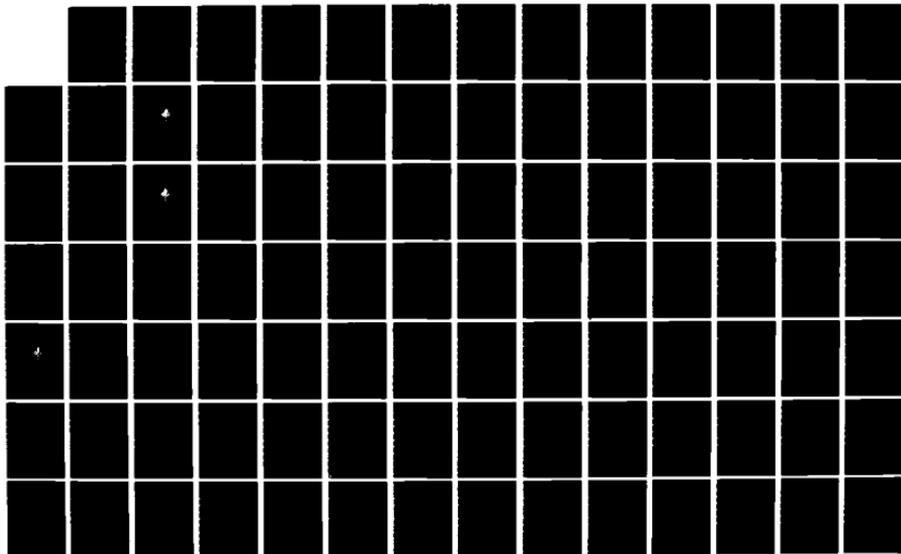
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APPLIED SCIENCE ASSOCIATES INC PITTSBURGH PA SEP 82  
DABT68-81-C-0006

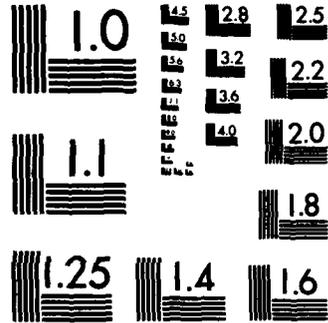
31/32

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MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

8. Distant terminal or repeater indicates loss of pcm.  
Local T-893(P)/GRC indicates loss of pcm input. All indications  
on local TD-352/U and TD-202/U are normal.

a. Equipment being operated: \_\_\_\_\_

b. Operator action: \_\_\_\_\_

c. Resulting symptom: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 22.

## Section C

### Matching Equipment Symptoms to Symptom Descriptions

Suppose you notice something wrong while you are operating your equipment. You have an equipment symptom. Now you must go to a troubleshooting table and find the symptom description that matches what happened on your equipment. You must find the symptom description that matches your equipment symptom in the following ways. Look for:

1. The same equipment component or components.
2. The same action which resulted in the symptom. (This is sometimes omitted.)
3. The same symptom you got, including the same results on all indicators involved.

Finding the right symptom requires careful reading of the symptom descriptions, because several descriptions are often very similar. Here is an example from a troubleshooting table:

<u>Item No.</u>	<u>Symptom</u>
1	POWER INDICATOR neon light fails to glow and no indication on AC VOLTS meter when power is applied to assemblage.
2	POWER INDICATOR neon light fails to glow when power is applied to assemblage. AC VOLTS meter indicates normal.

Both symptom descriptions include the same equipment (assemblage), and the same operator action (Apply power); but the resulting symptoms are different, as shown on the next page.

### Resulting Symptom

<u>Item No. 1</u>	<u>Item No. 2</u>
(1) POWER INDICATOR neon light fails to glow.	(1) POWER INDICATOR neon light fails to glow.
(2) No indication on AC VOLTS meter.	(2) AC VOLTS meter indicates normal.

Suppose that you are checking out an assemblage. You apply power. The AC VOLTS meter reading is normal, but the POWER INDICATOR light does not light. In that case, the symptom description with Item No. 2 matches what happened. Item No. 1 does not.

Here is another part of a troubleshooting table:

<u>Item No.</u>	<u>Symptom</u>
32	T-983(P)/GRC-103(V) AC POWER indicator lights, buzzer sounds, and blower operates, but LOW POWER indicator does not light when AC POWER switch is operated to ON/RESET.
33	T-983(P)/GRC-103(V) AC POWER and LOW POWER indicator light and blower operates, but buzzer does not sound when AC POWER switch is operated on ON/RESET.

### EXERCISE 5

Suppose that you are operating a T-983(P)/GRC-103(V). You set the AC POWER switch to ON/RESET. The AC POWER indicator lights. The LOW POWER indicator does not light. The buzzer sounds. The blower operates. Which of the two symptom descriptions matches what happened?  
Item No. \_\_\_\_\_

CHECK YOUR ANSWER ON PAGE 25.

EXERCISE 6

Each of the five questions below describes something that happened while operating a T-983(P)/GRC-103(V). On the following page, you will find a list of symptom descriptions from a troubleshooting table. Read each question. Then go to the table to find the symptom description that matches what happened on the equipment. Write its Item No. in the space provided.

(Remember: You are operating a T-983(P)/GRC-103(V) in all the questions below.)

1. You set the meter selector switch at REFL PWR. The meter indicates above normal. You set the meter selector switch of the R-1329(P)/GRC-103(V) to REFL PWR, and it also indicates above normal. \_\_\_\_\_
2. You set the meter selector switch at DOUBLER. The meter indication is normal. Next, you set the meter selector switch at MULT. The meter indicates below normal. \_\_\_\_\_
3. You set the meter selector switch at MULT. The meter indication is normal. Next, you set the meter selector switch at DRIVER. The meter indicates below normal. \_\_\_\_\_
4. You set the meter selector switch at PWR OUT. The LOW POWER indicator remains lit, but you get a normal indication on the meter. \_\_\_\_\_
5. You set the meter selector switch at DRIVER and get a normal indication. Next, you set the meter selector switch at PWR OUT. The meter indicates below normal. You set the meter selector switch of the R-1329(P)/GRC-103(V) at XMTR DUPL, and its meter also indicates below normal. \_\_\_\_\_

SUGGESTION: If you are not sure about any of your answers, break down the equipment symptom into three parts, like you did in Section B of this lesson:

- a. Equipment being operated.
- b. Operator action. 4-21
- c. Resulting symptom.

Then find the symptom description that breaks down the same way.

CHECK YOUR ANSWERS ON PAGE 25.

List of Symptom Descriptions from a Troubleshooting Table

<u>Item No.</u>	<u>Symptom</u>
1	T-983(P)/GRC-103(V) LOW POWER indicator does not extinguish within 60 seconds after AC POWER switch is operated to ON/RESET and meter indicates normal with meter selector switch at 600 VDC.
2	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at DOUBLER. Normal indication in OSC position.
3	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at MULT. Normal indication in DOUBLER position.
4	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at DRIVER. Normal indication in MULT position.
5	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at PWR OUT. Normal indication in DRIVER position, but R-1329(P)/GRC-103(V) meter indicates below normal with meter selector switch at XMTR DUPL.
6	T-983(P)/GRC-103(V) meter indicates below normal with meter selector switch at PWR OUT. Normal indication in DRIVER position, and R-1329(P)/GRC-103(V) meter indicates normal with meter selector switch at XMTR DUPL.
7	T-983(P)/GRC-103(V) LOW POWER indicator does not extinguish, but meter indication is normal with meter selector switch at PWR OUT.
8	T-983(P)/GRC-103(V) meter indicates above normal with meter selector switch at REFL PWR. R-1329(P)/GRC-103(V) meter indicates above normal with meter selector switch at REFL PWR.

ANSWER KEYS TO EXERCISES IN UNIT VIII, LESSON 4

Unit VIII  
Lesson 4

19

ANSWERS TO EXERCISE 1

	<u>Item No.</u>
1.	8
2.	3c
3.	4
4.	9
5.	10b

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON WITH THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

---

ANSWER TO EXERCISE 2

- a. Equipment being operated: R-1329(P)/GRC-103(V)
- b. Operator action: Operate (or set) AC POWER switch to ON.
- c. Resulting symptom: (1) AC POWER indicator does not light.  
(2) LOW SIGNAL indicator does not light.  
(3) Buzzer is silent.

GO ON WITH THE LESSON.

---

ANSWER TO EXERCISE 3

- a. Equipment being operated: R-1329(P)/GRC-103(V) and  
T-983(P)/GRC-103(V)
- b. Operator action: Set R-1329 selector switch at REFL PWR. Set  
T-983 switch at REFL PWR.
- c. Resulting symptom: (1) R-1329 meter indicates above normal.  
(2) T-983 meter indicates normal.

---

GO ON WITH THE LESSON.

ANSWERS TO EXERCISE 4

1. a. Equipment being operated: Assemblage  
b. Operator action: Apply power to assemblage.  
c. Resulting symptom: (1) POWER INDICATOR neon light fails to glow.  
(2) AC VOLTS meter indicates normal.  
\_\_\_\_\_  
\_\_\_\_\_

2. a. Equipment being operated: TD-204/U  
c. Resulting symptom: (1) No order wire communications through cable link.  
(2) All other indications are normal.  
\_\_\_\_\_  
\_\_\_\_\_

(Notice that this symptom description does not include an operator action.)

3. a. Equipment being operated: T-983(P)/GRC-103(V)  
b. Operator action: Set AC POWER switch to ON/RESET.  
c. Resulting symptom: (1) AC POWER indicator does not light.  
(2) LOW POWER indicator does not light.  
(3) Buzzer is silent.  
(4) Blower does not operate.

4. a. Equipment being operated: T-983(P)/GRC-103(V)
- b. Operator action: Set AC POWER switch to ON/RESET. Set meter selector switch to 600 VDC.
- c. Resulting symptom: (1) LOW POWER indicator does not go out within 60 seconds.
- (2) Meter indication is below normal.
5. a. Equipment being operated: TD-754/G
- b. Operator action: Set METER SELECT switch at CABLE CUR.
- c. Resulting symptom: (1) TEST ALIGN meter shows incorrect indication.
- (2) CABLE CUR indicator is lighted.
- (3) Buzzer sounds.
6. a. Equipment being operated: TD-352/U
- b. Operator action: Set METER SELECT switch at PCM IN. Set METER SELECT switch at TIMING IN.
- c. Resulting symptom: (1) ALARMS FRAME indicator lights.
- (2) Buzzer sounds.
- (3) TEST ALIGN meter indicates in green area.

7. a. Equipment being operated: TD-352/U, TD-202/U, and R-1331(P)/GRC  
b. Operator action: None given.  
c. Resulting symptom: (1) ALARMS FRAME indicator of TD-352/U lights.  
(2) ALARMS TRAFFIC indicator of TD-202/U lights.  
(3) SQUELCH NO SIGNAL indicator of R-1331(P)/GRC lights.
8. a. Equipment being operated: T-893(P)/GRC, TD-352/U, & D-202/U  
b. Operator action: None given.  
c. Resulting symptom: (1) Distant terminal or repeater indicates loss of pcm.  
(2) Loss of pcm input on T-893.  
(3) All indications on TD-352/U are normal.  
(4) All indications on TD-202/U are normal.

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWER TO EXERCISE 5

Item No. 32, because only item No. 32 includes "LOW POWER indicator does not light."

GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 6

1. Item No. 8.  
Explanation: The equipment symptom and Symptom Description No. 8 both break down as follows:
  - a. Equipment being operated: T-983(P)/GRC-103(V) and R-1329(P)/GRC-103(V)
  - b. Operator action: Set selector switch of T-983 at REFL POWER.  
Set selector switch of R-1329 at REFL POWER.
  - c. Resulting symptom: (1) T-983 meter indicates above normal.  
(2) R-1329 meter indicates above normal.
  
2. Item No. 3.  
Explanation: The equipment symptom and Symptom Description No. 3 both break down as follows:
  - a. Equipment being operated : T-983(P)/GRC-103(V)
  - b. Operator action: Set meter selector switch at DOUBLER.  
Set meter selector switch at MULT.
  - c. Resulting symptom: (1) Meter indicates normal with meter selector switch at DOUBLER.  
(2) Meter indicates below normal with meter selector switch at MULT.

3. Item No. 4.  
Explanation: The equipment symptom and Symptom Description No. 4 both break down as follows:
- a. Equipment being operated: T-983(P)/GRC-103(V)
  - b. Operator action: Set meter selector switch at MULT.  
Set meter selector switch at DRIVER.
  - c. Resulting symptom: (1) Meter indicates normal with meter selector switch at MULT.  
(2) Meter indicates below normal with meter selector switch at DRIVER.
4. Item No. 7.  
Explanation: The equipment symptom and Symptom Description No. 7 both break down as follows:
- a. Equipment being operated: T-983(P)/GRC-103(V)
  - b. Operator action: Set meter selector switch at PWR OUT.
  - c. Resulting symptom: (1) LOW POWER indicator remains lit.  
(2) Normal indication on meter.

5. Item No. 5.

Explanation: The equipment symptom and Symptom Description No. 5 both break down as follows:

- a. Equipment being operated: T-983(P)/GRC-103(V) and R-1329(P)/GRC-103(V)
- b. Operator action: Set meter selector switch of T-983 at DRIVER. Set meter selector switch of T-983 at PWR OUT. Set meter selector switch of R-1329 at XMTR DUPL.
- c. Resulting symptom:
  - (1) T-983 meter indicates normal with meter selector switch at DRIVER.
  - (2) T-983 meter indicates below normal with meter selector switch at PWR OUT.
  - (3) R-1329 meter indicates below normal with meter selector switch at XMTR DUPL.

IF YOU DO NOT UNDERSTAND ANY OF THESE ANSWERS,  
AS YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS LESSON,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A  
IN UNIT VIII - LESSON 4.

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT IX**  
**SCALE READING**  
**LESSON 1**  
**LABELING PLACE VALUE**

**PREREQUISITE: None**  
**MATERIALS REQUIRED: None**  
**TYPE OF LESSON: Self-Paced**

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STUDENT GUIDE

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UNIT IX. SCALE READING

Lesson 1. Labeling Place Value

INTRODUCTION:

In the 31M course, you will often use equipment having numbers which must be identified or lined up to one another. This will usually be on meters and dials. The numbers will sometimes look like this: 123.4. It is important for you to know the place value of each of the digits so that you can use the equipment correctly. This lesson will teach you place values for each of the digits in numbers such as 123.4

LEARNING GOALS:

In this lesson, you will learn to:

- A. Understand basic facts about place value (p. 2).
- B. Write numbers (p. 2).
- C. Identify place values (p. 9).

On the pages that follow, you will find material to read and questions to answer. Most of the time you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

When you finish the lesson, your instructor will give you a checkpoint. When you finish the checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

GO TO THE NEXT PAGE TO BEGIN THE LESSON.

Section A

Basic Facts About Place Values

In this lesson, the words digit and place value will be used often. Read the definitions of these words:

DIGIT- A number from 0 to 9.

PLACE VALUE -The value of the location of a digit in a number.

In the 31M10 course, you will be working with numbers having the following place values:

- 1) hundreds
- 2) tens
- 3) ones
- 4) tenths

The hundreds place value tells how many hundreds are in a number.

The tens place value tells how many tens are in a number.

The ones place value tells how many ones are in a number.

The tenths place value tells how many tenths are in a number.

Let's look at the number 123.4.

The digit 1 tells how many hundreds, so it has the place value of hundreds.

The digit 2 tells how many tens, so it has the place value of tens.

The digit 3 tells how many ones, so it has the place value of ones.

The digit 4 tells how many tenths, so it has the place value of tenths.

---

CONTINUE WITH THE NEXT PART OF THE LESSON.

---

Section B

Writing Numbers

Example:    1 2 3 . 4  
              H T O    T  
              U E N    E  
              N N E    N  
              D S S    T  
              R            H  
              E            S  
              D  
              S

Unit IX  
Lesson 1

Example: 3 4 7 . 9

H	T	O	T
U	E	N	E
N	N	E	N
D	S	S	T
R			H
E			S
D			
S			

Example: 2 1 1 . 3

H	T	O	T
U	E	N	E
N	N	E	N
D	S	S	T
R			H
E			S
D			
S			

Notice that tens and tenths mean different things. The digit in the tens place tells how many tens are in a number. For example, in 324.5 there are 2 tens in the number. The digit in the tenths place tells how many tenths are in a number. For example, in 324.5 there are 5 tenths in the number. The tens place is to the left of the decimal point. The tenths place is to the right of the decimal point.

Now you know where the place values are located. The next step is for you to make up the numbers when you are given the digits along with the place values they hold. Here is an example:

If the digit 8 has the place value of hundreds  
If the digit 2 has the place value of tens  
If the digit 3 has the place value of ones  
If the digit 7 has the place value of tenths

8 2 3 . 7

H	T	O	T
U	E	N	E
N	N	E	N
D	S	S	T
R			H
E			S
D			
S			

We can write the answer as 823.7 since:

And another example:

If the digit 5 has the place value of ones  
 If the digit 9 has the place value of hundreds  
 If the digit 4 has the place value of tenths  
 If the digit 1 has the place value of tens

9 1 5 . 4

H	T	O	T
U	E	N	E
N	N	E	N
D	S	S	T
R			H
E			S
D			
S			

We can write the answer as 915.4 since:

EXERCISE 1

1. If the digit 1 has the place value of hundreds  
 If the digit 2 has the place value of tens  
 If the digit 3 has the place value of ones  
 If the digit 4 has the place value of tenths

Write the digits in the correct blanks.

—	—	—	.	—
H	T	O		T
U	E	N		E
N	N	E		N
D	S	S		T
R				H
E				S
D				
S				

2. If the digit 7 has the place value of tenths  
 If the digit 2 has the place value of ones  
 If the digit 8 has the place value of tens  
 If the digit 5 has the place value of hundreds

Write the digits in the correct blanks.

—	—	—	.	—
H	T	O		T
U	E	N		E
N	N	E		N
D	S	S		T
R				H
E				S
D				
S				

3. If the digit 6 has the place value of tens  
 If the digit 8 has the place value of hundreds  
 If the digit 1 has the place value of tenths  
 If the digit 4 has the place value of ones

Write the digits in the correct blanks.

_	_	_	.	_
H	T	O		T
U	E	N		E
N	N	E		N
D	S	S		T
R				H
E				S
D				
S				

4. If the digit 2 has the place value of ones  
 If the digit 2 has the place value of tenths  
 If the digit 5 has the place value of hundreds  
 If the digit 5 has the place value of tens

Write the digits in the correct blanks.

_	_	_	.	_
H	T	O		T
U	E	N		E
N	N	E		N
D	S	S		T
R				H
E				S
D				
S				

CHECK YOUR ANSWERS ON PAGE 11.

Now let's see how well you can do the next ones. Here is an example:

**PROBLEM:** Write the number having:

- a. the digit 7 in the hundreds place
- b. the digit 3 in the tens place
- c. the digit 5 in the ones place
- d. the digit 6 in the tenths place

**ANSWER:** 735.6

This is the correct answer because we know: 7 3 5 . 6

H	T	O	T
U	E	N	E
N	N	E	N
D	S	S	T
R			H
E			S
D			
S			

Here are three more examples:

**EXAMPLE:** Write the number having:

- a. the digit 9 in the tenths place
- b. the digit 4 in the tens place
- c. the digit 0 in the ones place
- d. the digit 3 in the hundreds place

**ANSWER:** 340.9

This is the correct answer because we know: 3 4 0 . 9

H	T	O	T
U	E	N	E
N	N	E	N
D	S	S	T
R			H
E			S
D			
S			

EXAMPLE: Write a number having

- a. the digit 6 in the hundreds place
- b. the digit 4 in the tens place
- c. the digit 8 in the ones place
- d. the digit 7 in the tenths place

ANSWER: 648.7

This is the correct answer because we know:

6 4 8 . 7

H	T	O	T
U	E	N	E
N	N	E	N
D	S	S	T
R			H
E			S
D			
S			

EXAMPLE: Write a number having:

- a. the digit 2 in the tens place
- b. the digit 7 in the tenths place
- c. the digit 3 in the hundreds place
- d. the digit 1 in the ones place.

IX 1-7

ANSWER: 321.7

This is the correct answer because we know:

3 2 1 . 7

H	T	O	T
U	E	N	E
N	N	E	N
D	S	S	T
R			H
E			S
D			
S			

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 2

1. Write the number having:

the digit 7 in the hundreds place  
the digit 3 in the tens place  
the digit 2 in the ones place  
the digit 6 in the tenths place

ANSWER: \_\_\_\_\_

2. Write the number having:

the digit 1 in the tenths place  
the digit 5 in the ones place  
the digit 9 in the tens place  
the digit 4 in the hundreds place

ANSWER: \_\_\_\_\_

3. Write the number having:

the digit 6 in the ones place  
the digit 0 in the tenths place  
the digit 7 in the hundreds place  
the digit 3 in the tens place

ANSWER: \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 12.

Section C

Identifying Place Value

Now it is your turn to identify the place values on numbers. For each of the numbers listed below write the name of the correct place value in the blank(s).

Here are examples:

EXAMPLE: 2 2 3 . 2

|

ANSWER: 2 2 3 . 2

O  
N  
E  
S

EXAMPLE: 7 5 7 . 7

|

ANSWER: 7 5 7 . 7

T  
E  
N  
S

EXERCISE 3

Put the place values in the blanks for the numbers below:

1. 1 2 3 . 4

|

2. 2 8 7 . 3

|

3. 3 3 7 . 5

|

4. 6 8 7 . 6

|

CHECK YOUR ANSWERS ON PAGE 13.

ANSWER KEYS TO EXERCISES IN UNIT IX, LESSON 1

Unit IX  
Lesson 1

ANSWERS TO EXERCISE 1

1. 123.4
2. 582.7
3. 864.1
4. 552.2

CONTINUE WITH THE LESSON.

---

ANSWERS TO EXERCISE 2

1. ANSWER is 732.6 since 7 3 2 . 6

H T O T  
U E N E  
N N E N  
D S S T  
R H  
E S  
D  
S

2. ANSWER is 495.1 since 4 9 5 . 1

H T O T  
U E N E  
N N E N  
D S S T  
R H  
E S  
D  
S

3. ANSWER is 736.0 since 7 3 6 . 0

H T O T  
U E N E  
N N E N  
D S S T  
R H  
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D  
S

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO QUESTIONS ON THE PREVIOUS PAGE.

1. 1 2 3 . 4

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2. 2 8 7 . 3

T  
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S

3. 3 3 7 . 5

H  
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S

4. 6 8 7 . 6

T  
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S

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS LESSON,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A  
IN UNIT IX - LESSON 1.

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT IX**  
**SCALE READING**

**LESSON 2**  
**NUMBERING SCALE POINTS**

**PREREQUISITE: None**  
**MATERIALS REQUIRED: None**  
**TYPE OF LESSON: Self-Paced**

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STUDENT GUIDE

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UNIT IX. SCALE READING

Lesson 2. Numbering Scale Points

INTRODUCTION:

In the 31M course, you will use many types of equipment. On many pieces of equipment are dials which you set and meters which you read. These settings and readings are often measured by using scales.

In this lesson, you will learn to read scales similar to those used in the 31M course.

LEARNING GOALS:

In this lesson, you will learn to:

- A. Identify the value of unnumbered points on a fives scale (p. 2).
- B. Identify the value of unnumbered points on a ones scale (p. 2).
- C. Identify the value of unnumbered points on a tens scale (p. 9).
- D. Identify the value of points on a hundreds scale (p. 13).

On the pages that follow, you will find material to read and questions to answer. Most of the time you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

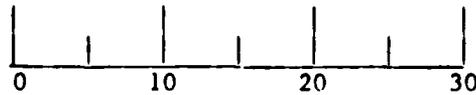
When you finish the lesson, your instructor will give you a checkpoint. When you finish the checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

GO ON TO THE NEXT PAGE TO BEGIN THE LESSON.

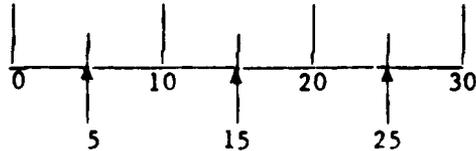
## Section A

### Identify the Value of Unnumbered Points on a Fives Scale

There are many meanings for the word scale. Fish have scales that cover their bodies. We can climb, or scale, a wall. We weigh ourselves on bathroom scales. In music, a group of tones is called a musical scale. These are all proper uses of the word scale, but in the 31M course, the word scale means a group of spaces marked by lines which is used to measure something. Here is an example of a scale like the ones you will be using in the 31M course.



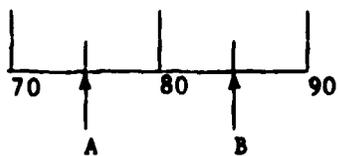
This scale looks something like a ruler, doesn't it? Some of the lines are labeled with numbers and some are not. Even though all of the lines are not numbered, we can guess, or estimate, the values of the unmarked lines. For example, on the example given above, it looks like the unlabeled lines are in the middle of the spaces between 0 and 10, 10 and 20, and 20 and 30. If they are in the middle of these spaces, they probably represent 5, 15, and 25, as shown.



So, on this scale, we can find the labeled numbers (0, 10, 20, and 30) and can also find lines representing 5, 15, and 25, even though these numbers are not written down for us. This is called a fives scale because the value of each line increases by five.

On the next page are some examples.

EXAMPLE: What numbers do A and B stand for?

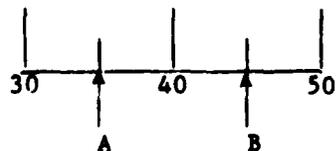


ANSWER:

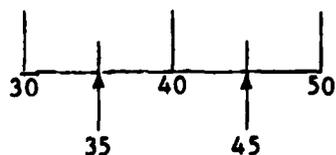


Since the unlabeled lines are in the middle of 70 - 80, and 80 - 90, they stand for 75 and 85, as shown.

EXAMPLE: What numbers do A and B stand for?



ANSWER:

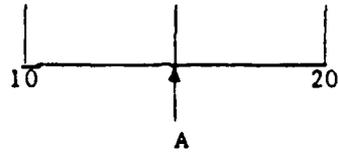


Since the unlabeled lines are in the middle of 30 - 40, and 40 - 50, they stand for 35 and 45, as shown.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

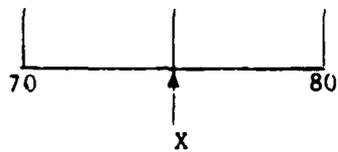
EXERCISE 1

1. What number does A stand for?



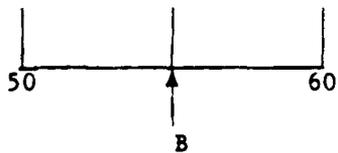
ANSWER: \_\_\_\_\_

2. What number does X stand for?



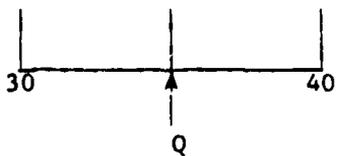
ANSWER: \_\_\_\_\_

3. What number does B stand for?



ANSWER: \_\_\_\_\_

4. What number does Q stand for?



ANSWER: \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 20.

Section B

Identify the Value of Unnumbered Points on a Ones Scale

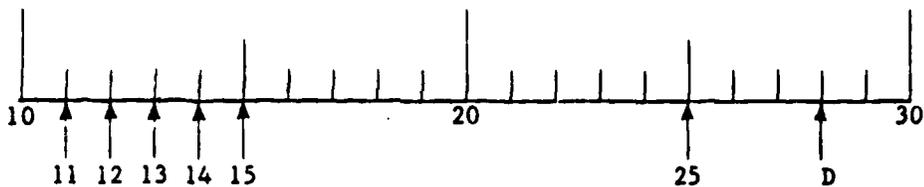
Let's look at another type of scale.



We can see that the lines standing for 10, 20, and 30 are marked. And like the last problems you did, we can tell that:

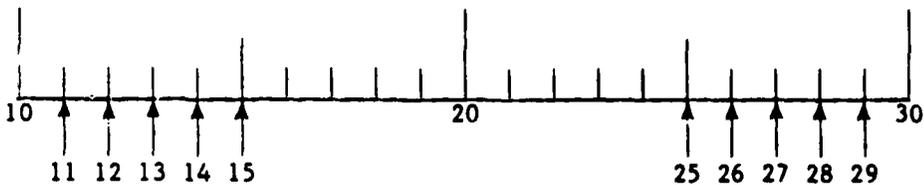
- A stands for 15 because it is in the middle of 10 and 20.
- B stands for 25 because it is in the middle of 20 and 30.

How what about the letter C. Look at the number of small lines between 10 and the letter A. There are four small lines. Since the letter A stands for 15 and there are four small lines between 10 and 15, each small line stands for a number between 10 and 15, as shown below.



And we see that the letter C stands for the number 12.

What about letter D? Just like before, we can see that each small line stands for a number between 25 and 30, as shown below.



And we see that the letter D stands for the number 28.

In the 31M course you will often be given a scale that looks like this:

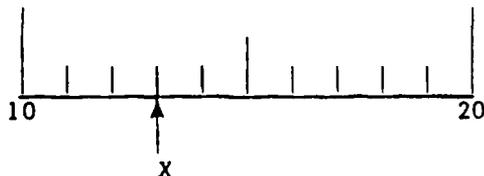


And you will be able to tell what number is represented by each of the unlabeled lines.

Usually, there is one middle line, for example, the middle line between 50 and 60 which stands for 55. The smallest lines stand for the number in between the labeled point and a middle line. This is called a ones scale because the value of each line increases by one.

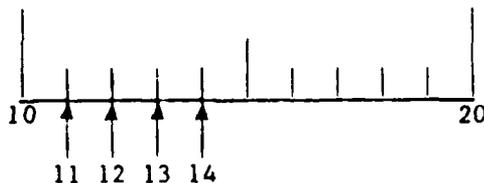
Here are some examples.

EXAMPLE: What number does X stand for?

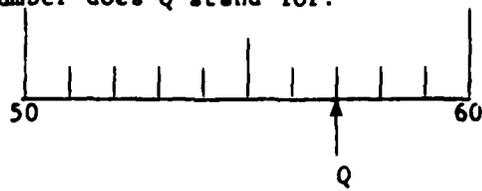


ANSWER: 13

The answer is 13 because the unmarked lines can be labeled like this:

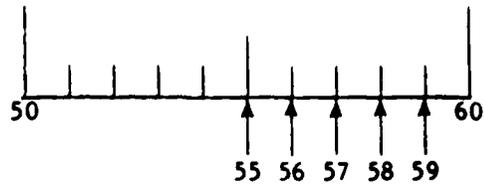


EXAMPLE: What number does Q stand for?



ANSWER: 57

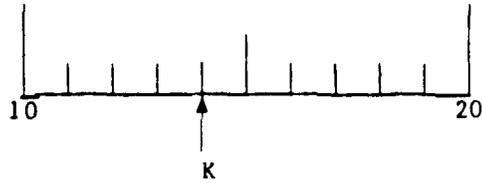
This answer is 57 because the unmarked lines can be labeled like this:



ANSWER THE QUESTIONS ON THE NEXT PAGE.

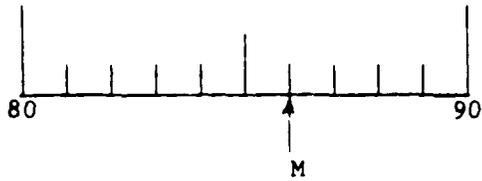
EXERCISE 2

1. What number does the letter K stand for?



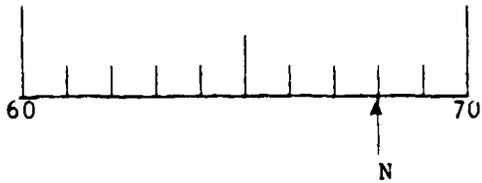
ANSWER: \_\_\_\_\_

2. What number does the letter M stand for?



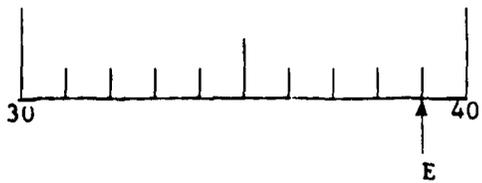
ANSWER: \_\_\_\_\_

3. What number does the letter N stand for?



ANSWER: \_\_\_\_\_

4. What number does the letter E stand for?



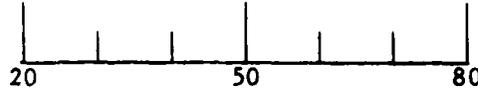
ANSWER: \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 21.

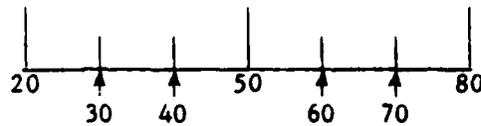
Section C

Identify the Value of Points on a Tens Scale

Now you know about Fives Scales and Ones Scales. You will also see Tens Scales on the equipment used in the 31M course. A Tens Scale may look something like the one shown below:



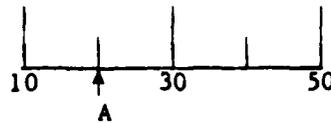
The lines standing for 20, 50, and 80 are marked. The smaller lines between the labeled ones increase by tens, as shown below:



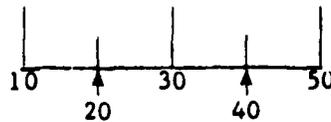
You will have to figure out the values of the unlabeled points.

Here are some examples:

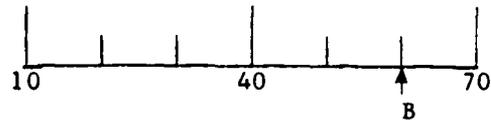
EXAMPLE: What number does A stand for?



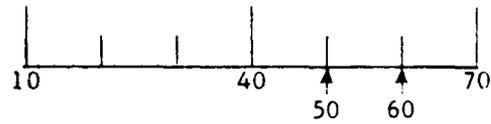
ANSWER: The answer is 20 because:



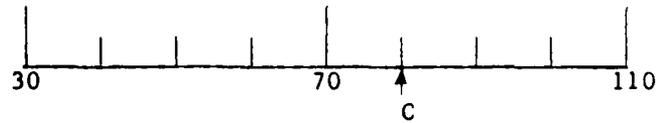
EXAMPLE: What number does B stand for?



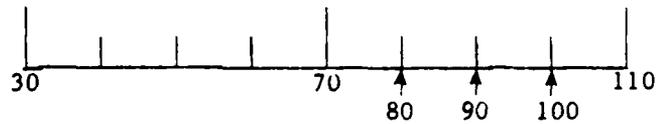
ANSWER: The answer is 60 because:



EXAMPLE: What number does C stand for?



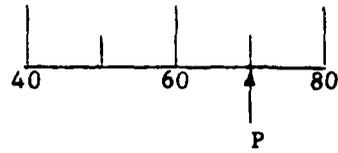
ANSWER: The answer is 80 because:



ANSWER THE QUESTIONS ON THE NEXT PAGE.

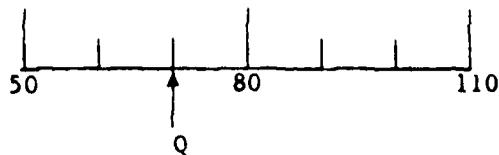
EXERCISE 3

1. What number does P stand for?



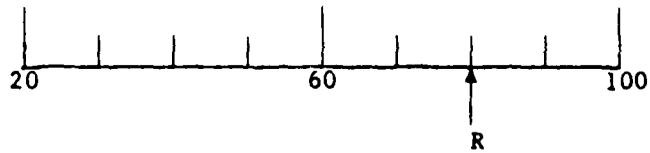
ANSWER \_\_\_\_\_

2. What number does Q stand for?



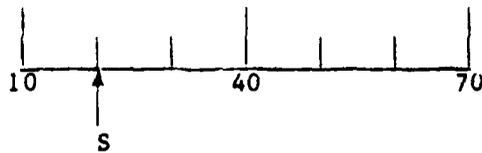
ANSWER \_\_\_\_\_

3. What number does R stand for?



ANSWER \_\_\_\_\_

4. What number does S stand for?



ANSWER \_\_\_\_\_

What number does T stand for?



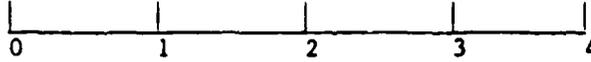
Answer \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 22.

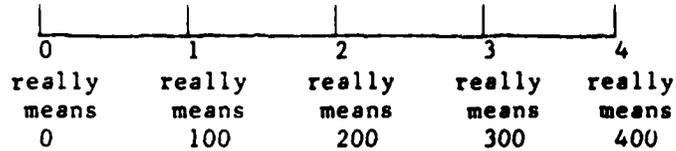
Section D

Identify the Value of Unit Points on a Hundreds Scale

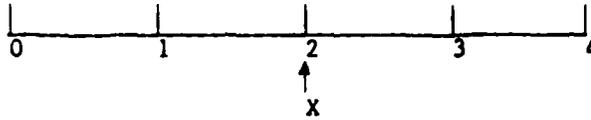
So far, so good. But now things get a bit more complicated. Some scale you will use look like this:



No big change. It doesn't look much different from the ones we already know about. But, wait a minute, we are told that this is a HUNDREDS scale. That means that each of those numbers stand for hundreds, like this:

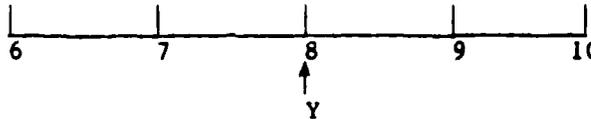


So, if we are told that the scale below is a hundreds scale and are asked what number the letter X stands for, do you know the answer?



ANSWER: 200      Since each of the numbers represents hundreds.

The scale below is a hundreds scale. What number does the letter Y stand for?



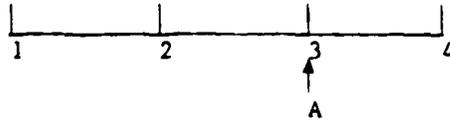
ANSWER: 800      Since each of the numbers stands for that many hundreds.

Not so tough are they?

ANSWER THE QUESTIONS ON THE NEXT PAGE.

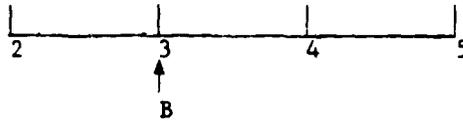
EXERCISE 4

1. The scale below is a hundreds scale.  
What number does the letter A stand for?



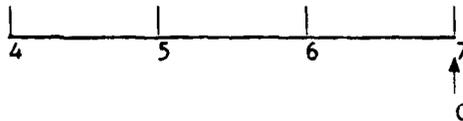
ANSWER: \_\_\_\_\_

2. The scale below is a hundreds scale.  
What number does the letter B stand for?



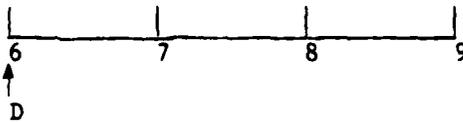
ANSWER: \_\_\_\_\_

3. The scale below is a hundreds scale.  
What number does the letter C stand for?



ANSWER: \_\_\_\_\_

4. The scale below is a hundreds scale.  
What number does the letter D stand for?



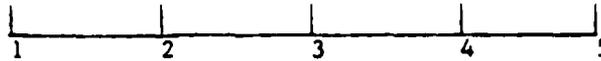
ANSWER: \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 23.

## Reading Right-to-Left Scales

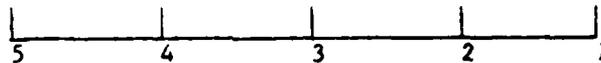
In all of the examples and exercises that have been in this lesson so far, the scale values have increased going from left to right.

For example:



The numbers increase from 1 to 5 in a left to right direction. This is the way we usually see scales. However, you will sometimes see them numbered in the opposite direction.

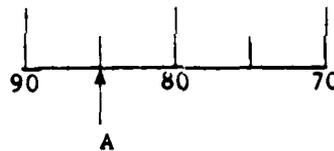
For example:



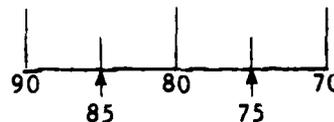
The numbers increase from 1 to 5 in a right to left direction. You will see this right-to-left scale in the 3M course.

They may be a ones, fives, tens, or hundreds scale, and you read them just the way you read left-to-right scales.

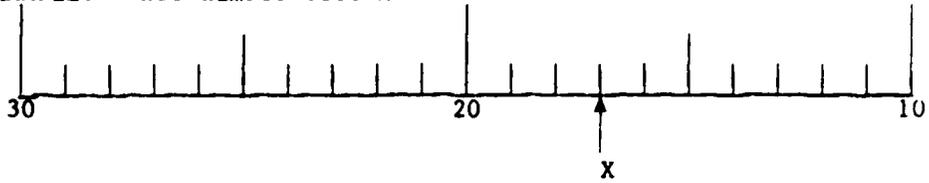
EXAMPLE: What number does A stand for?



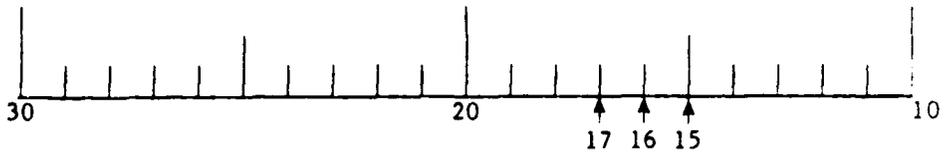
ANSWER: 85 because:



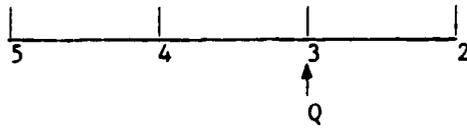
EXAMPLE: What number does X stand for?



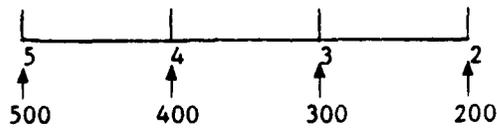
ANSWER: 17 because:



EXAMPLE: The scale below is a hundreds scale.  
What number does the letter Q stand for?



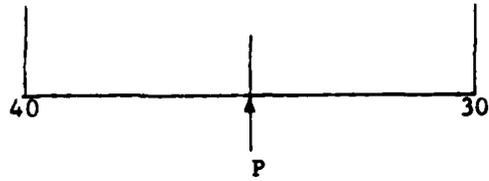
ANSWER: 300 because:



ANSWER THE QUESTIONS ON THE NEXT PAGE.

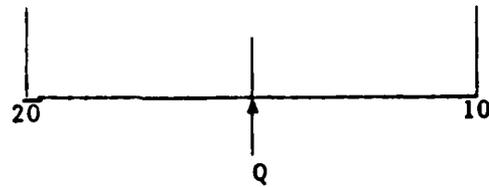
EXERCISE 5

1. What number does P stand for?



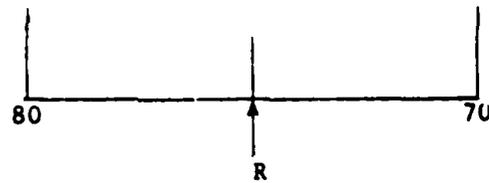
ANSWER: \_\_\_\_\_

2. What number does Q stand for?



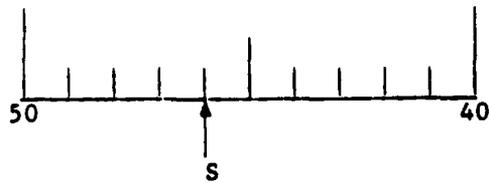
ANSWER: \_\_\_\_\_

3. What number does R stand for?



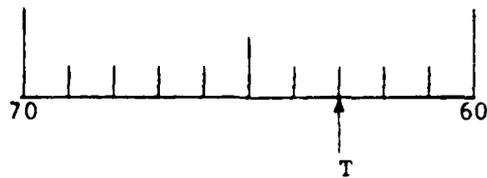
ANSWER: \_\_\_\_\_

4. What number does S stand for?



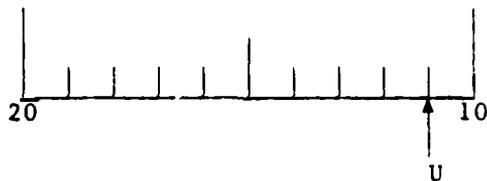
ANSWER: \_\_\_\_\_

6. What number does T stand for?



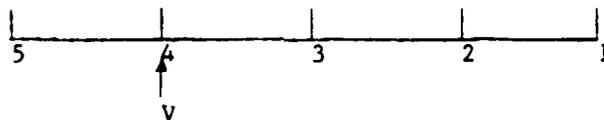
ANSWER: \_\_\_\_\_

7. What number does U stand for?



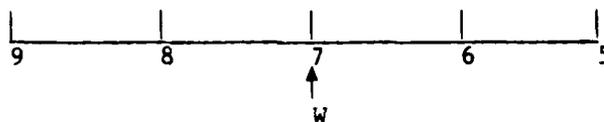
ANSWER: \_\_\_\_\_

7. The scale below is a hundreds scale.  
What number does the letter V stand for?



ANSWER: \_\_\_\_\_

8. The scale below is a hundreds scale.  
What number does the letter W stand for?



ANSWER: \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 24.

ANSWER KEYS TO EXERCISES IN UNIT IX, LESSON 2

Unit IX  
Lesson 2

19

ANSWERS TO EXERCISE 1

1. 15      Since A is in the middle of 10 and 20, A stands for 15.
2. 75      Since X is in the middle of 70 and 80, X stands for 75.
3. 55      Since B is in the middle of 50 and 60, B stands for 55.
4. 35      Since Q is in the middle of 30 and 40, Q stands for 35.

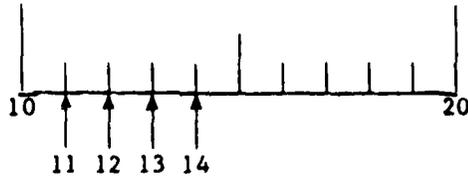
IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

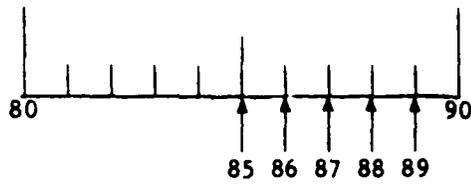
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ANSWERS TO EXERCISE 2

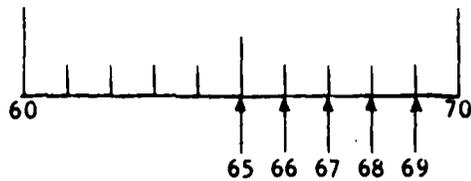
1. 14 Since the unnumbered lines can be labeled like this:



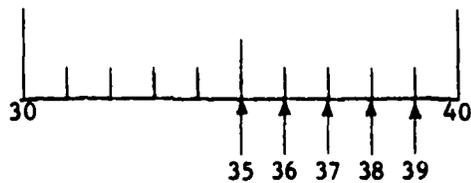
2. 86 Since the unnumbered lines can be labeled like this:



3. 68 Since the unnumbered lines can be labeled like this:



4. 39 Since the unnumbered lines can be labeled like this:



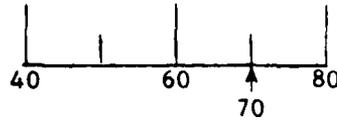
IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

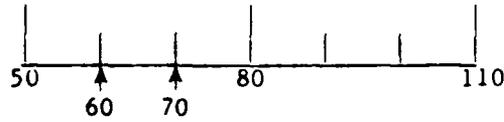
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ANSWERS TO EXERCISE 3

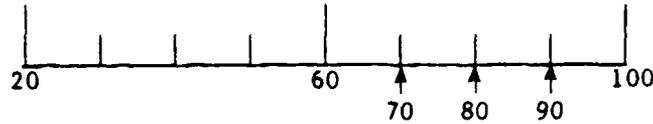
1. 70 because:



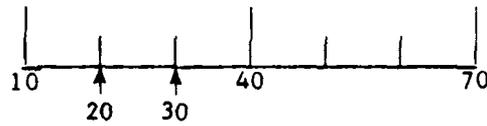
2. 70 because:



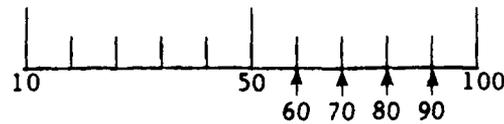
3. 80 because:



4. 20 because:



5. 60 because:



IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

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ANSWERS TO EXERCISE 4

Since each number stands for that many hundreds, the answers are:

1. 300
2. 300
3. 700
4. 600

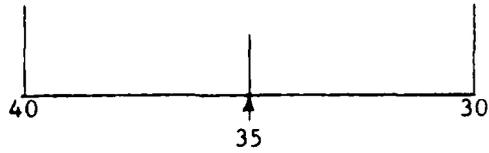
IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON WITH THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

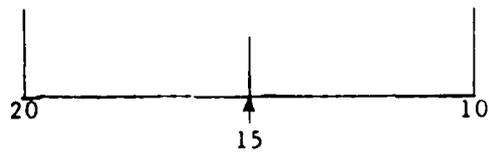
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ANSWERS TO EXERCISE 5

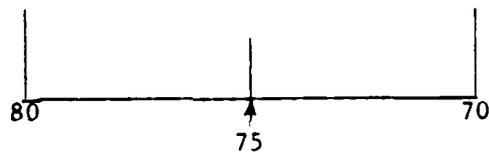
1. 35 because:



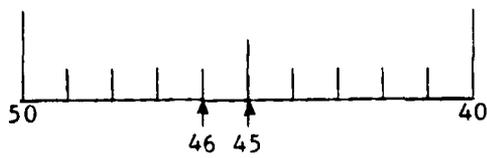
2. 15 because:



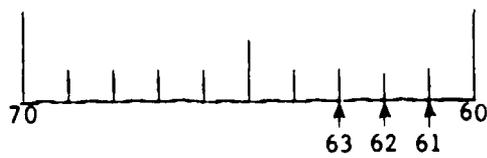
3. 75 because:



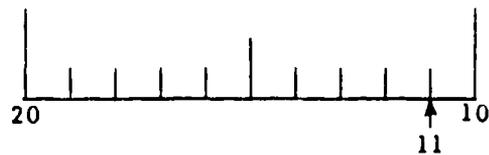
4. 46 because:



5. 63 because:



6. 11 because:



7. 400

8. 700

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS LESSON,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A  
IN UNIT IX - LESSON 2.

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT IX**  
**SCALE READING**

**LESSON 3**  
**SCALES DIVIDED INTO TENTHS**

**PREREQUISITE: None**  
**MATERIALS REQUIRED: None**  
**TYPE OF LESSON: Self-Paced**

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STUDENT GUIDE

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UNIT IX. SCALE READING

Lesson 3. Scales Divided into Tenths

INTRODUCTION:

In the 31M course, you will often deal with components that use, or refer to, numbers that are between zero and one. We call these decimal fractions. Some examples are: 0.3, 0.7, and 0.8. It is important for you to know what these decimal fractions mean and how to recognize them on meters and dials. This lesson will teach you the decimal fractions you will need to know for the 31M course, and will teach you to recognize these decimal fractions on scales. We will call a scale measuring decimal fractions by the name, decimal scale.

LEARNING GOALS:

In this lesson, you will learn to:

- A. Define the term decimal scale (p. 2).
- B. Assign values to scale divisions (p. 14).
- C. Identify the value of a line on a scale (p. 17).

On the pages that follow, you will find material to read and questions to answer. Most of the time you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

When you finish the lesson, your instructor will give you a checkpoint. When you finish the checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

GO ON TO THE NEXT PAGE TO BEGIN THE LESSON.

## Section A

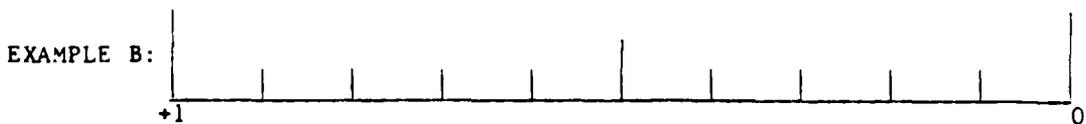
### Examples and Explanations of Scales

You already know that the scales used in the Army, and more specifically in the 31M course, are not fish scales or bathroom scales, but are devices used to measure things. In the 31M course, you will use many kinds of scales. For example, you might use one that measures ones as this one does:



You know that each of those unnumbered lines stands for the next whole number taken in order. Even though all of the small lines are not numbered, we can tell what numbers they stand for.

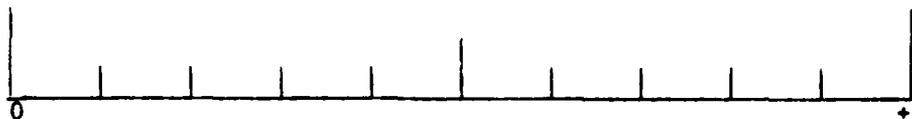
This is also true of scales which measure values between zero and one. For example, look at the scales shown here.



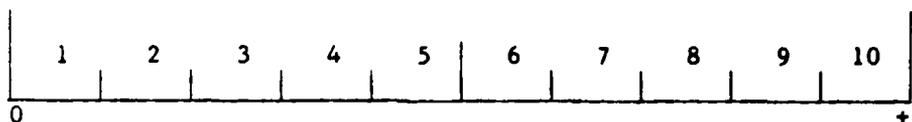
The unnumbered lines on these scales do not stand for whole numbers. They stand for equal parts (or fractions) of the line between 0 and +1. They can be used to measure things that have values between 0 and +1 and they are called decimal scales.

The difference between the two scales is the direction of them. Example A is the more common-looking scale, with +1 to the right of 0. However, you will also see scales like Example B in the 31M course. On such scales, +1 is to the left of 0. Since you will be using scales like both Example A and Example B, we will discuss each one in turn.

Look at the scale below:



Notice that the nine unnumbered lines divide the line segment into ten equal parts, as shown below:



Because the unnumbered lines divide the line segment into ten equal parts, each segment is called a tenth. And we name each of the unnumbered lines in order:

<u>Name</u>	<u>Number</u>
one-tenth	- 0.1
two-tenths	- 0.2
three-tenths	- 0.3
four-tenths	- 0.4
five-tenths	- 0.5
six-tenths	- 0.6
seven-tenths	- 0.7
eight-tenths	- 0.8
nine-tenths	- 0.9

You need to remember the names of the numbers as they are listed. Look at the list of numbers and their names and read the following examples:

EXAMPLE A.

One-tenth means what number?

ANSWER: 0.1

EXAMPLE B:

Nine-tenths means what number?

ANSWER: 0.9

EXAMPLE C:

Write the name for the number 0.3.

ANSWER: three-tenths

Unit IX  
Lesson 3

3

EXAMPLE D:

Write the name for the number 0.7.

ANSWER: seven-tenths

EXERCISE 1

1. Two-tenths means what number? ANSWER: \_\_\_\_\_
2. Three-tenths means what number? ANSWER: \_\_\_\_\_
3. Eight-tenths means what number? ANSWER: \_\_\_\_\_
4. Six-tenths means what number? ANSWER: \_\_\_\_\_
5. Four-tenths means what number? ANSWER: \_\_\_\_\_
6. Write the name for the number 0.1. ANSWER: \_\_\_\_\_
7. Write the name for the number 0.5. ANSWER: \_\_\_\_\_
8. Write the name for the number 0.9. ANSWER: \_\_\_\_\_
9. Write the name for the number 0.7. ANSWER: \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 22.

So you see that all of the values shown on a decimal scale are named tenths (like one-tenth, five-tenths). And in the work you will be doing for the 31M course, the tenths will most often be written with a leading zero followed by a decimal point, and the point will be followed by a number indicating the number of tenths.

For example

0                    .                    7  
  ↑                    ↑                    ↑  
leading            decimal            number of  
zero                point                tenths

### EXERCISE 2

Put an X beside each of the following that name values shown on a decimal scale.

1.    \_\_\_ a. one-tenth  
      \_\_\_ b. one-third  
      \_\_\_ c. four-tenths  
      \_\_\_ d. one-fourth  
      \_\_\_ e. one-ninth  
      \_\_\_ f. nine-tenths  
      \_\_\_ g. three-tenths  
      \_\_\_ h. one-sixth  
      \_\_\_ i. six-tenths

2. Put an X beside each of the following that are tenths.

\_\_\_\_\_ a. .07

\_\_\_\_\_ b. 0.7

\_\_\_\_\_ c. 0.2

\_\_\_\_\_ d. .02

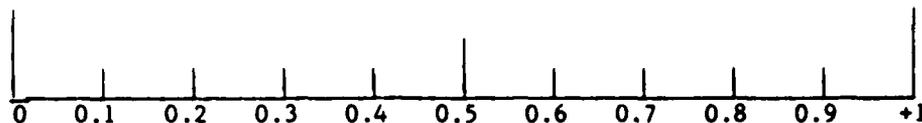
\_\_\_\_\_ e. .003

\_\_\_\_\_ f. 3.0

\_\_\_\_\_ g. 0.3

CHECK YOUR ANSWERS ON PAGE 23.

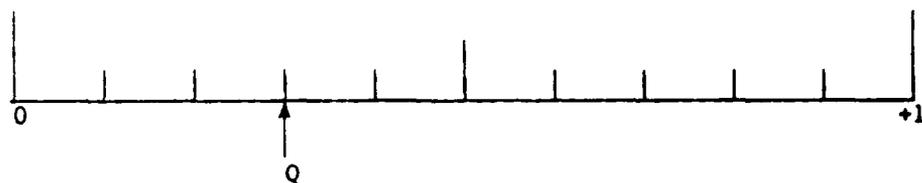
We can label each of the unnumbered lines like this:



In the following examples, we used the scale above to find the answers:

EXAMPLE A:

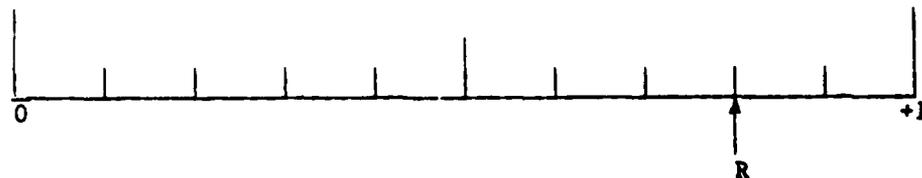
What number does the letter Q stand for?



ANSWER: 0.3 or three-tenths. To find any value along the decimal scale, we start at 0 and count the number of lines that indicate tenths. In this case, we count 3 small lines to reach Q, so Q is three-tenths.

EXAMPLE B:

What number does the letter R stand for? Remember to start at 0 and count the number of small lines until you reach R.

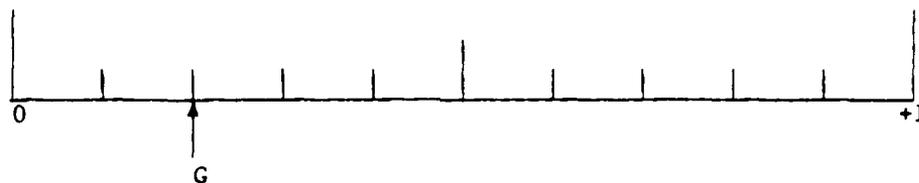


ANSWER: 0.8 or eight-tenths

### EXERCISE 3

For each of the questions below, pick the best answer and put an "X" beside it. Remember to start at 0 and count toward +1.

1. What number does the letter G stand for?



- a. 1.0
- b. two
- c. 0.1
- d. two-tenths

2. What number does the letter H stand for?



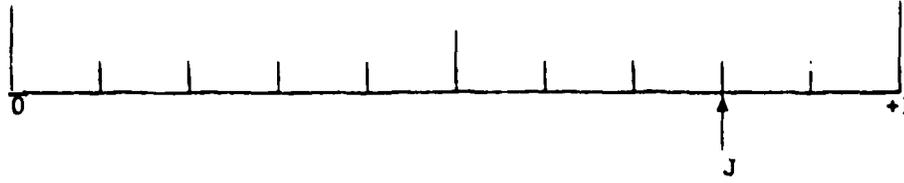
- a. 0.1
- b. 0.6
- c. seven-tenths
- d. one-sixth

3. What number does the letter I stand for?



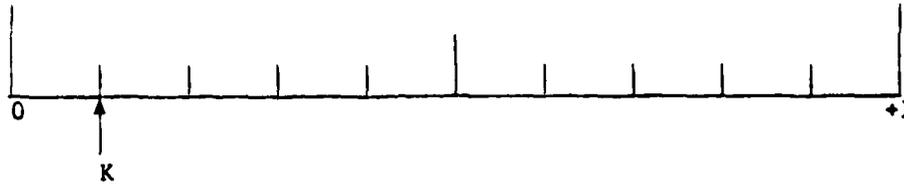
- a. 0
- b. 0.1
- c. five-tenths
- d. one-fifth

4. What number does the letter J stand for?



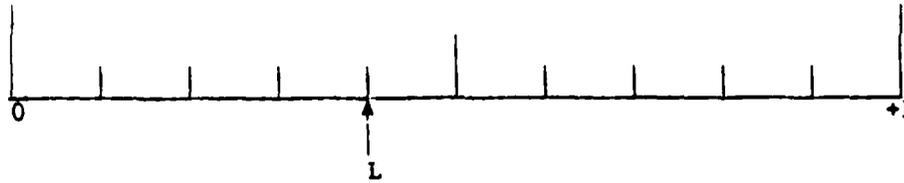
- a. 0.3
- b. 0.8
- c. one-eighth
- d. four-tenths

5. What number does the letter K stand for?



- a. 0.1
- b. 0.01
- c. 1.0
- d. 10

6. What number does the letter L stand for?



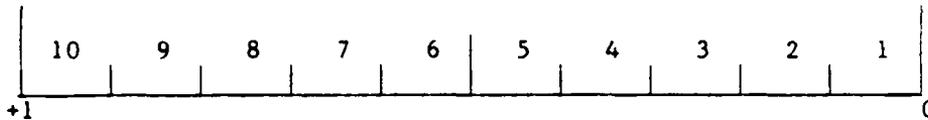
- a. 0.5
- b. .05
- c. 0.4
- d. .04

CHECK YOUR ANSWERS ON PAGE 24.

Now, let's study the other scale. Remember, it's the one that goes in the opposite direction. Notice that +1 is to the left of 0.



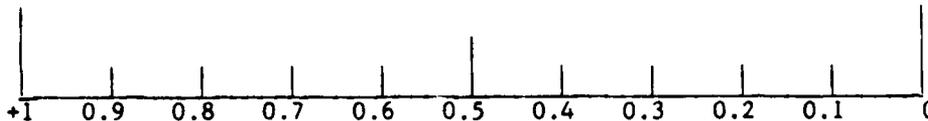
But the unnumbered lines still divide the line segment into ten equal parts (just like the scale going in the opposite direction). See the example below:



Notice that we started counting the parts at 0 and moved toward +1. Because the unnumbered lines divide the line segment into ten equal parts, each segment is called a tenth. And we name each of the unnumbered lines in order, starting at 0 and moving toward +1:

<u>Name</u>	<u>Number</u>
one-tenth	- 0.1
two-tenths	- 0.2
three-tenths	- 0.3
four-tenths	- 0.4
five-tenths	- 0.5
six-tenths	- 0.6
seven-tenths	- 0.7
eight-tenths	- 0.8
nine-tenths	- 0.9

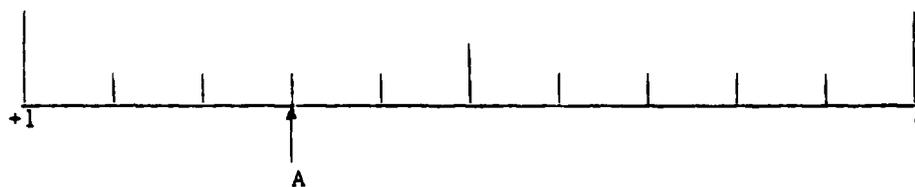
This list should look familiar to you. Here is how we label each of the unnumbered lines:



In the following examples, we used the scale above to find the answers.

EXAMPLE A:

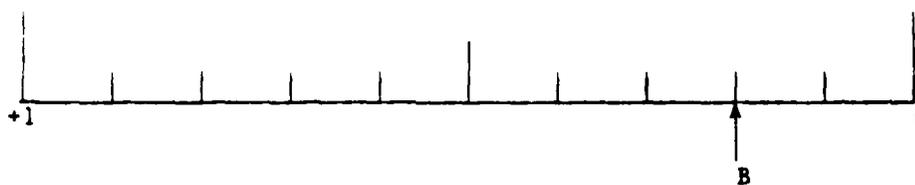
What number does the letter A stand for?



ANSWER: 0.7 or seven-tenths. Remember to start at 0 and count the number of lines over to A. There are 7 small lines, so A is seven-tenths.

EXAMPLE B:

What number does the letter B stand for? Remember to start at 0 and count over to B.

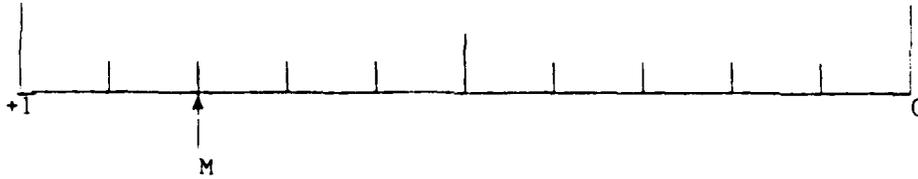


ANSWER: 0.2 or two-tenths

EXERCISE 4

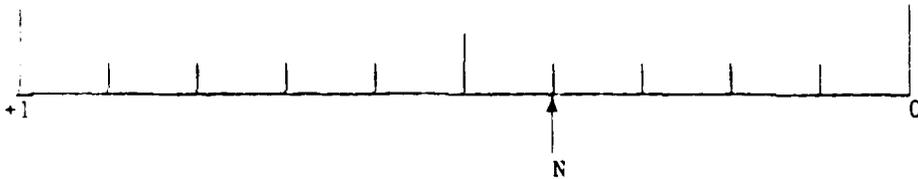
For each of the questions below, pick the best answer and put an "X" beside it.

1. What number does the letter M stand for?



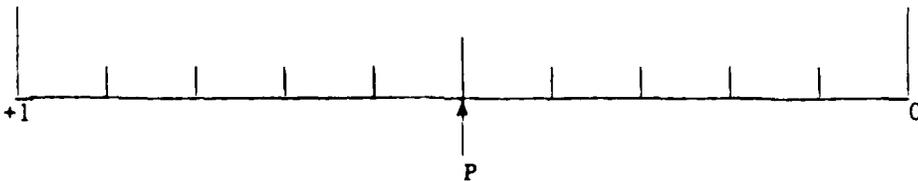
- a. 0.8
- b. 0.2
- c. one-eighth
- d. three-tenths

2. What number does the letter N stand for?



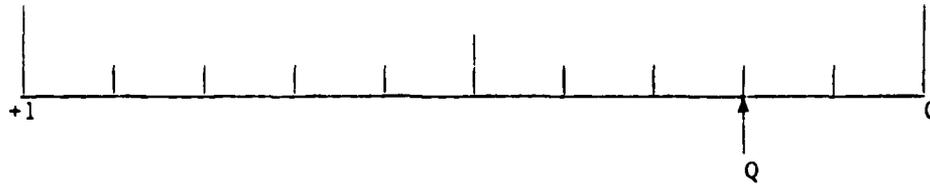
- a. one-tenth
- b. 0.5
- c. 0.6
- d. four-tenths

3. What number does the letter P stand for?



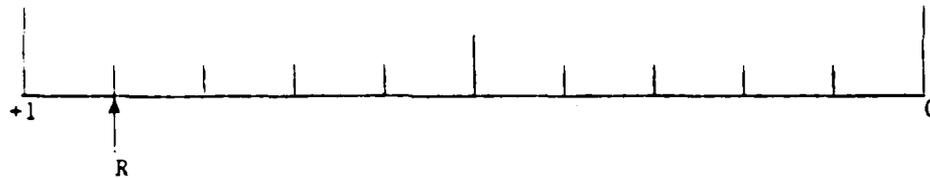
- a. 0.5
- b. .05
- c. one-fifth
- d. 0.6

4. What number does the letter Q stand for?



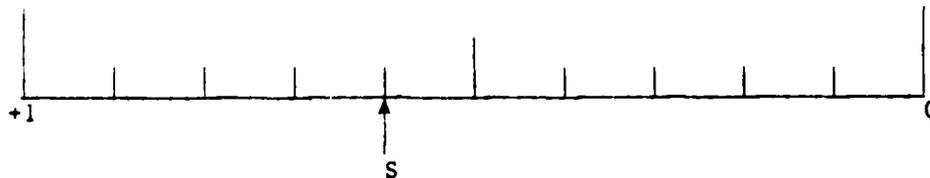
- a. 0.2
- b. 0.3
- c. 0.8
- d. .04

5. What number does the letter R stand for?



- a. .01
- b. 0.1
- c. nine-tenths
- d. one-ninth

6. What number does the letter S stand for?



- a. one-sixth
- b. six-tenths
- c. .04
- d. 0.4

CHECK YOUR ANSWERS ON PAGE 25.

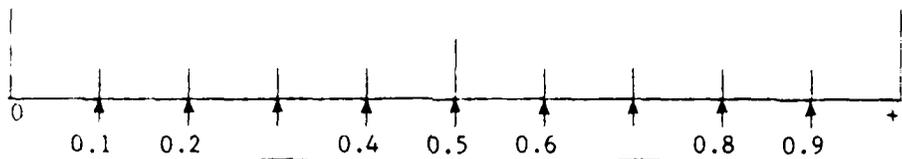
Section B

Assigning Values to Scale Divisions

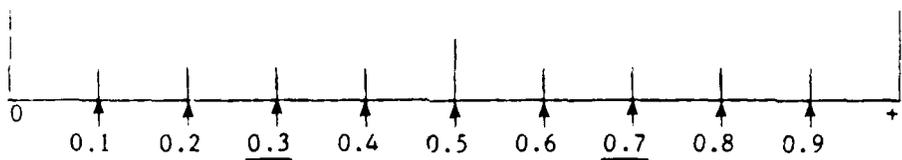
In this part of the lesson, you will be asked to give the value of scale divisions. Look at these examples.

EXAMPLE A:

Fill in the missing values.



ANSWER:

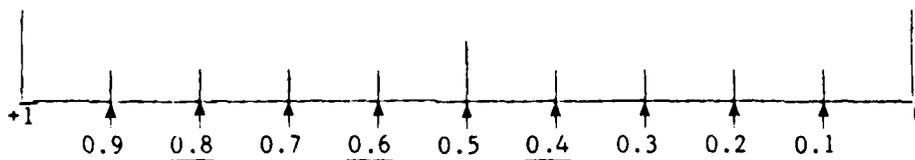


EXAMPLE B:

Fill in the missing values.

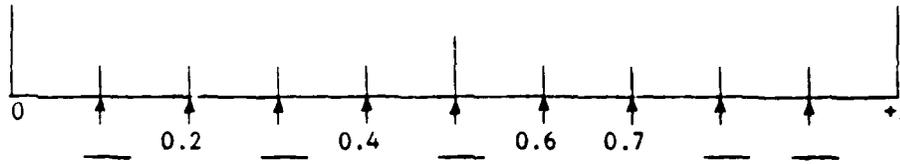


ANSWER:

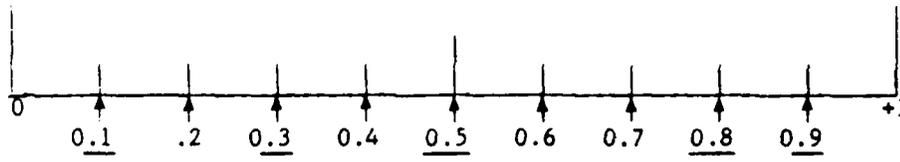


EXAMPLE C:

Fill in the missing values.



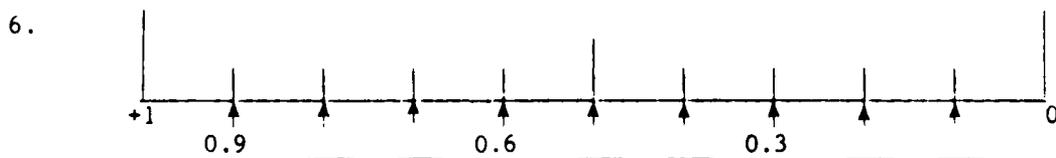
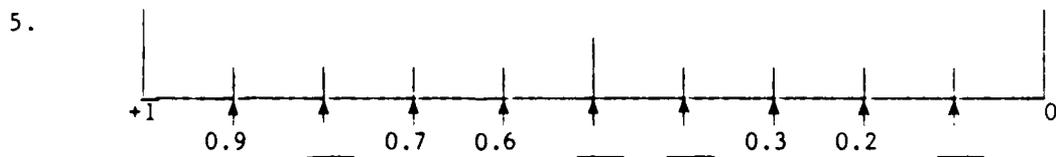
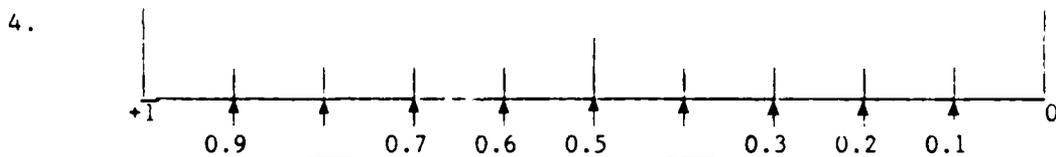
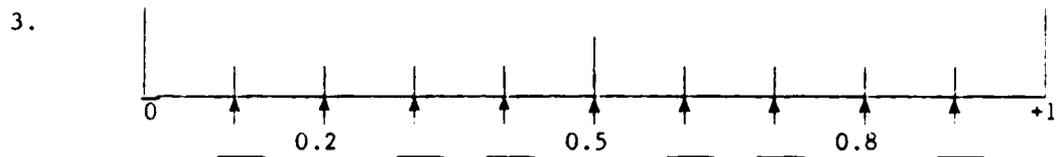
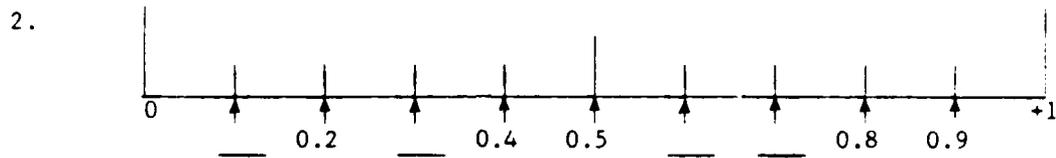
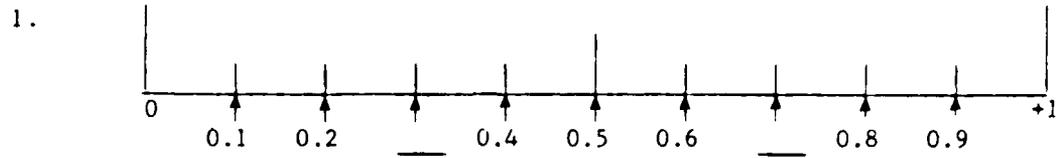
ANSWER:



ANSWER THE QUESTIONS ON THE NEXT PAGE.

### EXERCISE 5

Fill in the missing values for all of the following:



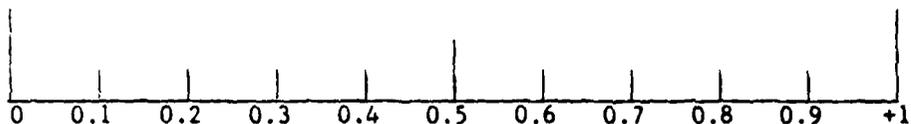
CHECK YOUR ANSWERS ON PAGE 26.

## Section C

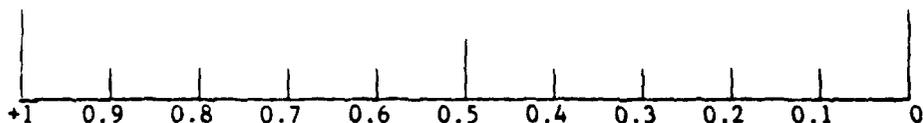
### Identifying the Value of a Line on a Scale

In this part, you will write the values of unnumbered lines on decimal scales.

Remember that some decimal scales have 0 at the left and increase up to +1 at the right, like this:



But other decimal scales have 0 at the right and increase up to +1 at the left, like this:



So one of the first things you must do when reading decimal scales is to determine where 0 is and where +1 is. Then you can tell where the other values fall along the scale. Always find 0 and count the small lines toward +1.

Also remember the only values you will find between 0 and +1 on the decimal scale are as follows:

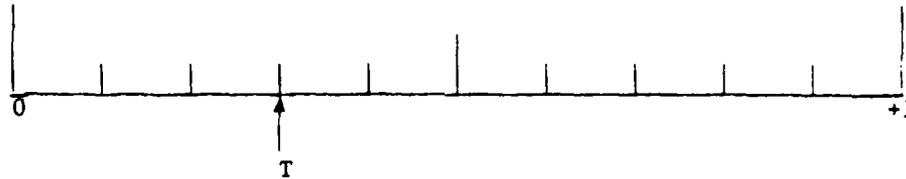
<u>Name</u>	<u>Number</u>
one-tenth	- 0.1
two-tenths	- 0.2
three-tenths	- 0.3
four-tenths	- 0.4
five-tenths	- 0.5
six-tenths	- 0.6
seven-tenths	- 0.7
eight-tenths	- 0.8
nine-tenths	- 0.9

All of the values are tenths because the scale line is divided into ten equal parts.

Look at the examples.

EXAMPLE A:

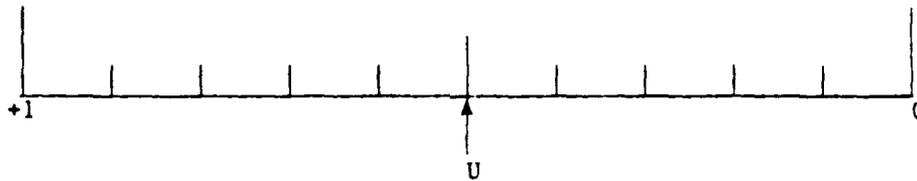
What number does the letter T stand for?



ANSWER: 0.3

EXAMPLE B:

What number does the letter U stand for?

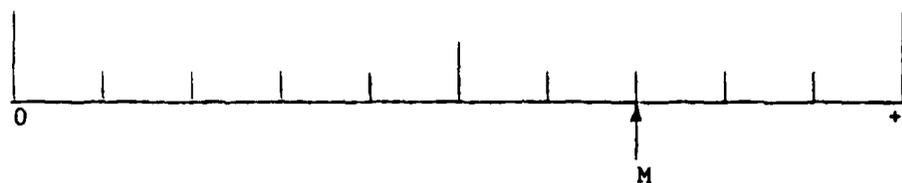


ANSWER: 0.5

ANSWER THE QUESTIONS ON THE NEXT PAGES.

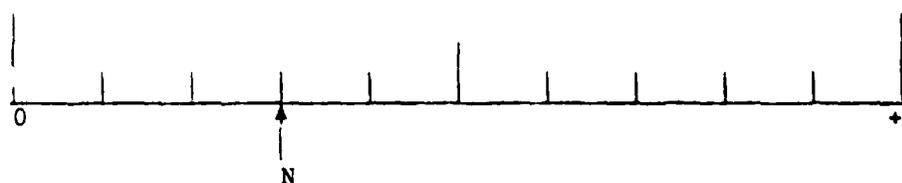
EXERCISE 6

1. What number does the letter M stand for?



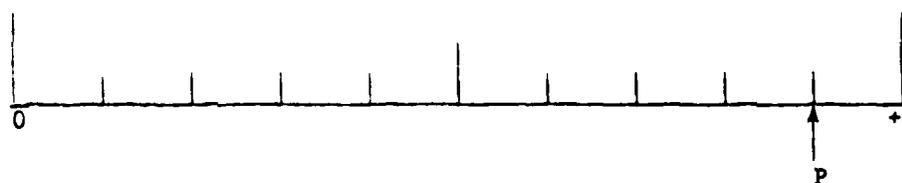
ANSWER: \_\_\_\_\_

2. What number does the letter N stand for?



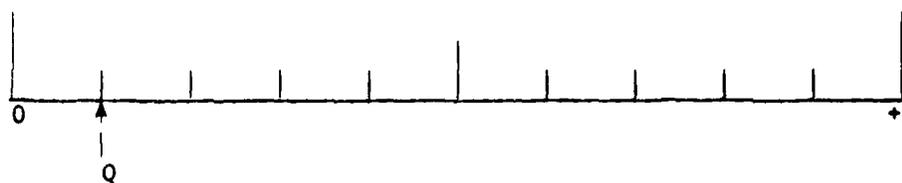
ANSWER: \_\_\_\_\_

3. What number does the letter P stand for?



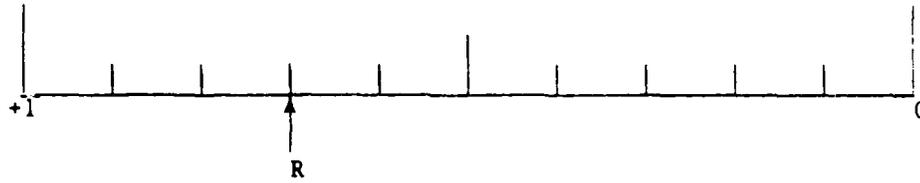
ANSWER: \_\_\_\_\_

4. What number does the letter Q stand for?



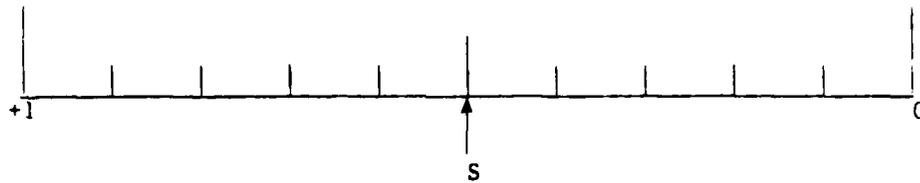
ANSWER: \_\_\_\_\_

5. What number does the letter R stand for?



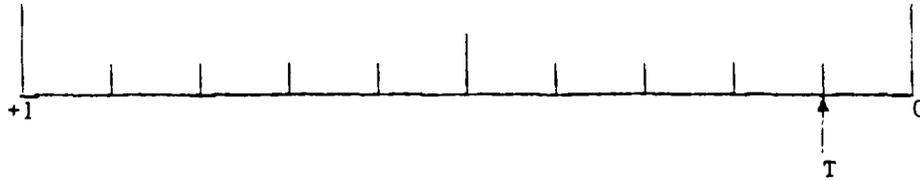
ANSWER: \_\_\_\_\_

6. What number does the letter S stand for?



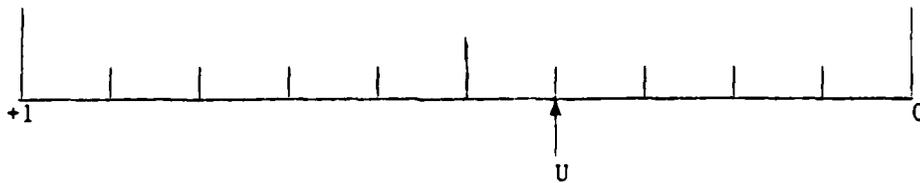
ANSWER: \_\_\_\_\_

7. What number does the letter T stand for?



ANSWER: \_\_\_\_\_

8. What number does the letter U stand for?



ANSWER: \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 27.

ANSWER KEYS TO EXERCISES IN UNIT IX, LESSON 3

Unit IX  
Lesson 3

21

ANSWERS TO EXERCISE 1

1. 0.2
2. 0.3
3. 0.8
4. 0.6
5. 0.4
6. one-tenth
7. five-tenths
8. nine-tenths
9. seven-tenths

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON WITH THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

---

ANSWERS TO EXERCISE 2

1. a, c, f, g, and i all express tenths and are found on a decimal scale. The others are not named tenths so will not be shown on a decimal scale.
  
2. b, c, and g are tenths because they have:
  - 1) a leading zero
  - 2) a decimal point
  - 3) a number telling the number of tenths

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

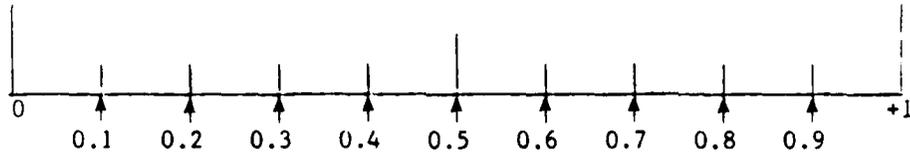
IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
CONTINUE WITH THE LESSON.

---

ANSWERS TO EXERCISE 3

1. d. two-tenths
2. b. 0.6
3. c. five-tenths
4. b. 0.8
5. a. 0.1
6. c. 0.4

STUDY THE SCALE BELOW IF YOU MISSED ANY OF THE QUESTIONS ABOVE.

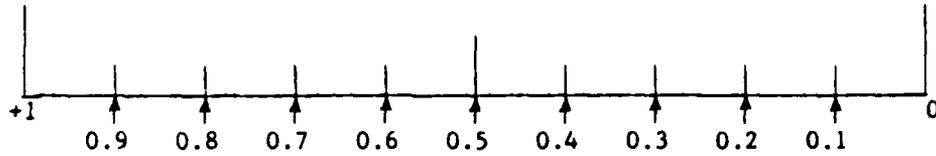


---

CONTINUE WITH THE NEXT PART OF THE LESSON.

ANSWERS TO EXERCISE 4

Look at the labeled scale if you have missed any of the items.



1. a. 0.8
2. d. four-tenths
3. a. 0.5
4. a. 0.2
5. c. nine-tenths
6. b. six-tenths

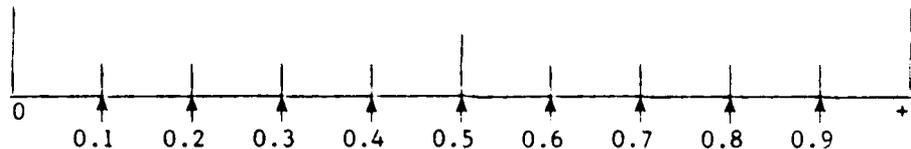
IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

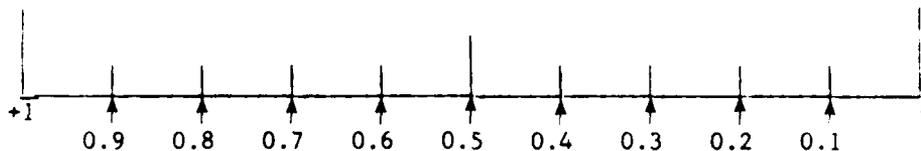
---

### ANSWERS TO EXERCISE 5

When you supplied the missing numbers, the scales in Items 1, 2, and 3 should have looked like this:



When you supplied the missing numbers, the scales in Items 4, 5, and 6 should have looked like this:



The missing values were:

1. 0.3 and 0.7
2. 0.1, 0.3, 0.6, and 0.7
3. 0.1, 0.3, 0.4, 0.6, 0.7, and 0.9
4. 0.8 and 0.4
5. 0.8, 0.5, 0.4, and 0.1
6. 0.8, 0.7, 0.5, 0.4, 0.2, and 0.1

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

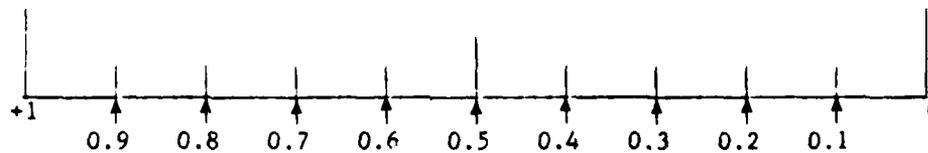
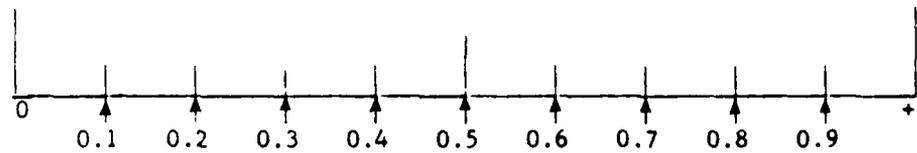
IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

---

ANSWERS TO EXERCISE 6

1. 0.7
2. 0.3
3. 0.9
4. 0.1
5. 0.7
6. 0.5
7. 0.1
8. 0.4

Look at these scales, if you missed any of the above questions.



IF YOU DO NOT UNDERSTAND ANY OF THESE ANSWERS,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS LESSON,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A  
IN UNIT IX - LESSON 3

**FBSEP**  
**MULTICHANNEL**  
**COMMUNICATIONS EQUIPMENT**  
**OPERATOR**  
**MOS 31M10**  
**STUDENT GUIDE**



**UNIT IX**  
**SCALE READING**

**LESSON 4**  
**COMPARING SCALE SETTINGS**

**PREREQUISITE:** None  
**MATERIALS REQUIRED:** None  
**TYPE OF LESSON:** Self-Paced

UNIT IX. SCALE READING

Lesson 4. Comparing Scale Settings

INTRODUCTION:

In the 31M course, you will often be asked to compare the settings on different scales. These comparisons are used to determine if the equipment is operating correctly.

In this lesson, you will learn to compare and judge the amount of difference between readings on different scales.

LEARNING GOALS:

In this lesson, you will learn to:

- A. Read different types of scales (p. 2).
- B. State whether a scale reading is within a specified range (p. 17).
- C. Select the scale having the reading within a specified range (p. 28).

On the pages that follow, you will find material to read and questions to answer. Most of the time you will check your own answers to see how well you understand the material. If you need help at any time, ask your instructor.

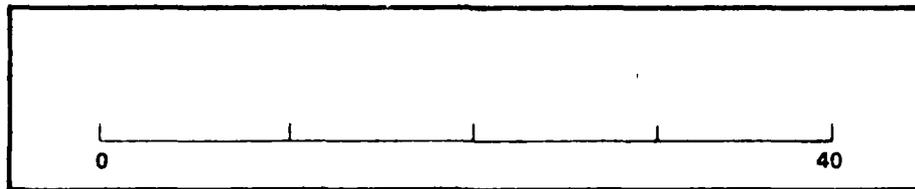
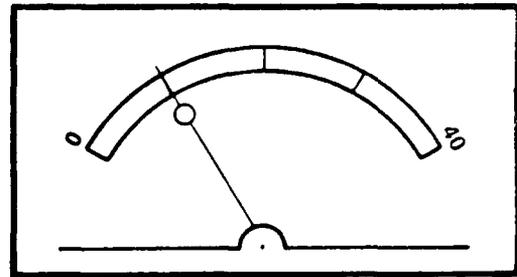
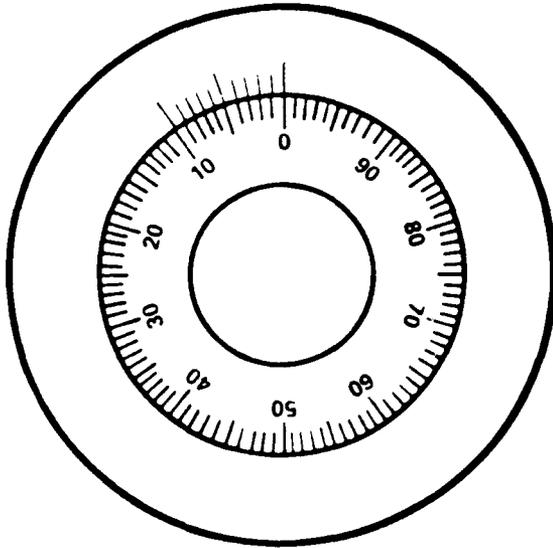
When you finish the lesson, your instructor will give you a checkpoint. When you finish the checkpoint, take it to your instructor for scoring. The instructor will tell you your score and what you should do next.

GO ON TO THE NEXT PAGE TO BEGIN THE LESSON.

Section A

Reading Different Types of Scales

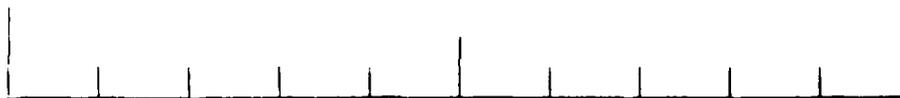
You will work with many different scales in the 31M course. The scales will be on different types of equipment, but they will always be used to measure something. Here are some examples of meters and dials having scales on them.



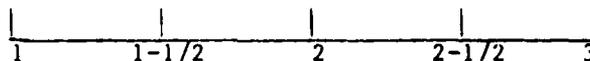
In order to be able to compare readings on such dials and meters, you must know how to read the scales. You may already know how to read all of these types of scales and meters, but here is a chance to review them.

## Straight Line Scales

A straight line scale is one that looks like this:

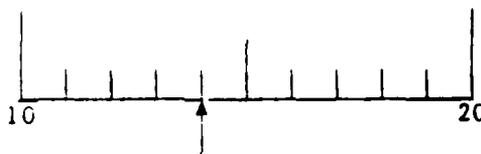


It can be used to measure many different numbers depending upon the values assigned to the unnumbered lines. For example, the straight line scale will look like part of a ruler, if we label it like this:



The straight line scales that you will use in the 31M course measure values by ones, fives, tens, or hundreds. Here are examples of each type.

EXAMPLE 1. Straight line scale measuring by ones.



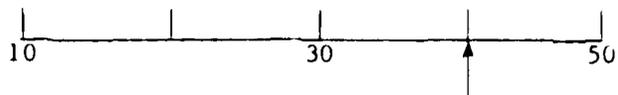
The scale value with the arrow below it is 14.

EXAMPLE 2. Straight line scale measuring by fives.



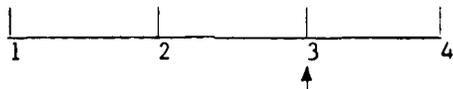
The scale value with the arrow below it is 15.

EXAMPLE 3. Straight line scale measuring by tens.



The scale value with the arrow below it is 40.

EXAMPLE 4. Straight line scale measuring by hundreds.



The scale value with the arrow below it is 300.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

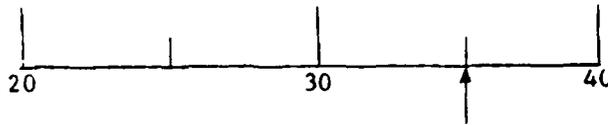
EXERCISE 1

1. The scale shown here measures by ones. What is the value of the line with the arrow below it?



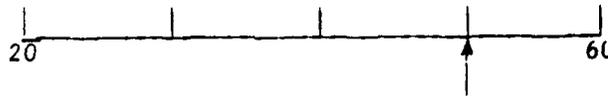
ANSWER: \_\_\_\_\_

2. The scale shown here measures by fives. What is the value of the line with the arrow below it?



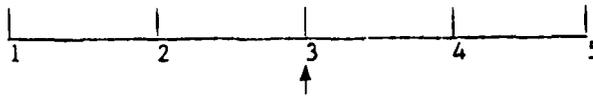
ANSWER: \_\_\_\_\_

3. The scale here measures by tens. What is the scale value of the line with the arrow below it?



ANSWER: \_\_\_\_\_

4. The scale here measures by hundreds. What is the value of the line with the arrow below it?

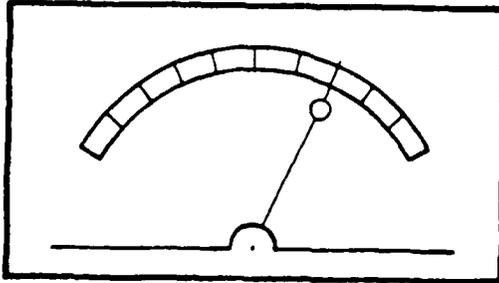


ANSWER: \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 43.

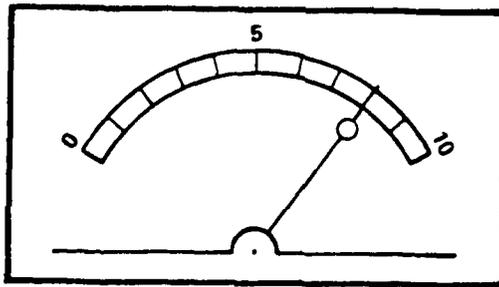
### Meters with Curved Scales

Sometimes, scales are curved a bit and put on a meter. Although they look somewhat different from the straight line scale, they are used to measure in the same way. A meter looks something like this:



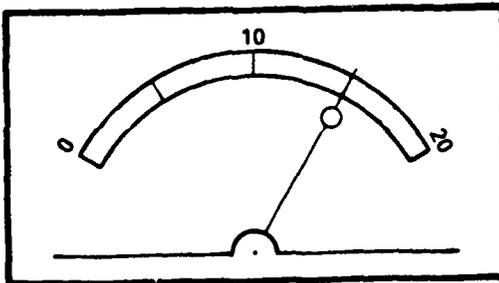
The scales on meters may measure by ones, fives, tens, or hundreds (just like the straight line scales). Here are examples of each type:

EXAMPLE 1:



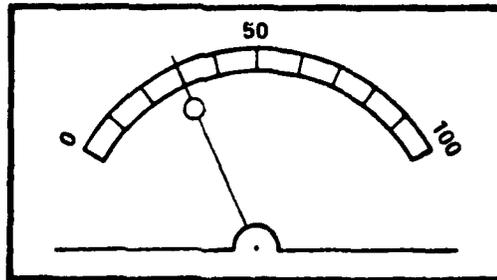
The meter measures by ones. The reading on the scale is 8.

EXAMPLE 2:



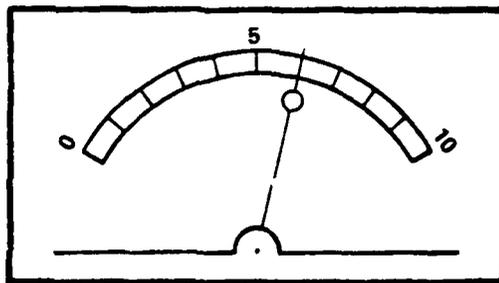
The meter measures by fives. The reading on the scale is 15.

EXAMPLE 3:



The meter measures by tens. The reading on the scale is 30.

EXAMPLE 4:

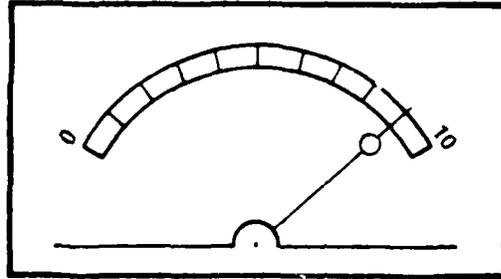


If we are told this meter measures by hundreds, the reading on the scale is 600.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

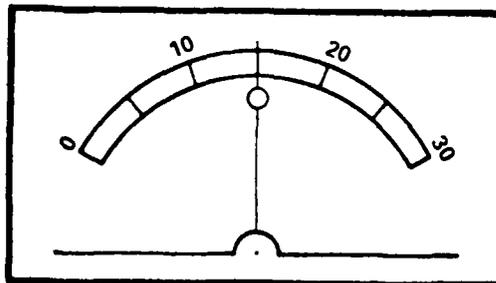
EXERCISE 2

1. The meter below measures by ones. What value does the arrow point to?



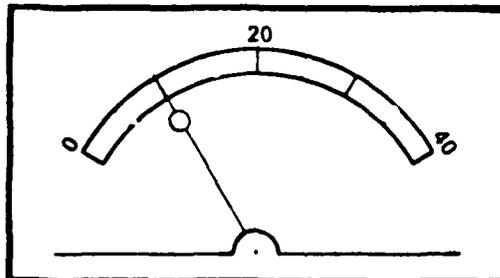
ANSWER: \_\_\_\_\_

2. The meter below measures by fives. What value does the arrow point to?



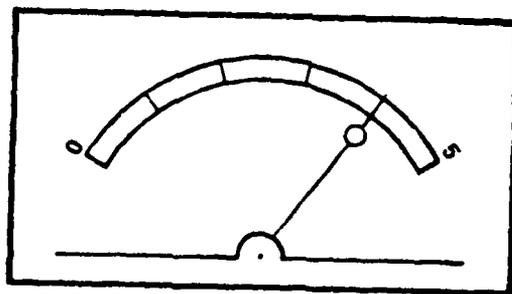
ANSWER: \_\_\_\_\_

3. The meter below measures by tens. What value does the arrow point to?



ANSWER: \_\_\_\_\_

4. The meter below measures by hundreds. What value does the arrow point to?

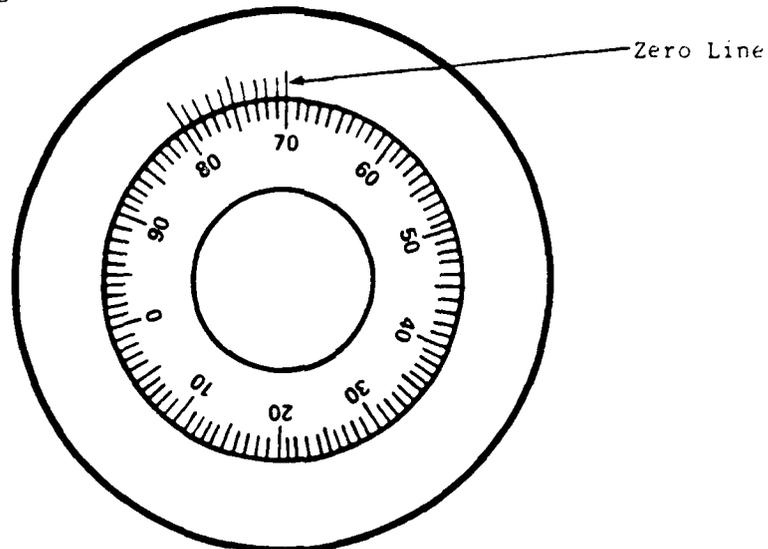


ANSWER: \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 44.

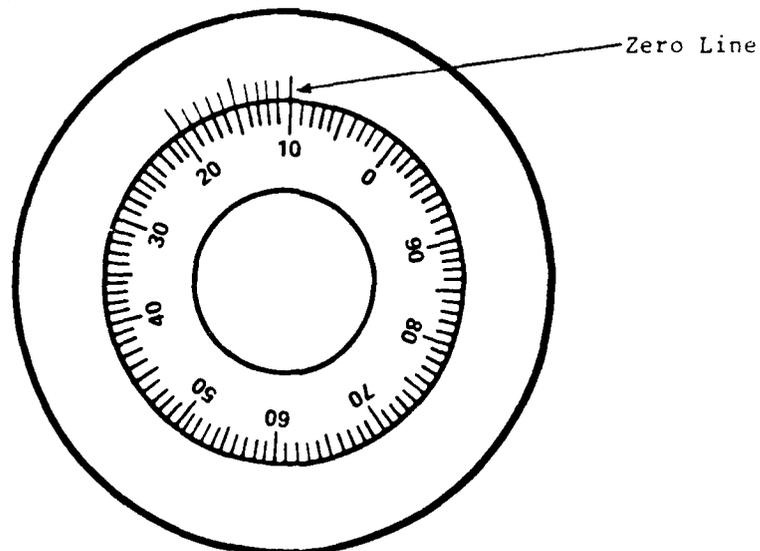
### Dials With Scales

Sometimes, you will work with scales on circular dials. They will look something like this:



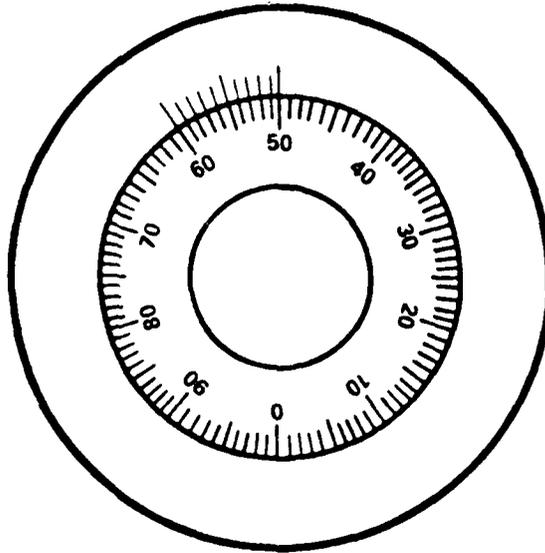
The inside small lines make up a circle-shaped ones scale. The values range from 0 to 99. The zero line at the top indicates the reading on the scale.

For example, the reading on the scale below is 10 because the zero line matches up with the scale value ten.



Here are some more examples.

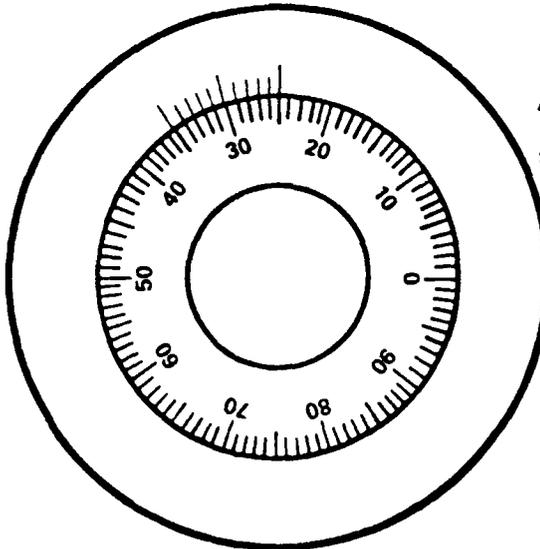
EXAMPLE 1: What is the reading on the dial below?



ANSWER: 50

Because the zero line matches the line whose value is 50.

EXAMPLE 2: What is the reading on the dial below?



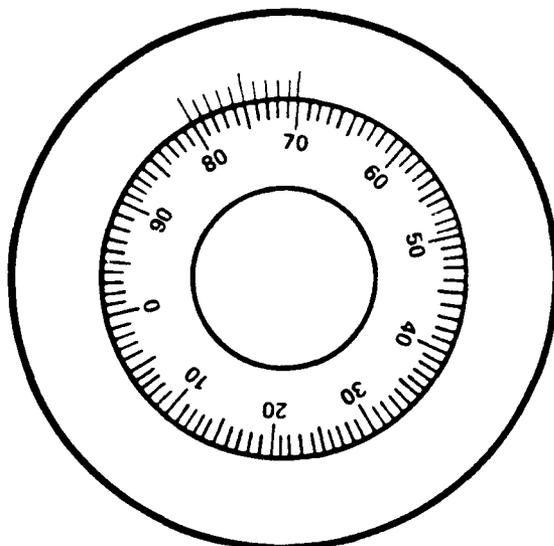
ANSWER: 25

Because the zero line matches the line whose value is 25.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

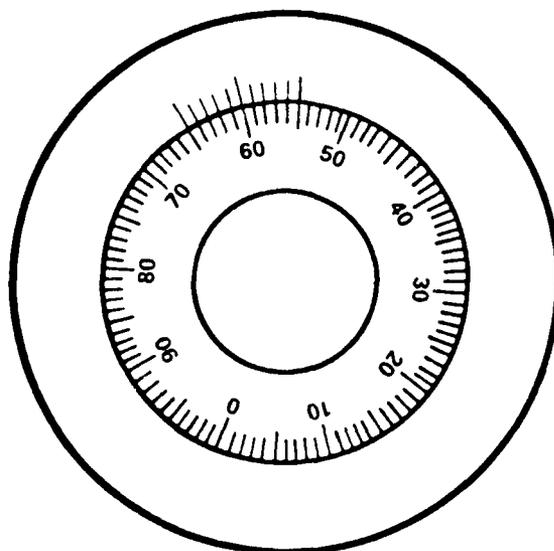
EXERCISE 3

1. What is the reading on the dial below?



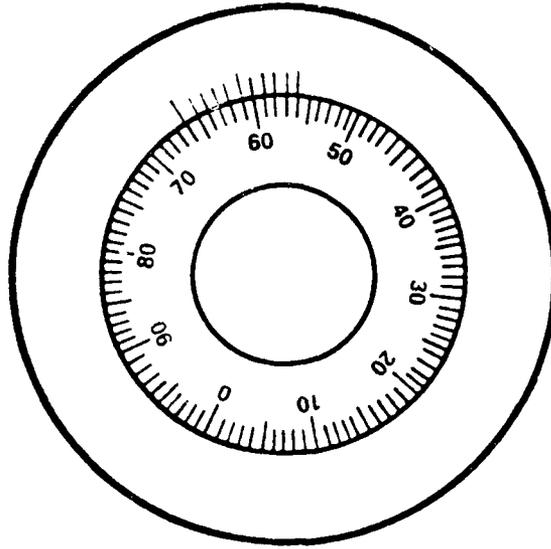
ANSWER \_\_\_\_\_

2. What is the reading on the dial below?



ANSWER: \_\_\_\_\_

3. What is the reading on the dial below?



ANSWER: \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 45.

AD-A134 334

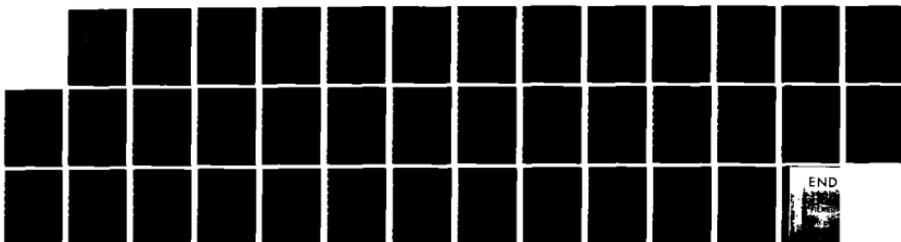
31M10 FUNCTIONAL BASIC SKILLS EDUCATION PACKAGE(U)  
APPLIED SCIENCE ASSOCIATES INC PITTSBURGH PA SEP 82  
DABT60-81-C-0006

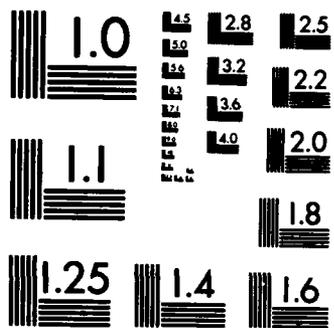
32/32

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MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

### Approximate Readings

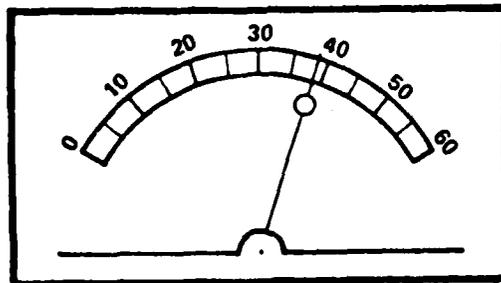
Sometimes, the readings on scales do not exactly match the lines representing values.

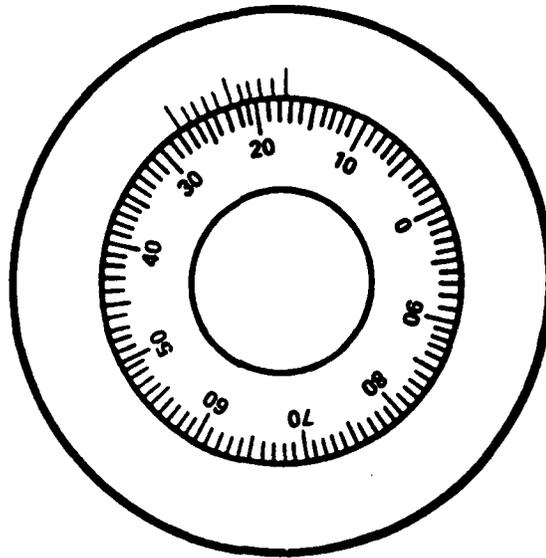
For example:



This scale shows a reading between 13 and 14. It is closest to the value of 14.

The reading on the meter above is between 35 and 40. It is closest to the value of 40.



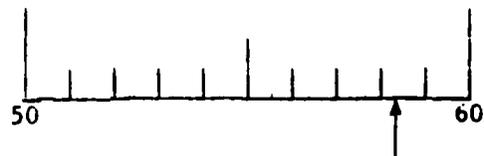


The reading on the dial above is between 17 and 18. It is closest to the value of 18.

#### EXERCISE 4

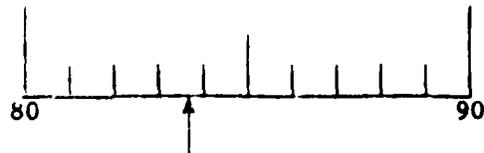
For each of the following, you will supply the closest value.

1.



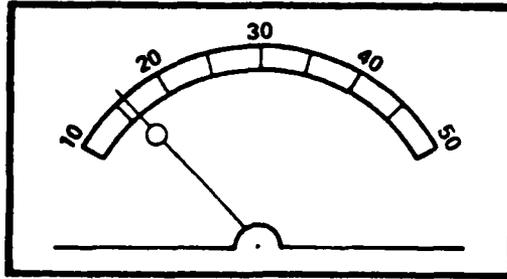
ANSWER: The closest value is \_\_\_\_\_.

2.



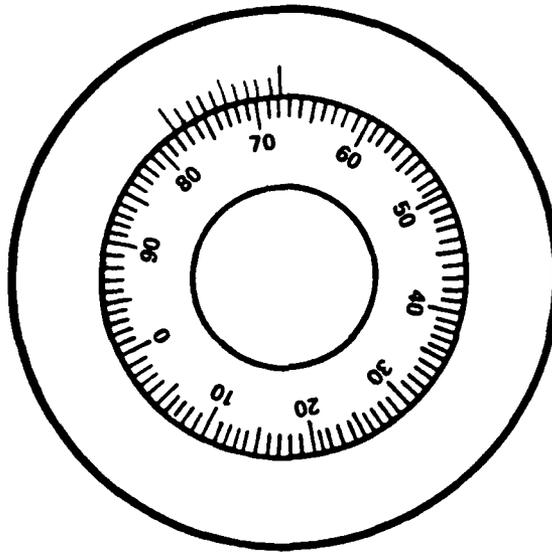
ANSWER: The closest value is \_\_\_\_\_.

3.



ANSWER: The closest value is \_\_\_\_\_.

4.



ANSWER: The closest value is \_\_\_\_\_.

CHECK YOUR ANSWERS ON PAGE 45.

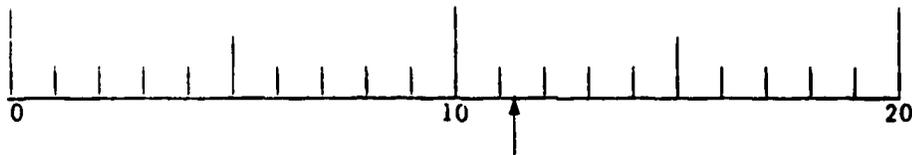
Section B

Reading within Ranges

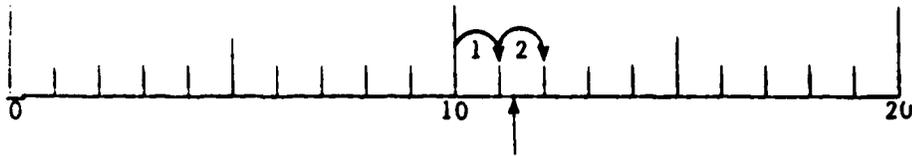
Sometimes in the 3IM course, you will need to check to see if the reading on a scale is near a given value.

Straight Line Scales

For example, look at the straight line scale below.

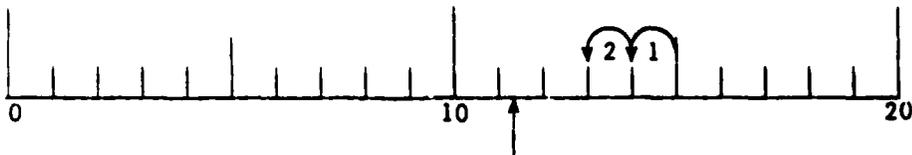


If the reading on the scale is where the arrow points, is the reading within two marks from the value of 10?



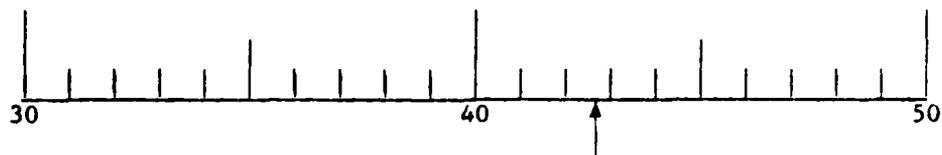
YES. As shown in the diagram above, the reading is within two marks from the value of 10.

Is the reading within two marks from the value of 15?

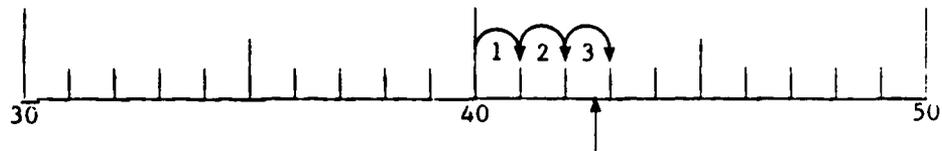


NO. As shown in the diagram above, the reading is not within two marks from the value of 15.

Let's look at another example.

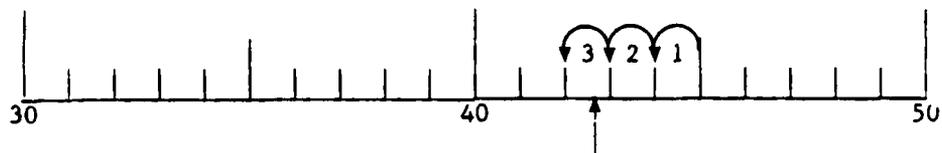


If the reading on the scale is where the arrow points, is the reading within three marks from the value of 40?



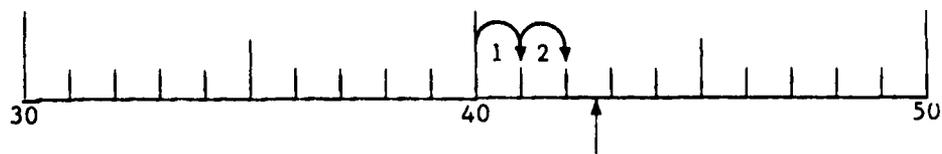
YES. As shown in the diagram above, the reading is within three marks from the value of 40.

Is the reading within three marks from the value of 45?



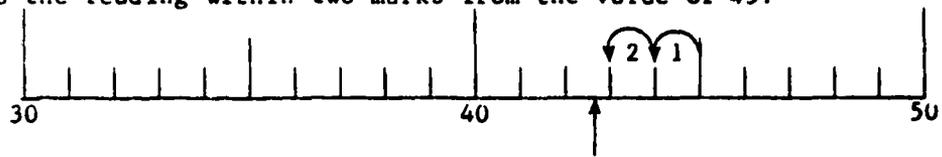
YES. As shown in the diagram above, the reading is within three marks from the value of 45.

Is the reading within two marks from the value of 40?



NO. As shown in the diagram above, the reading is not within two marks from the value of 40.

Is the reading within two marks from the value of 45?



NO. As shown in the diagram above, the reading is not within two marks from the value of 45.

### EXERCISE 5

1.



If the reading on the scale is where the arrow points, is the reading within three marks from the value of 70?

ANSWER: \_\_\_\_\_

2. On the scale above, is the reading within three marks from the value of 65?

ANSWER: \_\_\_\_\_

3. On the scale above, is the reading within three marks from the value of 64?

ANSWER: \_\_\_\_\_

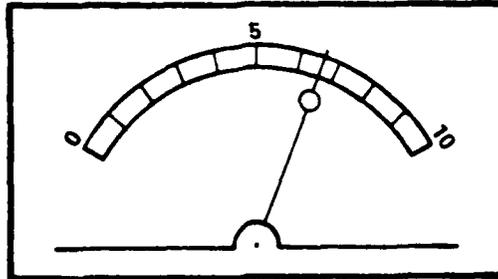
4. On the scale above, is the reading within three marks from the value of 69?

ANSWER: \_\_\_\_\_

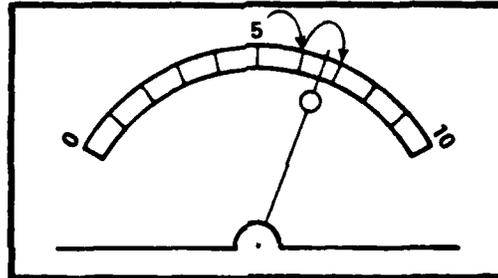
CHECK YOUR ANSWERS ON PAGE 46.

Meters

Let's try the same thing with the curved scales on meters.  
Look at the meter below.

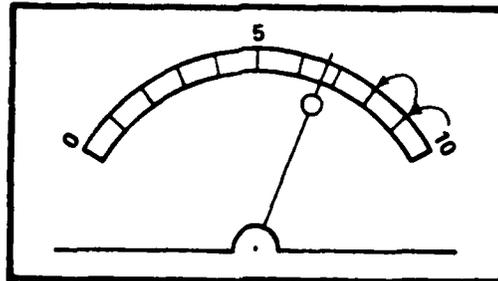


The scale on the meter measures by ones. Is the reading on the scale within two marks from the value of 5?



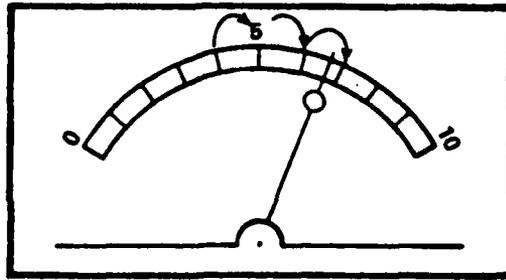
YES. As shown in the diagram above, the reading is within two marks from the value of 5.

Is the reading on the scale within two marks from the value of 10?



NO. As shown in the diagram above, the reading is not within two marks from the value of 10.

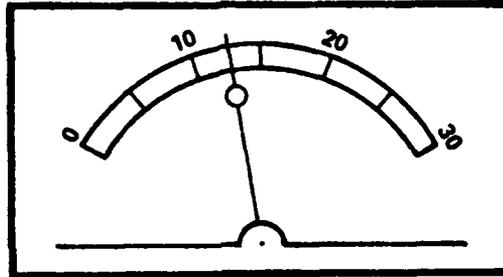
Is the reading on the scale within three marks from the value of 4?



YES. As shown in the diagram above, the reading is within three marks from the value of 4.

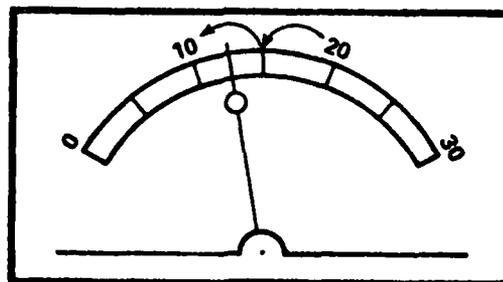
Here are some more examples using the fives, tens, and hundreds scales.

EXAMPLE 1:  
Fives scale

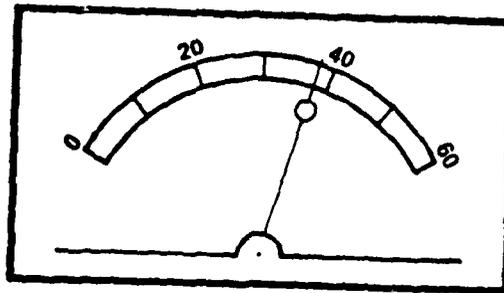


Is the reading on the scale within two marks from the value of 20?

YES. As shown in the diagram below.

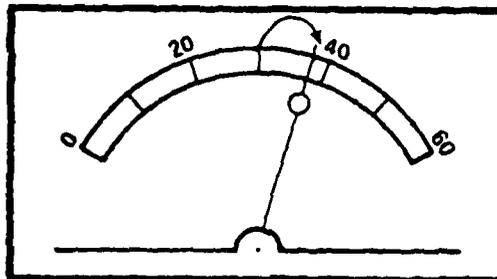


EXAMPLE 2.  
Tens Scale

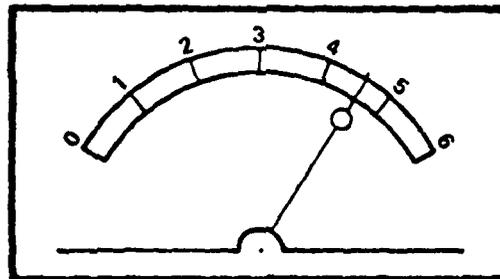


Is the reading on the scale within one mark from the value of 30?

YES. As shown in the diagram below.

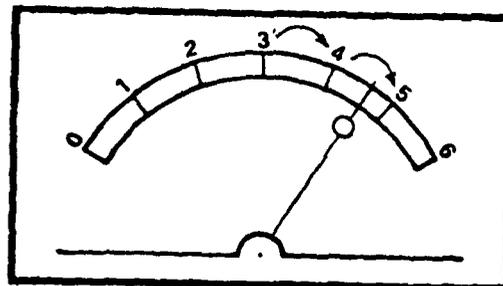


Example 3.  
Hundreds Scale



Is the reading on the scale within two marks from the value of 300?

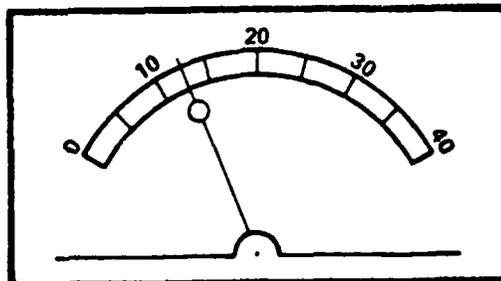
YES. As shown in the diagram below.



Unit IX  
Lesson 4

EXERCISE 6

1. The scale on the meter below is a fives scale. Is the reading on the scale with three marks from the value of 0?

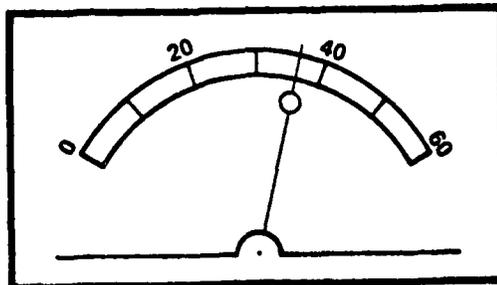


ANSWER: \_\_\_\_\_

2. On the scale above, is the reading within three marks from the value of 25?

ANSWER: \_\_\_\_\_

3. The scale on the meter below is a tens scale. Is the reading on the scale within two marks from the value of 60?

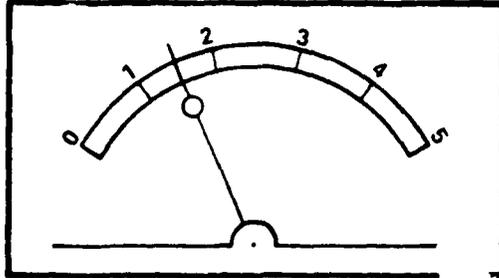


ANSWER: \_\_\_\_\_

4. On the scale above, is the reading within two marks from the value of 50?

ANSWER: \_\_\_\_\_

- a. The scale on the meter below is a hundreds scale. Is the reading on the scale within three marks from the value of 300?



ANSWER: \_\_\_\_\_

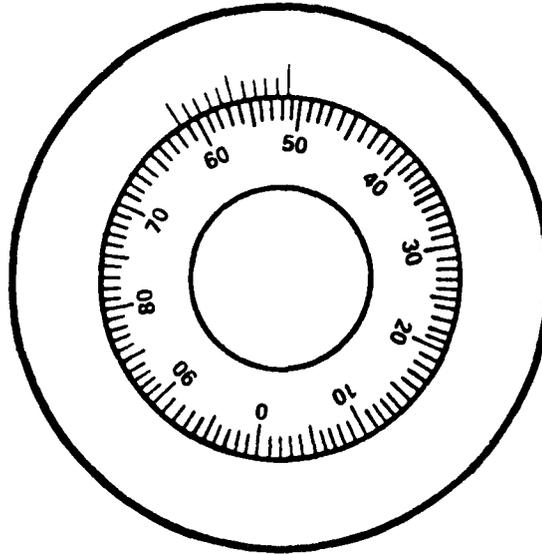
- b. On the scale above, is the reading within two marks from the value of 500?

ANSWER: \_\_\_\_\_

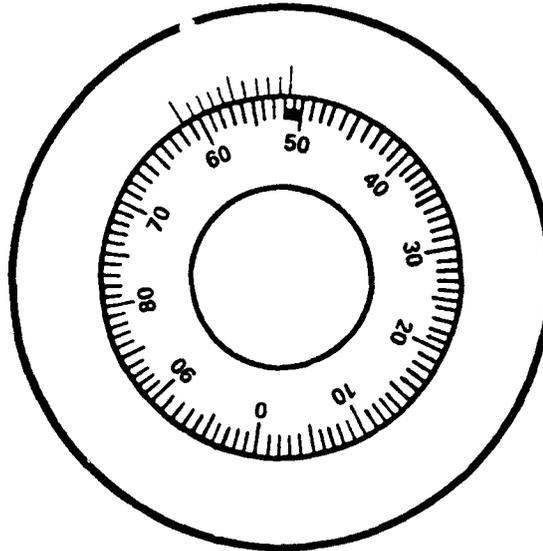
CHECK YOUR ANSWERS ON PAGE 47.

Dials with Scales

Let's try the same thing with scales on a dial.  
Look at the reading on the dial below.

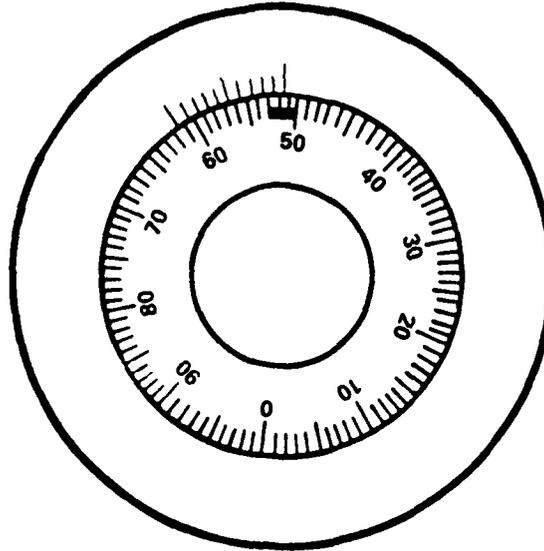


The scale on the dial measures by ones. Is the reading on the dial within two marks from the value of 50?



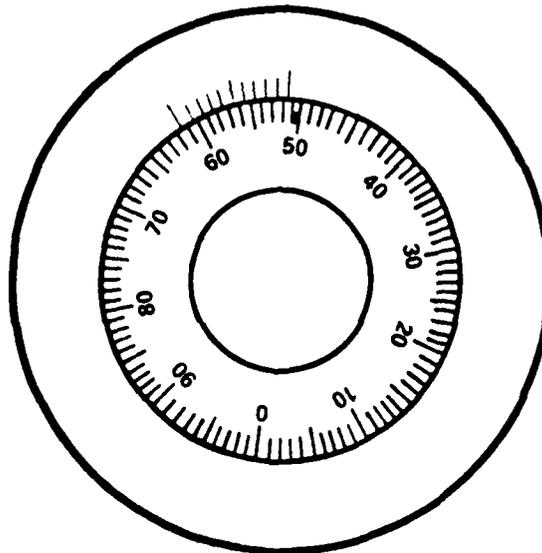
YES. As shown by the dark line across two marks from the value of 50 to the value of 52, the reading is within two marks from the value of 50.

10. Reading on the dial within three marks from the value of 50?



11. As shown by the dark line across three marks from 50 to 53, the reading is within three marks from the value of 50.

12. Reading on the dial within one mark from the value of 50?

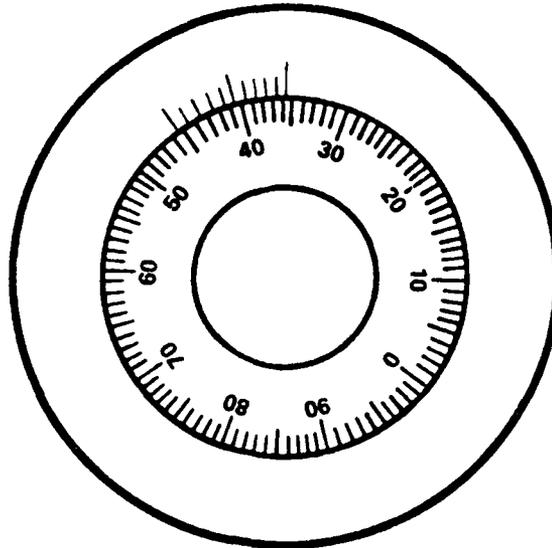


13. As shown by the dark line from 50 to 51, the reading is not within one mark from the value of 50.

ANSWER THE QUESTIONS ON THE NEXT PAGE.

EXERCISE 7

Look at this dial and answer the questions below.



1. Is the reading on the dial within one mark of 35?

ANSWER: \_\_\_\_\_

2. Is the reading on the dial within three marks from 40?

ANSWER: \_\_\_\_\_

3. Is the reading on the dial within three marks from 38?

ANSWER: \_\_\_\_\_

4. Is the reading on the dial within two marks from 32?

ANSWER: \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 49.

Section C

Selecting Readings within Ranges

In this section, you will learn to select the scale having a reading within a given number of marks.

Sometimes in the 31M course, you will be asked to compare the readings on two scale and tell which readings are closest to each other.

Let's look at a straight line scale first.

Scale A

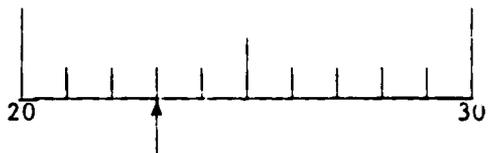


You can see that the scale measures ones. The reading on the scale is shown by the arrow. Look at the scales below and the readings on the scales.

Scale B



Scale C

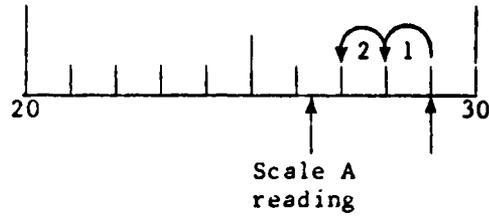


Scale D

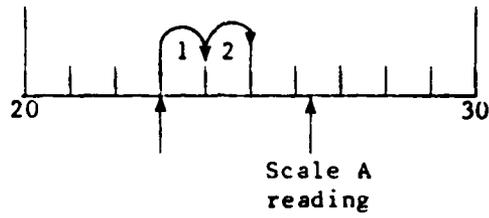


The reading on only one of these scales is within two marks of the reading on Scale A. Look at the scales below. They all show their own reading and that of Scale A.

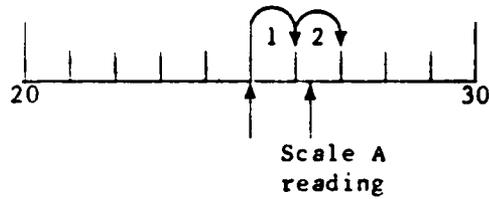
Scale B



Scale C

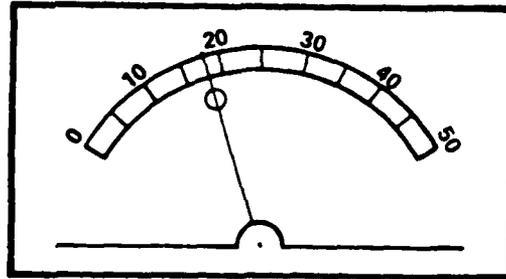


Scale D



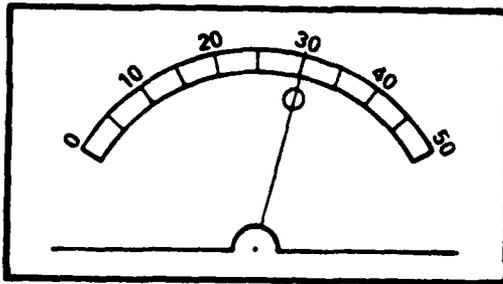
Only the reading on Scale D is within two marks of the reading on Scale A (because we hop over the reading of Scale A as we count two marks from the reading on Scale D).

Now, let's try a curved scale on a meter.

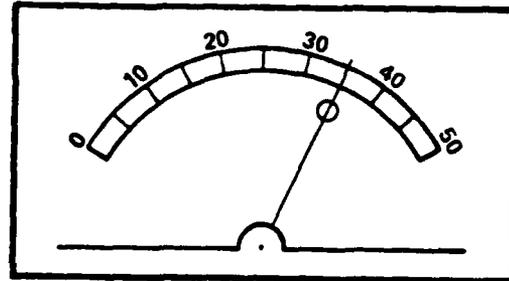


Meter A

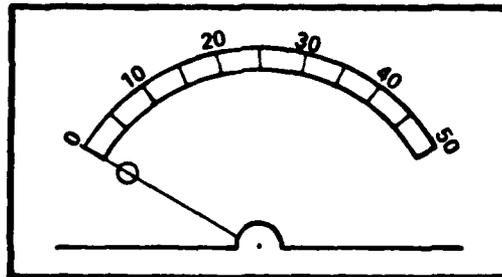
You can see that the scale on Meter A measures fives. The reading on the scale is between 15 and 20. Look at the meters below and their readings.



Meter B.



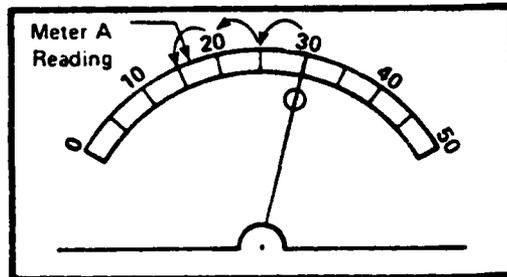
Meter C.



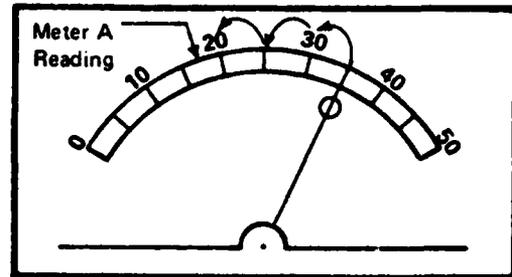
Meter D.

The reading on only one of these meters is within three marks of the reading on Meter A.

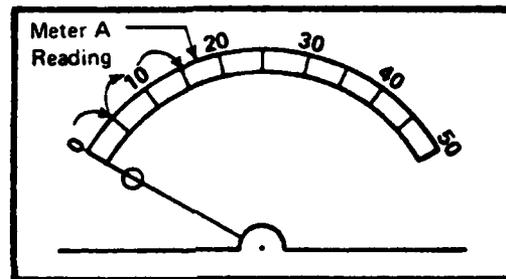
Look at the meters below. They all show their own readings and that of Meter A.



Meter B.



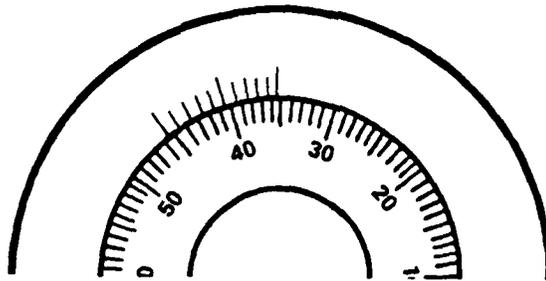
Meter C.



Meter D.

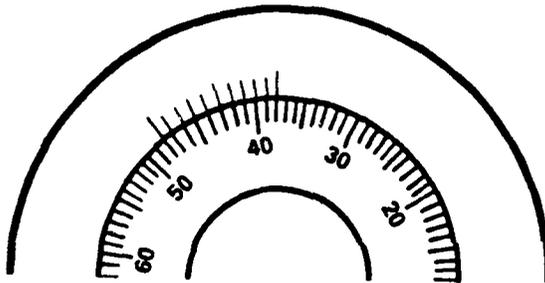
Only the reading on Meter B is within three marks of the reading on Meter A (because we hop over the Meter A reading as we count three marks from the reading on Meter B).

Lets look at part of a circular scale on a dial.

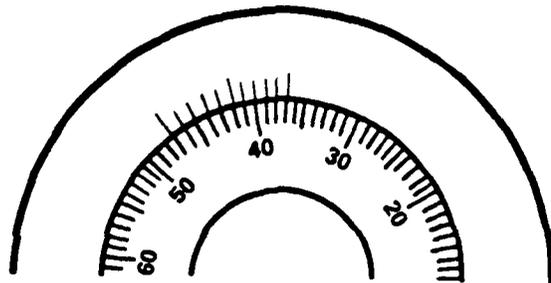


Dial A

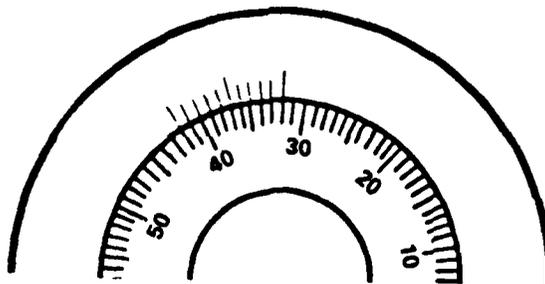
You can see that the scale measures ones. The reading on the scale is between 35 and 36. Look at the dials and their readings below.



Dial B



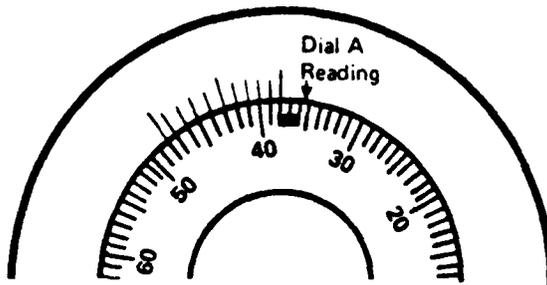
Dial C



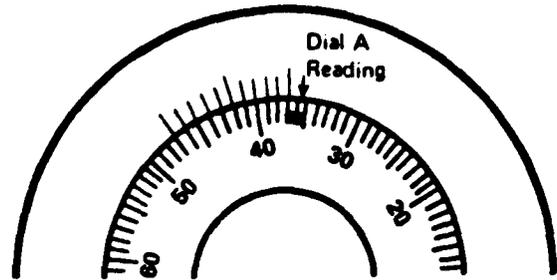
Dial D

The reading on only one of these dials is within two marks of the reading on Dial A.

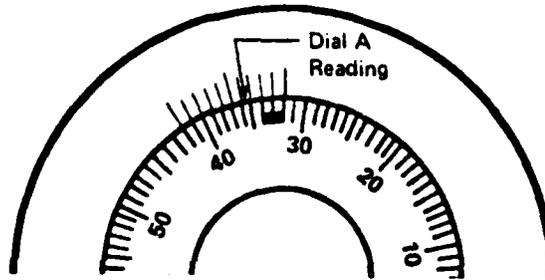
Look at the dials below. They all show their own reading and that of Dial A.



Dial B



Dial C



Dial D

When you are asked to compare the reading on one scale to readings on other scales, here are the steps to follow:

1. Note the reading on the first scale given to you.
2. Mark this reading on the other scales.
3. Use your pencil to hop along the other scales to see if you hop over the reading of the first scale. If you do, you have found a scale reading within the range you need.

This is the procedure used in the example above. Use this procedure when you answer questions on the following pages.

EXERCISE 8

1. Scale A



The reading on Scale A is shown by the arrow. Look at the scales below. Which of them has a reading that is within two marks of the reading on Scale A? Remember to follow the procedures given on the previous page.

Scale B



Scale C

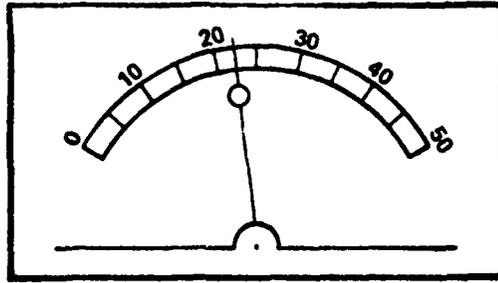


Scale D



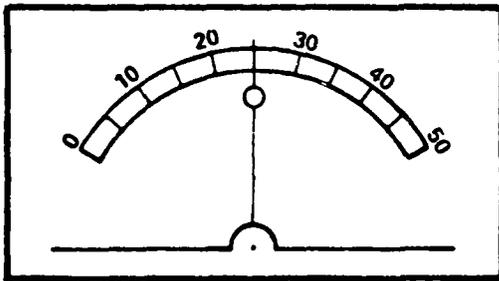
ANSWER: \_\_\_\_\_

2.

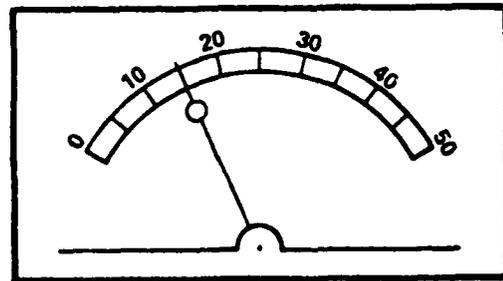


Meter A

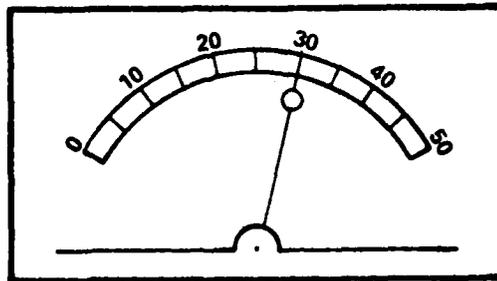
The reading on Meter A is between 20 and 25. Which of the scales below has a reading that is within one mark of the reading on Meter A?



Meter B



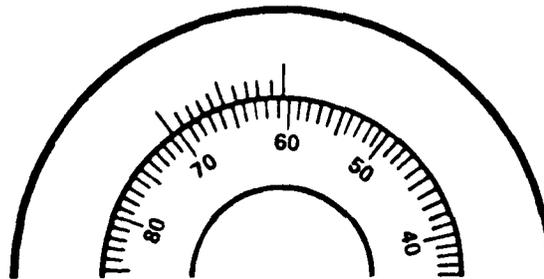
Meter C



Meter D

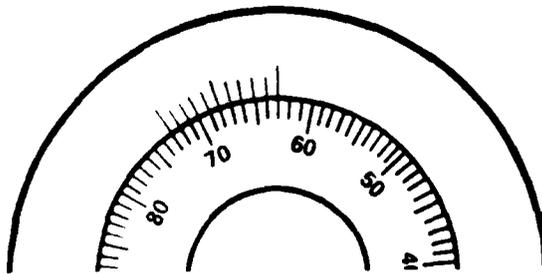
ANSWER: \_\_\_\_\_

Unit IX  
Lesson 4

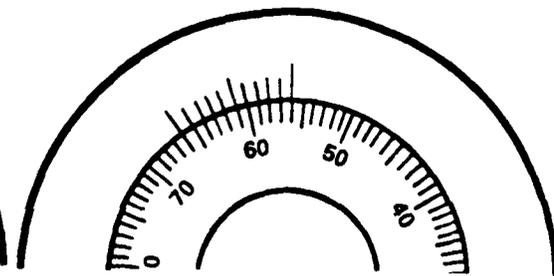


Dial A

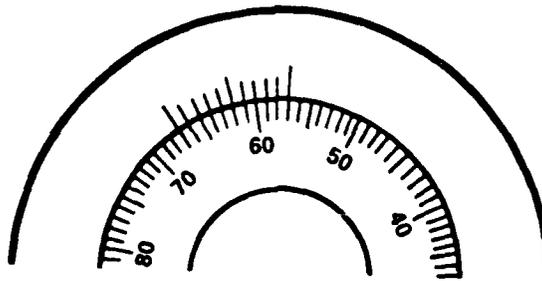
The reading on Dial A is between 60 and 61. Which of the dials below has a reading that is within three marks of the reading on Dial A.



Dial B



Dial C



Dial D

ANSWER: \_\_\_\_\_

4. Scale A



The reading on Scale A is shown by the arrow. Look at the scales below. Which one of them has a reading that is within three marks of the reading on Scale A?

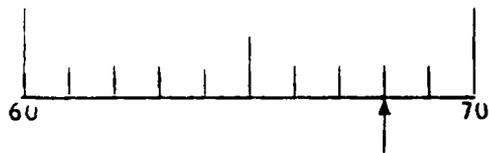
Scale B



Scale C

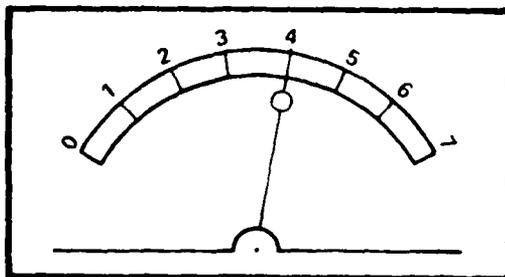


Scale D



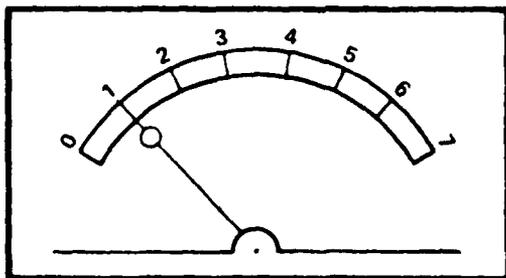
ANSWER: \_\_\_\_\_

5. Look at the scale on the meter below. Note the reading on the meter.

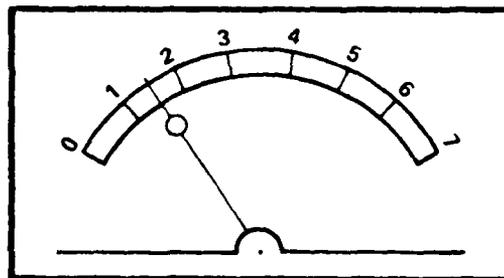


Meter Q

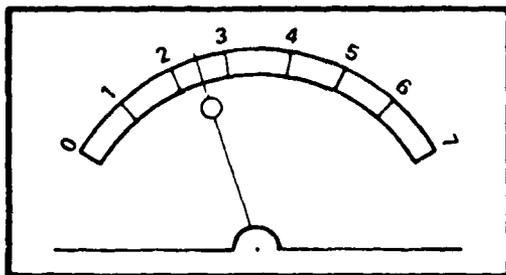
Which of the meters below has a reading within two marks of Meter Q?



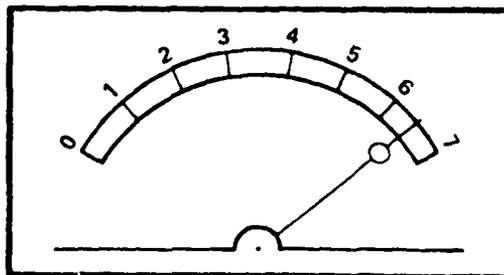
Meter A



Meter B



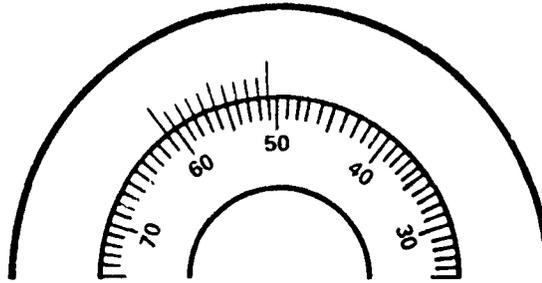
Meter C



Meter D

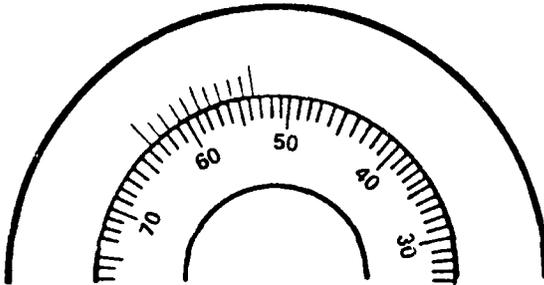
ANSWER: \_\_\_\_\_

6. Look at the scale on the dial below. Note the reading on the scale.

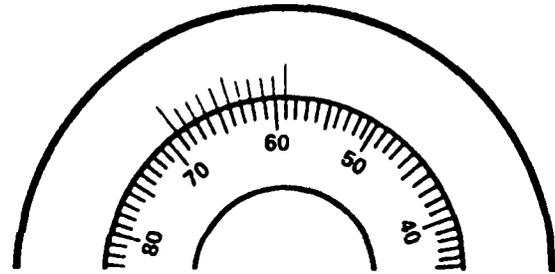


Dial M

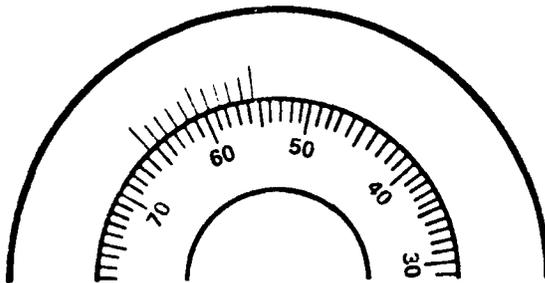
Which of the dials below has a reading within three marks of the reading on Dial M?



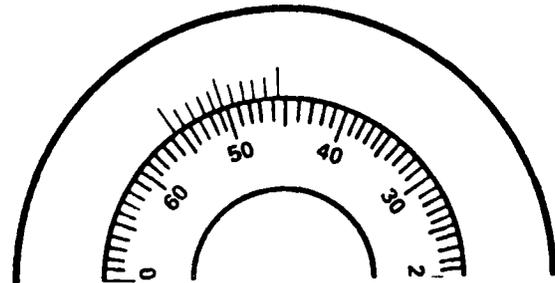
Dial A



Dial B



Dial C

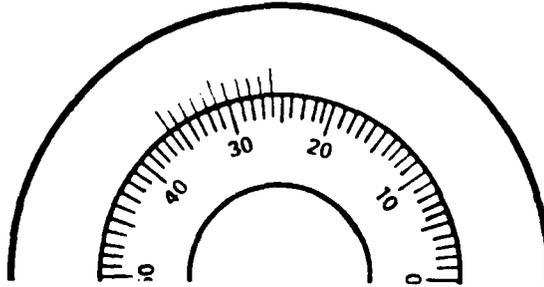


Dial D

ANSWER: \_\_\_\_\_

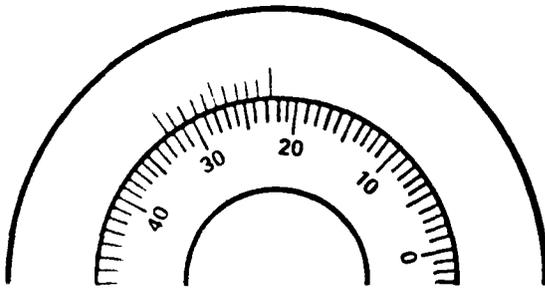
UNIT IA  
Lesson 4

Look at the scale on the dial below. Note the reading on the scale.

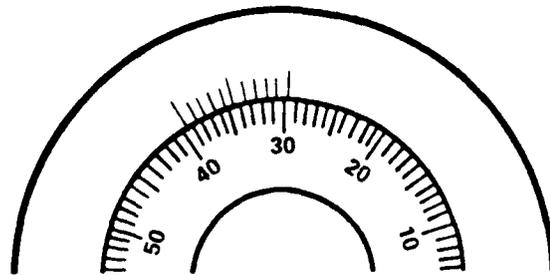


Dial N

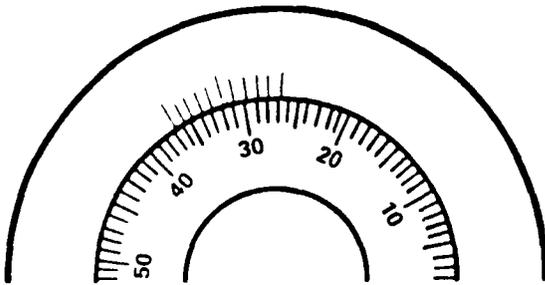
Which of the dials below has a reading within three marks of the reading on Dial N?



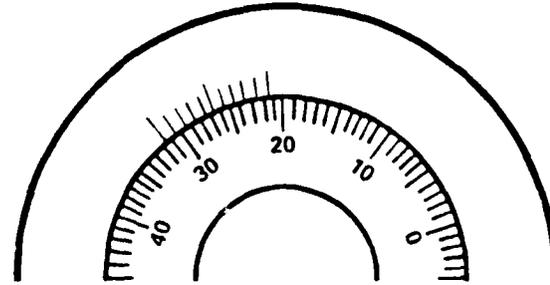
Dial A



Dial B



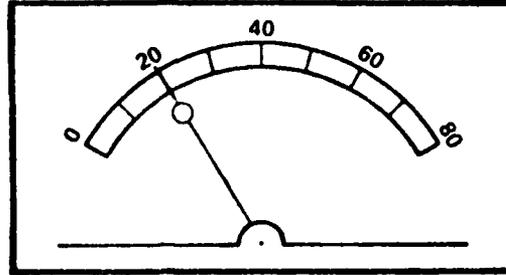
Dial C



Dial D

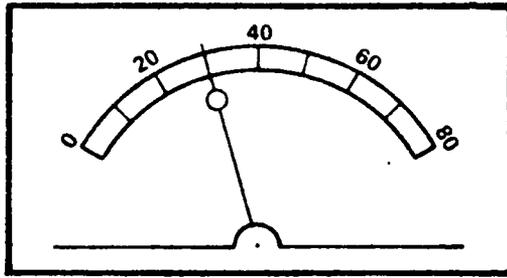
ANSWER: \_\_\_\_\_

8. Look at the scale on the meter below. Note the reading on the meter.

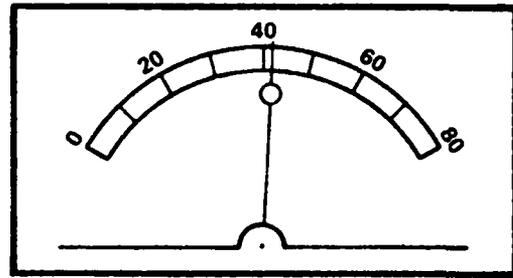


Meter Y

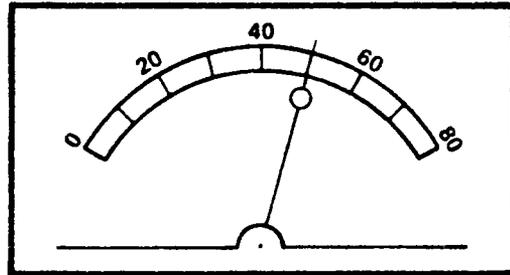
Which of the meters below has a reading within two marks of Meter Y?



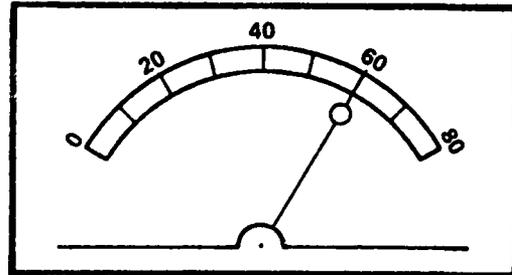
Meter A



Meter B



Meter C



Meter D

ANSWER: \_\_\_\_\_

CHECK YOUR ANSWERS ON PAGE 51.

ANSWER KEYS TO EXERCISES IN UNIT IX, LESSON 4

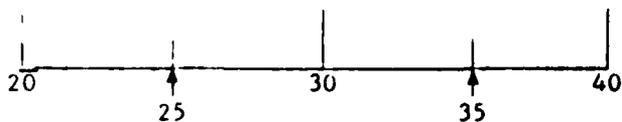
Unit IX  
Lesson 4

ANSWERS TO EXERCISE 1

1. 46 because:



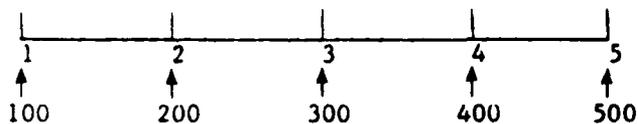
2. 35 because:



3. 50 because:



4. 300 because:

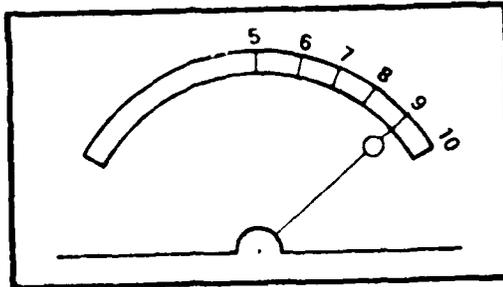


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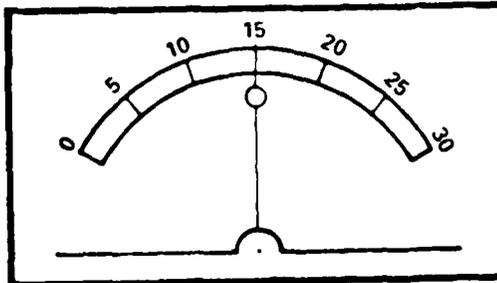
GO ON WITH THE LESSON.

ANSWERS TO EXERCISE 2

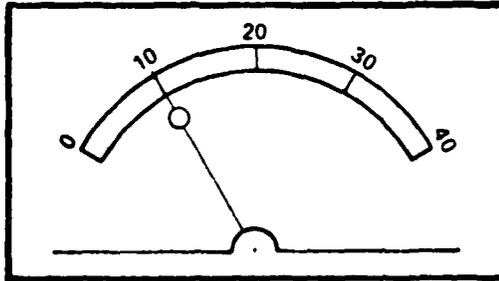
because:



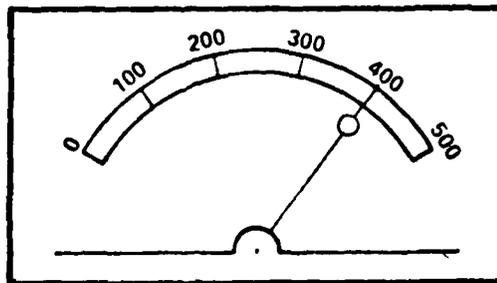
because:



because:



490 because:



CONTINUE WITH THE LESSON.

ANSWERS TO EXERCISE 3

1. 70      Because 70 lines up with the zero line.
2. 55      Because 55 lines up with the zero line.
3. 56      Because 56 lines up with the zero line.

---

GO ON WITH THE LESSON.

ANSWERS TO EXERCISE 4

1. 58
2. 84
3. 15
4. 68

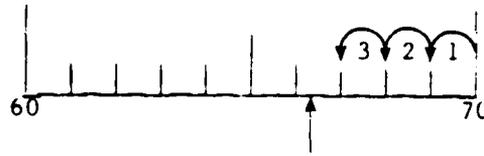
IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

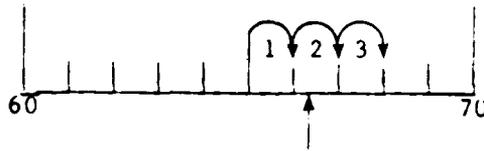
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ANSWERS TO EXERCISE 5

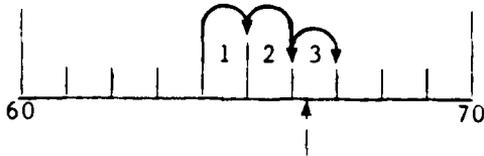
1. NO. Because:



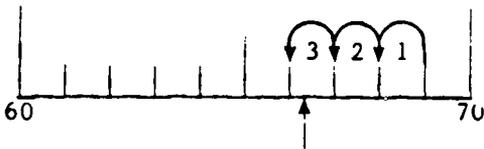
2. YES. Because:



3. YES. Because:



4. YES. Because:



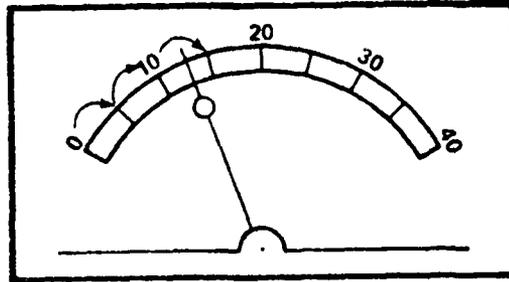
IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON WITH THE LESSON.

IF YOU UNDERSTAND ALL OF THE ANSWERS ABOVE,  
GO ON WITH THE LESSON.

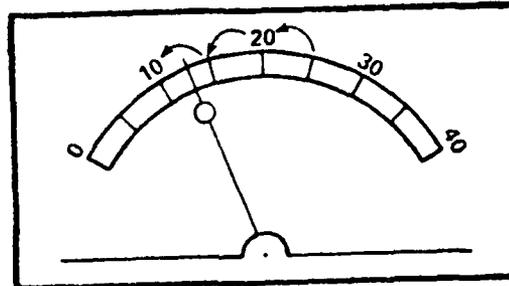
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ANSWERS TO EXERCISE 6

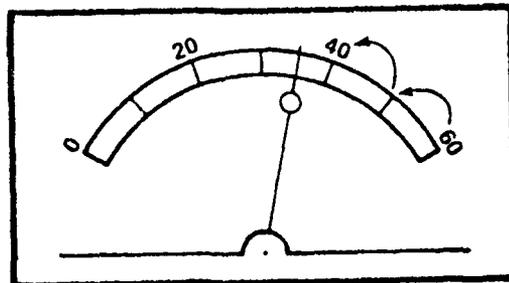
1. YES. Because



2. YES. Because

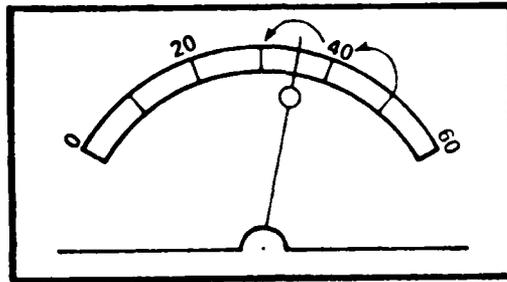


3. NO. Because



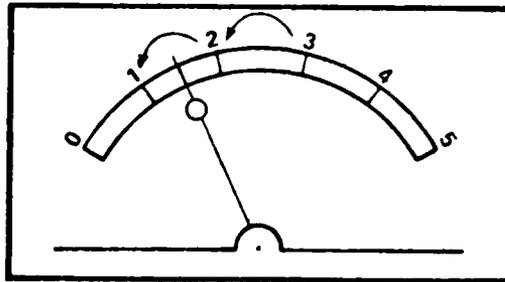
4. YES.

Because



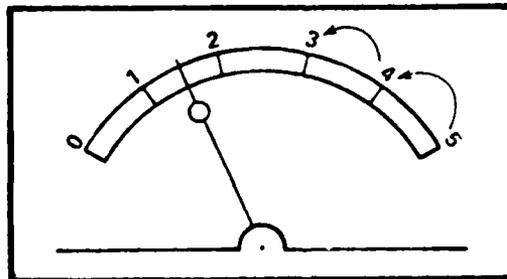
5. YES.

Because



6. NO.

Because

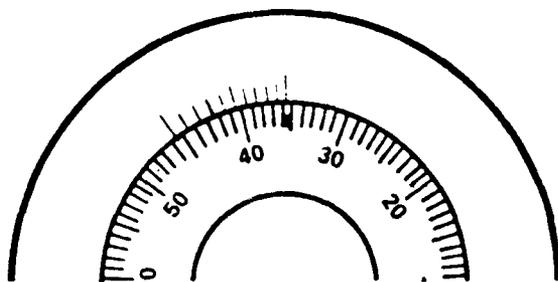


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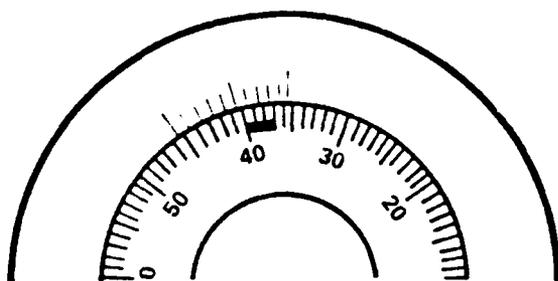
GO ON WITH THE LESSON

ANSWERS TO EXERCISE 7

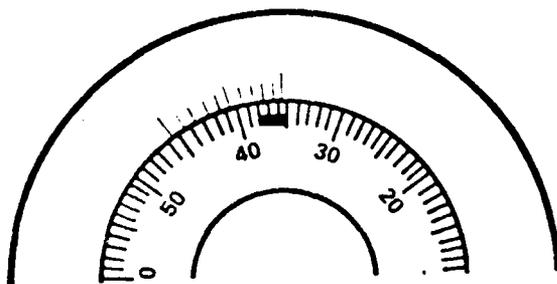
1. YES



2. NO

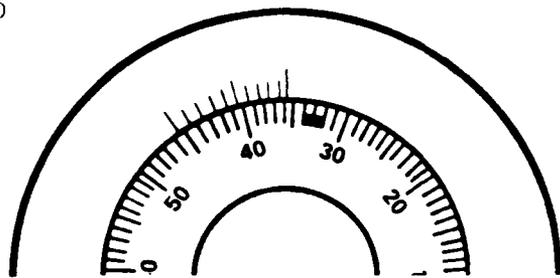


3. YES



Unit IX  
Lesson 4

4. NO



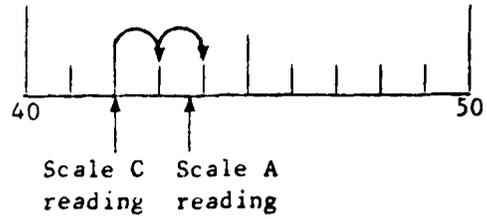
IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP BEFORE YOU GO ON  
TO THE NEXT PART OF THE LESSON.

IF YOU UNDERSTAND ALL THE ANSWERS ABOVE,  
GO ON TO THE NEXT PART OF THE LESSON.

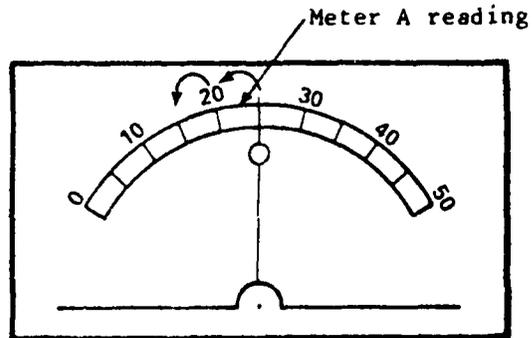
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ANSWERS TO EXERCISE 8

1. Scale C because:



2. Meter B because



3. Dial B

Meter B

4. Scale A

5. Meter C

6. Dial A

7. Dial C

8. Meter A

IF YOU DO NOT UNDERSTAND ANY OF THE ANSWERS ABOVE,  
ASK YOUR INSTRUCTOR FOR HELP.

IF YOU UNDERSTAND ALL THE MATERIAL IN THIS LESSON,  
TELL YOUR INSTRUCTOR THAT YOU ARE READY FOR CHECKPOINT 1, FORM A  
IN UNIT IX - LESSON 4.

