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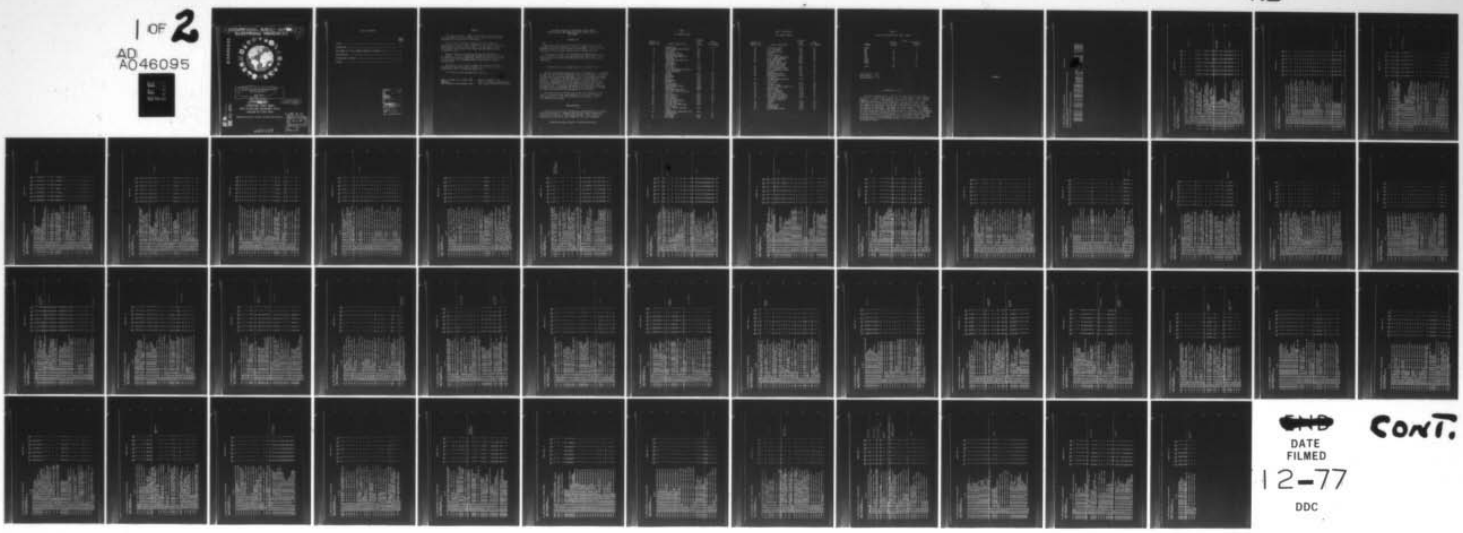

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OCCUPATIONAL SURVEY REPORT.
ELECTRONIC PRINCIPLES

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(6) AVIONIC INERTIAL AND RADAR NAVIGATION SYSTEMS SPECIALIST

AFSC 32854.

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OCCUPATIONAL SURVEY BRANCH
USAF OCCUPATIONAL MEASUREMENT CENTER
LACKLAND AFB TEXAS 78236

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PREFACE

This report presents a summary of the results of a detailed Air Force Electronic Principles Survey of the Avionic Inertial and Radar Navigation Systems Specialist, AFSC 32854.

The Electronic Principles Inventory (EPI) was developed by Major Thomas J. O'Connor and Mr. Hendrick W. Ruck and the survey data were analyzed by Captain Elena J. Weber. All are members of the Occupational Survey Branch, USAF Occupational Measurement Center, Lackland AFB, Texas.

Computer programs for analyzing the data were designed by Dr. Raymond E. Christal, Occupational and Manpower Research Division, Air Force Human Resources Laboratory (AFHRL), and were written by the Project Analysis and Programming Branch, Computational Sciences Division, AFHRL.

Distribution of this report is made upon request to the USAF Occupational Measurement Center, attention of the Chief, Occupational Survey Branch (OMY), Lackland AFB, Texas 78236.

This report has been reviewed and is approved.

JAMES A. TURNER, JR., Colonel, USAF
Commander
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ELECTRONIC PRINCIPLES OCCUPATIONAL SURVEY REPORT
AVIONIC INERTIAL AND RADAR NAVIGATION SYSTEMS SPECIALIST
AFSC 32854

INTRODUCTION

This report summarizes the results of the administration of the Electronic Principles Inventory to airmen assigned as Avionic Inertial and Radar Navigation Systems Specialist (AFSC 32854). The data for this report were collected during the period April through June 1977.

This report describes: (1) development and administration of the survey instrument; and (2) electronic principles used by DAFSC 5-skill level personnel both CONUS and overseas and assigned to selected major commands.

DEVELOPMENT OF THE ELECTRONIC PRINCIPLES INVENTORY (EPI)

The EPI was developed by personnel from the Occupational Survey Branch who were well qualified in theoretical physics and electronics, as well as in task analysis and survey development. Over 300 maintenance personnel from SAC, TAC, ADC, MAC, and AFCS participated in the development of the inventory. Representing the five ATC training centers, electronics experts who averaged 12 years of maintenance experience and four years of electronic principles instruction experience spent several weeks refining the EPI. In addition, personnel at the Electrical Engineering Department of the USAF Academy and the Air Force Human Resources Laboratory were consulted during the development of the inventory.

The final version of the EPI used in this survey contained 1,257 items in 62 subject matter areas covering all electronic principles training given at the five ATC technical training centers. Table 1 lists the 62 subject areas.

ADMINISTRATION

The Electronic Principles Inventory was administered by mail to AFSC 32854 airmen worldwide. Responses from 220 individuals represented 19 percent of the total of all AFSC 32854 personnel. Table 2 shows the percentage distribution by major command of the survey incumbents.

TABLE 1

EPI SUBJECT AREAS

SEQUENCE OF SUBJECT AREAS	SUBJECT AREA TITLE	BEGINNING ITEM NUMBER	GPSUM PAGE NUMBER
1	MATHEMATICS	A1	2
2	DIRECT CURRENT AND VOLTAGE	A15	2
3	RESISTANCE	A24	2
4	MULTIMETER USES	B52	3
5	ALTERNATING CURRENT	B61	4
6	INDUCTORS AND INDUCTIVE REACTANCE	B67	4
7	CAPACITORS AND CAPACITIVE REACTANCE	C92	5
8	TRANSFORMERS	C128	6
9	MAGNETISM	C171	7
10	RCL CIRCUITS	D185	8
11	SERIES AND PARALLEL RESONANCE (TIME CONSTANTS)	D229	10
12	FILTERS	D239	10
13	COUPLING	E261	11
14	SOLDERING	E273	11
15	RELAYS	E295	12
16	MICROPHONES	F314	12
17	SPEAKERS	F327	13
18	OSCILLOSCOPES	F342	13
19	SEMICONDUCTOR DIODES	G354	13
20	TRANSISTORS	G404	15
21	TRANSISTOR AMPLIFIERS	G428	16
22	SOLID-STATE SPECIAL PURPOSE DEVICES	H477	19
23	POWER SUPPLIES	H483	19
24	OSCILLATORS	H512	19
25	MULTIVIBRATORS	I539	20
26	LIMITERS AND CLAMPERS	I555	21
27	ELECTRON TUBES	I565	21
28	ELECTRON TUBE AMPLIFIERS AND CIRCUITS	J609	22
29	SPECIAL PURPOSE ELECTRON TUBES	J616	23
30	HETERODYNING, MODULATION, AND DEMODULATION	J632	23
31	AM SYSTEMS	K638	23
32	FM SYSTEMS	K666	24

TABLE 1 (CONTINUED)

EPI SUBJECT AREAS

SEQUENCE OF SUBJECT AREAS	SUBJECT AREA TITLE	BEGINNING ITEM NUMBER	GPSUM PAGE NUMBER
33	NUMBERING SYSTEMS	K685	25
34	LOGIC FUNCTIONS	L695	25
35	BOOLEAN EQUATIONS	L708	26
36	COUNTERS	L733	27
37	TIMING CIRCUITS	M757	27
38	USE OF SIGNAL GENERATORS	M769	28
39	MOTORS AND GENERATORS	M779	28
40	METER MOVEMENTS	N808	29
41	SATURABLE REACTORS AND MAGNETIC AMPLIFIERS	N818	29
42	WAVESHAPING CIRCUITS	N834	30
43	SINGLE SIDEBAND SYSTEMS	0845	30
44	PULSE MODULATION SYSTEMS	0875	31
45	ANTENNAS	0914	32
46	TRANSMISSION LINES	P953	34
47	WAVEGUIDES AND CAVITY RESONATORS	P984	35
48	MICROWAVE AMPLIFIERS AND OSCILLATORS	P1034	37
49	REGISTERS	Q1110	39
50	STORAGE DEVICES	Q1117	40
51	DIGITAL TO ANALOG CONVERTERS	Q1126	40
52	PHANTASTRONS	Q1140	41
53	SCHMITT TRIGGERS	R1141	41
54	CABLE FABRICATION	R1144	41
55	INPUT/OUTPUT DEVICES	S1146	41
56	PHOTO SENSITIVE DEVICES	S1149	41
57	SYNCHRONOUS VIBRATIONS (CHOPPER CIRCUITS)	S1150	41
58	INFRARED	T1159	41
59	LASERS	T1186	42
60	DISPLAY TUBES	T1220	43
61	PROGRAMMING	U1234	43
62	DB AND POWER RATIOS	U1255	44

TABLE 2

COMMAND REPRESENTATION OF SURVEY SAMPLE

COMMAND	32854 PERCENT ASSIGNED	PERCENT OF SAMPLE
ADCOM	1	2
ATC	2	1
MAC	29	31
SAC	18	20
AFSC	2	1
TAC	27	24
USAFE	13	13
PACAF	7	7
OTHER	1	1
TOTAL	100	100

Total Assigned - 1150
Total Sampled - 220
Percent Sampled - 19%

PRESENTATON OF RESULTS

Personnel responded "yes" or "no" to the 1,257 electronic principles questions as related to their present job. A Group Summary (GPSUM) computer printout is provided in the Appendix portion of this report. Page 1 of the GPSUM lists the seven selected groups identified for this report. Pages 2-44 show the percentage of the incumbents responding to the EPI items. The computer program results display the percent members answering "yes" to the subject area questions. The reader can locate a specific subject area by referring to the Appendix page number as listed in Table 1. For example, the Transformers area results are given on page 6 of the GPSUM. The percentage of survey respondents indicating use of specific electronic principles ranged from high in areas such as Oscilloscopes (p. 13) and Power Supplies (p. 19) to low in areas such as Microphones (p. 12) and Speakers (p. 13). Additional AFSC 328X4 data can be obtained upon request to the Chief, Occupational Survey Branch (OMY).

APPENDIX

TABULATION OF ELECTRONIC PRINCIPLES UTILIZATION DATA FOR SELECTED GROUPS
IN THE 32859 CAREER FIELD.

REPORTS ON THE FOLLOWING GROUPS WERE REQUESTED

GROUP IDENTITY =	SPC176	ALL AIRMEN DAFSC 32859		AINING	220 MEMBERS.
GROUP IDENTITY =	SPC177	ALL AIRMEN DAFSC 32859	STATIONED IN CONUS	CONTAINING	146 MEMBERS.
GROUP IDENTITY =	SPC178	ALL AIRMEN DAFSC 32859	STATIONED OVERSEAS	CONTAINING	74 MEMBERS.
GROUP IDENTITY =	SPC179	ALL AIRMEN DAFSC 32859	ASSIGNED TO MAC	CONTAINING	68 MEMBERS.
GROUP IDENTITY =	SPC180	ALL AIRMEN DAFSC 32859	ASSIGNED TO SAC	CONTAINING	99 MEMBERS.
GROUP IDENTITY =	SPC181	ALL AIRMEN DAFSC 32859	ASSIGNED TO TAC	CONTAINING	54 MEMBERS.
GROUP IDENTITY =	SPC182	ALL AIRMEN DAFSC 32859	ASSIGNED TO USAFE	CONTAINING	30 MEMBERS.

PCT MBRS RESPONDING 'YES' BY SELECTED GRPS GPSUM9 PAGE 2

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		DY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
A	1	A1-01 IN YOUR PRESENT JOB, DO YOU USE INSTRUMENTS, SUCH AS METERS OR OSCILLOSCOPES, IN WHICH IT IS NECESSARY TO AMPLIFY OR ATTENUATE VOLTAGE, RESISTANCE, ETC., BY POWERS OF 10.	81	82	80	90	95	65	63	
A	2	A1-02 DO YOU USE PUBLICATIONS, SUCH AS A TECHNICAL ORDERS OR MAINTENANCE MANUALS, IN WHICH IT IS NECESSARY FOR YOU TO MULTIPLY OR DIVIDE BY A POWER OF 10 BEFORE YOU CAN APPLY THE INFORMATION FROM THE PUBLICATION IN A USEFUL WAY ON THE JOB.	41	41	41	51	48	29	13	MATHEMATICS
A	3	A1-03 DO YOU REARRANGE AND SOLVE FORMULAS OR EQUATIONS.	34	35	32	44	25	22	27	
A	4	A1-04 DO YOU CALCULATE THE SQUARE ROOT OF A QUANTITY.	15	15	16	10	16	9	17	
A	5	A1-05 DO YOU SOLVE FOR UNKNOWN QUANTITIES.	28	26	32	37	25	15	17	
A	6	A1-06 DO YOU CONVERT NUMBERS TO LOGARITHMS.	7	9	3	10	5	4	3	
A	7	A1-07 DO YOU USE LOGARITHM TABLES IN ANY TYPE OF CALCULATIONS.	10	13	3	13	9	7	7	
A	8	A1-08 DO YOU SOLVE QUADRATIC EQUATIONS.	8	7	9	10	2	4	10	
A	9	A1-09 DO YOU USE THE NATURAL SYSTEM OF LOGARITHMS.	5	5	4	6	7	0	3	
A	10	A1-10 DO YOU PERFORM CALCULATIONS ON VECTOR QUANTITIES.	41	42	39	49	39	35	43	
A	11	A1-11 DO YOU WORK WITH TRIGONOMETRIC FUNCTIONS SUCH AS SINE, COSINE, OR TANGENT.	56	53	61	56	52	48	67	
A	12	A1-12 DO YOU DETERMINE AREAS OF PLANE FIGURES.	14	12	18	22	9	7	13	
A	13	A1-13 DO YOU SOLVE OR USE SIMULTANEOUS EQUATIONS.	8	9	5	15	2	6	7	
A	14	A1-14 DO YOU SOLVE OR USE PROPORTIONS.	20	17	24	26	18	9	10	
A	15	A2-01 DO YOU USE THE TERM VOLTAGE OR VOLT (V).	98	98	97	96	100	98	97	
A	16	A2-02 DO YOU USE THE TERM ELECTROMOTIVE FORCE (EMF).	24	25	22	32	25	15	23	
A	17	A2-03 DO YOU USE THE TERM OHM.	98	98	97	97	100	96	97	DIRECT CURRENT AND VOLTAGE
A	18	A2-04 DO YOU USE THE TERM ION.	10	12	7	13	14	4	10	
A	19	A2-05 DO YOU USE THE TERM DYNE.	8	11	3	15	9	4	3	
A	20	A2-06 DO YOU USE THE TERM AMPERE.	90	90	89	93	98	89	77	
A	21	A2-07 DO YOU USE THE TERM NEUTRON.	12	15	5	15	16	7	10	
A	22	A2-08 DO YOU USE THE TERM COULOMB.	12	15	5	13	20	6	7	
A	23	A2-09 DO YOU USE THE TERM PROTON.	11	14	4	15	16	6	7	
A	24	A3-01 DO YOU WORK WITH RESISTORS IN YOUR PRESENT JOB.	81	80	82	75	89	80	80	
A	25	A3-02 DO YOU INSPECT RESISTORS.	86	84	91	78	98	80	90	
A	26	A3-03 DO YOU CLEAN RESISTORS.	66	67	65	69	80	52	57	
A	27	A3-04 DO YOU ADJUST RESISTORS.	90	90	89	84	100	87	83	RESISTANCE
A	28	A3-05 DO YOU CHECK OHMIC VALUE OF RESISTORS.	87	87	86	84	100	80	80	
A	29	A3-06 DO YOU REMOVE OR REPLACE RESISTORS.	79	78	80	82	95	65	67	
A	30	A3-07 DO YOU USE OR REFER TO TEMPERATURE COEFFICIENTS FOR RESISTORS ON ANY TASKS YOU PERFORM.	24	24	24	26	23	22	23	
A	31	A3-08 DO YOU USE OR REFER TO RESISTOR SYMBOLS SUCH AS FIXED RESISTOR SYMBOLS OR TAPPED RESISTOR SYMBOLS.	80	82	74	76	95	80	57	
A	32	A3-09 DO YOU IDENTIFY OR CLASSIFY THE RESISTORS YOU WORK WITH AS CARBON, FIXED WIRE, SLIDE TAP, RHEOSTAT, OR POTENTIOMETER.	80	82	76	76	93	78	57	
A	33	A3-10 DO YOU USE RESISTOR COLOR CODES WHICH INDICATE OHMIC VALUE OF RESISTANCE.	72	73	72	78	95	54	47	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		BY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
A	34	A3-11 DO YOU USE RESISTOR COLOR CODES WHICH INDICATE TOLERANCE.	61	62	59	68	82	41	33	
A	35	A3-12 DO YOU USE RESISTOR COLOR CODES WHICH INDICATE FAILURE RATE.	14	16	11	13	18	13	10	
A	36	A3-13 DO YOU MAKE DECISIONS IN WHICH YOU MUST DETERMINE HOW TWO OR MORE BATTERIES MUST BE CONNECTED TOGETHER TO ACHIEVE A SPECIFIC VOLTAGE.	22	24	19	28	30	17	13	
A	37	A3-14 DO YOU USE OR REFER TO THE SCHEMATIC SYMBOLS WHICH REPRESENT BATTERIES, FUSES, CONDUCTORS, LAMPS, OR SWITCHES	88	88	89	79	98	87	87	
A	38	A3-15 DO YOU CALCULATE TOTAL RESISTANCE FOR SERIES RESISTIVE CIRCUITS.	44	42	47	46	64	24	27	
A	39	A3-16 DO YOU CALCULATE TOTAL CURRENT FOR SERIES RESISTIVE CIRCUITS.	36	37	34	37	59	20	17	
A	40	A3-17 DO YOU CALCULATE INDIVIDUAL VOLTAGE DROPS FOR SERIES RESISTIVE CIRCUITS.	42	41	43	46	66	22	20	
A	41	A3-18 DO YOU CALCULATE POWER DISSIPATION FOR SERIES RESISTIVE CIRCUITS.	26	27	24	25	39	17	13	
A	42	A3-19 DO YOU CALCULATE TOTAL RESISTANCE FOR SERIES PARALLEL RESISTIVE CIRCUITS.	41	40	45	43	61	24	23	
A	43	A3-20 DO YOU CALCULATE TOTAL CURRENT FOR SERIES PARALLEL RESISTIVE CIRCUITS.	34	35	32	35	55	20	17	
A	44	A3-21 DO YOU CALCULATE INDIVIDUAL VOLTAGE DROPS FOR SERIES PARALLEL RESISTIVE CIRCUITS.	40	38	42	44	57	22	20	
A	45	A3-22 DO YOU CALCULATE INDIVIDUAL BRANCH CURRENTS FOR SERIES PARALLEL RESISTIVE CIRCUITS.	30	32	26	32	43	19	17	
A	46	A3-23 DO YOU CALCULATE POWER DISSIPATION FOR SERIES PARALLEL RESISTIVE CIRCUITS.	24	25	22	24	34	17	13	
A	47	A3-24 DO YOU CALCULATE TOTAL RESISTANCE FOR PARALLEL RESISTIVE CIRCUITS.	40	40	41	43	61	24	17	
A	48	A3-25 DO YOU CALCULATE TOTAL CURRENT FOR PARALLEL RESISTIVE CIRCUITS.	34	35	31	35	55	20	13	
A	49	A3-26 DO YOU CALCULATE INDIVIDUAL VOLTAGE DROPS FOR PARALLEL RESISTIVE CIRCUITS.	38	37	41	43	57	22	13	
A	50	A3-27 DO YOU CALCULATE INDIVIDUAL BRANCH CURRENTS FOR PARALLEL RESISTIVE CIRCUITS.	30	34	23	31	45	20	13	
A	51	A3-28 DO YOU CALCULATE POWER DISSIPATION FOR PARALLEL RESISTIVE CIRCUITS.	23	24	22	24	32	17	10	
B	52	B1-01 DO YOU MEASURE RESISTANCE.	96	97	95	97	95	96	93	
B	53	B1-02 DO YOU REPAIR OHMMETERS.	8	10	3	9	18	4	0	
B	54	B1-03 DO YOU MEASURE VOLTAGE.	98	98	97	99	100	96	97	MULTIMETER USES
B	55	B1-04 DO YOU REPAIR VOLTMETERS.	6	10	0	7	16	4	0	
B	56	B1-05 DO YOU REPAIR AMMETERS.	6	9	0	7	14	4	0	
B	57	B1-06 DO YOU MEASURE CURRENT.	75	79	65	76	93	69	47	
B	58	B1-07 DO YOU USE MULTIMETERS.	98	99	97	97	100	98	97	
B	59	B1-08 DO YOU DIRECTLY USE A QUANTITY OF CHARGE CALLED A COULOMB.	6	8	3	7	7	2	7	
B	60	B1-09 DO YOU READ SCHEMATICS.	97	97	97	97	98	96	93	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		DY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
B	61	B2-01 DO YOU USE OR REFER TO THE TERM EFFECTIVE VOLTAGE (RMS).	71	71	70	84	77	57	47	ALTERNATING CURRENT
B	62	B2-02 DO YOU USE OR REFER TO THE TERM PEAK TO PEAK VOLTAGE.	88	89	85	94	93	81	70	
B	63	B2-03 DO YOU USE OR REFER TO THE TERM AVERAGE VOLTAGE (DC).	73	76	68	82	77	67	53	
B	64	B2-04 DO YOU USE OR REFER TO THE TERM WAVE LENGTH.	67	72	58	81	86	54	30	
B	65	B2-05 DO YOU USE OR REFER TO THE TERM FREQUENCY.	94	94	93	96	100	91	83	
B	66	B2-06 DO YOU USE OR REFER TO THE TERM INSTANTANEOUS VALUE.	28	27	30	26	36	24	20	
B	67	B3-01 DO YOU WORK WITH INDUCTORS OR CIRCUITS CONTAINING INDUCTORS, CHOKES, OR CHOKE COILS IN YOUR PRESENT JOB.	59	55	46	62	77	43	37	
B	68	B3-02 DO YOU INSPECT INDUCTORS.	57	54	42	65	82	33	27	INDUCTORS AND INDUCTIVE REACTANCE
B	69	B3-03 DO YOU CLEAN INDUCTORS.	41	39	45	54	52	17	17	
B	70	B3-04 DO YOU ADJUST INDUCTORS.	44	42	47	50	80	17	20	
B	71	B3-05 DO YOU REMOVE OR REPLACE INDUCTORS.	51	49	57	62	82	22	23	
B	72	B3-06 DO YOU USE OR REFER TO INDUCTANCE.	44	41	49	53	70	19	20	
B	73	B3-07 DO YOU USE OR REFER TO HENRIES.	30	30	28	38	45	13	13	
B	74	B3-08 DO YOU USE OR REFER TO INDUCTIVE REACTANCE.	30	29	31	34	43	11	17	
B	75	B3-09 DO YOU USE OR REFER TO COPPER LOSS IN INDUCTORS.	5	6	1	6	7	2	0	
B	76	B3-10 DO YOU USE OR REFER TO HYSTERESIS LOSS IN INDUCTORS.	9	10	7	10	11	4	3	
B	77	B3-11 DO YOU USE OR REFER TO EDDY CURRENT LOSS IN INDUCTORS	6	8	3	9	5	4	0	
B	78	B3-12 DO YOU USE OR REFER TO THE GENERAL RULE THAT INDUCTANCE IS PROPORTIONAL TO THE SQUARE OF THE NUMBER OF TURNS OF THE COIL.	6	8	3	12	7	2	0	
B	79	B3-13 DO YOU USE OR REFER TO THE GENERAL RULE THAT THE INDUCTANCE OF A COIL IS DIRECTLY PROPORTIONAL TO THE CROSS SECTIONAL AREA OF THE CORE.	4	5	0	4	7	2	0	
B	80	B3-14 DO YOU USE OR REFER TO THE GENERAL RULE THAT THE INDUCTANCE OF A COIL IS INVERSELY PROPORTIONAL TO ITS LENGTH.	4	5	0	4	5	4	0	
B	81	B3-15 DO YOU USE OR REFER TO THE GENERAL RULE THAT THE INDUCTANCE OF A COIL IS DIRECTLY PROPORTIONAL TO THE PERMEABILITY OF THE CORE MATERIAL.	4	5	1	6	7	2	0	
B	82	B3-16 DO YOU CALCULATE INDUCTANCE FOR PARTICULAR INDUCTORS USING FORMULAS.	6	8	3	7	9	6	0	
B	83	B3-17 DO YOU CALCULATE THE TOTAL INDUCTANCE FOR INDUCTANCE IN SERIES.	6	8	1	7	9	4	0	
B	84	B3-18 DO YOU CALCULATE THE TOTAL INDUCTANCE FOR INDUCTORS IN PARALLEL.	5	8	1	7	7	4	0	
B	85	B3-19 DO YOU CALCULATE THE TOTAL INDUCTANCE FOR INDUCTORS IN SERIES-PARALLEL CIRCUITS.	6	8	1	7	9	4	0	
B	86	B3-20 DO YOU USE OR REFER TO THE GENERAL RULE THAT CURRENT LAGS VOLTAGE IN AC INDUCTOR CIRCUITS.	15	18	9	22	16	9	3	
B	87	B3-21 DO YOU CALCULATE INDUCTIVE REACTANCE.	8	10	4	10	11	4	0	
B	88	B3-22 DO YOU USE OR REFER TO THE GENERAL RULE THAT INDUCTIVE REACTANCE IS DIRECTLY PROPORTIONAL TO FREQUENCY.	16	17	14	22	23	7	3	
B	89	B3-23 DO YOU WORK WITH POWER INDUCTORS.	32	32	32	38	36	28	20	
B	90	B3-24 DO YOU WORK WITH AUDIO FREQUENCY INDUCTORS.	31	33	28	44	55	11	0	
B	91	B3-25 DO YOU WORK WITH RADIO FREQUENCY INDUCTORS.	33	34	31	44	45	15	10	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		DY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182
C	92	C1-01 DO YOU WORK WITH CAPACITORS OR CIRCUITS CONTAINING CAPACITORS IN YOUR PRESENT JOB.	80	82	77	75	86	81	70
C	93	C1-02 DO YOU INSPECT CAPACITORS.	80	79	82	78	93	74	67
C	94	C1-03 DO YOU CLEAN CAPACITORS.	60	59	61	66	66	43	50
C	95	C1-04 DO YOU ADJUST CAPACITORS.	50	49	53	47	84	35	30
C	96	C1-05 DO YOU TEST CAPACITORS.	65	60	76	66	77	54	50
C	97	C1-06 DO YOU DISCHARGE CAPACITORS.	60	57	68	66	91	37	30
C	98	C1-07 DO YOU REMOVE OR REPLACE CAPACITORS.	72	70	76	76	93	54	53
C	99	C1-08 DO YOU USE OR REFER TO DISTRIBUTED CAPACITANCE.	14	16	8	15	18	13	10
C	100	C1-09 DO YOU USE OR REFER TO ORBITAL STRESS OF ELECTRONS IN A DIELECTRIC.	3	4	0	4	2	2	0
C	101	C1-10 DO YOU USE OR REFER TO FARADS, MICROFARADS, OR PICOFARADS.	66	64	68	66	89	52	43
C	102	C1-11 DO YOU USE OR REFER TO CAPACITANCE.	65	63	70	72	82	46	50
C	103	C1-12 DO YOU USE OR REFER TO DIELECTRIC CONSTANT	12	15	5	15	25	4	0
C	104	C1-13 DO YOU USE OR REFER TO WORKING VOLTAGE RATING OF CAPACITORS	48	48	47	57	68	24	23
C	105	C1-14 DO YOU USE OR REFER TO CAPACITIVE REACTANCE	25	29	18	29	39	20	0
C	106	C1-15 DO YOU USE OR REFER TO CAPACITOR COLOR CODES	22	25	16	32	25	13	10
C	107	C1-16 DO YOU WORK WITH CAPACITORS IN DC CIRCUITS	78	79	74	79	91	78	53
C	108	C1-17 DO YOU WORK WITH CAPACITORS IN AC CIRCUITS	80	79	81	72	93	78	70
C	109	C1-18 DO YOU WORK WITH CAPACITORS IN CIRCUITS WITH BOTH DC AND AC	76	75	78	71	93	70	67
C	110	C1-19 DO YOU WORK WITH CAPACITORS IN DON'T REMEMBER WHICH CIRCUITS	15	18	11	16	11	17	20
C	111	C1-20 DO YOU CALCULATE CAPACITANCE FOR PARTICULAR CAPACITORS USING FORMULAS	7	9	3	9	7	6	0
C	112	C1-21 DO YOU USE OR REFER TO THE GENERAL RULE THAT CAPACITANCE OF A CAPACITOR IS DIRECTLY PROPORTIONAL TO THE DIELECTRIC CONSTANT	5	7	1	4	7	4	0
C	113	C1-22 DO YOU USE OR REFER TO THE GENERAL RULE THAT CAPACITANCE OF A CAPACITOR IS INVERSELY PROPORTIONAL TO THE DIELECTRIC THICKNESS	6	8	1	6	7	6	0
C	114	C1-23 DO YOU CALCULATE THE TOTAL CAPACITANCE OF CAPACITORS IN SERIES	11	12	11	12	14	6	7
C	115	C1-24 DO YOU CALCULATE THE TOTAL CAPACITANCE OF CAPACITORS IN PARALLEL	11	12	11	12	14	6	7
C	116	C1-25 DO YOU CALCULATE THE TOTAL CAPACITANCE OF CAPACITORS IN SERIES-PARALLEL CIRCUITS	11	12	9	12	14	6	7
C	117	C1-26 DO YOU USE OR REFER TO THE GENERAL RULE THAT CURRENT DOES NOT FLOW THROUGH CAPACITORS, IT ONLY APPEARS TO DO SO	23	25	19	25	32	17	23
C	118	C1-27 DO YOU USE OR REFER TO THE GENERAL RULE THAT CURRENT LEADS VOLTAGE IN AC CAPACITOR CIRCUITS	19	21	15	25	23	15	7
C	119	C1-28 DO YOU USE OR REFER TO THE GENERAL RULE THAT CAPACITIVE REACTANCE IS INVERSELY PROPORTIONAL TO FREQUENCY	17	19	14	21	23	13	10
C	120	C1-29 DO YOU CALCULATE CAPACITIVE REACTANCE	9	12	3	9	16	6	0

CAPACITORS AND CAPACITIVE REACTANCE

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182
C 121	C1-30 DO YOU WORK WITH ROTOR-STATOR (VARIABLE) CAPACITORS	48	51	41	44	82	44	27
C 122	C1-31 DO YOU WORK WITH COMPRESSION (TRIMMER) CAPACITORS	38	39	35	38	57	31	20
C 123	C1-32 DO YOU WORK WITH ELECTROLYTIC (FIXED) CAPACITORS	74	73	74	74	95	63	50
C 124	C1-33 DO YOU WORK WITH PAPER (FIXED) CAPACITORS	68	67	69	66	95	48	43
C 125	C1-34 DO YOU WORK WITH MICA (FIXED) CAPACITORS	64	62	69	69	84	44	40
C 126	C1-35 DO YOU WORK WITH CERAMIC (FIXED) CAPACITORS	69	68	70	71	95	52	37
C 127	C1-36 DO YOU WORK WITH DON'T REMEMBER WHICH TYPE OF CAPACITORS	16	21	8	12	9	30	20
C 128	C2-01 DO YOU WORK WITH TRANSFORMERS IN YOUR PRESENT JOB	74	75	72	66	95	72	50
C 129	C2-02 DO YOU INSPECT TRANSFORMERS	76	76	76	71	98	72	50
C 130	C2-03 DO YOU CLEAN TRANSFORMERS	51	50	53	54	68	33	27
C 131	C2-04 DO YOU ADJUST TRANSFORMERS	31	34	27	43	45	17	13
C 132	C2-05 DO YOU TROUBLESHOOT TRANSFORMERS	61	62	59	59	82	54	37
C 133	C2-06 DO YOU REMOVE OR REPLACE COMPLETE TRANSFORMERS	66	67	65	72	91	50	37
C 134	C2-07 DO YOU REMOVE OR REPLACE TRANSFORMER PARTS, SUCH AS THE PRIMARY WINDING	3	4	0	4	7	0	0
C 135	C2-08 DO YOU MAKE A DISTINCTION BETWEEN MUTUAL INDUCTION AND MUTUAL INDUCTANCE (M)	3	4	1	6	2	4	0
C 136	C2-09 DO YOU USE THE SYMBOL FOR MUTUAL INDUCTANCE, M	5	5	3	6	2	7	3
C 137	C2-10 DO YOU REFER TO OR USE THE COEFFICIENT OF COUPLING WHEN WORKING WITH TRANSFORMERS	7	9	3	7	14	2	3
C 138	C2-11 DO YOU CALCULATE TURNS RATIOS FOR TRANSFORMERS USING CURRENT OR VOLTAGE RATIOS	7	9	3	9	9	4	3
C 139	C2-12 DO YOU REFER TO REFLECTED IMPEDANCE WHEN WORKING WITH TRANSFORMERS	5	7	3	7	5	4	3
C 140	C2-13 DO YOU CALCULATE IMPEDANCE INTERACTIONS FOR TRANSFORMERS	4	5	3	7	2	4	0
C 141	C2-14 DO YOU WORK WITH AUTOTRANSFORMERS	28	27	28	35	39	15	13
C 142	C2-15 DO YOU WORK WITH POWER TRANSFORMERS	68	68	66	71	89	57	40
C 143	C2-16 DO YOU WORK WITH AUDIO TRANSFORMERS	33	33	32	43	57	13	7
C 144	C2-17 DO YOU WORK WITH RADIO FREQUENCY TRANSFORMERS	37	36	39	47	55	15	13
C 145	C2-18 DO YOU WORK WITH DON'T REMEMBER WHAT TYPE OF TRANSFORMERS	17	18	15	10	11	24	23
C 146	C2-19 DO YOU CHECK TRANSFORMERS FOR OPEN WINDINGS BY MEASURING RESISTANCE	63	60	69	65	89	44	43
C 147	C2-20 DO YOU CHECK TRANSFORMERS FOR SHORTED WINDINGS BY MEASURING RESISTANCE	61	59	66	66	89	39	40
C 148	C2-21 DO YOU CHECK TRANSFORMERS FOR SHORTED WINDINGS BY MEASURING OUTPUT VOLTAGES	57	54	64	54	84	39	40
C 149	C2-22 DO YOU MEASURE RESISTANCE OF TRANSFORMER WINDINGS TO DETERMINE WHETHER A TRANSFORMER HAS A STEP-UP OR STEP-DOWN TURNS RATIO	17	18	15	18	27	13	13
C 150	C2-23 DO YOU MEASURE OUTPUT VOLTAGE OF TRANSFORMERS TO DETERMINE WHETHER A TRANSFORMER HAS A STEP-UP OR STEP-DOWN TURNS RATIO	25	25	24	26	34	15	17
C 151	C2-24 DO YOU REFER TO BASIC TRANSFORMER SCHEMATIC SYMBOLS FOR TRANSFORMERS	72	73	72	66	91	69	53

TRANSFORMERS

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
C 152	C2-25 DO YOU REFER TO MULTIPLE SECONDARY-WINDINGS SCHEMATIC SYMBOLS FOR TRANSFORMERS	63	63	64	65	82	59	40	
C 153	C2-26 DO YOU REFER TO MULTIPLE TAP SCHEMATIC SYMBOLS FOR TRANSFORMERS	63	63	62	65	80	54	37	
C 154	C2-27 DO YOU REFER TO CENTER TAP SCHEMATIC SYMBOLS FOR TRANSFORMERS	66	65	68	66	82	52	47	
C 155	C2-28 DO YOU REFER TO AIR CORE SCHEMATIC SYMBOLS FOR TRANSFORMERS	29	33	22	31	45	26	10	
C 156	C2-29 DO YOU REFER TO IRON CORE SCHEMATIC SYMBOLS FOR TRANSFORMERS	39	41	34	38	61	28	20	
C 157	C2-30 DO YOU REFER TO COMBINATIONS OF THE ABOVE SCHEMATIC SYMBOLS FOR TRANSFORMERS	55	53	57	59	70	44	30	
C 158	C2-31 DO YOU DETERMINE PHASE RELATIONSHIPS BETWEEN SECONDARY AND PRIMARY VOLTAGES OF TRANSFORMERS USING SCHEMATIC SYMBOLS	28	29	26	32	32	19	13	
C 159	C2-32 DO YOU DETERMINE OR REFER TO THE TYPE OF CORE IN TRANSFORMERS YOU WORK WITH	15	18	8	21	16	17	0	
C 160	C2-33 DO YOU REFER TO OR USE THE GENERAL RULE THAT THE TURNS RATIO OF A TRANSFORMER IS EQUAL TO THE VOLTAGE RATIO	15	17	11	19	16	11	10	
C 161	C2-34 DO YOU USE OR REFER TO STEP-UP OR STEP-DOWN RATIOS FOR TRANSFORMERS	25	26	24	31	25	22	17	
C 162	C2-35 DO YOU CALCULATE VOLTAGE RATIOS FOR TRANSFORMERS USING TURNS RATIOS	8	10	4	10	7	4	7	
C 163	C2-36 DO YOU CALCULATE CURRENT RATIOS FOR TRANSFORMERS USING TURNS RATIOS	6	9	0	9	7	4	3	
C 164	C2-37 DOES YOUR JOB INVOLVE ANY TASKS DEALING WITH THREE PHASE TRANSFORMERS	38	36	42	37	39	37	27	
C 165	C2-38 DO YOU INSPECT THREE PHASE TRANSFORMERS	37	39	43	37	45	30	20	
C 166	C2-39 DO YOU CLEAN OR LUBRICATE THREE PHASE TRANSFORMERS	25	26	22	26	30	19	13	
C 167	C2-40 DO YOU ADJUST THREE PHASE TRANSFORMERS	15	16	14	18	18	11	7	
C 168	C2-41 DO YOU TROUBLESHOOT THREE PHASE TRANSFORMERS	29	26	34	29	39	19	17	
C 169	C2-42 DO YOU REMOVE OR REPLACE COMPLETE THREE PHASE TRANSFORMERS	33	29	39	37	45	19	17	
C 170	C2-43 DO YOU REMOVE OR REPLACE THREE PHASE TRANSFORMER PARTS SUCH AS WINDINGS	4	5	0	6	2	6	0	
C 171	C3-01 DO YOU USE OR REFER TO PERMANENT MAGNETS	41	44	35	50	55	30	7	
C 172	C3-02 DO YOU USE OR REFER TO TEMPORARY MAGNETS	25	25	26	34	16	20	13	
C 173	C3-03 DO YOU USE OR REFER TO RETENTIVITY OF MAGNETIC MATERIALS	12	14	7	18	11	6	7	MAGNETISM
C 174	C3-04 DO YOU USE OR REFER TO RELUCTANCE OF MAGNETIC MATERIALS	10	12	5	15	5	6	7	
C 175	C3-05 DO YOU USE OR REFER TO PERMEABILITY OF MAGNETIC MATERIALS	10	12	4	15	9	4	7	
C 176	C3-06 DO YOU USE OR REFER TO RESIDUAL MAGNETISM	10	12	5	15	7	7	3	
C 177	C3-07 DO YOU USE OR REFER TO MAGNETIC LINES OF FORCE OR FLUX	26	26	26	26	16	24	27	
C 178	C3-08 DO YOU USE OR REFER TO WEBER'S THEORY OF MAGNETISM	4	5	1	10	0	4	0	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

			DY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
C	179	C3-09	DO YOU USE OR REFER TO DOMAIN THEORY OF MAGNETISM	5	6	3	12	0	4	0	
C	180	C3-10	DO YOU USE OR REFER TO MAGNETIC INDUCTION	14	14	14	19	14	6	7	
C	181	C3-11	DO YOU USE OR REFER TO FLUX DENSITY	12	14	8	18	5	9	3	
C	182	C3-12	DO YOU USE OR REFER TO THE GENERAL RULE THAT FOR MAGNETIC POLES, LIKE POLES REPEL AND UNLIKE POLES ATTRACT	33	34	31	43	36	20	17	
C	183	C3-13	DO YOU USE THE LEFT HAND THUMB RULE TO FIND THE DIRECTION OF MAGNETIC FIELDS ABOUT STRAIGHT WIRES	15	14	15	21	11	7	10	
C	184	C3-14	DO YOU USE THE LEFT HAND THUMB RULE TO FIND THE NORTH POLE OF A CURRENT CARRYING COIL	13	13	12	18	9	6	10	
D	185	D1-01	DO YOU WORK WITH RC, LR, RCL CIRCUITS IN YOUR PRESENT JOB	48	41	54	53	52	30	23	
D	186	D1-02	DO YOU USE OR REFER TO VECTORS WHEN WORKING WITH RCL CIRCUITS	20	23	16	25	25	11	13	
D	187	D1-03	DO YOU USE OR REFER TO PYTHAGOREAN THEOREM WHEN WORKING WITH RCL CIRCUITS	15	18	8	18	18	9	0	RCL CIRCUITS
D	188	D1-04	DO YOU USE OR REFER TO SINE WHEN WORKING WITH RCL CIRCUITS	30	29	31	35	25	20	23	
D	189	D1-05	DO YOU USE OR REFER TO COSINE WHEN WORKING WITH RCL CIRCUITS	30	29	31	35	27	19	23	
D	190	D1-06	DO YOU USE OR REFER TO TANGENT WHEN WORKING WITH RCL CIRCUITS	26	26	26	29	25	15	23	
D	191	D1-07	DO YOU USE OR REFER TO WATTS WHEN WORKING WITH RCL CIRCUITS	23	22	24	35	9	17	7	
D	192	D1-08	DO YOU USE OR REFER TO TRUE POWER (PT) WHEN WORKING WITH RCL CIRCUITS	16	19	11	22	18	13	3	
D	193	D1-09	DO YOU USE OR REFER TO MAXIMUM POWER (PM) WHEN WORKING WITH RCL CIRCUITS	17	20	12	22	16	15	3	
D	194	D1-10	DO YOU USE OR REFER TO AVERAGE POWER (PAVE) WHEN WORKING WITH RCL CIRCUITS	21	22	19	29	18	13	7	
D	195	D1-11	DO YOU USE OR REFER TO APPARENT POWER (PA) WHEN WORKING WITH RCL CIRCUITS	15	16	11	21	16	13	0	
D	196	D1-12	DO YOU USE OR REFER TO POWER FACTOR (PF) WHEN WORKING WITH RCL CIRCUITS	13	15	8	19	9	11	3	
D	197	D1-13	DO YOU USE OR REFER TO RESONANT CIRCUITS WHEN WORKING WITH RCL CIRCUITS	31	33	28	43	36	17	10	
D	198	D1-14	DO YOU USE OR REFER TO BANDWIDTH WHEN WORKING WITH RCL CIRCUITS	34	36	30	44	41	20	10	
D	199	D1-15	DO YOU USE OR REFER TO SELECTIVITY WHEN WORKING WITH RCL CIRCUITS	26	27	26	35	30	17	10	
D	200	D1-16	DO YOU USE OR REFER TO RESONANT FREQUENCY WHEN WORKING WITH RCL CIRCUITS	34	36	30	43	43	20	10	
D	201	D1-17	DO YOU USE OR REFER TO HALF POWER POINTS WHEN WORKING WITH RCL CIRCUITS	20	20	22	35	23	4	0	
D	202	D1-18	DO YOU USE OR REFER TO BANDPASS REGION WHEN WORKING WITH RCL CIRCUITS	27	30	22	41	30	15	3	
D	203	D1-19	DO YOU USE OR REFER TO CIRCUIT Q WHEN WORKING WITH RCL CIRCUITS	14	16	9	22	14	7	0	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182
D 204	D1-20 DO YOU USE OR REFER TO TANK CIRCUITS WHEN WORKING WITH RCL CIRCUITS	29	25	23	31	32	11	10
D 205	D1-21 DO YOU DETERMINE VALUES OF TRIGONOMETRIC FUNCTIONS USING FORMULAS	29	22	28	25	20	13	27
D 206	D1-22 DO YOU DRAW VOLTAGE, CURRENT, OR IMPEDANCE VECTOR DIAGRAMS FOR CIRCUITS	9	12	3	9	18	6	0
D 207	D1-23 DO YOU CALCULATE TOTAL IMPEDANCE FOR CAPACITIVE CIRCUITS	8	10	4	12	7	6	0
D 208	D1-24 DO YOU CALCULATE PHASE ANGLES BETWEEN IMPEDANCE AND RESISTANCE IN CAPACITIVE CIRCUITS	8	11	1	10	11	7	0
D 209	D1-25 DO YOU CALCULATE TOTAL IMPEDANCE FOR SERIES RCL CIRCUITS	10	12	5	15	9	7	0
D 210	D1-26 DO YOU CALCULATE IMPEDANCE ANGLES FOR SERIES RCL CIRCUITS	6	8	4	10	7	6	0
D 211	D1-27 DO YOU CALCULATE APPARENT POWER (PA) FOR SERIES RCL CIRCUITS	7	8	4	12	5	4	0
D 212	D1-28 DO YOU CALCULATE TRUE POWER (PT) FOR SERIES RCL CIRCUITS	8	10	4	12	7	6	0
D 213	D1-29 DO YOU CALCULATE POWER FACTORS (PF) FOR SERIES RCL CIRCUITS	6	8	3	12	2	4	0
D 214	D1-30 DO YOU CALCULATE TOTAL CURRENT FOR PARALLEL RCL CIRCUITS	6	9	1	12	5	4	0
D 215	D1-31 DO YOU CALCULATE IMPEDANCE ANGLES FOR PARALLEL RCL CIRCUITS	5	8	0	9	5	6	0
D 216	D1-32 DO YOU CALCULATE TOTAL IMPEDANCE FOR PARALLEL RCL CIRCUITS USING THE ASSUMED VOLTAGE METHOD	6	8	1	9	7	6	0
D 217	D1-33 DO YOU CALCULATE TOTAL IMPEDANCE FOR PARALLEL RCL CIRCUITS USING OHM'S LAW	9	10	5	13	7	4	3
D 218	D1-34 DO YOU CHECK CAPACITORS USING OHMMETERS	47	42	57	56	52	31	27
D 219	D1-35 DO YOU CHECK CAPACITORS USING SUBSTITUTION	34	29	43	38	45	19	17
D 220	D1-36 DO YOU CHECK INDUCTORS USING OHMMETERS	44	39	53	54	55	26	13
D 221	D1-37 DO YOU CHECK INDUCTORS USING SUBSTITUTION	29	23	41	31	34	17	17
D 222	D1-38 DO YOU USE OR REFER TO THE GENERAL RULE THAT THETA= 0, PF = 1, AND PA = PT FOR RESONANT CIRCUITS	3	4	1	6	2	2	0
D 223	D1-39 DO YOU CALCULATE RESONANT FREQUENCIES FOR RCL CIRCUITS	10	14	3	16	9	7	0
D 224	D1-40 DO YOU USE OR REFER TO THE GENERAL RULE THAT IMPEDANCE IS MINIMUM AND CURRENT MAXIMUM AT THE RESONANT FREQUENCY FOR SERIES RCL CIRCUITS	10	13	4	15	14	6	0
D 225	D1-41 DO YOU USE OR REFER TO THE GENERAL RULE THAT LINE CURRENT IS MINIMUM AND IMPEDANCE MAXIMUM AT RESONANT FREQUENCY FOR PARALLEL RCL CIRCUITS	10	12	4	13	11	9	0
D 226	D1-42 DO YOU USE OR REFER TO THE GENERAL RULE THAT HALF POWER POINTS ARE AT 70.7 PERCENT OF THE PEAK CURRENT VALUE	22	23	22	32	18	15	3
D 227	D1-43 DO YOU USE OR REFER TO THE GENERAL RULE THAT BANDWIDTH IS INVERSELY PROPORTIONAL TO Q	11	14	7	18	16	4	0
D 228	D1-44 DO YOU DETERMINE HOW CHANGES IN FREQUENCY, RESISTANCE, CAPACITANCE, OR INDUCTANCE WILL AFFECT CURRENT OR PHASE ANGLES FOR RCL CIRCUITS	12	16	3	18	16	7	3

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TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
D 229	D2-01 IN YOUR PRESENT JOB: DO YOU WORK WITH, USE, OR REFER TO SERIES OR PARALLEL RESONANT CIRCUITS OR TIME CONSTANTS	25	27	22	26	25	20	7	
D 230	D2-02 DO YOU WORK WITH, USE, OR REFER TO TIME CONSTANTS	20	22	18	26	20	11	3	SERIES AND PARALLEL RESONANCE (TIME CONSTANTS)
D 231	D2-03 DO YOU WORK WITH, USE, OR REFER TO AVAILABLE VOLTAGE	12	15	7	15	11	7	3	
D 232	D3-04 DO YOU WORK WITH, USE, OR REFER TO TRANSIENT INTERVALS	9	10	7	13	7	6	0	
D 233	D2-05 DO YOU USE OR REFER TO THE GENERAL RULE THAT A CAPACITOR IS FULLY CHARGED (OR DISCHARGED) AFTER FIVE (5) TIME CONSTANTS (TC)	13	16	5	15	11	9	0	
D 234	D2-06 DO YOU USE OR REFER TO UNIVERSAL TIME CONSTANT CHARTS	6	8	1	4	7	6	0	
D 235	D2-07 DO YOU USE EQUATIONS OR FORMULAS TO DETERMINE CIRCUIT CURRENT OR COMPONENT VOLTAGES AFTER A SPECIFIC TIME FOR RC OR LR CIRCUITS	5	7	1	6	7	4	0	
D 236	D2-08 DO YOU USE EQUATIONS OR FORMULAS TO DETERMINE THE TIME REQUIRED FOR CIRCUIT CURRENT OR COMPONENT VOLTAGES TO REACH SPECIFIC VALUES FOR RC OR LR CIRCUITS	6	7	4	7	7	2	0	
D 237	D2-09 DO YOU USE EQUATIONS OR FORMULAS TO DETERMINE COMPONENT VALUES REQUIRED FOR CIRCUIT CURRENT AND COMPONENT VOLTAGES TO REACH SPECIFIC VALUES IN SPECIFIC TIMES	5	6	3	7	2	6	0	
D 238	D2-10 DO YOU USE OR REFER TO THE GENERAL RULE THAT CURRENT IN LR CIRCUITS REACHES ITS MINIMUM VALUE (OR ZERO) AFTER FIVE (5) TIME CONSTANTS	8	10	4	12	7	7	0	
D 239	D3-01 DO YOU WORK WITH CIRCUITS USED AS FILTERS IN YOUR PRESENT JOB	57	56	58	66	64	56	20	
D 240	D3-02 DO YOU INSPECT FILTER CIRCUITS	56	55	59	68	66	46	17	
D 241	D3-03 DO YOU CLEAN FILTER CIRCUITS	42	41	45	54	45	31	10	FILTERS
D 242	D3-04 DO YOU ALIGN OR ADJUST FILTER CIRCUITS	33	32	34	46	48	17	3	
D 243	D3-05 DO YOU TROUBLESHOOT TO THE FILTER CIRCUIT LEVEL	50	47	58	60	66	31	17	
D 244	D3-06 DO YOU TROUBLESHOOT TO COMPONENT PARTS	40	36	46	54	50	17	13	
D 245	D3-07 DO YOU REMOVE OR REPLACE THE COMPLETE FILTER CIRCUIT	55	52	61	63	68	43	20	
D 246	D3-08 DO YOU REMOVE OR REPLACE FILTER CIRCUIT COMPONENT PARTS	39	36	45	51	48	19	13	
D 247	D3-09 DO YOU WORK WITH LOW PASS FILTERS	45	45	47	60	59	30	13	
D 248	D3-10 DO YOU WORK WITH HIGH PASS FILTERS	43	41	47	59	57	24	13	
D 249	D3-11 DO YOU WORK WITH BANDPASS FILTERS	43	41	47	57	64	19	13	
D 250	D3-12 DO YOU WORK WITH BAND-REJECT FILTERS	29	29	28	37	32	24	7	
D 251	D3-13 DON'T REMEMBER WHICH TYPE OF FILTER YOU WORK WITH	19	19	19	18	11	22	20	
D 252	D3-14 DO YOU WORK WITH L-SECTION FILTER CONFIGURATION	29	27	32	38	39	17	10	
D 253	D3-15 DO YOU WORK WITH T-SECTION FILTER CONFIGURATION	28	26	31	34	41	15	13	
D 254	D3-16 DO YOU WORK WITH PI-SECTION FILTER CONFIGURATION	22	21	23	28	27	11	10	
D 255	D3-17 DON'T REMEMBER WHICH TYPE FILTER CONFIGURATION	30	30	28	26	30	37	17	
D 256	D3-18 DO THE FILTERS YOU WORK WITH USE PARALLEL RESONANT CIRCUITS	26	26	27	31	43	17	7	
D 257	D3-19 DO THE FILTERS YOU WORK WITH USE SERIES-PARALLEL CIRCUITS	29	28	31	34	45	19	7	
D 258	D3-20 DO THE FILTERS YOU WORK WITH USE SERIES RESONANT CIRCUITS	25	25	26	29	43	13	7	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		BY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182
D	259	D3-21 DON'T REMEMBER WHICH TYPE OF BASIC CIRCUIT	29	29	30	28	25	35	20
D	260	D3-22 DO YOU USE EQUATIONS OR FORMULAS TO DETERMINE CAPACITANCE OR INDUCTANCE VALUES REQUIRED FOR SPECIFIC FILTERS	6	7	4	9	5	6	7
E	261	E1-01 DO YOU WORK WITH COUPLING DEVICES IN YOUR PRESENT JOB	45	41	51	63	55	20	30
E	262	E1-02 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH RC COUPLING	36	36	38	50	45	19	20
E	263	E1-03 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH IMPEDANCE COUPLING	28	27	31	39	41	13	17
E	264	E1-04 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH TRANSFORMER COUPLING	38	36	42	53	48	20	20
E	265	E1-05 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM RC COUPLING	36	34	41	49	50	19	17
E	266	E1-06 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM IMPEDANCE COUPLING	30	28	34	37	45	13	17
E	267	E1-07 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM TRANSFORMER COUPLING	38	36	43	51	55	19	20
E	268	E1-08 DO YOU WORK WITH DIRECTLY COUPLED CIRCUITS	35	34	39	53	43	13	23
E	269	E1-09 DO YOU WORK WITH CAPACITIVE-RESISTIVE COUPLED CIRCUITS	33	31	38	46	45	15	20
E	270	E1-10 DO YOU WORK WITH CAPACITIVE-INDUCTIVE COUPLED CIRCUITS	28	25	34	35	43	9	17
E	271	E1-11 DO YOU WORK WITH TRANSFORMER COUPLED CIRCUITS	37	35	41	53	48	17	23
E	272	E1-12 DON'T REMEMBER WHICH TYPE OF COUPLING CIRCUITS	14	12	16	16	11	13	10
E	273	E2-01 IN YOUR PRESENT JOB, DO YOU PERFORM SOLDERING TECHNIQUES OR INSPECT OR EVALUATE SOLDERED CONNECTIONS	94	95	92	90	95	94	93
E	274	E2-02 DO YOU SELECT TYPE OF SOLDER TO USE	69	67	73	72	75	59	60
E	275	E2-03 DO YOU ADD FLUX TO CONNECTIONS	90	93	85	87	95	98	83
E	276	E2-04 DO YOU CLEAN CONNECTIONS USING SOLVENTS	76	78	72	81	82	76	60
E	277	E2-05 DO YOU STRIP INSULATION FROM WIRES	96	97	93	94	98	100	93
E	278	E2-06 DO YOU CONNECT OR DISCONNECT HEAT SINKS	84	86	78	87	93	81	67
E	279	E2-07 DO YOU BEND OR SHAPE WIRES OR LEADS	95	97	92	93	98	98	93
E	280	E2-08 DO YOU CUT WIRES	96	98	93	94	98	100	93
E	281	E2-09 DO YOU FILE OR SHAPE SOLDERING IRON TIPS	77	82	69	71	80	87	63
E	282	E2-10 DO YOU TIN SOLDERING IRON TIPS	94	97	89	93	95	100	87
E	283	E2-11 DO YOU CLEAN SOLDERING IRON TIPS	95	98	89	94	98	100	83
E	284	E2-12 DO YOU CLEAN ELECTRICAL SURFACES USING ERASERS	81	82	80	88	84	74	67
E	285	E2-13 DO YOU TIN OR PRE-TIN CONDUCTORS	90	93	84	91	93	94	70
E	286	E2-14 DO YOU INSPECT SOLDERED CONNECTIONS	94	96	91	93	98	94	90
E	287	E2-15 DO YOU DESOLDER CONNECTIONS BY WICKING	63	63	62	65	70	65	47
E	288	E2-16 DO YOU DESOLDER CONNECTIONS USING VACUUM DESOLDERING TOOLS	85	84	86	88	89	80	80
E	289	E2-17 DO YOU CUT COMPONENT LEADS TO REMOVE COMPONENTS	65	64	66	72	80	54	53
E	290	E2-18 DO YOU CRUSH COMPONENTS FOR REMOVAL	24	24	23	31	23	22	13

COUPLING

SOLDERING

PCT MBRS RESPONDING 'YES' BY SELECTED GRPS GPSUM9 PAGE 12

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		BY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
E	291	E2-19 DO YOU MAKE HARDWIRE CONNECTIONS	87	89	84	91	91	87	80	
E	292	E2-20 DO YOU MAKE PRINTED CIRCUIT BOARD CONNECTIONS	75	75	73	85	77	69	50	
E	293	E2-21 DO YOU SOLDER PASSIVE COMPONENTS SUCH AS RESISTORS OR CAPACITORS ON PRINTED CIRCUIT BOARDS	71	71	72	81	77	63	47	
E	294	E2-22 DO YOU SOLDER ACTIVE COMPONENTS SUCH AS SOLID-STATE DIODES OR TRANSISTORS ON PRINTED CIRCUIT BOARDS	69	68	70	81	64	59	53	
E	295	E3-01 DO YOU WORK WITH RELAYS ON YOUR PRESENT JOB	86	88	82	87	95	85	70	
E	296	E3-02 DO YOU ADJUST RELAYS	26	28	22	43	45	6	3	
E	297	E3-03 DO YOU CLEAN RELAYS	47	47	46	68	59	29	27	
E	298	E3-04 DO YOU INSPECT RELAYS	73	72	74	75	84	65	67	RELAYS
E	299	E3-05 DO YOU REMOVE OR REPLACE COMPLETE RELAYS	84	84	84	85	93	76	73	
E	300	E3-06 DO YOU REMOVE OR REPLACE PARTS OR RELAYS	8	10	3	18	9	2	0	
E	301	E3-07 DO YOU TROUBLESHOOT RELAYS	80	83	73	78	89	85	63	
E	302	E3-08 DO YOU STRAIGHTEN RELAY CONTACTS	41	44	38	62	41	26	10	
E	303	E3-09 DO YOU PERFORM TASKS ON RELAY CONTACTS	35	36	31	59	32	22	10	
E	304	E3-10 DO YOU PERFORM TASKS ON RELAY CORES	6	7	4	18	2	0	0	
E	305	E3-11 DO YOU PERFORM TASKS ON RELAY COILS	5	6	4	15	2	0	3	
E	306	E3-12 DO YOU PERFORM TASKS ON RELAY ARMATURES	13	12	15	32	9	0	3	
E	307	E3-13 DO YOU PERFORM TASKS ON RELAY SPRINGS	10	10	8	25	7	0	0	
E	308	E3-14 DO YOU USE OR REFER TO SINGLE POLE, SINGLE THROW (SPST), NORMALLY OPEN (NO) SCHEMATIC SYMBOLS FOR RELAYS	69	69	68	75	70	63	53	
E	309	E3-15 DO YOU USE OR REFER TO SINGLE POLE, SINGLE THROW (SPST), NORMALLY CLOSED (NC) SCHEMATIC SYMBOLS FOR RELAYS	65	65	66	72	66	61	47	
E	310	E3-16 DO YOU USE OR REFER TO SINGLE POLE, DOUBLE THROW (SPDT) SCHEMATIC SYMBOLS FOR RELAYS	61	64	57	71	59	63	40	
E	311	E3-17 DO YOU USE OR REFER TO DOUBLE POLE, DOUBLE THROW (DPDT) SCHEMATIC SYMBOLS FOR RELAYS	61	63	57	69	59	61	40	
E	312	E3-18 DO YOU USE OR REFER TO OTHER RELAY SYMBOLS SCHEMATIC SYMBOLS FOR RELAYS	62	62	62	68	59	65	47	
E	313	E3-19 DO YOU CHECK ELECTRICAL CONTINUITY OF COILS BY MEASURING RESISTANCE	64	63	66	65	73	59	50	
F	314	F1-01 IN YOUR PRESENT JOB, DO YOU PERFORM ANY TASKS DEALING WITH MICROPHONES	4	3	4	4	2	4	3	
F	315	F1-02 DO YOU INSPECT MICROPHONES	2	1	4	1	2	0	3	
F	316	F1-03 DO YOU CLEAN MICROPHONES	1	1	3	1	2	0	0	
F	317	F1-04 DO YOU OPERATE MICROPHONES	4	3	4	6	2	4	0	MICROPHONES
F	318	F1-05 DO YOU TROUBLESHOOT AS FAR AS CHECKING WIRE CONNECTIONS BUT DO NOT TROUBLESHOOT DOWN TO COMPONENT PARTS OR MICROPHONES	2	1	5	3	2	0	3	
F	319	F1-06 DO YOU TROUBLESHOOT DOWN TO MICROPHONE PARTS	0	0	0	0	0	0	0	
F	320	F1-07 DO YOU REMOVE OR REPLACE COMPLETE MICROPHONES	2	1	4	3	2	2	3	
F	321	F1-08 DO YOU REMOVE OR REPLACE MICROPHONE PARTS	0	0	0	0	0	0	0	
F	322	F1-09 DO YOU PERFORM TASKS ON CARBON MICROPHONES	1	0	3	1	0	0	3	
F	323	F1-10 DO YOU PERFORM TASKS ON CAPACITOR MICROPHONES	0	0	1	1	0	0	0	
F	324	F1-11 DO YOU PERFORM TASKS ON CRYSTAL MICROPHONES	0	0	1	1	0	0	0	
F	325	F1-12 DO YOU PERFORM TASKS ON DYNAMIC MICROPHONES	2	1	3	3	2	2	0	
F	326	F1-13 DO YOU PERFORM TASKS ON VELOCITY RIBBON MICROPHONES	0	0	1	1	0	0	0	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
F 327	F2-01 IN YOUR PRESENT JOB, DO YOU PERFORM ANY TASKS DEALING WITH SPEAKERS	3	4	1	6	2	2	3	
F 328	F2-02 DO YOU INSPECT SPEAKERS	1	0	3	1	0	0	3	SPEAKERS
F 329	F2-03 DO YOU CLEAN SPEAKERS	1	1	1	1	2	0	0	
F 330	F2-04 DO YOU OPERATE SPEAKERS	2	3	1	4	2	2	0	
F 331	F2-05 DO YOU TROUBLESHOOT AS FAR AS CHECKING WIRE CONNECTIONS BUT DO NOT TROUBLESHOOT DOWN TO COMPONENT PARTS OF SPEAKERS	1	1	3	1	2	0	3	
F 332	F2-06 DO YOU TROUBLESHOOT DOWN TO SPEAKER PARTS	0	0	0	0	0	0	0	
F 333	F2-07 DO YOU REMOVE OR REPLACE COMPLETE SPEAKERS	1	1	3	1	2	0	3	
F 334	F2-08 DO YOU REMOVE OR REPLACE SPEAKER PARTS	0	0	0	0	0	0	0	
F 335	F2-09 DO YOU PERFORM ANY TASKS ON SPEAKER CONES	0	1	0	0	0	2	0	
F 336	F2-10 DO YOU PERFORM ANY TASKS ON SPEAKER SPIDERS	0	0	0	0	0	0	0	
F 337	F2-11 DO YOU PERFORM ANY TASKS ON SPEAKER FIELD COILS	0	0	0	0	0	0	0	
F 338	F2-12 DO YOU PERFORM ANY TASKS ON SPEAKER VOICE COILS	0	0	0	0	0	0	0	
F 339	F2-13 DO YOU PERFORM ANY TASKS ON SPEAKER PERMANENT MAGNETS	0	0	0	0	0	0	0	
F 340	F2-14 DO YOU PERFORM ANY TASKS ON SPEAKER ELECTROMAGNETS	0	0	0	0	0	0	0	
F 341	F2-15 DO YOU PERFORM ANY TASKS ON SPEAKER SOFT IRON CORES	0	0	0	0	0	0	0	
F 342	F3-01 DO YOU USE OSCILLOSCOPES IN YOUR PRESENT JOB	93	93	93	87	98	94	97	
F 343	F3-02 DO YOU USE OSCILLOSCOPES TO PERFORM OPERATIONAL CHECKS	89	90	86	90	98	87	77	
F 344	F3-03 DO YOU USE OSCILLOSCOPES TO PERFORM ALIGNMENTS OR ADJUSTMENTS	88	90	84	84	98	89	73	OSCILLOSCOPES
F 345	F3-04 DO YOU USE OSCILLOSCOPES TO TROUBLESHOOT ELECTRONIC CIRCUITS	88	90	85	87	95	89	77	
F 346	F3-05 DO YOU USE OSCILLOSCOPES TO MEASURE FREQUENCY	84	85	81	87	100	74	67	
F 347	F3-06 DO YOU USE OSCILLOSCOPES TO MEASURE TIME	75	79	68	84	100	63	33	
F 348	F3-07 DO YOU USE OSCILLOSCOPES TO OBSERVE LISAJOUS PATTERNS	42	47	32	43	73	30	17	
F 349	F3-08 DO YOU USE OSCILLOSCOPES TO OBSERVE SIGNALS WHILE UTILIZING ATTENUATOR PROBES	70	74	64	84	98	54	27	
F 350	F3-09 DO YOU USE OSCILLOSCOPES TO MAKE FREQUENCY OR TIME MEASUREMENTS USING DELAY TIME MULTIPLIERS	44	48	36	62	57	31	7	
F 351	F3-10 DO YOU USE OSCILLOSCOPES TO MEASURE AC VOLTAGE	87	88	85	84	98	80	87	
F 352	F3-11 DO YOU USE OSCILLOSCOPES TO MEASURE OR OBSERVE SIGNALS AFTER FIRST ADJUSTING THE GAIN AND DC BAL CONTROLS	61	64	57	69	77	48	40	
F 353	F3-12 DO YOU USE OSCILLOSCOPES TO MEASURE DC VOLTAGE	84	86	82	88	98	72	73	
G 354	G1-01 DO YOU WORK WITH SEMICONDUCTOR DIODES IN YOUR PRESENT JOB	76	75	77	81	82	69	63	
G 355	G1-02 DO YOU INSPECT DIODES	74	73	74	79	86	63	57	
G 356	G1-03 DO YOU REMOVE OR REPLACE DIODES	68	67	70	82	82	50	40	SEMICONDUCTOR DIODES
G 357	G1-04 DO YOU CHECK DIODES USING AN INSTRUMENT	69	67	73	78	84	52	50	
G 358	G1-05 DO YOU USE ENERGY LEVEL DIAGRAMS IN YOUR WORK WITH DIODES	5	8	1	7	7	6	0	
G 359	G1-06 DO YOU USE PN JUNCTION DIODE CHARACTERISTIC CURVES, TOGETHER WITH VALUES OF FORWARD AND REVERSE BIAS VOLTAGE, TO COMPUTE FORWARD OR REVERSE BIAS RESISTANCE	6	9	1	12	2	6	0	
G 360	G1-07 DO YOU COMPUTE FORWARD OR REVERSE BIAS RESISTANCE FOR DIODES	12	14	8	15	14	11	3	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182
G 361	G1-08 DO YOU USE OR REFER TO THE GENERAL RULE THAT TEMPERATURE CAN AFFECT THE OPERATION OF DIODES	38	32	50	49	39	22	27
G 362	G1-09 DO YOU IDENTIFY SEMICONDUCTOR DIODES AS OPPOSED TO OTHER ELECTRONIC COMPONENTS, SUCH AS RESISTORS, BASED ON THEIR PHYSICAL APPEARANCE	63	60	68	72	70	46	50
G 363	G1-10 DO YOU REFER TO OR DO YOU DETERMINE THE GENERAL EFFECTS OF DOPING ON CURRENT FLOW	8	9	5	18	2	6	0
G 364	G1-11 DO YOU USE OR REFER TO MEASUREMENTS OF FORWARD BIAS RESISTANCE	45	42	50	57	50	30	20
G 365	G1-12 DO YOU USE OR REFER TO DIODE COLOR CODING	26	26	26	38	14	20	20
G 366	G1-13 DO YOU USE OR REFER TO CENTRIFUGAL FORCE OF AN ELECTRON IN ORBIT AROUND A NUCLEUS	2	3	1	7	0	0	0
G 367	G1-14 DO YOU USE OR REFER TO CENTRIPETAL FORCE OF AN ELECTRON IN ORBIT AROUND A NUCLEUS	2	3	1	7	0	0	0
G 368	G1-15 DO YOU USE OR REFER TO DIODE NUMBERING SYSTEM, SUCH AS IN 538	46	45	49	62	48	30	27
G 369	G1-16 DO YOU USE OR REFER TO KINETIC ENERGY OF AN ELECTRON MOVING IN ORBIT	2	3	0	6	0	0	0
G 370	G1-17 DO YOU USE OR REFER TO POTENTIAL ENERGY OF AN ELECTRON MOVING IN ORBIT	2	3	0	6	0	0	0
G 371	G1-18 DO YOU USE OR REFER TO MEASUREMENTS OF REVERSE BIAS RESISTANCE	45	42	50	59	48	28	27
G 372	G1-19 DO YOU USE OR REFER TO NUMBER OF ELECTRONS IN A PARTICULAR SHELL OR ORBIT	2	3	0	6	0	0	0
G 373	G1-20 DO YOU USE OR REFER TO PERMISSIBLE ENERGY LEVELS OF AN ORBITING ELECTRON	2	3	0	6	0	0	0
G 374	G1-21 DO YOU USE OR REFER TO FORBIDDEN ENERGY LEVELS OF AN ORBITING ELECTRON	2	3	0	6	0	0	0
G 375	G1-22 DO YOU USE OR REFER TO VALENCE ELECTRONS (THOSE IN THE OUTERMOST SHELL)	2	3	1	6	0	0	0
G 376	G1-23 DO YOU USE OR REFER TO ATOMIC NUMBER (TOTAL NUMBER OF ELECTRONS IN ATOM)	2	3	1	6	0	0	0
G 377	G1-24 DO YOU USE OR REFER TO SYMBOLS ON THE DIODE WHICH INDICATE THE CATHODE END	62	60	65	76	68	48	47
G 378	G1-25 DO YOU NEED TO KNOW WHICH MATERIALS ARE USED IN THE CONSTRUCTION OF DIODES SUCH AS GERMANIUM OR SILICON	14	12	19	21	14	7	3
G 379	G1-26 DO YOU NEED TO KNOW THAT SEMICONDUCTORS HAVE NEGATIVE TEMPERATURE COEFFICIENTS OF RESISTANCE (AS TEMPERATURE INCREASES RESISTANCE DECREASES)	19	19	19	24	18	19	3
G 380	G1-27 DO YOU USE OR REFER TO PN JUNCTION DIODE CHARACTERISTIC CURVES, SUCH AS VOLTAGE - CURRENT CHARACTERISTIC CURVES (PERHAPS YOU DO THIS TO IDENTIFY POINTS OF STRUCTURAL BREAKDOWN OR OPERATING REGIONS)	5	8	1	10	2	4	0
G 381	G1-28 DO YOU DETERMINE WHETHER PN JUNCTION DIODES ARE FORWARD BIASED OR REVERSE BIASED WHEN YOU READ OR INTERPRET CIRCUIT DIAGRAMS	37	35	41	54	36	22	17
G 382	G1-29 DO YOU USE OR REFER TO VALENCE BAND IN SEMICONDUCTOR MATERIALS	1	2	0	4	0	0	0

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
G 383	G1-30 DO YOU USE OR REFER TO FORBIDDEN BAND IN SEMICONDUCTOR MATERIALS	1	2	0	4	0	0	0	
G 384	G1-31 DO YOU USE OR REFER TO CONDUCTION BAND IN SEMICONDUCTOR MATERIALS	2	3	0	4	5	0	0	
G 385	G1-32 DO YOU USE OR REFER TO COVALENT BONDING IN SEMICONDUCTOR MATERIALS	1	2	0	4	0	0	0	
G 386	G1-33 DO YOU USE OR REFER TO ELECTRON-HOLE PAIR CREATED IN SEMICONDUCTORS	2	3	1	7	0	0	0	
G 387	G1-34 DO YOU USE OR REFER TO ELECTRON FLOW OR HOLE FLOW IN SEMICONDUCTORS	7	7	8	12	11	0	3	
G 388	G1-35 DO YOU USE OR REFER TO DONOR IMPURITY IN SEMICONDUCTORS	2	3	0	6	2	0	0	
G 389	G1-36 DO YOU USE OR REFER TO ACCEPTOR IMPURITY IN SEMICONDUCTORS	2	3	0	6	0	0	0	
G 390	G1-37 DO YOU USE OR REFER TO P-TYPE SEMICONDUCTOR MATERIAL	16	19	19	25	11	9	0	
G 391	G1-38 DO YOU USE OR REFER TO N-TYPE SEMICONDUCTOR MATERIAL	15	14	18	25	11	9	0	
G 392	G1-39 DO YOU USE OR REFER TO MAJORITY CARRIERS IN SEMICONDUCTORS	4	5	1	7	2	2	0	
G 393	G1-40 DO YOU USE OR REFER TO MINORITY CARRIERS IN SEMICONDUCTORS	4	5	1	7	2	2	0	
G 394	G1-41 DO YOU USE OR REFER TO JUNCTION RECOMBINATION IN SEMICONDUCTORS	2	3	0	7	0	0	0	
G 395	G1-42 DO YOU USE OR REFER TO DEPLETION REGION IN SEMICONDUCTORS	2	3	0	6	0	0	0	
G 396	G1-43 DO YOU USE OR REFER TO RELATIONSHIP BETWEEN BARRIER WIDTH AND DIFFERENCE OF POTENTIAL	2	2	1	6	0	0	0	
G 397	G1-44 DO YOU USE OR REFER TO THE 10:1 BACK TO FRONT RESISTANCE RATIO FOR DIODES	36	34	36	46	41	29	17	
G 398	G1-45 DO YOU USE OR REFER TO BARRIER HEIGHT IN SEMICONDUCTORS	0	1	0	1	0	0	0	
G 399	G1-46 DO YOU USE OR REFER TO DIODE SUBSTITUTION INFORMATION	24	22	27	29	23	20	3	
G 400	G1-47 DO YOU USE OR REFER TO MAXIMUM AVERAGE FORWARD CURRENT DIODE RATINGS	9	10	5	12	9	7	0	
G 401	G1-48 DO YOU USE OR REFER TO PEAK RECURRENT FORWARD CURRENT DIODE RATINGS	10	12	7	13	11	9	0	
G 402	G1-49 DO YOU USE OR REFER TO MAXIMUM SURGE CURRENT DIODE RATINGS	9	11	5	12	11	6	0	
G 403	G1-50 DO YOU USE OR REFER TO PEAK REVERSE (INVERSE) VOLTAGE DIODE RATINGS	12	12	12	19	14	6	0	
G 404	G2-01 DO YOU WORK WITH TRANSISTORS IN YOUR PRESENT JOB.	74	73	74	75	70	72	63	
G 405	G2-02 DO YOU INSPECT TRANSISTORS	69	68	70	75	66	67	50	
G 406	G2-03 DO YOU REMOVE OR REPLACE TRANSISTORS	63	60	69	76	52	52	47	
G 407	G2-04 DO YOU CHECK TRANSISTORS USING AN INSTRUMENT	57	53	65	72	41	50	40	TRANSISTORS
G 408	G2-05 DO YOU USE OR REFER TO EMITTER - BASE (EB) FORWARD AND REVERSE RESISTANCE MEASUREMENTS	49	44	58	66	39	41	20	
G 409	G2-06 DO YOU USE OR REFER TO COLLECTOR - BASE (CB) FORWARD AND REVERSE RESISTANCE MEASUREMENTS	48	43	58	63	39	43	20	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
G 410	G2-07 DO YOU USE OR REFER TO EMITTER - COLLECTOR (EC) RESISTANCE MEASUREMENTS	48	43	58	65	39	39	23	
G 411	G2-08 DO YOU USE OR REFER TO HOW BIASING AFFECTS THE PHYSICAL BARRIER WIDTH OF THE EMITTER - BASE JUNCTION	15	14	15	22	7	11	13	
G 412	G2-09 DO YOU USE OR REFER TO HOW BIASING AFFECTS THE PHYSICAL BARRIER WIDTH OF THE COLLECTOR - BASE JUNCTION	14	14	14	22	5	9	13	
G 413	G2-10 DO YOU USE OR REFER TO THE PHYSICAL SIZE OF THE TRANSISTOR STRUCTURE (COLLECTOR, BASE AND EMITTER)	33	29	39	46	23	20	33	
G 414	G2-11 DO YOU USE OR REFER TO LEAKAGE CURRENT (ICBO) IN A TRANSISTOR	12	13	11	24	7	9	3	
G 415	G2-12 DO YOU USE OR REFER TO TRANSISTOR SCHEMATIC SYMBOLS	68	67	70	74	59	69	53	
G 416	G2-13 DO YOU USE OR REFER TO TRANSISTOR NOTATION SUCH AS Q1, Q2, Q3, ETC	69	66	74	75	55	69	60	
G 417	G2-14 DO YOU USE OR REFER TO TRANSISTOR SUBSTITUTION INFORMATION	30	29	32	41	18	30	7	
G 418	G2-15 DO YOU USE OR REFER TO THE GENERAL RULE THAT THE TRANSISTOR BASE CURRENT IB IS NORMALLY SIGNIFICANTLY SMALLER THAN THE EMITTER CURRENT IE (USUALLY IB BEING 2 TO 8 PERCENT OF IE)	17	16	18	26	14	15	10	
G 419	G2-16 DO YOU USE THE INFORMATION THAT THE EFFECT OF EMITTER BASE VOLTAGE ON BASE CURRENT IS THE CONTROLLING FACTOR FOR TRANSISTORS	24	23	26	34	18	22	10	
G 420	G2-17 DO YOU USE THE GENERAL RULE THAT LEAKAGE CURRENT (ICBO) IN A TRANSISTOR INCREASES AS TEMPERATURE INCREASES	10	12	7	16	5	9	3	
G 421	G2-18 DO YOU USE OR REFER TO TRANSISTOR CHARACTERISTIC CURVES	3	4	1	7	0	4	0	
G 422	G2-19 DO YOU USE OR REFER TO BETA TRANSISTOR GAINS	9	8	11	19	2	6	0	
G 423	G2-20 DO YOU USE OR REFER TO ALPHA TRANSISTOR GAINS	8	8	9	18	2	6	0	
G 424	G2-21 DO YOU USE OR REFER TO GAMMA TRANSISTOR GAINS	7	7	8	15	2	6	0	
G 425	G2-22 DO YOU CALCULATE BETA TRANSISTOR GAINS	2	3	0	4	0	2	0	
G 426	G2-23 DO YOU CALCULATE ALPHA TRANSISTOR GAINS	2	3	0	4	0	2	0	
G 427	G2-24 DO YOU CALCULATE GAMMA TRANSISTOR GAINS	2	3	0	3	0	2	0	
G 428	G3-01 DO YOU WORK WITH TRANSISTOR AMPLIFIERS IN YOUR PRESENT JOB	55	51	61	72	41	46	37	
G 429	G3-02 DO YOU INSPECT TRANSISTOR AMPLIFIERS	52	47	62	71	39	37	40	
G 430	G3-03 DO YOU ALIGN OR ADJUST TRANSISTOR AMPLIFIERS	33	29	41	46	23	22	20	TRANSISTOR AMPLIFIERS
G 431	G3-04 DO YOU TROUBLESHOOT TO THE AMPLIFIER CIRCUIT LEVEL	47	41	59	63	34	35	37	
G 432	G3-05 DO YOU TROUBLESHOOT TO AMPLIFIER COMPONENTS	37	32	49	62	20	19	17	
G 433	G3-06 DO YOU REMOVE OR REPLACE THE COMPLETE AMPLIFIER	51	48	57	72	39	37	37	
G 434	G3-07 DO YOU REMOVE OR REPLACE AMPLIFIER COMPONENTS	38	32	51	62	20	20	20	
G 435	G3-08 DO YOU USE OR REFER TO (COMMON EMITTER) THE CHANGE IN COLLECTOR CURRENT WHICH RESULTS FROM A CHANGE IN BASE CURRENT	15	14	16	24	7	15	0	
G 436	G3-09 DO YOU USE OR REFER TO (COMMON EMITTER) THE CALCULATIONS NECESSARY TO MEASURE THE SPECIFIC CHANGE IN COLLECTOR CURRENT WHICH RESULTS FROM A SPECIFIC CHANGE IN BASE CURRENT	7	8	5	12	2	6	0	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182
G 437	G3-10 DO YOU USE OR REFER TO (COMMON EMITTER) THE CHANGE IN COLLECTOR VOLTAGE WHICH RESULTS FROM A CHANGE IN BASE CURRENT	16	15	18	25	7	15	0
G 438	G3-11 DO YOU USE OR REFER TO (COMMON EMITTER) THE CALCULATIONS NECESSARY TO MEASURE THE SPECIFIC CHANGE IN COLLECTOR VOLTAGE WHICH RESULTS FROM A SPECIFIC CHANGE IN BASE CURRENT	6	6	5	10	2	4	0
G 439	G3-12 DO YOU USE OR REFER TO (COMMON EMITTER) THE CHANGE IN BASE CURRENT WHICH RESULTS FROM AN INPUT SIGNAL	15	14	16	29	7	13	3
G 440	G3-13 DO YOU USE OR REFER TO (COMMON EMITTER) THE CALCULATIONS NECESSARY TO MEASURE THE SPECIFIC CHANGE IN BASE CURRENT WHICH RESULTS FROM A SPECIFIC INPUT SIGNAL	7	8	5	12	2	4	0
G 441	G3-14 DO YOU USE THE LOAD-LINE METHOD OF ANALYSIS IN YOUR CIRCUIT ANALYSIS (THIS METHOD REQUIRES YOU TO PLOT A LOAD-LINE ON A TRANSISTOR CHARACTERISTIC CURVE)	3	3	3	7	0	0	0
G 442	G3-15 DO YOU USE OR REFER TO THE OPERATING POINT Q (QUIESCENT POINT) FOR A TRANSISTOR	7	5	11	13	2	2	3
G 443	G3-16 DO YOU CALCULATE THE SPECIFIC QUIESCENT POINT FOR A PARTICULAR TRANSISTOR	3	3	3	6	0	4	0
G 444	G3-17 DO YOU MEASURE VOLTAGE GAIN USED IN THE COMMON EMITTER CONFIGURATION	29	21	31	35	14	19	17
G 445	G3-18 DO YOU MEASURE CURRENT GAIN USED IN THE COMMON EMITTER CONFIGURATION	17	16	18	31	9	9	7
G 446	G3-19 DO YOU MEASURE POWER GAIN USED IN THE COMMON EMITTER CONFIGURATION	15	14	16	31	9	4	3
G 447	G3-20 DO YOU CALCULATE THE VOLTAGE GAIN FOR SPECIFIC TRANSISTORS USING A FORMULA THAT IS, DO YOU DIVIDE THE CHANGE IN BASE-EMITTER VOLTAGE INTO THE CHANGE THE BASE COLLECTOR VOLTAGE TO DETERMINE THE VOLTAGE GAIN	4	4	4	9	0	2	0
G 448	G3-21 DO YOU CALCULATE THE CURRENT GAIN FOR SPECIFIC TRANSISTORS USING A FORMULA THAT IS, DO YOU DIVIDE THE CHANGE IN BASE CURRENT INTO THE CHANGE IN COLLECTOR CURRENT TO DETERMINE THE CURRENT GAIN	4	4	3	7	0	2	0
G 449	G3-22 DO YOU CALCULATE THE POWER GAIN FOR A SPECIFIC TRANSISTOR USING A FORMULA THAT IS, DO YOU MULTIPLY THE CURRENT GAIN TIMES THE VOLTAGE GAIN TO DETERMINE THE POWER GAIN	3	3	1	6	0	2	0
G 450	G3-23 DO YOU NEED TO KNOW THAT MORE COLLECTOR CURRENT IS GENERATED WITH LESS COLLECTOR VOLTAGE AS TEMPERATURE INCREASES (THIS AFFECTS THE STATIC OPERATING POINT [Q] OF THE TRANSISTOR)	5	5	4	6	2	4	0
G 451	G3-24 DO YOU COMPUTE THE STATIC OPERATING POINT [Q] OF A TRANSISTOR AT DIFFERENT TEMPERATURES	1	2	0	3	0	2	0
G 452	G3-25 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH EMITTER (SWAMPING) RESISTOR STABILIZATION	17	18	16	28	11	11	0
G 453	G3-26 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH SELF-BIAS STABILIZATION	15	15	16	25	11	7	0

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182
G 454	63-27 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH THERMISTOR STABILIZATION	15	16	14	22	9	9	3
G 455	63-28 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH FORWARD BIAS DIODE STABILIZATION	19	16	23	29	14	11	3
G 456	63-29 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH REVERSE BIAS DIODE STABILIZATION	19	16	23	29	14	11	3
G 457	63-30 DO YOU IDENTIFY ON SCHEMATIC DIAGRAMS AND RELATE TO THE ACTUAL CIRCUITRY THE COMPONENTS ASSOCIATED WITH DOUBLE DIODE STABILIZATION	12	13	11	21	7	7	0
G 458	63-31 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM EMITTER (SWAMPING) RESISTOR STABILIZATION	21	20	23	34	14	13	0
G 459	63-32 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM SELF-BIAS STABILIZATION	20	17	27	34	14	9	0
G 460	63-33 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM THERMISTOR STABILIZATION	21	19	24	34	14	13	0
G 461	63-34 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM FORWARD BIAS DIODE STABILIZATION	24	19	32	38	14	15	3
G 462	63-35 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM REVERSE BIAS DIODE STABILIZATION	24	19	32	38	14	15	3
G 463	63-36 DO YOU TROUBLESHOOT CIRCUITS WHICH HAVE COMPONENTS WHICH PERFORM DOUBLE DIODE STABILIZATION	17	15	20	28	9	9	0
G 464	63-37 DO YOU IDENTIFY AMPLITUDE DISTORTION FOR TRANSISTOR CIRCUITS	24	20	31	41	18	7	3
G 465	63-38 DO YOU TROUBLESHOOT TRANSISTOR CIRCUITS TO FIND THE CAUSES OF AMPLITUDE DISTORTION	21	18	27	38	16	7	3
G 466	63-39 DO YOU IDENTIFY FREQUENCY DISTORTION FOR TRANSISTOR CIRCUITS	22	21	24	41	14	11	3
G 467	63-40 DO YOU IDENTIFY PHASE DISTORTION FOR TRANSISTOR CIRCUITS	14	13	16	24	11	6	3
G 468	63-41 DO YOU TROUBLESHOOT TRANSISTOR CIRCUITS TO FIND THE CAUSES OF PHASE DISTORTION	13	12	15	21	11	6	0
G 469	63-42 DO YOU TROUBLESHOOT TRANSISTOR CIRCUITS TO FIND THE CAUSES OF FREQUENCY DISTORTION	19	16	24	34	14	9	3
G 470	63-43 DO YOU NEED TO KNOW THE DEGENERATIVE EFFECTS ON THE CIRCUIT CAUSED BY CHANGING EMITTER RESISTANCE FOR TRANSISTOR AMPLIFIERS IN THE COMMON COLLECTOR CONFIGURATION	11	13	8	21	5	7	0
G 471	63-44 DO YOU DETERMINE THE CLASS OF OPERATION FOR AMPLIFIERS IN ORDER TO TROUBLESHOOT AMPLIFIER CIRCUITS	11	11	12	19	7	9	0
G 472	63-45 DO YOU TROUBLESHOOT OR REPAIR PARAPHASE AMPLIFIERS	18	14	26	28	14	11	3
G 473	63-46 DO YOU TROUBLESHOOT OR REPAIR PUSH-PULL AMPLIFIERS	30	25	39	44	20	17	17
G 474	63-47 DO YOU TROUBLESHOOT OR REPAIR COMPLEMENTARY SYMMETRY CIRCUITS	17	12	27	28	11	9	0
G 475	63-48 DO YOU TROUBLESHOOT OR REPAIR COMPOUND-CONNECTED AMPLIFIERS	15	12	20	22	14	7	3

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		DY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
G	476	63-99 DO YOU TROUBLESHOOT OR REPAIR CASCADE-CONNECTED AMPLIFIERS	21	17	28	34	14	11	3	
M	477	H1-01 DO YOU USE OR REFER TO VARACTORS	16	16	16	28	14	9	3	
M	478	H1-02 DO YOU USE OR REFER TO TUNNEL DIODES	18	14	24	31	11	9	0	
M	479	H1-03 DO YOU USE OR REFER TO FIELD EFFECT TRANSISTORS (FET)	31	30	32	54	11	22	10	SOLID-STATE SPECIAL PURPOSE DEVICES
M	480	H1-04 DO YOU USE OR REFER TO UNIJUNCTION TRANSISTORS	27	23	34	41	9	17	13	
M	481	H1-05 DO YOU USE OR REFER TO ZENER DIODES	55	53	59	71	61	37	27	
M	482	H1-06 DO YOU USE OR REFER TO INTEGRATED CIRCUITS	54	51	59	71	93	41	93	
M	483	H2-01 IN YOUR PRESENT JOB, DO YOU WORK WITH POWER SUPPLIES	85	88	78	82	93	89	73	
M	484	H2-02 DO YOU INSPECT POWER SUPPLIES	86	80	81	85	100	83	70	
M	485	H2-03 DO YOU CLEAN POWER SUPPLIES	70	73	64	79	77	56	53	
M	486	H2-04 DO YOU ALIGN OR ADJUST POWER SUPPLIES	72	72	73	81	84	56	50	
M	487	H2-05 DO YOU TROUBLESHOOT TO POWER SUPPLY CIRCUIT LEVEL	78	79	76	78	95	70	60	POWER SUPPLIES
M	488	H2-06 DO YOU TROUBLESHOOT TO POWER SUPPLY COMPONENTS	62	62	62	72	89	41	27	
M	489	H2-07 DO YOU REMOVE OR REPLACE COMPLETE POWER SUPPLIES	85	88	80	85	98	83	70	
M	490	H2-08 DO YOU REMOVE OR REPLACE POWER SUPPLY COMPONENTS	62	63	61	79	91	41	30	
M	491	H2-09 DO YOU WORK WITH HALF-WAVE RECTIFIERS	50	47	55	59	66	28	33	
M	492	H2-10 DO YOU WORK WITH FULL-WAVE RECTIFIERS OTHER THAN BRIDGE RECTIFIERS	51	49	57	62	75	28	30	
M	493	H2-11 DO YOU WORK WITH BRIDGE RECTIFIERS	53	51	57	63	66	35	27	
M	494	H2-12 DO YOU WORK WITH THREE-PHASE RECTIFIERS	39	37	43	50	39	28	27	
M	495	H2-13 DO YOU USE OR REFER TO INPUT VOLTAGE	69	69	69	79	82	69	53	
M	496	H2-14 DO YOU USE OR REFER TO INPUT FREQUENCY	53	53	54	59	52	50	47	
M	497	H2-15 DO YOU USE OR REFER TO PEAK OUTPUT VOLTAGE	51	51	51	57	61	39	33	
M	498	H2-16 DO YOU USE OR REFER TO AVERAGE OUTPUT VOLTAGE	56	55	58	65	59	48	40	
M	499	H2-17 DO YOU USE OR REFER TO RIPPLE AMPLITUDE	45	45	47	51	48	39	33	
M	500	H2-18 DO YOU USE OR REFER TO RIPPLE FREQUENCY	34	31	39	44	41	17	30	
M	501	H2-19 DO YOU USE OR REFER TO PEAK REVERSE (INVERSE) VOLTAGE	21	21	22	31	25	11	10	
M	502	H2-20 DO YOU USE OR REFER TO SHAPE OF OUTPUT WAVEFORMS	62	61	64	69	61	56	53	
M	503	H2-21 DO YOU USE OR REFER TO EFFECTIVE OUTPUT VOLTAGE	54	53	57	65	55	41	40	
M	504	H2-22 DO YOU WORK WITH CIRCUITS WHICH EMPLOY CAPACITIVE FILTERS	49	45	55	62	57	33	27	
M	505	H2-23 DO YOU WORK WITH CIRCUITS WHICH EMPLOY INDUCTIVE FILTERS	45	41	53	57	57	31	20	
M	506	H2-24 DO YOU WORK WITH CIRCUITS WHICH EMPLOY CAPACITIVE INPUT L-TYPE FILTERS	35	32	42	44	50	17	17	
M	507	H2-25 DO YOU WORK WITH CIRCUITS WHICH EMPLOY INDUCTIVE INPUT L-TYPE FILTERS	34	31	41	41	50	17	17	
M	508	H2-26 DO YOU WORK WITH CIRCUITS WHICH EMPLOY LC PI-TYPE FILTERS	30	27	36	38	41	13	17	
M	509	H2-27 DO YOU WORK WITH CIRCUITS WHICH EMPLOY RC PI-TYPE FILTERS	31	28	38	40	39	15	20	
M	510	H2-28 DO YOU WORK WITH CIRCUITS WHICH EMPLOY DON'T REMEMBER WHICH TYPE OF FILTER	41	47	30	41	39	46	33	
M	511	H2-29 DO YOU HAVE THE OPTION OF REPLACING ONE TYPE OF FILTER WITH A DIFFERENT TYPE FILTER	3	4	0	3	5	2	0	
M	512	H3-01 DO YOU WORK WITH OSCILLATORS IN YOUR PRESENT JOB	45	47	43	68	66	17	10	OSCILLATORS

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182
H 513	H3-02 DO YOU INSPECT OSCILLATORS	43	43	42	62	61	17	13
H 514	H3-03 DO YOU ALIGN OR ADJUST OSCILLATORS	40	41	38	56	68	15	0
H 515	H3-04 DO YOU REMOVE OR REPLACE COMPLETE OSCILLATORS	42	42	41	62	52	19	13
H 516	H3-05 DO YOU REMOVE OR REPLACE OSCILLATOR COMPONENTS	34	34	34	53	55	11	0
H 517	H3-06 DO YOU TROUBLESHOOT TO OSCILLATOR CIRCUIT LEVEL	42	40	46	54	66	20	10
H 518	H3-07 DO YOU TROUBLESHOOT TO OSCILLATOR COMPONENTS	34	33	35	56	50	11	0
H 519	H3-08 DO YOU USE OR REFER TO FEEDBACK	33	33	34	49	45	13	10
H 520	H3-09 DO YOU USE OR REFER TO FREQUENCY DETERMINING DEVICES (FDD)	30	32	28	44	39	16	13
H 521	H3-10 DO YOU USE OR REFER TO AMPLITUDE STABILITY	27	27	27	40	32	15	3
H 522	H3-11 DO YOU USE OR REFER TO FREQUENCY STABILITY	31	32	31	40	48	19	10
H 523	H3-12 DO YOU USE OR REFER TO DAMPING	21	21	23	31	34	7	3
H 524	H3-13 DO YOU USE OR REFER TO REGENERATIVE FEEDBACK	29	29	30	40	41	13	10
H 525	H3-14 DO YOU USE OR REFER TO PIEZOELECTRIC EFFECT	10	12	7	18	11	6	0
H 526	H3-15 DO YOU USE OR REFER TO CRITICAL DAMPING	10	12	7	15	11	6	0
H 527	H3-16 DO YOU USE OR REFER TO UNDER DAMPING	12	13	11	19	14	6	0
H 528	H3-17 DO YOU USE OR REFER TO OVER DAMPING	12	13	11	19	14	6	0
H 529	H3-18 DO YOU WORK WITH OSCILLATORS WHICH USE LC TANK CIRCUITS AS FDD	21	22	20	34	27	7	7
H 530	H3-19 DO YOU WORK WITH OSCILLATORS WHICH USE RC NETWORKS AS FDD	30	29	34	44	45	9	13
H 531	H3-20 DO YOU WORK WITH OSCILLATORS WHICH USE CRYSTALS AS FDD	32	34	28	56	50	11	3
H 532	H3-21 DO YOU WORK WITH OSCILLATORS WHICH USE DON'T REMEMBER WHICH TYPE OF FDD	11	12	9	18	11	4	3
H 533	H3-22 DO YOU WORK WITH SERIES HARTLEY SINUSOIDAL OSCILLATORS	13	12	14	18	20	4	0
H 534	H3-23 DO YOU WORK WITH SHUNT HARTLEY SINUSOIDAL OSCILLATORS	12	12	12	18	23	4	0
H 535	H3-24 DO YOU WORK WITH COLPITTS SINUSOIDAL OSCILLATORS	15	14	15	21	20	6	0
H 536	H3-25 DO YOU WORK WITH CLAPP SINUSOIDAL OSCILLATORS	10	11	9	15	20	2	0
H 537	H3-26 DO YOU WORK WITH BUTLER SINUSOIDAL OSCILLATORS	8	9	7	12	14	2	0
H 538	H3-27 DO YOU WORK WITH DON'T REMEMBER WHICH TYPE OF OSCILLATORS	25	27	23	32	34	11	17
I 539	I1-01 DO YOU WORK WITH MULTIVIBRATORS IN YOUR PRESENT JOB	43	43	43	60	43	28	27
I 540	I1-02 DO YOU INSPECT WAVE GENERATING OR SHAPING CIRCUITS	35	35	34	49	36	20	17
I 541	I1-03 DO YOU ALIGN OR ADJUST WAVE GENERATING OR SHAPING CIRCUITS	31	32	30	43	34	17	13
I 542	I1-04 DO YOU CALIBRATE WAVE GENERATING OR SHAPING CIRCUITS	23	25	18	34	23	11	7
I 543	I1-05 DO YOU TROUBLESHOOT TO WAVE GENERATING OR SHAPING CIRCUITS	34	34	35	49	36	19	17
I 544	I1-06 DO YOU TROUBLESHOOT TO WAVE GENERATING OR SHAPING CIRCUIT COMPONENTS	28	29	26	40	32	15	7
I 545	I1-07 DO YOU REMOVE OR REPLACE COMPLETE WAVE GENERATING OR SHAPING CIRCUITS	32	29	38	44	32	19	20
I 546	I1-08 DO YOU REMOVE OR REPLACE WAVE GENERATING OR SHAPING COMPONENTS	28	29	26	41	30	17	3
I 547	I1-09 DO YOU WORK WITH MULTIVIBRATORS WHICH CONTAIN LC TANK CIRCUITS	22	24	19	32	27	11	3

MULTIVIBRATORS

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		DY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
I	548	11-10 DO YOU WORK WITH MULTIVIBRATORS WHICH CONTAIN RC NETWORKS	25	27	22	37	27	11	7	
I	549	11-11 DO YOU WORK WITH MULTIVIBRATORS WHICH CONTAIN CRYSTALS	23	24	22	34	32	11	3	
I	550	11-12 DO YOU WORK WITH MULTIVIBRATORS WHICH CONTAIN DON'T REMEMBER WHICH TYPE OF FDD	14	15	12	18	9	15	17	
I	551	11-13 DO YOU WORK WITH ASTABLE MULTIVIBRATORS	25	27	20	40	23	13	13	
I	552	11-14 DO YOU WORK WITH MONOSTABLE MULTIVIBRATORS	27	27	27	41	30	15	13	
I	553	11-15 DO YOU WORK WITH BISTABLE MULTIVIBRATORS	32	32	34	50	30	19	17	
I	554	11-16 DO YOU WORK WITH DON'T REMEMBER WHICH TYPE MULTIVIBRATORS	14	16	11	18	14	11	7	
I	555	12-01 DO YOU WORK WITH LIMITERS OR CLAMPERS IN YOUR PRESENT JOB	34	29	42	40	48	15	20	
I	556	12-02 DO YOU WORK WITH SERIES DIODE LIMITERS	20	19	23	25	32	7	7	LIMITERS AND CLAMPERS
I	557	12-03 DO YOU WORK WITH SHUNT DIODE LIMITERS	19	18	22	19	32	9	7	
I	558	12-04 DO YOU WORK WITH LIMITERS WITH BIAS	15	15	15	13	30	9	3	
I	559	12-05 DO YOU WORK WITH ZENER DIODE LIMITERS	19	18	22	19	32	9	7	
I	560	12-06 DO YOU WORK WITH TRANSISTOR LIMITERS	16	16	18	19	23	7	7	
I	561	12-07 DO YOU WORK WITH DON'T KNOW WHICH TYPE OF LIMITERS	16	15	19	24	16	6	10	
I	562	12-08 DO YOU WORK WITH BASIC DIODE CLAMPING CIRCUITS	14	14	14	12	30	6	7	
I	563	12-09 DO YOU WORK WITH DIODE CLAMPING CIRCUITS WITH BIAS	14	15	12	10	30	7	7	
I	564	12-10 DO YOU WORK WITH DON'T KNOW WHICH TYPE OF CLAMPING CIRCUIT	16	16	16	26	14	4	10	
I	565	13-01 IN YOUR PRESENT JOB, DO YOU WORK ON EQUIPMENT WHICH CONTAINS ELECTRON TUBES	49	49	47	72	91	13	0	
I	566	13-02 DO YOU CHECK ELECTRON TUBES TO SEE IF THEY ARE GOOD	47	48	46	68	91	13	0	ELECTRON TUBES
I	567	13-03 DO YOU USE TUBE TESTERS TO CHECK ELECTRON TUBES	38	42	30	56	84	7	0	
I	568	13-04 DO YOU USE MULTIMETERS TO CHECK ELECTRON TUBES	29	29	27	40	57	11	0	
I	569	13-05 DO YOU USE SCOPES TO CHECK ELECTRON TUBES	29	30	26	43	57	11	0	
I	570	13-06 DO YOU USE SUBSTITUTION TO CHECK ELECTRON TUBES	46	47	43	69	91	9	0	
I	571	13-07 DO YOU USE OR REFER TO CUTOFF	18	18	18	32	32	4	0	
I	572	13-08 DO YOU USE OR REFER TO PEAK INVERSE VOLTAGE RATING	9	11	5	16	16	2	0	
I	573	13-09 DO YOU USE OR REFER TO PEAK CURRENT RATING	10	13	5	18	20	2	0	
I	574	13-10 DO YOU USE OR REFER TO TRANSIT TIME	8	10	4	12	20	2	0	
I	575	13-11 DO YOU USE OR REFER TO PLATE DISSIPATION RATING	7	10	3	13	14	2	0	
I	576	13-12 DO YOU USE OR REFER TO SATURATION	17	17	18	32	32	2	0	
I	577	13-13 DO YOU USE OR REFER TO DC PLATE RESISTANCE	12	13	9	22	23	2	0	
I	578	13-14 DO YOU COMPUTE ACTUAL VALUES OF THE DC PLATE RESISTANCE FOR ELECTRON TUBES	4	4	4	9	5	2	0	
I	579	13-15 DO YOU USE OR REFER TO PLATE VOLTAGE	35	37	30	51	68	6	0	
I	580	13-16 DO YOU USE OR REFER TO PLATE CURRENT	27	30	22	40	59	2	0	
I	581	13-17 DO YOU USE OR REFER TO GRID VOLTAGE	33	36	27	49	66	6	0	
I	582	13-18 DO YOU USE OR REFER TO GRID CURRENT	27	30	22	40	59	2	0	
I	583	13-19 DO YOU USE OR REFER TO CATHODE VOLTAGE	33	36	27	47	68	6	0	
I	584	13-20 DO YOU USE OR REFER TO CATHODE CURRENT	27	30	20	38	59	2	0	
I	585	13-21 DO YOU USE OR REFER TO THE TRIODE AMPLIFICATION FACTOR (THE AMPLIFICATION FACTOR FOR TRIODES IS DEFINED AS THE RATIO OF CHANGE IN PLATE VOLTAGE TO A CHANGE IN GRID VOLTAGE)	5	7	1	9	9	2	0	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		BY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
I	586	I3-22 DO YOU CALCULATE ACTUAL VALUES OF TRIODE AMPLIFICATION FACTORS	1	1	0	1	2	0	0	
I	587	I3-23 DO YOU USE OR REFER TO MULTIGRID (TETRODE, PENTODE, ETC) AMPLIFICATION FACTORS	5	5	4	9	9	2	0	
I	588	I3-24 DO YOU USE OR REFER TO ELECTRON TUBE TRANSCONDUCTANCE (G, WHICH IS MEASURED IN MHOS)	2	1	3	6	0	0	0	
I	589	I3-25 DO YOU CALCULATE ACTUAL VALUES OF ELECTRON TUBE TRANSCONDUCTANCES	1	1	0	1	2	0	0	
I	590	I3-26 DO YOU USE OR REFER TO THE ELECTRON TUBE PARAMETER CALLED AC PLATE RESISTANCE	2	3	0	4	2	0	0	
I	591	I3-27 DO YOU CALCULATE ACTUAL VALUES OF AC PLATE RESISTANCE	2	3	0	4	0	2	0	
I	592	I3-28 DO YOU USE OR REFER TO ELECTRON TUBE INTERELECTRODE CAPACITANCE	3	4	1	7	2	2	0	
I	593	I3-29 DO YOU USE OR REFER TO CHARACTERISTIC CURVES IN YOUR WORK WITH ELECTRON TUBES	1	2	0	4	0	0	0	
I	594	I3-30 DO YOU USE CHARACTERISTIC CURVES TO SELECT PLATE VOLTAGE FOR A SPECIFIED BIAS	3	4	1	6	5	2	0	
I	595	I3-31 DO YOU USE CHARACTERISTIC CURVES TO SELECT PLATE CURRENT FOR A SPECIFIED BIAS	3	4	1	6	5	2	0	
I	596	I3-32 DO YOU USE CHARACTERISTIC CURVES TO SELECT BIAS REQUIRED FOR CUTOFF	4	4	3	7	5	2	0	
I	597	I3-33 DO YOU USE CHARACTERISTIC CURVES TO SELECT BIAS REQUIRED FOR SATURATION	4	4	3	7	5	2	0	
I	598	I3-34 DO YOU USE OR REFER TO ELECTRON TUBE AMPLIFIER GAIN	22	24	19	32	50	4	0	
I	599	I3-35 DO YOU USE OR REFER TO ELECTRON TUBE AMPLIFIER EFFICIENCY	14	16	9	24	27	2	0	
I	600	I3-36 DO YOU USE TEST TUBE CHECKERS TO DETERMINE ELECTRON TUBE AMPLIFIER GAIN	27	30	22	44	57	4	0	
I	601	I3-37 DO YOU USE MULTIMETERS TO DETERMINE ELECTRON TUBE AMPLIFIER GAIN	20	20	19	22	48	6	0	
I	602	I3-38 DO YOU USE OSCILLOSCOPES TO DETERMINE ELECTRON TUBE AMPLIFIER GAIN	20	19	22	26	45	6	0	
I	603	I3-39 DO YOU USE CHARACTERISTIC CURVES TO DETERMINE ELECTRON TUBE AMPLIFIER GAIN	4	5	1	9	5	2	0	
I	604	I3-40 DO YOU CALCULATE ANY ELECTRON TUBE CAPACITANCES SUCH AS INPUT CAPACITANCE	1	2	0	4	0	0	0	
I	605	I3-41 DO YOU USE OR REFER TO TUBE SOCKET NOTATION	40	39	41	59	80	7	0	
I	606	I3-42 DO YOU USE OR REFER TO PIN NUMBERING SYSTEMS	45	46	42	69	82	9	0	
I	607	I3-43 DO YOU USE OR REFER TO THE TYPE OF MATERIAL OR THE OPERATING TEMPERATURE OF THE EMITTING SURFACE IN THE ELECTRON TUBES YOU WORK ON	3	5	0	4	7	2	0	
I	608	I3-44 DO YOU USE OR REFER TO TUBE SUBSTITUTION MATERIAL SUCH AS MANUALS OR CHARTS	19	21	15	25	52	0	0	
J	609	J1-01 DO YOU WORK WITH ELECTRON TUBE AMPLIFIERS OR CIRCUITS IN YOUR PRESENT JOB	37	37	38	56	73	9	0	ELECTRON TUBE AMPLIFIERS AND CIRCUITS
J	610	J1-02 DO YOU DETERMINE THE CLASS OF OPERATION FOR ELECTRON TUBE AMPLIFIERS IN ORDER TO TROUBLESHOOT AMPLIFIER CIRCUITS	9	9	9	13	18	4	0	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
J 611	J1-03 DO YOU TROUBLESHOOT OR REPAIR PARAPHASE AMPLIFIERS	15	14	15	24	30	2	0	
J 612	J1-04 DO YOU TROUBLESHOOT OR REPAIR PUSH-PULL AMPLIFIERS	20	19	23	31	43	4	0	
J 613	J1-05 DO YOU TROUBLESHOOT OR REPAIR COMPOUND-CONNECTED AMPLIFIERS	12	14	9	16	30	4	0	
J 614	J1-06 DO YOU TROUBLESHOOT OR REPAIR CASCADE-CONNECTED AMPLIFIERS	15	14	18	24	27	4	0	
J 615	J1-07 DO YOU TROUBLESHOOT OR REPAIR DON'T KNOW WHICH TYPE OF AMPLIFIER	18	18	16	28	30	6	0	
J 616	J2-01 DO YOU WORK WITH GAS TUBES (HOT CATHODE OR COLD CATHODE)	26	27	24	41	57	4	0	
J 617	J2-02 DO YOU WORK WITH CATHODE-RAY TUBES	27	25	31	44	50	4	0	
J 618	J2-03 DO YOU USE OR REFER TO THE CHARACTERISTICS OF BEAM POWER TUBES	4	6	0	9	5	0	0	SPECIAL PURPOSE ELECTRON TUBES
J 619	J2-04 DO YOU TROUBLESHOOT OR REPAIR CIRCUITS IN WHICH BEAM POWER TUBES ARE USED	7	9	4	16	9	0	0	
J 620	J2-05 DO YOU USE OR REFER TO THE CHARACTERISTICS OF THYRATRONS	11	10	12	15	25	0	0	
J 621	J2-06 DO YOU TROUBLESHOOT OR REPAIR CIRCUITS IN WHICH THYRATRONS ARE USED	14	12	18	21	25	2	0	
J 622	J2-07 DO YOU USE OR REFER TO THE PRINCIPLES OF OPERATION OF ELECTRON GUNS OF CATHODE-RAY TUBES (CRT)	15	12	20	28	14	4	0	
J 623	J2-08 DO YOU USE OR REFER TO THE PRINCIPLES OF OPERATION OF ELECTROMAGNETIC DEFLECTION SYSTEMS OF CATHODE-RAY TUBES (CRT)	13	12	14	25	16	4	0	
J 624	J2-09 DO YOU USE OR REFER TO THE PRINCIPLES OF OPERATION OF ELECTROSTATIC DEFLECTION SYSTEMS OF CATHODE-RAY TUBES (CRT)	13	12	16	25	16	2	0	
J 625	J2-10 DO YOU USE OR REFER TO PHOSPHOR SCREENS	15	13	18	28	14	2	0	
J 626	J2-11 DO YOU USE OR REFER TO AQUADAG COATINGS	8	8	7	15	7	2	0	
J 627	J2-12 DO YOU USE OR REFER TO ELECTRON OPTICS	7	7	7	13	5	2	0	
J 628	J2-13 DO YOU USE OR REFER TO PERSISTENCE	14	15	18	32	11	4	0	
J 629	J2-14 DO YOU USE OR REFER TO DECAY TIMES	13	13	14	25	14	2	0	
J 630	J2-15 DO YOU USE OR REFER TO FLUORESCENCE	10	11	9	24	7	2	0	
J 631	J2-16 DO YOU USE OR REFER TO PHOSPHORESCENCE	11	11	11	22	9	2	0	
J 632	J3-01 DO YOU WORK ON TRANSMIT OR RECEIVE SYSTEMS IN YOUR PRESENT JOB	56	61	47	82	82	30	7	
J 633	J3-02 DO YOU PERFORM TASKS ON FREQUENCY CONVERTERS	39	44	30	63	50	22	3	HETERODYNING, MODULATION, AND DEMODULATION
J 634	J3-03 DO YOU PERFORM TASKS ON FREQUENCY MIXERS	51	55	42	72	80	28	7	
J 635	J3-04 DO YOU USE OR REFER TO THE HETERODYNING OF SIGNALS IN YOUR WORK WITH TRANSMIT OR RECEIVE SYSTEMS	29	34	20	44	45	11	3	
J 636	J3-05 DO YOU PERFORM TASKS ON REACTANCE MODULATORS	23	28	14	37	32	13	0	
J 637	J3-06 DO YOU PERFORM TASKS ON MODULATED OSCILLATORS	39	45	27	57	59	20	7	
K 638	K1-01 DO YOU WORK ON AM TRANSMIT OR RECEIVE SYSTEMS IN YOUR PRESENT JOB	6	6	7	10	9	4	0	
K 639	K1-02 DO YOU INSPECT AM TRANSMIT OR RECEIVE SYSTEMS	6	6	5	9	9	4	0	AM SYSTEMS
K 640	K1-03 DO YOU CLEAN AM TRANSMIT OR RECEIVE SYSTEMS	5	6	4	7	9	4	0	
K 641	K1-04 DO YOU ALIGN OR ADJUST AM TRANSMIT OR RECEIVE SYSTEMS	5	6	4	7	9	4	0	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
K 642	K1-05 DO YOU TROUBLESHOOT TO AM TRANSMIT OR RECEIVE SYSTEMS	6	6	7	10	9	4	0	
K 643	K1-06 DO YOU TROUBLESHOOT TO AM TRANSMIT OR RECEIVE COMPONENTS	5	6	4	7	9	4	0	
K 644	K1-07 DO YOU REMOVE OR REPLACE AM TRANSMIT OR RECEIVE SYSTEMS	6	6	7	10	9	4	0	
K 645	K1-08 DO YOU REMOVE OR REPLACE AM TRANSMIT OR RECEIVE COMPONENTS	5	5	4	6	9	4	0	
K 646	K1-09 DO YOU PERFORM TASKS ON RF OSCILLATORS	5	5	3	6	9	4	0	
K 647	K1-10 DO YOU PERFORM TASKS ON RF AMPLIFIERS	5	5	3	6	9	4	0	
K 648	K1-11 DO YOU PERFORM TASKS ON AUDIO AMPLIFIERS	5	5	3	6	11	2	0	
K 649	K1-12 DO YOU PERFORM TASKS ON POWER AMPLIFIERS	5	7	3	7	11	4	0	
K 650	K1-13 DO YOU PERFORM TASKS ON LOCAL OSCILLATORS	5	6	3	7	9	4	0	
K 651	K1-14 DO YOU PERFORM TASKS ON IF AMPLIFIERS	5	6	3	7	9	4	0	
K 652	K1-15 DO YOU PERFORM TASKS ON DETECTORS	5	6	3	7	9	4	0	
K 653	K1-16 DO YOU PERFORM TASKS ON DON'T REMEMBER WHICH AM STAGE	2	2	1	4	2	0	0	
K 654	K1-17 DO YOU USE OR REFER TO AMPLITUDE STABILIZATION IN TRANSMITTERS	5	6	4	7	9	4	0	
K 655	K1-18 DO YOU USE OR REFER TO FREQUENCY STABILIZATION IN TRANSMITTERS	5	5	4	7	9	2	0	
K 656	K1-19 DO YOU USE OR REFER TO SENSITIVITY OF RECEIVERS	7	7	7	9	14	4	0	
K 657	K1-20 DO YOU USE OR REFER TO SELECTIVITY OF RECEIVERS	6	6	7	9	11	4	0	
K 658	K1-21 DO YOU USE OR REFER TO 2ND HARMONIC DISTORTION	3	3	3	6	5	0	0	
K 659	K1-22 DO YOU USE OR REFER TO BANDPASS DISTORTION	4	4	3	6	7	2	0	
K 660	K1-23 DO YOU USE OR REFER TO SQUARE LAW DISTORTION	2	3	1	4	2	2	0	
K 661	K1-24 DO YOU USE OR REFER TO CO-CHANNEL INTERFERENCE	3	3	3	6	2	2	0	
K 662	K1-25 DO YOU USE OR REFER TO IMAGE FREQUENCIES IN RECEIVERS	3	3	3	6	5	2	0	
K 663	K1-26 DO YOU USE OR REFER TO SIGNAL TO IMAGE RATIOS OR IMAGE REJECTION RATIOS	4	4	3	6	7	2	0	
K 664	K1-27 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH AM TRANSMITTER SCHEMATIC DIAGRAMS	6	6	5	7	11	4	0	
K 665	K1-28 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH AM RECEIVER SCHEMATIC DIAGRAMS	6	7	6	9	11	4	0	
K 666	K2-01 DO YOU WORK WITH FM TRANSMIT OR RECEIVE SYSTEMS IN YOUR PRESENT JOB	29	32	24	41	50	15	3	
K 667	K2-02 DO YOU INSPECT FM TRANSMIT OR RECEIVE SYSTEMS	27	29	24	40	50	9	3	
K 668	K2-03 DO YOU CLEAN FM TRANSMIT OR RECEIVE SYSTEMS	25	27	22	37	45	7	3	FM SYSTEMS
K 669	K2-04 DO YOU ALIGN FM TRANSMIT OR RECEIVE SYSTEMS	27	29	23	40	50	9	3	
K 670	K2-05 DO YOU TROUBLESHOOT TO FM TRANSMIT OR RECEIVE SYSTEMS	29	31	26	43	50	13	3	
K 671	K2-06 DO YOU TROUBLESHOOT TO FM TRANSMIT OR RECEIVE COMPONENTS	28	30	23	40	50	11	3	
K 672	K2-07 DO YOU REMOVE OR REPLACE FM TRANSMIT OR RECEIVE SYSTEMS	30	32	26	44	50	15	3	
K 673	K2-08 DO YOU REMOVE OR REPLACE FM TRANSMIT OR RECEIVE COMPONENTS	28	30	23	41	50	11	3	
K 674	K2-09 DO YOU PERFORM TASKS ON AUDIO AMPLIFIERS	23	25	20	31	48	11	0	
K 675	K2-10 DO YOU PERFORM TASKS ON FREQUENCY MULTIPLIERS	20	23	15	29	36	9	3	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
K 676	K2-11 DO YOU PERFORM TASKS ON DRIVERS (INTERMEDIATE AMPLIFIERS)	23	25	18	29	45	11	3	
K 677	K2-12 DO YOU PERFORM TASKS ON POWER AMPLIFIERS	23	25	18	32	43	9	3	
K 678	K2-13 DO YOU PERFORM TASKS ON RF AMPLIFIERS	22	25	18	29	45	11	3	
K 679	K2-14 DO YOU PERFORM TASKS ON FREQUENCY CONVERTERS	18	19	16	26	34	7	3	
K 680	K2-15 DO YOU PERFORM TASKS ON IF AMPLIFIERS	28	30	23	41	50	11	3	
K 681	K2-16 DO YOU PERFORM TASKS ON LIMITERS	19	21	15	25	39	7	3	
K 682	K2-17 DO YOU PERFORM TASKS ON FREQUENCY DISCRIMINATORS	17	20	12	22	36	7	3	
K 683	K2-18 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH SCHEMATIC DIAGRAMS OF FM TRANSMITTERS	24	25	23	34	48	9	3	
K 684	K2-19 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH SCHEMATIC DIAGRAMS OF FM RECEIVERS	26	27	23	40	50	7	3	
K 685	K3-01 DO YOU CONVERT DECIMAL (BASE 10) NUMBERS TO OCTAL (BASE 8) NUMBERS	23	22	24	40	27	6	3	
K 686	K3-02 DO YOU CONVERT DECIMAL NUMBERS TO BINARY (BASE 2) NUMBERS	26	25	30	49	30	11	3	NUMBERING SYSTEMS
K 687	K3-03 DO YOU CONVERT OCTAL NUMBERS TO DECIMAL NUMBERS	21	21	22	41	23	6	0	
K 688	K3-04 DO YOU CONVERT OCTAL NUMBERS TO BINARY NUMBERS	21	21	22	41	23	6	0	
K 689	K3-05 DO YOU CONVERT BINARY NUMBERS TO DECIMAL NUMBERS	26	25	27	49	27	11	0	
K 690	K3-06 DO YOU CONVERT BINARY NUMBERS TO OCTAL NUMBERS	21	21	22	41	23	7	0	
K 691	K3-07 DO YOU ADD BINARY NUMBERS TO GET A SUM	23	24	20	38	25	15	0	
K 692	K3-08 DO YOU SUBTRACT BINARY NUMBERS USING THE END-AROUND-CARRY METHOD	16	18	12	28	18	9	0	
K 693	K3-09 DO YOU SUBTRACT BINARY NUMBERS USING THE DIRECT SUBTRACTION METHOD	20	21	18	35	23	9	0	
K 694	K3-10 DO YOU ADD OCTAL NUMBERS TO GET A SUM	18	19	15	32	23	4	0	
L 695	L1-01 IN YOUR PRESENT JOB, DO YOU PERFORM ANY TASKS RELATING TO LOGIC FUNCTIONS	27	24	32	59	14	6	3	
L 696	L1-02 DO YOU CONSTRUCT TRUTH TABLES FOR AND LOGIC SYMBOLS OR GATES	8	9	5	18	2	2	0	
L 697	L1-03 DO YOU CONSTRUCT TRUTH TABLES FOR OR LOGIC SYMBOLS OR GATES	8	9	5	18	2	2	0	LOGIC FUNCTIONS
L 698	L1-04 DO YOU CONSTRUCT TRUTH TABLES FOR AND OR OR LOGIC SYMBOLS WITH STATE INDICATORS	7	8	5	16	2	2	0	
L 699	L1-05 DO YOU CONSTRUCT TRUTH TABLES FOR EXCLUSIVE OR LOGIC SYMBOLS OR GATES	8	9	5	18	2	2	0	
L 700	L1-06 DO YOU USE OR REFER TO TRUTH TABLES FOR AND LOGIC SYMBOLS OR GATES	14	14	12	29	9	4	0	
L 701	L1-07 DO YOU USE OR REFER TO TRUTH TABLES FOR OR LOGIC SYMBOLS OR GATES	14	14	12	29	9	4	0	
L 702	L1-08 DO YOU USE OR REFER TO TRUTH TABLES FOR AND OR OR LOGIC SYMBOLS WITH STATE INDICATORS	13	14	12	28	9	4	0	
L 703	L1-09 DO YOU USE OR REFER TO TRUTH TABLES FOR EXCLUSIVE OR LOGIC SYMBOLS	14	15	12	31	9	4	0	
L 704	L1-10 DO YOU USE OR REFER TO LOGIC SYMBOLS FOR AND GATES	23	21	28	54	9	4	0	
L 705	L1-11 DO YOU USE OR REFER TO LOGIC SYMBOLS FOR OR GATES	23	20	28	53	9	4	0	
L 706	L1-12 DO YOU USE OR REFER TO LOGIC SYMBOLS FOR NAND OR NOR GATES	22	20	27	53	9	4	0	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

DY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
L 707 L1-13 DO YOU USE OR REFER TO LOGIC SYMBOLS FOR EXCLUSIVE OR GATES	22	21	26	59	9	4	0	
L 708 L2-01 IN YOUR PRESENT JOB, DO YOU PERFORM ANY TASKS RELATING TO BOOLEAN EQUATIONS, LOGIC DIAGRAMS, OR LOGIC CIRCUITS	21	21	23	50	9	6	0	
L 709 L2-02 DO YOU DRAW LOGIC SYMBOLS FOR DIRECT COUPLED TRANSISTOR LOGIC (DCTL) CIRCUITS	7	8	4	16	2	2	0	BOOLEAN EQUATIONS
L 710 L2-03 DO YOU CONSTRUCT TRUTH TABLES FOR CURRENT MODE LOGIC (CML) CIRCUITS	5	5	3	10	2	2	0	
L 711 L2-04 DO YOU DRAW LOGIC DIAGRAMS FROM GIVEN BOOLEAN EQUATIONS	9	11	5	24	2	2	0	
L 712 L2-05 DO YOU MEASURE INPUTS OR OUTPUTS OF LOGIC GATES	19	18	19	43	9	6	0	
L 713 L2-06 DO YOU DEVELOP OR ANALYZE BOOLEAN EQUATIONS IN THE PROCESS OF TROUBLESHOOTING DIGITAL CIRCUITS	10	11	9	26	2	4	0	
L 714 L2-07 DO YOU ANALYZE LOGIC CIRCUITS BY USING BOOLEAN ALGEBRA	10	11	9	26	2	4	0	
L 715 L2-08 DO YOU USE OR REFER TO LOGIC SYMBOLS FOR DIRECT COUPLED TRANSISTOR LOGIC (DCTL) CIRCUIT GATES	15	16	12	34	9	4	0	
L 716 L2-09 DO YOU USE OR REFER TO TRUTH TABLES FOR CURRENT MODE LOGIC (CML) CIRCUITS	8	9	5	19	0	4	0	
L 717 L2-10 DO YOU USE OR REFER TO LOGIC DIAGRAMS CONSISTING OF MORE THAN ONE GATE	19	18	20	44	9	4	0	
L 718 L2-11 DO YOU COMPUTE SUM AND CARRY EXPRESSIONS FOR SERIAL HALF OR FULL ADDER LOGIC DIAGRAMS	7	8	5	21	2	2	0	
L 719 L2-12 DO YOU TRACE DATA FLOW THROUGH PARALLEL FULL ADDER LOGIC DIAGRAMS	10	10	8	24	5	2	0	
L 720 L2-13 DO YOU WORK WITH ASTABLE (FREE RUNNING) MULTIVIBRATORS	18	19	16	41	11	4	0	
L 721 L2-14 DO YOU WORK WITH BISTABLE (FLIP-FLOP) MULTIVIBRATORS	21	21	23	49	11	4	0	
L 722 L2-15 DO YOU WORK WITH MONOSTABLE (ONE-SHOT) MULTIVIBRATORS	18	17	19	41	9	4	0	
L 723 L2-16 DO YOU USE OR REFER TO FLIP-FLOP MULTIVIBRATOR SYMBOLS	20	18	23	46	9	6	0	
L 724 L2-17 DO YOU USE OR REFER TO SINGLE-SHOT MULTIVIBRATOR SYMBOLS	16	15	18	35	9	6	0	
L 725 L2-18 DO YOU USE OR REFER TO FLIP-FLOP CIRCUIT DIAGRAMS	20	19	23	46	9	6	0	
L 726 L2-19 DO YOU USE OR REFER TO FLIP-FLOP TRUTH TABLES	12	13	11	29	5	4	0	
L 727 L2-20 DO YOU USE OR REFER TO COMPLEMENTED FLIP-FLOP LOGIC SYMBOLS	16	17	15	38	7	6	0	
L 728 L2-21 DO YOU USE OR REFER TO COMPLEMENTING FLIP-FLOP LOGIC SYMBOLS	17	17	16	40	7	6	0	
L 729 L2-22 DO YOU MEASURE OUTPUT WAVESHAPES OF LOGIC CIRCUITS	20	18	22	47	9	4	0	
L 730 L2-23 DO YOU TRACE DATA FLOW THROUGH COMPLEMENTED FLIP-FLOP SCHEMATIC DIAGRAMS	17	18	15	40	9	4	0	
L 731 L2-24 DO YOU TRACE DATA FLOW THROUGH COMPLEMENTING FLIP-FLOP SCHEMATIC DIAGRAMS	16	16	16	38	9	4	0	
L 732 L2-25 DO YOU CONSTRUCT TRUTH TABLES FOR J-K FLIP-FLOP LOGIC SYMBOLS	5	5	4	10	0	2	0	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
L 733	L3-01 DO YOU WORK WITH DIGITAL COUNTERS IN YOUR PRESENT JOB	31	33	27	54	18	22	7	
L 734	L3-02 DO YOU USE OR REFER TO UP-COUNTERS	25	25	24	50	16	11	0	COUNTERS
L 735	L3-03 DO YOU USE OR REFER TO DOWN-COUNTERS	23	23	24	50	11	9	0	
L 736	L3-04 DO YOU USE OR REFER TO SERIAL COUNTERS	22	22	22	49	9	7	3	
L 737	L3-05 DO YOU USE OR REFER TO PARALLEL COUNTERS	16	16	16	35	9	4	0	
L 738	L3-06 DO YOU USE OR REFER TO RING COUNTERS	10	12	8	21	5	4	0	
L 739	L3-07 DO YOU USE OR REFER TO DECADE COUNTERS	13	14	11	28	7	6	0	
L 740	L3-08 DO YOU USE OR REFER TO COUNT DETECT CIRCUITS	17	18	15	35	11	6	0	
L 741	L3-09 DO YOU USE OR REFER TO DOWN CLOCKS	24	23	24	50	14	6	3	
L 742	L3-10 DO YOU USE OR REFER TO UP CLOCKS	24	23	24	50	14	6	3	
L 743	L3-11 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF UP-COUNTERS HAVING COMPLEMENTED FLIP-FLOPS	15	16	12	34	5	7	0	
L 744	L3-12 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF SERIAL UP- OR DOWN-COUNTERS HAVING COMPLEMENTING FLIP-FLOPS	15	14	15	35	2	7	0	
L 745	L3-13 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF DECADE COUNTERS	10	11	7	21	2	6	0	
L 746	L3-14 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF RING COUNTERS	6	8	4	13	2	4	0	
L 747	L3-15 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF SERIAL UP-COUNTERS FEEDING A PARALLEL STORAGE REGISTER	11	12	9	25	5	4	0	
L 748	L3-16 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF SHIFT REGISTERS	14	16	11	31	7	7	0	
L 749	L3-17 DO YOU TRACE DATA FLOW THROUGH LOGIC DIAGRAMS OF OTHER TYPE OF COUNTERS	16	17	15	32	11	6	3	
L 750	L3-18 DO YOU COMPUTE THE BINARY COUNT AFTER SPECIFIC INPUT PULSES FOR UP-COUNTERS HAVING COMPLEMENTED FLIP-FLOPS	9	10	8	21	2	7	0	
L 751	L3-19 DO YOU COMPUTE THE BINARY COUNT AFTER SPECIFIC INPUT PULSES FOR SERIAL UP- OR DOWN-COUNTERS HAVING COMPLEMENTING FLIP-FLOPS	10	10	9	24	5	4	0	
L 752	L3-20 DO YOU COMPUTE THE BINARY COUNT AFTER SPECIFIC INPUT PULSES FOR SERIAL UP-COUNTERS FEEDING A PARALLEL STORAGE REGISTERS	9	10	7	19	5	6	0	
L 753	L3-21 DO YOU COMPUTE THE BINARY COUNT AFTER SPECIFIC INPUT PULSES FOR OTHER TYPES OF COUNTERS	10	12	4	19	5	9	0	
L 754	L3-22 DO YOU CONSTRUCT TRUTH TABLES FROM LOGIC DIAGRAMS OF DECADE COUNTERS	3	4	1	6	0	4	0	
L 755	L3-23 DO YOU DETERMINE THE STATE OF EACH FLIP-FLOP IN RING COUNTERS FOR SPECIFIC INPUT PULSES	7	7	7	15	2	4	0	
L 756	L3-24 DO YOU DETERMINE THE APPROPRIATE AND GATE NECESSARY IN COUNT DETECT CIRCUITS TO INDICATE A REQUIRED COUNT	5	5	5	13	2	4	0	
M 757	M1-01 DO YOU WORK WITH SAWTOOTH WAVE GENERATORS	37	36	39	49	50	17	27	
M 758	M1-02 DO YOU WORK WITH TRAPEZOIDAL WAVE GENERATORS	18	18	16	31	20	7	0	TIMING CIRCUITS
M 759	M1-03 DO YOU WORK WITH PULSED OSCILLATORS WITH REGENERATIVE FEEDBACK	29	29	27	46	41	13	3	
M 760	M1-04 DO YOU WORK WITH PULSED OSCILLATORS WITHOUT REGENERATIVE FEEDBACK	22	25	16	37	34	7	3	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
M 761	M1-05 DO YOU WORK WITH BLOCKING OSCILLATORS	30	34	24	34	59	17	10	
M 762	M1-06 DO YOU USE OR REFER TO RISE TIME	29	32	24	44	34	17	0	
M 763	M1-07 DO YOU USE OR REFER TO FALL OR FLYBACK TIME	30	35	22	40	57	13	0	
M 764	M1-08 DO YOU USE OR REFER TO SWEEP TIME	43	45	39	49	70	28	13	
M 765	M1-09 DO YOU USE OR REFER TO ELECTRICAL LENGTH OF SAWTOOTH WAVEFORMS	28	31	23	37	39	17	10	
M 766	M1-10 DO YOU USE OR REFER TO PHYSICAL LENGTH OF SAWTOOTH WAVEFORMS	31	32	31	41	36	19	17	
M 767	M1-11 DO YOU USE OR REFER TO LINEAR SLOPE OF SAWTOOTH WAVEFORMS	25	25	26	37	30	9	17	
M 768	M1-12 DO YOU USE OR REFER TO GATE LENGTH OF SAWTOOTH WAVEFORMS	29	29	28	40	34	15	10	
M 769	M2-01 DO YOU USE SIGNAL GENERATORS IN YOUR PRESENT JOB	70	66	77	76	75	48	77	
M 770	M2-02 DO YOU PERFORM OPERATIONAL CHECKS WHILE USING SIGNAL GENERATORS	68	65	73	81	73	46	63	
M 771	M2-03 DO YOU PERFORM PERIODIC MAINTENANCE SUCH AS ADJUSTING, ALIGNING, OR CALIBRATING WHILE USING SIGNAL GENERATORS	49	47	51	65	48	31	40	USE OF SIGNAL GENERATORS
M 772	M2-04 DO YOU TROUBLESHOOT TO AN ASSEMBLY OR SUBASSEMBLY WHILE USING SIGNAL GENERATORS	50	46	58	66	41	30	53	
M 773	M2-05 DO YOU TROUBLESHOOT TO THE SMALLEST REPLACEABLE COMPONENT WHILE USING SIGNAL GENERATORS	29	27	32	47	34	9	7	
M 774	M2-06 DO YOU USE AUDIO SINE-WAVE GENERATORS	58	58	57	68	73	37	53	
M 775	M2-07 DO YOU USE AUDIO NON-SINUSOIDAL WAVE GENERATORS SUCH AS SQUARE WAVE, TRIANGLE, PULSE, OR SPIKE	28	29	24	54	16	9	13	
M 776	M2-08 DO YOU USE RF GENERATORS LESS THAN 1,000 MH	28	26	31	53	16	9	10	
M 777	M2-09 DO YOU USE RF GENERATORS GREATER THAN 1,000 MH	33	33	34	60	34	11	10	
M 778	M2-10 DO YOU USE OTHER SPECIAL PURPOSE OR MULTI-FUNCTION GENERATORS	33	34	32	51	32	19	20	
M 779	M3-01 IN YOUR PRESENT JOB, DO YOU PERFORM ANY TASKS DEALING WITH ALTERNATING CURRENT OR DIRECT CURRENT MOTORS OR GENERATORS	50	47	54	59	64	33	30	
M 780	M3-02 DO YOU INSPECT MOTORS	48	45	53	60	61	30	27	MOTORS AND GENERATORS
M 781	M3-03 DO YOU CLEAN OR LUBRICATE MOTORS	36	37	35	54	50	17	7	
M 782	M3-04 DO YOU OPERATE MOTORS	41	41	42	53	56	28	17	
M 783	M3-05 DO YOU REMOVE OR REPLACE COMPLETE MOTORS	46	45	50	60	61	24	20	
M 784	M3-06 DO YOU REMOVE OR REPLACE MOTOR PARTS	10	12	7	18	11	6	3	
M 785	M3-07 DO YOU TROUBLESHOOT AS FAR AS CHECKING WIRE CONNECTIONS OF MOTORS	46	45	49	59	57	31	23	
M 786	M3-08 DO YOU TROUBLESHOOT DOWN TO COMPONENT PARTS OF MOTORS	5	5	7	13	5	0	0	
M 787	M3-09 DO YOU PERFORM ANY TASKS ON FIELD COILS	2	3	1	6	2	0	0	
M 788	M3-10 DO YOU PERFORM ANY TASKS ON ARMATURES	4	3	7	9	5	0	0	
M 789	M3-11 DO YOU PERFORM ANY TASKS ON ROTORS	5	3	7	9	7	0	0	
M 790	M3-12 DO YOU PERFORM ANY TASKS ON BRUSHES	5	3	7	7	9	0	0	
M 791	M3-13 DO YOU PERFORM ANY TASKS ON SLIP RINGS	6	6	7	10	9	4	0	
M 792	M3-14 DO YOU PERFORM ANY TASKS ON COMMUTATORS	4	3	4	6	5	2	0	
M 793	M3-15 DO YOU PERFORM ANY TASKS ON POLE PIECES	2	2	1	4	0	2	0	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
M 794	M3-16 DO YOU DETERMINE OR MEASURE THE MAGNITUDE OF THE FORCE OR TORQUE CREATED BY A MOTOR	5	5	4	6	5	6	0	
M 795	M3-17 DO YOU DETERMINE OR MEASURE THE DIRECTION OF THE MECHANICAL FORCE OR TORQUE CREATED BY A MOTOR	9	8	9	13	9	7	0	
M 796	M3-18 DO YOU DETERMINE OR MEASURE THE MAGNITUDE OR DIRECTION OF THE INDUCED VOLTAGE IN MOTORS	5	4	5	6	2	4	0	
M 797	M3-19 DO YOU WORK WITH SYNCHRONOUS MOTORS	34	32	38	46	39	20	23	
M 798	M3-20 DO YOU WORK WITH INDUCTION MOTORS	25	27	20	31	34	17	10	
M 799	M3-21 DO YOU WORK WITH SPLIT-PHASE MOTORS	21	23	18	26	25	17	10	
M 800	M3-22 DO YOU WORK WITH SOME COMBINATION OF THE ABOVE MOTORS	31	33	28	41	48	20	3	
M 801	M3-23 DO YOU INSPECT GENERATORS	23	21	28	24	41	11	13	
M 802	M3-24 DO YOU CLEAN OR LUBRICATE GENERATORS	16	14	20	21	25	6	3	
M 803	M3-25 DO YOU OPERATE GENERATORS	20	19	23	24	32	11	10	
M 804	M3-26 DO YOU REMOVE OR REPLACE COMPLETE GENERATORS	20	18	22	19	39	7	10	
M 805	M3-27 DO YOU REMOVE OR REPLACE GENERATOR PARTS	5	5	3	6	9	0	3	
M 806	M3-28 DO YOU TROUBLESHOOT AS FAR AS CHECKING WIRE CONNECTIONS OF GENERATORS	20	17	24	21	32	11	10	
M 807	M3-29 DO YOU TROUBLESHOOT DOWN TO COMPONENT PARTS OF GENERATORS	4	3	4	6	5	2	0	
N 808	N1-01 DO YOU WORK WITH METERS IN YOUR PRESENT JOB	83	81	88	84	82	85	87	
N 809	N1-02 DO YOU CONCEPTUALIZE OR CONSIDER THE FUNCTIONS OF PERMANENT MAGNETS	21	24	15	28	25	13	3	METER MOVEMENTS
N 810	N1-03 DO YOU CONCEPTUALIZE OR CONSIDER THE FUNCTIONS OF MOVING COILS	21	24	15	28	27	13	3	
N 811	N1-04 DO YOU CONCEPTUALIZE OR CONSIDER THE FUNCTIONS OF SPIRAL SPRINGS	17	20	12	21	27	11	0	
N 812	N1-05 DO YOU READ METER SCALES	87	85	91	87	84	91	90	
N 813	N1-06 DO YOU EXTEND THE RANGE OF AMMETERS	29	32	22	26	32	30	23	
N 814	N1-07 DO YOU ZERO OHMMETERS	86	84	88	87	84	89	90	
N 815	N1-08 DO YOU ZERO AMMETERS	35	39	28	32	48	37	30	
N 816	N1-09 DO YOU EXTEND THE RANGE OF VOLTMETERS	45	45	45	40	57	43	40	
N 817	N1-10 DO YOU USE OR REFER TO VOLTMETER SENSITIVITY (EXPRESSED IN UNITS OF OHMS PER VOLT)	45	45	45	51	55	39	23	
N 818	N2-01 DO YOU WORK WITH SATURABLE REACTORS OR MAGNETIC AMPLIFIERS IN YOUR PRESENT JOB	15	16	11	21	30	7	0	SATURABLE REACTORS AND MAGNETIC AMPLIFIERS
N 819	N2-02 DO YOU INSPECT MAGNETIC AMPLIFIERS OR SATURABLE REACTORS	12	13	11	18	25	4	0	
N 820	N2-03 DO YOU CLEAN MAGNETIC AMPLIFIERS OR SATURABLE REACTORS	10	10	9	15	20	2	0	
N 821	N2-04 DO YOU ADJUST MAGNETIC AMPLIFIERS OR SATURABLE REACTORS	6	7	4	7	11	4	0	
N 822	N2-05 DO YOU TROUBLESHOOT MAGNETIC AMPLIFIERS OR SATURABLE REACTORS	11	12	9	15	25	4	0	
N 823	N2-06 DO YOU REMOVE OR REPLACE MAGNETIC AMPLIFIERS OR SATURABLE REACTORS	12	13	9	16	27	4	0	
N 824	N2-07 DO YOU REMOVE OR REPLACE MAGNETIC AMPLIFIER OR SATURABLE REACTOR COMPONENTS	4	5	3	3	11	2	0	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

		DY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
N	825	N2-08 DO YOU USE OR REFER TO HYSTERESIS CURVES OR LOOPS	2	3	1	4	5	0	0	
N	826	N2-09 DO YOU INTERPRET SCHEMATIC DRAWINGS TO DEVELOP OUTPUT WAVEFORMS ACROSS REACTOR WINDINGS OR LOAD RESISTORS OF SINGLE WINDING SATURABLE REACTORS	3	3	4	6	5	0	0	
N	827	N2-10 DO YOU MEASURE OUTPUT WAVEFORMS ACROSS REACTOR WINDINGS OR LOAD RESISTORS OF SINGLE WINDING SATURABLE REACTORS	6	5	7	10	11	0	0	
N	828	N2-11 DO YOU INTERPRET SCHEMATIC DRAWINGS TO DEVELOP OUTPUT WAVEFORMS FOR MAGNETIC AMPLIFIERS	3	3	3	6	7	0	0	
N	829	N2-12 DO YOU USE OR REFER TO COERCIVE FORCE IN SATURABLE REACTORS	0	0	0	0	0	0	0	
N	830	N2-13 DO YOU USE OR REFER TO RESIDUAL MAGNETISM IN SATURABLE REACTORS	0	0	0	0	0	0	0	
N	831	N2-14 DO YOU USE OR REFER TO FLUX DENSITY IN SATURABLE REACTORS	0	0	1	1	0	0	0	
N	832	N2-15 DO YOU USE OR REFER TO POINT OF SATURATION IN SATURABLE REACTORS	1	1	0	1	2	0	0	
N	833	N2-16 DO YOU USE OR REFER TO SATURABLE REACTOR SCHEMATIC SYMBOLS	8	8	7	9	20	4	0	
N	834	N3-01 DO YOU WORK WITH WAVESHAPING CIRCUITS IN YOUR PRESENT JOB	40	38	42	56	48	19	20	
N	835	N3-02 DO YOU USE OR REFER TO TRANSIENT INTERVALS	13	14	9	19	14	6	3	WAVESHAPING CIRCUITS
N	836	N3-03 DO YOU USE OR REFER TO PULSE WIDTH (PW)	34	36	31	49	52	13	7	
N	837	N3-04 DO YOU USE OR REFER TO PULSE RECURRENCE TIME (PRT)	32	34	27	46	48	13	7	
N	838	N3-05 DO YOU USE OR REFER TO PULSE RECURRENCE FREQUENCY (PRF)	33	34	30	47	50	13	7	
N	839	N3-06 DO YOU USE OR REFER TO DIFFERENTIATING CIRCUITS	29	27	18	31	34	13	7	
N	840	N3-07 DO YOU USE OR REFER TO INTEGRATING CIRCUITS	31	30	32	41	34	15	20	
N	841	N3-08 DO YOU USE OR REFER TO THE CLASSIFICATION OF TIME CONSTANTS (TC) AS LONG, MEDIUM, OR SHORT	15	15	15	25	16	6	0	
N	842	N3-09 DO YOU DETERMINE WHETHER AN LR OR RC CIRCUIT IS DIFFERENTIATING OR INTEGRATING BASED ON THE TIME CONSTANT AND OUTPUT CONFIGURATION	6	8	3	6	7	7	0	
N	843	N3-10 DO YOU WORK WITH SQUARE WAVE GENERATORS	29	27	31	47	34	11	7	
N	844	N3-11 DO YOU WORK WITH RECTANGULAR WAVE GENERATORS	16	18	14	25	16	9	0	
O	845	O1-01 DO YOU WORK ON SINGLE SIDEBAND SYSTEMS IN YOUR PRESENT JOB	5	3	8	9	2	2	0	
O	846	O1-02 DO YOU INSPECT SS_B TRANSMIT OR RECEIVE SYSTEMS	4	1	8	7	2	0	0	
O	847	O1-03 DO YOU CLEAN SSB TRANSMIT OR RECEIVE SYSTEMS	3	1	8	6	2	0	0	SINGLE SIDEBAND SYSTEMS
O	848	O1-04 DO YOU ALIGN SSB TRANSMIT OR RECEIVE SYSTEMS	3	1	7	6	2	0	0	
O	849	O1-05 DO YOU TROUBLESHOOT TO SS_B TRANSMIT OR RECEIVE SYSTEMS	3	1	7	6	2	0	0	
O	850	O1-06 DO YOU TROUBLESHOOT TO SS_B TRANSMIT OR RECEIVE COMPONENTS	3	1	5	4	2	0	0	
O	851	O1-07 DO YOU REMOVE OR REPLACE SSB TRANSMIT OR RECEIVE SYSTEMS	4	2	7	7	2	0	0	
O	852	O1-08 DO YOU REMOVE OR REPLACE SSB TRANSMIT OR RECEIVE COMPONENTS	3	1	7	6	2	0	0	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
0 853	01-09 DO YOU PERFORM TASKS ON SSB AUDIO AMPLIFIERS	4	1	8	7	2	0	0	
0 854	01-10 DO YOU PERFORM TASKS ON SSB BALANCED MODULATORS	3	2	5	6	2	0	0	
0 855	01-11 DO YOU PERFORM TASKS ON SSB CARRIER OSCILLATORS	3	1	8	6	2	0	0	
0 856	01-12 DO YOU PERFORM TASKS ON SSB LC FILTERS	3	1	8	6	2	0	0	
0 857	01-13 DO YOU PERFORM TASKS ON SSB CRYSTAL FILTERS	4	1	8	7	2	0	0	
0 858	01-14 DO YOU PERFORM TASKS ON SSB MECHANICAL FILTERS	2	1	4	6	0	0	0	
0 859	01-15 DO YOU PERFORM TASKS ON SSB OSCILLATORS	4	2	8	9	2	0	0	
0 860	01-16 DO YOU PERFORM TASKS ON SSB MIXERS	4	2	8	9	2	0	0	
0 861	01-17 DO YOU PERFORM TASKS ON SSB DRIVERS	4	2	7	9	0	0	0	
0 862	01-18 DO YOU PERFORM TASKS ON SSB POWER AMPLIFIERS	4	1	8	7	2	0	0	
0 863	01-19 DO YOU PERFORM TASKS ON SSB RF AMPLIFIERS	4	1	8	7	2	0	0	
0 864	01-20 DO YOU PERFORM TASKS ON SSB FREQUENCY CONVERTERS	4	1	8	7	2	0	0	
0 865	01-21 DO YOU PERFORM TASKS ON SSB IF AMPLIFIERS	4	2	8	9	2	0	0	
0 866	01-22 DO YOU PERFORM TASKS ON SSB DEMODULATORS	4	2	7	9	0	0	0	
0 867	01-23 DO YOU PERFORM TASKS ON SSB DON'T REMEMBER WHICH SSB SYSTEM STAGES	2	1	3	6	0	0	0	
0 868	01-24 DO YOU USE OR REFER TO SELECTIVE FADING	1	1	3	4	0	0	0	
0 869	01-25 DO YOU USE OR REFER TO PEAK POWER	4	2	8	9	2	0	0	
0 870	01-26 DO YOU USE OR REFER TO FREQUENCY STABILITY	4	1	8	7	2	0	0	
0 871	01-27 DO YOU USE OR REFER TO RESPONSE CURVES FOR BANDWIDTH FILTERS	2	1	4	4	2	0	0	
0 872	01-28 DO YOU CALCULATE PEAK POWER OR EFFECTIVE POWER OF SSB TRANSMITTERS	2	1	5	4	2	0	0	
0 873	01-29 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH SSB TRANSMITTER SCHEMATIC DIAGRAMS	3	2	5	7	2	0	0	
0 874	01-30 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH SSB RECEIVER SCHEMATIC DIAGRAMS	3	2	5	7	2	0	0	
0 875	02-01 DO YOU WORK ON PULSE MODULATION SYSTEMS IN YOUR PRESENT JOB	28	29	24	46	43	11	3	
0 876	02-02 DO YOU INSPECT PULSE MODULATION SYSTEMS	26	28	22	40	45	9	3	PULSE MODULATION SYSTEMS
0 877	02-03 DO YOU CLEAN PULSE MODULATION SYSTEMS	23	25	18	34	39	9	3	
0 878	02-04 DO YOU ALIGN PULSE MODULATION SYSTEMS	25	29	19	38	43	11	3	
0 879	02-05 DO YOU TROUBLESHOOT TO PULSE MODULATION SYSTEMS	27	29	22	41	45	11	3	
0 880	02-06 DO YOU TROUBLESHOOT TO PULSE MODULATION SYSTEM COMPONENTS	22	25	16	29	43	9	3	
0 881	02-07 DO YOU REMOVE OR REPLACE PULSE MODULATION SYSTEMS	27	29	22	43	43	11	3	
0 882	02-08 DO YOU REMOVE OR REPLACE PULSE MODULATION SYSTEM COMPONENTS	22	25	15	31	41	7	3	
0 883	02-09 DO YOU WORK ON PULSE-AMPLITUDE MODULATION (PAM) SYSTEMS	10	11	9	21	9	4	3	
0 884	02-10 DO YOU WORK ON PULSE-DURATION MODULATION (PDM) SYSTEMS	12	14	9	18	20	6	0	
0 885	02-11 DO YOU WORK ON PULSE-POSITION MODULATION (PPM) SYSTEMS	5	5	4	9	5	2	0	
0 886	02-12 DO YOU WORK ON PULSE-CODE MODULATION (PCM) SYSTEMS	3	2	4	7	0	0	0	
0 887	02-13 DO YOU WORK ON LINE PULSING MODULATION SYSTEMS	5	5	4	9	5	0	0	
0 888	02-14 DO YOU WORK ON DON'T REMEMBER WHICH TYPE OF MODULATION SYSTEM	12	12	11	21	14	6	3	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
0 889	02-15 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM POWER SUPPLIES	21	23	18	26	43	11	3	
0 890	02-16 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM CHARGING CHOKES AND CHARGING DIODES	15	16	12	16	32	9	0	
0 891	02-17 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM PULSE FORMING NETWORKS	20	21	19	25	39	11	3	
0 892	02-18 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM TIMERS	19	21	15	31	27	9	3	
0 893	02-19 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM SWITCHES SUCH AS GAS THYRATRONS	10	9	11	12	18	6	0	
0 894	02-20 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM PULSE TRANSFORMERS	16	16	15	21	32	6	0	
0 895	02-21 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM TRANSMITTER TUBES	24	25	20	32	48	7	3	
0 896	02-22 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM RF AMPLIFIERS	20	19	20	25	34	11	3	
0 897	02-23 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM FREQUENCY CONVERTERS	17	18	15	24	34	7	3	
0 898	02-24 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM IF AMPLIFIERS	26	29	20	37	48	11	3	
0 899	02-25 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM DETECTORS	20	21	16	26	32	11	3	
0 900	02-26 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM VIDEO AMPLIFIERS	13	12	14	24	7	9	0	
0 901	02-27 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM POWER VIDEO AMPLIFIERS	9	10	7	18	9	4	0	
0 902	02-28 DO YOU PERFORM TASKS ON PULSE MODULATION SYSTEM DON'T REMEMBER WHICH PULSE MODULATION SYSTEM STAGES	6	7	4	10	5	4	3	
0 903	02-29 DO YOU USE OR REFER TO PULSE RECURRENCE FREQUENCY (PRF)	27	30	22	44	45	9	3	
0 904	02-30 DO YOU USE OR REFER TO PULSE RECURRENCE TIME (PRT)	25	27	20	41	36	9	3	
0 905	02-31 DO YOU USE OR REFER TO PULSE WIDTH (PW)	27	29	23	44	43	9	3	
0 906	02-32 DO YOU USE OR REFER TO PULSE SHAPE	25	27	19	40	39	9	3	
0 907	02-33 DO YOU USE OR REFER TO PEAK POWER	24	25	22	43	30	11	3	
0 908	02-34 DO YOU USE OR REFER TO AVERAGE POWER	22	23	19	35	34	7	3	
0 909	02-35 DO YOU CALCULATE PULSE RECURRENCE TIME (PRT) OR PULSE RECURRENCE FREQUENCY (PRF)	14	14	14	21	23	6	0	
0 910	02-36 DO YOU MEASURE PULSE RECURRENCE TIME (PRT) OR PULSE RECURRENCE FREQUENCY (PRF)	20	21	18	28	39	9	0	
0 911	02-37 DO YOU USE FORMULAS TO CALCULATE AVERAGE POWER OR PEAK POWER OF PULSE MODULATION TRANSMIT SYSTEMS	8	8	8	19	5	4	0	
0 912	02-38 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH PULSE MODULATION TRANSMITTER SCHEMATIC DIAGRAMS	21	23	19	34	39	7	0	
0 913	02-39 DO YOU TRACE SIGNALS OR CURRENT PATHS THROUGH PULSE MODULATION RECEIVER SCHEMATIC DIAGRAMS	23	26	18	35	39	9	3	
0 914	03-01 DO YOU WORK WITH ANTENNAS IN YOUR PRESENT JOB	65	71	53	93	91	39	7	ANTENNAS
0 915	03-02 DO YOU INSPECT ANTENNAS	64	70	51	88	91	41	7	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182
0 916	03-03 DO YOU CLEAN ANTENNAS	60	65	99	81	89	35	7
0 917	03-04 DO YOU PHYSICALLY ALIGN ANTENNAS	57	62	96	81	84	33	3
0 918	03-05 DO YOU ELECTRICALLY ALIGN ANTENNAS	56	61	97	81	73	37	3
0 919	03-06 DO YOU TROUBLESHOOT TO ANTENNAS	65	71	53	93	91	91	7
0 920	03-07 DO YOU TROUBLESHOOT TO ANTENNA COMPONENTS	61	66	51	88	84	39	7
0 921	03-08 DO YOU REMOVE OR INSTALL ANTENNAS	65	71	53	93	91	91	7
0 922	03-09 DO YOU REMOVE OR REPLACE COMPONENTS OF ANTENNAS	61	66	51	87	89	39	3
0 923	03-10 DO YOU USE OR REFER TO TECHNICAL DATA CONTAINING REPRESENTATIONS OF E OR ELECTRIC FIELD LINES	11	12	8	13	18	6	0
0 924	03-11 DO YOU USE OR REFER TO TECHNICAL DATA CONTAINING REPRESENTATIONS OF H OR MAGNETIC FIELD LINES	10	12	5	13	14	6	0
0 925	03-12 DO YOU DETERMINE THE DIRECTION OF THE MAGNETIC LINES IN RELATION TO THE ELECTRIC LINES OF FORCE FOR ANTENNAS	7	8	4	12	5	4	0
0 926	03-13 DO YOU USE OR REFER TO THE GENERAL RULE THAT ANTENNAS WHICH ARE OF CORRECT LENGTH (HALF-WAVE) ACT AS INDUCTIVE LOADS TO THE GENERATOR	7	8	5	16	5	4	0
0 927	03-14 DO YOU USE OR REFER TO THE GENERAL RULE THAT ANTENNAS WHICH ARE LONGER THAN A HALF-WAVE ACT AS INDUCTIVE LOADS TO THE GENERATOR	6	7	4	13	2	4	0
0 928	03-15 DO YOU USE OR REFER TO THE GENERAL RULE THAT ANTENNAS WHICH ARE SHORTER THAN A HALF-WAVE ACT AS CAPACITIVE LOADS TO THE GENERATOR	6	6	7	15	2	2	0
0 929	03-16 DO YOU WORK WITH HERTZ ANTENNAS	9	9	9	13	14	6	0
0 930	03-17 DO YOU WORK WITH MARCONI ANTENNAS	15	14	18	29	11	2	3
0 931	03-18 DO YOU WORK WITH BROADSIDE ARRAYS	14	10	20	22	23	4	0
0 932	03-19 DO YOU WORK WITH END-FIRE ARRAYS	6	6	7	15	2	2	3
0 933	03-20 DO YOU WORK WITH CARDIOID ARRAYS	5	5	5	10	2	4	0
0 934	03-21 DO YOU WORK WITH COLLINEAR ARRAYS	15	16	14	19	25	7	0
0 935	03-22 DO YOU USE OR REFER TO THE TERM ELECTROMAGNETIC INDUCTION FIELDS WHEN WORKING WITH ANTENNAS	6	8	3	13	2	2	0
0 936	03-23 DO YOU MEASURE ELECTROMAGNETIC INDUCTION FIELDS OF ANTENNAS	4	5	3	7	7	2	0
0 937	03-24 DO YOU USE OR REFER TO THE TERM ELECTROMAGNETIC RADIATION FIELDS WHEN WORKING WITH ANTENNAS	12	15	7	19	20	4	0
0 938	03-25 DO YOU MEASURE ELECTROMAGNETIC RADIATION FIELDS OF ANTENNAS	10	12	7	10	25	6	3
0 939	03-26 DO YOU USE OR REFER TO THE TIME PHASE OF ELECTRIC (E) AND MAGNETIC (H) COMPONENTS IN ANTENNA RADIATION	3	4	1	7	0	2	0
0 940	03-27 DO YOU USE OR REFER TO THE TIME PHASE OF ELECTRIC (E) AND MAGNETIC (H) COMPONENTS IN ANTENNA INDUCTION FIELD	3	4	1	7	0	2	0
0 941	03-28 ARE ANY OF THE ANTENNAS YOU WORK ON LINEARLY POLARIZED	20	17	27	29	18	19	0
0 942	03-29 ARE ANY OF THE ANTENNAS YOU WORK ON CIRCULARLY POLARIZED	13	9	22	19	2	13	0
0 943	03-30 DO YOU MEASURE OR DETERMINE THE POLARITY OF ANTENNAS YOU WORK ON	7	8	5	9	9	6	0
0 944	03-31 DO YOU CONSTRUCT, OR MAKE THE CALCULATIONS NECESSARY TO CONSTRUCT, ANTENNAS OF CORRECT LENGTH FOR SPECIFIC WAVELENGTHS	4	5	1	6	7	2	0

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
U 945	03-32 DO THE ANTENNA ARRAYS YOU WORK WITH CONTAIN PARASITIC ELEMENTS	9	10	8	22	5	2	0	
O 946	03-33 DO THE ANTENNA ARRAYS YOU WORK WITH CONTAIN PARASITIC ELEMENTS SERVING AS DIRECTORS	9	11	5	21	7	2	0	
O 947	03-34 DO THE ANTENNA ARRAYS YOU WORK WITH CONTAIN PARASITIC ELEMENTS SERVING AS REFLECTORS	13	14	9	24	14	4	0	
O 948	03-35 DO THE ANTENNA ARRAYS YOU WORK WITH CONTAIN DON'T REMEMBER WHAT KIND OF ELEMENTS	26	29	20	34	30	24	7	
O 949	03-36 DO YOU WORK ON UNIDIRECTIONAL ANTENNAS	19	20	18	31	20	11	3	
O 950	03-37 DO YOU WORK ON BIDIRECTIONAL ANTENNAS	29	33	22	40	48	15	3	
O 951	03-38 DO YOU WORK ON DON'T REMEMBER THE DIRECTIONALITY	18	20	14	25	11	19	3	
O 952	03-39 DO YOU WORK WITH ROTAR ANTENNA ARRAYS	35	35	36	71	39	9	3	
P 953	P1-01 IN YOUR PRESENT JOB DO YOU WORK WITH TRANSMISSION LINES (TRANSMISSION LINES ARE DEFINED TO INCLUDE LEADS BETWEEN RECEIVERS AND ANTENNAS, TELEPHONE LEADS, AS WELL AS HIGH VOLTAGE POWER LINES, ETC. DO NOT CONSIDER WAVEGUIDES AS TRANSMISSION LINES	17	16	19	37	11	6	0	TRANSMISSION LINES
P 954	P1-02 DO YOU REFER TO OR USE COPPER LOSS OR I2R LOSS IN TRANSMISSION LINES	2	2	1	3	0	2	0	
P 955	P1-03 DO YOU REFER TO OR USE SKIN EFFECTS OF HIGH FREQUENCY CURRENTS IN TRANSMISSION LINES	2	3	0	3	0	2	0	
P 956	P1-04 DO YOU REFER TO OR USE RADIATION LOSS IN TRANSMISSION LINES	4	3	4	7	2	2	0	
P 957	P1-05 DO YOU USE OR REFER TO DIELECTRIC LOSS IN TRANSMISSION LINES	2	3	0	3	0	4	0	
P 958	P1-06 DO YOU USE OR REFER TO LEAKAGE LOSSES IN TRANSMISSION LINES	3	3	3	4	2	4	0	
P 959	P1-07 DO YOU WORK WITH TWISTED PAIR TRANSMISSION LINES	1	2	0	3	2	0	0	
P 960	P1-08 DO YOU WORK WITH TWIN LEAD TRANSMISSION LINES	3	4	0	4	2	2	0	
P 961	P1-09 DO YOU WORK WITH OPEN TWO-WIRE TRANSMISSION LINES	1	2	0	4	0	0	0	
P 962	P1-10 DO YOU WORK WITH FLEXIBLE COAXIAL CABLE TRANSMISSION LINES	16	15	19	34	11	6	0	
P 963	P1-11 DO YOU WORK WITH RIGID COAXIAL CABLE TRANSMISSION LINES	4	5	3	10	0	2	0	
P 964	P1-12 DO YOU TROUBLESHOOT TRANSMISSION LINES	14	12	19	31	9	4	0	
P 965	P1-13 DO YOU ANALYZE VOLTAGE OR CURRENT WAVEFORMS IN TRANSMISSION LINES TO DETERMINE THE TYPE OF TERMINATION (OPEN, SHORTED, CAPACITIVE, INDUCTIVE)	0	1	0	1	0	0	0	
P 966	P1-14 DO YOU SELECT APPROPRIATE TRANSMISSION LINES TERMINATIONS TO ACHIEVE DESIRED WAVEFORMS	3	2	5	7	2	2	0	
P 967	P1-15 DO YOU USE OR REFER TO SCHEMATIC SYMBOLS FOR LINE TERMINATIONS IN TERMS OF CIRCUIT TERMINATIONS	5	3	9	13	5	0	0	
P 968	P1-16 DO YOU MEASURE STANDING WAVE RATIOS (SR) OF TRANSMISSION LINES	5	5	4	9	7	2	0	
P 969	P1-17 DO YOU CALCULATE STANDING WAVE RATIOS (SWR) OF TRANSMISSION LINES	5	6	1	7	5	4	0	
P 970	P1-18 DO YOU PERFORM THE CALCULATIONS NECESSARY TO DETERMINE THE IMPEDANCE AND LENGTH OF QUARTER - WAVELENGTH MATCHING TRANSFORMERS TO MATCH TRANSMISSION LINES TO LOADS	1	2	0	4	0	0	0	

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TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	DY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
P 971	P1-19 DO YOU WORK WITH TRANSMISSION LINES WHICH ARE MATCHED TO LOADS USING MATCHING TRANSFORMERS	1	1	0	3	0	0	0	
P 972	P1-20 DO YOU WORK WITH TRANSMISSION LINES WHICH ARE MATCHED TO LOADS USING DELTA MATCHING	1	1	0	3	0	0	0	
P 973	P1-21 DO YOU SELECT THE TYPE OF TRANSMISSION LINE NEEDED FOR PARTICULAR JOBS WITHOUT REFERRING TO TECHNICAL DATA	2	2	1	4	0	2	0	
P 974	P1-22 DO YOU USE OR REFER TO THE TERM CHARACTERISTIC IMPEDANCE (ZO) OF TRANSMISSION LINES	1	1	1	3	2	0	0	
P 975	P1-23 DO YOU CALCULATE THE CHARACTERISTIC IMPEDANCE (ZO) OF TRANSMISSION LINES	1	1	1	1	2	0	0	
P 976	P1-24 DO YOU USE OR REFER TO THE TERM CUTOFF FREQUENCY OF TRANSMISSION LINES	2	3	0	1	5	0	0	
P 977	P1-25 DO YOU USE OR REFER TO THE TERM VELOCITY FACTOR (K) OF TRANSMISSION LINES	0	1	0	1	0	0	0	
P 978	P1-26 DO YOU COMPUTE THE ELECTRICAL LENGTH OF TRANSMISSION LINES FOR PARTICULAR FREQUENCIES	0	1	0	1	0	0	0	
P 979	P1-27 DO YOU CONSTRUCT TRANSMISSION LINES OF PARTICULAR ELECTRICAL LENGTH FOR GIVEN FREQUENCIES	1	1	1	3	0	0	0	
P 980	P1-28 DO YOU USE OR REFER TO THE GENERAL RULE THAT AS THE FREQUENCY INCREASES AND THE PHYSICAL LENGTH OF TRANSMISSION LINES REMAIN CONSTANT, THE ELECTRICAL LENGTH INCREASES	1	1	1	4	0	0	0	
P 981	P1-29 DO YOU WORK WITH NONRESONANT (FLAT) TRANSMISSION LINES	4	3	7	12	2	0	0	
P 982	P1-30 DO YOU WORK WITH RESONANT TRANSMISSION LINES	4	5	3	9	5	2	0	
P 983	P1-31 DO YOU WORK WITH TRANSMISSION LINES WHICH ARE MATCHED TO LOADS USING STUB MATCHING	3	3	3	4	5	2	0	
P 984	P2-01 DO YOU WORK WITH WAVEGUIDES OR CAVITY RESONATORS IN YOUR PRESENT JOB	60	65	50	81	91	39	7	
P 985	P2-02 DO YOU INSPECT WAVEGUIDES OR CAVITY RESONATORS	58	62	50	79	89	35	7	WAVEGUIDES AND CAVITY RESONATORS
P 986	P2-03 DO YOU CLEAN WAVEGUIDES OR CAVITY RESONATORS	51	54	46	71	84	24	3	
P 987	P2-04 DO YOU BEND WAVEGUIDES OR CAVITY RESONATORS	15	19	8	16	36	7	3	
P 988	P2-05 DO YOU TWIST WAVEGUIDES OR CAVITY RESONATORS	11	14	7	10	25	7	3	
P 989	P2-06 DO YOU PRESSURIZE WAVEGUIDES OR CAVITY RESONATORS	38	38	38	51	77	13	0	
P 990	P2-07 DO YOU PURGE WAVEGUIDES OR CAVITY RESONATORS	21	21	23	43	27	4	0	
P 991	P2-08 DO YOU TROUBLESHOOT WAVEGUIDES OR CAVITY RESONATORS	45	49	36	65	73	20	3	
P 992	P2-09 DO YOU REMOVE OR INSTALL COMPLETE WAVEGUIDES	55	60	46	76	89	28	7	
P 993	P2-10 DO YOU REMOVE OR INSTALL WAVEGUIDE SECTIONS	53	58	43	69	89	31	0	
P 994	P2-11 DO YOU REMOVE OR INSTALL DUMMY LOADS	46	51	38	56	89	20	7	
P 995	P2-12 DO YOU REMOVE OR INSTALL E BENDS	25	29	19	29	57	11	0	
P 996	P2-13 DO YOU REMOVE OR INSTALL H BENDS	26	29	19	29	59	13	0	
P 997	P2-14 DO YOU REMOVE OR INSTALL OTHER BENDS	34	38	26	47	59	22	0	
P 998	P2-15 DO YOU REMOVE OR INSTALL CHOKE JOINTS	14	16	11	21	30	7	0	
P 999	P2-16 DO YOU REMOVE OR INSTALL ROTATING JOINTS	33	37	26	38	64	19	0	
P1000	P2-17 DO YOU REMOVE OR INSTALL DIRECTIONAL COUPLERS	41	46	32	49	80	20	3	
P1001	P2-18 DO YOU REMOVE OR INSTALL BIDIRECTIONAL COUPLERS	23	25	19	29	27	19	3	
P1002	P2-19 DO YOU USE OR REFER TO "A" WALL OF WAVEGUIDES	8	10	3	12	11	2	3	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182
P1003	P2-20 DO YOU USE OR REFER TO "B" WALL OF WAVEGUIDES	8	10	4	13	11	2	3
P1004	P2-21 DO YOU USE OR REFER TO CUTOFF FREQUENCY OF WAVEGUIDES	8	8	7	10	11	4	0
P1005	P2-22 DO YOU USE OR REFER TO FREQUENCY-DETERMINING WALL OF WAVEGUIDES	7	9	3	10	9	4	0
P1006	P2-23 DO YOU USE OR REFER TO POWER-DETERMINING WALL OF WAVEGUIDES	5	8	1	9	9	0	0
P1007	P2-24 DO YOU USE OR REFER TO ELECTRIC FIELD BOUNDARY CONDITIONS	4	5	1	6	5	2	0
P1008	P2-25 DO YOU USE OR REFER TO MAGNETIC FIELD BOUNDARY CONDITIONS	4	5	1	6	5	2	0
P1009	P2-26 DO YOU USE OR REFER TO DUPLEXER FIELD BOUNDARY CONDITIONS	4	5	3	9	5	2	0
P1010	P2-27 DO YOU USE OR REFER TO THE GENERAL RULE THAT MOST WAVEGUIDES ARE MADE WITH A "B" WALL SIZE OF .7 WAVELENGTHS OF THE OPERATING FREQUENCY	5	5	3	12	5	0	0
P1011	P2-28 DO YOU USE OR REFER TO THE GENERAL RULE THAT MOST "A" WALLS RANGE FROM .2 TO .5 WAVELENGTHS IN SIZE, WITH .35 USED AS AN AVERAGE	3	4	0	9	0	0	0
P1012	P2-29 ARE YOU CONCERNED WITH THE MATERIAL (SUCH AS BRASS) WHICH WAVEGUIDES ARE MADE OF	8	7	11	16	7	4	0
P1013	P2-30 DO YOU COMPUTE THE LENGTH OF A WAVEGUIDE FOR SPECIFIC INSTALLATION	3	3	3	9	2	0	0
P1014	P2-31 DO YOU USE THE RIGHT HAND RULE TO DETERMINE THE DIRECTION OF PROPAGATION, DIRECTION OF "E" FIELD, OR DIRECTION OF "H" FIELD IN WAVEGUIDES	3	3	3	7	0	0	0
P1015	P2-32 DO YOU USE OR REFER TO THE TIME PHASE OF PEAK "E" OR "H" LINES IN WAVEGUIDES	2	2	1	6	0	0	0
P1016	P2-33 DO YOU MEASURE THE TIME PHASE OF "E" OR "H" LINES IN WAVEGUIDES	1	2	0	4	0	0	0
P1017	P2-34 DO YOU USE OR REFER TO THE SPACE QUADRATURE OF "E" OR "H" LINES IN WAVEGUIDES	2	3	0	6	0	0	0
P1018	P2-35 ARE HIGH POWER PROBES USED ON WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	8	9	7	12	14	4	0
P1019	P2-36 ARE LOW POWER PROBES USED ON WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	12	13	11	18	23	4	3
P1020	P2-37 ARE LOOPS USED ON WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	5	6	3	9	9	0	0
P1021	P2-38 ARE APERTURES (WINDOWS OR IRISES) USED ON WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	20	21	18	29	30	7	0
P1022	P2-39 ARE DON'T REMEMBER THE KIND OF ENERGY COUPLING USED ON WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	25	27	23	38	30	19	7
P1023	P2-40 DO YOU DETERMINE WHERE PROBES SHOULD BE MOUNTED IN WAVEGUIDES OR CAVITY RESONATORS WITHOUT REFERRING TO TECHNICAL DATA	3	3	1	6	2	2	0
P1024	P2-41 DO YOU DETERMINE THE POSITIONING OF LOOPS IN WAVEGUIDES OR CAVITY RESONATORS WITHOUT REFERRING TO TECHNICAL DATA	2	2	1	4	2	0	0

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
P1025	P2-92 DO YOU DETERMINE THE POSITIONING OR SIZE OF APERTURES IN WAVEGUIDES OR CAVITY RESONATORS WITHOUT REFERRING TO TECHNICAL DATA	3	2	4	9	0	0	0	
P1026	P2-93 ARE CHOKE JOINTS USED IN WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	8	9	7	13	16	4	0	
P1027	P2-94 ARE ROTATING JOINTS USED IN WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	29	32	24	32	55	15	3	
P1028	P2-95 ARE DON'T REMEMBER THE KIND OF JOINTS USED IN WAVEGUIDES OR CAVITY RESONATORS YOU WORK WITH	21	23	18	32	23	19	7	
P1029	P2-96 DO YOU TUNE CAVITY RESONATORS USING CAPACITIVE TUNING	10	11	8	12	20	4	3	
P1030	P2-97 DO YOU TUNE CAVITY RESONATORS USING INDUCTIVE TUNING	7	8	5	10	11	2	0	
P1031	P2-98 DO YOU TUNE CAVITY RESONATORS USING VOLUME TUNING	14	16	8	15	27	7	0	
P1032	P2-99 DO YOU TUNE CAVITY RESONATORS USING DON'T REMEMBER THE METHOD OF TUNING	19	19	19	26	27	13	3	
P1033	P2-60 DO YOU MEASURE THE FREQUENCY OF SIGNALS IN CAVITY RESONATORS	28	32	22	35	52	15	7	
P1034	P3-01 IN YOUR PRESENT JOB DO YOU WORK WITH KLYSTRONS, TRAVELING WAVE TUBES (TWT), PARAMETRIC AMPLIFIERS, OR MAGNETRONS	47	50	42	65	70	30	7	MICROWAVE AMPLIFIERS AND OSCILLATORS
P1035	P3-02 DO YOU USE OR REFER TO INTERELECTRODE CAPACITANCE	7	8	4	7	9	4	0	
P1036	P3-03 DO YOU USE OR REFER TO ELECTRON TRANSIT TIME	5	6	1	7	5	2	0	
P1037	P3-04 DO YOU USE OR REFER TO LEAD INDUCTANCE	5	6	3	9	2	4	0	
P1038	P3-05 DO YOU USE OR REFER TO RF LOSSES IN EXTERNAL CIRCUITRY	13	14	11	16	18	6	7	
P1039	P3-06 DO YOU USE OR REFER TO PRINCIPLE OF ELECTRON VELOCITY MODULATION	4	4	3	7	2	0	0	
P1040	P3-07 DO YOU USE OR REFER TO ELECTRON BUNCHING	4	5	3	7	5	0	0	
P1041	P3-08 DO YOU WORK WITH TWO-CAVITY KLYSTRONS	12	12	11	16	18	7	0	
P1042	P3-09 DO YOU WORK WITH THREE-CAVITY KLYSTRONS	5	5	5	9	0	7	0	
P1043	P3-10 DO YOU WORK WITH REFLEX KLYSTRONS	30	29	34	46	43	13	7	
P1044	P3-11 DO YOU WORK WITH TRAVELING-WAVE TUBES (TWT)	5	5	5	6	5	6	0	
P1045	P3-12 DO YOU WORK WITH NONDEGENERATIVE PARAMETRIC AMPLIFIERS	2	1	3	4	2	0	0	
P1046	P3-13 DO YOU WORK WITH UP-CONVERTER PARAMETRIC AMPLIFIERS	2	1	3	4	2	0	0	
P1047	P3-14 DO YOU WORK WITH MAGNETRONS	39	40	36	41	68	31	0	
P1048	P3-15 DO YOU INSPECT KLYSTRONS OR TWT	36	35	39	49	59	17	7	
P1049	P3-16 DO YOU CLEAN KLYSTRONS OR TWT	22	22	22	32	32	7	7	
P1050	P3-17 DO YOU TUNE KLYSTRONS OR TWT ELECTRICALLY	23	18	31	34	27	13	3	
P1051	P3-18 DO YOU TUNE KLYSTRONS OR TWT MECHANICALLY	29	31	26	25	66	15	7	
P1052	P3-19 DO YOU PERFORM OPERATIONAL CHECKS OF KLYSTRONS OR TWT	39	39	39	49	64	22	7	
P1053	P3-20 DO YOU TROUBLESHOOT KLYSTRONS OR TWT	26	29	22	32	48	17	7	
P1054	P3-21 DO YOU REMOVE OR REPLACE COMPLETE KLYSTRON OR TWT	40	40	41	51	66	20	7	
P1055	P3-22 DO YOU REMOVE OR REPLACE KLYSTRON OR TWT COMPONENTS	5	8	0	7	7	6	0	
P1056	P3-23 DO YOU INSPECT PARAMETRIC AMPLIFIERS	3	2	4	3	7	0	0	
P1057	P3-24 DO YOU CLEAN PARAMETRIC AMPLIFIERS	2	2	1	1	5	0	0	
P1058	P3-25 DO YOU ADJUST PARAMETRIC AMPLIFIERS	2	2	3	1	7	0	0	

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TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

BY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182
P1059 P3-26 DO YOU TUNE PARAMETRIC AMPLIFIERS	2	2	3	1	7	0	0
P1060 P3-27 DO YOU PERFORM OPERATIONAL CHECKS OF PARAMETRIC AMPLIFIERS	2	2	3	1	7	0	0
P1061 P3-28 DO YOU TROUBLESHOOT PARAMETRIC AMPLIFIERS	2	2	3	1	7	0	0
P1062 P3-29 DO YOU REMOVE OR REPLACE COMPLETE PARAMETRIC AMPLIFIER	2	2	3	1	7	0	0
P1063 P3-30 DO YOU REMOVE OR REPLACE PARAMETRIC AMPLIFIER COMPONENTS	1	1	1	1	2	0	0
P1064 P3-31 DO YOU INSPECT MAGNETRONS	37	39	32	35	73	28	0
P1065 P3-32 DO YOU CLEAN MAGNETRONS	21	21	23	25	36	15	0
P1066 P3-33 DO YOU ADJUST MAGNETRONS	26	26	27	31	61	9	0
P1067 P3-34 DO YOU TUNE MAGNETRONS	29	30	27	34	68	9	0
P1068 P3-35 DO YOU PERFORM OPERATIONAL CHECKS OF MAGNETRONS	37	38	35	40	68	28	0
P1069 P3-36 DO YOU TROUBLESHOOT MAGNETRONS	29	32	22	28	59	22	0
P1070 P3-37 DO YOU REMOVE OR REPLACE COMPLETE MAGNETRON	39	40	38	41	73	30	0
P1071 P3-38 DO YOU REMOVE OR REPLACE MAGNETRON COMPONENTS	4	5	3	7	5	4	0
P1072 P3-39 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS COLLECTOR PLATES	4	4	4	7	0	4	0
P1073 P3-40 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS CATCHER CAVITIES	2	2	3	4	0	0	0
P1074 P3-41 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS CATCHER GRIDS	2	2	3	4	0	0	0
P1075 P3-42 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS FEEDBACK LOOPS	5	6	3	6	2	6	0
P1076 P3-43 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS DRIFT SPACES	1	2	0	3	0	0	0
P1077 P3-44 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS BUNCHER GRIDS	0	1	0	1	0	0	0
P1078 P3-45 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS BUNCHER CAVITIES	1	1	0	1	0	0	0
P1079 P3-46 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS CONTROL GRIDS	4	5	3	4	2	6	0
P1080 P3-47 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TWO-CAVITY KLYSTRONS CATHODES	7	7	7	7	9	6	0
P1081 P3-48 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF REFLEX KLYSTRON REPELLER (REFLECTOR) PLATES	17	16	19	25	16	7	7
P1082 P3-49 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF REFLEX KLYSTRON GRIDS	15	14	15	21	16	6	7
P1083 P3-50 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF REFLEX KLYSTRON GRID CAVITY GAPS	8	9	7	12	7	6	3
P1084 P3-51 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF REFLEX KLYSTRON RESONANT CAVITIES	15	15	15	25	9	7	7
P1085 P3-52 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF REFLEX KLYSTRON MAGNETIC COUPLING LOOPS	8	8	8	14	2	0	3
P1086 P3-53 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF REFLEX KLYSTRON FILAMENTS	13	12	14	15	20	6	3
P1087 P3-54 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF REFLEX KLYSTRON CATHODES	15	15	14	21	18	6	7

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	Dy-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
P1088	P3-55 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF REFLEX KLYSTRON OUTPUT LEADS	14	14	15	25	11	6	7	
P1089	P3-56 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TRAVELING-WAVE TUBES FILAMENTS	4	4	3	6	2	4	0	
P1090	P3-57 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TRAVELING-WAVE TUBES CATHODES	4	5	1	6	2	4	0	
P1091	P3-58 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TRAVELING-WAVE TUBES MODULATOR GRIDS	3	3	1	3	2	4	0	
P1092	P3-59 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TRAVELING-WAVE TUBES ANODES	4	5	1	7	2	2	0	
P1093	P3-60 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TRAVELING-WAVE TUBES HELIXES	1	1	1	3	0	0	0	
P1094	P3-61 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TRAVELING-WAVE TUBES COLLECTORS	4	4	3	7	2	2	0	
P1095	P3-62 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TRAVELING-WAVE TUBES MAGNETS	5	7	3	9	2	7	0	
P1096	P3-63 DO YOU USE OR REFER TO THE OPERATING PRINCIPLES OF TRAVELING-WAVE TUBES ATTENUATORS	7	9	4	13	7	6	0	
P1097	P3-64 DO YOU PERFORM TASKS ON PARAMETRIC AMPLIFIER FERRITE CIRCULATORS	2	3	0	1	2	2	0	
P1098	P3-65 DO YOU PERFORM TASKS ON PARAMETRIC AMPLIFIER SIGNAL CAVITIES	1	2	0	1	0	2	0	
P1099	P3-66 DO YOU PERFORM TASKS ON PARAMETRIC AMPLIFIER IDLER CAVITIES	1	1	0	1	0	0	0	
P1100	P3-67 DO YOU PERFORM TASKS ON PARAMETRIC AMPLIFIER VARACTOR DIODES	1	1	1	1	2	0	0	
P1101	P3-68 DO YOU PERFORM TASKS ON PARAMETRIC AMPLIFIER FERRITE ISOLATORS	3	3	1	1	7	2	0	
P1102	P3-69 DO YOU PERFORM TASKS ON PARAMETRIC AMPLIFIER REVERSE-BIAS BATTERIES	1	1	0	1	0	0	0	
P1103	P3-70 DO YOU PERFORM TASKS ON ANODES	4	5	1	6	5	6	0	
P1104	P3-71 DO YOU PERFORM TASKS ON ANODE COOLING PINS	2	3	1	6	0	2	0	
P1105	P3-72 DO YOU PERFORM TASKS ON COUPLING LOOPS	4	5	3	6	5	6	0	
P1106	P3-73 DO YOU PERFORM TASKS ON HEATER LEADS	6	8	4	6	16	6	0	
P1107	P3-74 DO YOU PERFORM TASKS ON RESONANT CAVITIES	4	5	1	4	7	6	0	
P1108	P3-75 DO YOU PERFORM TASKS ON CATHODES	4	5	1	6	7	4	0	
P1109	P3-76 DO YOU PERFORM TASKS ON MAGNETS	5	7	3	6	9	7	0	
Q1110	Q1-01 DO YOU USE OR REFER TO STORAGE REGISTERS	25	25	24	50	14	9	7	
Q1111	Q1-02 DO YOU USE OR REFER TO SHIFT REGISTERS	26	26	26	54	14	9	7	
Q1112	Q1-03 DO YOU USE OR REFER TO LOGIC SYMBOLS OF SHIFT REGISTERS	24	23	26	50	14	9	3	REGISTERS
Q1113	Q1-04 DO YOU USE OR REFER TO LOGIC SYMBOLS OF STORAGE REGISTERS	23	23	24	47	14	9	3	
Q1114	Q1-05 DO YOU TRACE THE DATA FLOW THROUGH LOGIC DIAGRAMS OF SHIFT REGISTERS	18	19	16	37	11	7	7	
Q1115	Q1-06 DO YOU TRACE THE DATA FLOW THROUGH LOGIC DIAGRAMS OF OTHER TYPE OF REGISTERS	16	16	16	32	9	7	7	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
Q1116	Q1-07 DO YOU DETERMINE THE STATE OF EACH FLIP-FLOP OF A SHIFT REGISTER AFTER A SPECIFIED NUMBER OF SHIFT PULSES HAVE PASSED	15	14	16	35	7	4	3	
Q1117	Q2-01 DO YOU WORK WITH DIGITAL COUNTERS, REGISTERS, OR STORAGE DEVICES IN YOUR PRESENT JOB	30	28	36	66	18	13	7	
Q1118	Q2-02 DO YOU USE OR REFER TO DELAY LINES	13	14	11	28	5	6	0	STORAGE DEVICES
Q1119	Q2-03 DO YOU USE OR REFER TO MAGNETIC CORES	19	16	24	40	14	6	0	
Q1120	Q2-04 DO YOU USE OR REFER TO MAGNETIC DRUMS	22	18	30	62	9	4	0	
Q1121	Q2-05 DO YOU USE OR REFER TO MAGNETIC TAPES	18	15	23	47	9	4	0	
Q1122	Q2-06 DO YOU USE OR REFER TO ACCESS TIME OR SPEED OF MEMORY SYSTEMS	22	18	28	50	16	4	3	
Q1123	Q2-07 DO YOU USE OR REFER TO WORD CAPACITY OF MEMORY SYSTEMS	24	21	30	54	18	6	0	
Q1124	Q2-08 DO YOU USE OR REFER TO VOLATILITY OF MEMORY SYSTEMS	12	13	11	28	7	2	0	
Q1125	Q2-09 DO YOU USE OR REFER TO LOGIC SYMBOL OF DELAY LINES	13	14	11	29	5	2	3	
Q1126	Q3-01 IN YOUR PRESENT JOB, DO YOU WORK WITH DIGITAL-TO-ANALOG (D/A) CONVERTERS, ANALOG-TO-DIGITAL (A/D) CONVERTERS, OR BINARY-TO-DECIMAL READOUT CONVERTERS	38	34	47	76	23	20	0	DIGITAL TO ANALOG CONVERTERS
Q1127	Q3-02 DO YOU COMPUTE OUTPUT VOLTAGES FOR ELECTROMECHANICAL DIGITAL-TO-ANALOG (D/A) CONVERTERS FOR GIVEN INPUT VOLTAGES	7	7	7	13	2	6	0	
Q1128	Q3-03 DO YOU USE OR REFER TO THE GENERAL RULE THAT THE COUNT IN ELECTROMECHANICAL DIGITAL-TO-ANALOG (D/A) CONVERTERS IS DETERMINED BY ADDING THE DENOMINATORS OF THE RESISTORS	5	5	4	10	2	4	0	
Q1129	Q3-04 DO YOU COMPUTE ANALOG VOLTAGES FOR GIVEN BINARY COUNTS IN ELECTRONIC DIGITAL-TO-ANALOG (D/A) CONVERTERS	6	5	7	10	2	6	0	
Q1130	Q3-05 DO YOU PERFORM SAMPLE FUNCTION TASKS ON VARIABLE TIME ANALOG-TO-DIGITAL (A/D) CONVERTER CIRCUITS	7	6	9	18	0	4	0	
Q1131	Q3-06 DO YOU PERFORM HOLD FUNCTION TASKS ON VARIABLE TIME ANALOG-TO-DIGITAL (A/D) CONVERTER CIRCUITS	9	8	11	19	0	6	0	
Q1132	Q3-07 DO YOU PERFORM COMPARE FUNCTION TASKS ON VARIABLE TIME ANALOG-TO-DIGITAL (A/D) CONVERTER CIRCUITS	7	6	8	16	0	4	0	
Q1131	Q3-08 DO YOU PERFORM DIGITIZE FUNCTION TASKS ON VARIABLE TIME ANALOG-TO-DIGITAL (A/D) CONVERTER CIRCUITS	7	6	8	18	0	4	0	
Q1134	Q3-09 DO YOU PERFORM DON'T REMEMBER WHICH FUNCTION TASKS ON VARIABLE TIME ANALOG-TO-DIGITAL (A/D) CONVERTER CIRCUITS	12	10	16	29	5	6	0	
Q1135	Q3-10 DO YOU USE OR REFER TO SAMPLE FUNCTION OF A/D CONVERTERS	10	9	11	21	2	6	0	
Q1136	Q3-11 DO YOU USE OR REFER TO HOLD FUNCTION OF A/D CONVERTERS	10	9	14	22	2	6	0	
Q1137	Q3-12 DO YOU USE OR REFER TO COMPARE FUNCTION OF A/D CONVERTERS	10	9	12	21	2	6	0	
Q1138	Q3-13 DO YOU USE OR REFER TO DIGITAL FUNCTION OF A/D CONVERTERS	14	12	18	31	2	6	0	
Q1139	Q3-14 DO YOU PERFORM ANY TASKS ON MECHANICAL ANALOG-TO-DIGITAL (A/D) CONVERTERS	24	21	30	51	16	9	0	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
R1140	R1-01 DO YOU WORK WITH PHANTASTRON CIRCUITRY IN YOUR PRESENT JOB	31	31	32	56	41	9	7	PHANTASTRONS
R1141	R2-01 IN YOUR PRESENT JOB DO YOU WORK WITH SCHMITT TRIGGER CIRCUITS	35	34	38	63	27	17	7	
R1142	R2-02 DO YOU TRACE DATA FLOW THROUGH SCHMITT TRIGGER SCHEMATIC DIAGRAMS	26	25	30	43	20	17	0	SCHMITT TRIGGERS
R1143	R2-03 DO YOU USE OR REFER TO SCHMITT TRIGGER LOGIC SYMBOLS	21	23	18	41	20	11	0	
R1144	R3-01 IN YOUR PRESENT JOB DO YOU FABRICATE MULTICONDUCTOR CABLES	58	61	53	68	75	46	30	CABLE FABRICATION
R1145	R3-02 DO YOU FABRICATE COAXIAL CABLES	41	42	39	72	89	39	33	
S1146	S1-01 IN YOUR PRESENT JOB DO YOU PERFORM ANY TASKS ON VISUAL READOUT SYSTEMS	55	55	55	76	45	41	40	
S1147	S1-02 DO YOU PERFORM ANY TASKS ON NIXIE LIGHTS OR NIXIE LIGHT DECODER SYSTEMS	15	16	15	24	14	7	0	INPUT/OUTPUT DEVICES
S1148	S1-03 DO YOU ANALYZE NIXIE LIGHT DECODER SYSTEMS USING BOOLEAN ALGEBRA	7	8	4	15	5	2	0	
S1149	S2-01 DO YOU WORK WITH PHOTO TUBES IN YOUR PRESENT JOB	10	11	9	26	7	2	0	PHOTO SENSITIVE DEVICES
S1150	S3-01 IN YOUR PRESENT JOB DO YOU WORK WITH CHOPPER CIRCUITS	15	14	16	12	9	17	20	
S1151	S3-02 DO YOU MEASURE EXCITATION FREQUENCIES	5	5	4	3	5	6	3	SYNCHRONOUS VIBRATIONS (CHOPPER CIRCUITS)
S1152	S3-03 DO YOU MEASURE VOLTAGE-CURRENT PHASE RELATIONSHIPS	2	2	3	1	2	0	3	
S1153	S3-04 DO YOU USE OR REFER TO EXCITATION FREQUENCIES	5	5	5	1	7	4	7	
S1154	S3-05 DO YOU USE OR REFER TO VOLTAGE-CURRENT PHASE RELATIONSHIPS	2	1	4	0	0	2	7	
S1155	S3-06 DO YOU USE SERVOS IN CONJUNCTION WITH CHOPPER CIRCUIT OPERATION	10	8	14	6	7	11	13	
S1156	S3-07 DO YOU USE DETECTORS IN CONJUNCTION WITH CHOPPER CIRCUIT OPERATION	8	7	11	4	5	9	10	
S1157	S3-08 DO YOU USE ERROR SIGNAL DEVICES IN CONJUNCTION WITH CHOPPER CIRCUIT OPERATION	9	8	11	4	7	11	7	
S1158	S3-09 DO YOU USE COMPARISON CIRCUITS IN CONJUNCTION WITH CHOPPER CIRCUIT OPERATION	8	6	11	4	7	7	10	
T1159	T1-01 DOES YOUR PRESENT JOB INVOLVE ANY TASKS DEALING WITH INFRARED SYSTEMS	0	1	0	0	2	0	0	
T1160	T1-02 DO YOU INSPECT INFRARED SYSTEMS	0	0	0	0	0	0	0	INFRARED
T1161	T1-03 DO YOU CLEAN INFRARED SYSTEMS	0	0	0	0	0	0	0	
T1162	T1-04 DO YOU ADJUST OR CALIBRATE INFRARED SYSTEMS	0	0	0	0	0	0	0	
T1163	T1-05 DO YOU OPERATE INFRARED SYSTEMS	0	0	0	0	0	0	0	
T1164	T1-06 DO YOU TROUBLESHOOT WIRE CONNECTIONS OF INFRARED SYSTEMS	0	0	0	0	0	0	0	
T1165	T1-07 DO YOU TROUBLESHOOT MAJOR ASSEMBLIES OF INFRARED SYSTEMS	0	0	0	0	0	0	0	
T1166	T1-08 DO YOU TROUBLESHOOT DOWN TO INFRARED SYSTEM COMPONENT PARTS	0	0	0	0	0	0	0	
T1167	T1-09 DO YOU REMOVE OR REPLACE MAJOR ASSEMBLIES OF INFRARED SYSTEMS	0	0	0	0	0	0	0	
T1168	T1-10 DO YOU REMOVE OR REPLACE INFRARED SYSTEM COMPONENT PARTS	0	0	0	0	0	0	0	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

BY-TSK		SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182
T1169 T1-11 DO YOU USE OR REFER TO FAR REGION		0	0	0	0	0	0	0
T1170 T1-12 DO YOU USE OR REFER TO INTERMEDIATE REGION		0	0	0	0	0	0	0
T1171 T1-13 DO YOU USE OR REFER TO NEAR REGION		0	0	0	0	0	0	0
T1172 T1-14 DO YOU USE OR REFER TO MICRON		0	0	0	0	0	0	0
T1173 T1-15 DO YOU USE OR REFER TO GRAY BODIES		0	0	0	0	0	0	0
T1174 T1-16 DO YOU USE OR REFER TO BLACK BODIES		0	0	0	0	0	0	0
T1175 T1-17 DO YOU USE OR REFER TO ABSORPTION		0	0	0	0	0	0	0
T1176 T1-18 DO YOU USE OR REFER TO SCATTERING		0	0	0	0	0	0	0
T1177 T1-19 DO YOU USE OR REFER TO ABSOLUTE ZERO		0	0	0	0	0	0	0
T1178 T1-20 DO YOU PERFORM TASKS ON BLITZ		0	0	0	0	0	0	0
T1179 T1-21 DO YOU PERFORM TASKS ON TARGET BUTTONS		0	0	0	0	0	0	0
T1180 T1-22 DO YOU PERFORM TASKS ON ERECTOR LENSES		0	0	0	0	0	0	0
T1181 T1-23 DO YOU PERFORM TASKS ON OCULAR LENSES		0	0	0	0	0	0	0
T1182 T1-24 DO YOU PERFORM TASKS ON CORRECTION LENSES		0	0	0	0	0	0	0
T1183 T1-25 DO YOU PERFORM TASKS ON FILTERS		0	0	0	0	0	0	0
T1184 T1-26 DO YOU PERFORM TASKS ON SPHERICAL MIRRORS		0	0	0	0	0	0	0
T1185 T1-27 DO YOU PERFORM TASKS ON PLANE MIRRORS		0	0	0	0	0	0	0
T1186 T2-01 DOES YOUR PRESENT JOB INVOLVE ANY TASKS DEALING WITH LASERS		2	3	1	3	2	2	3
T1187 T2-02 DO YOU INSPECT LASER SYSTEMS		0	0	0	0	0	0	0
T1188 T2-03 DO YOU CLEAN LASER SYSTEMS		0	0	0	0	0	0	0
T1189 T2-04 DO YOU OPERATE LASER SYSTEMS		1	1	0	1	0	2	0
T1190 T2-05 DO YOU OPERATE LASER SYSTEMS		1	2	0	3	0	2	0
T1191 T2-06 DO YOU TROUBLESHOOT WIRE CONNECTIONS OF LASER SYSTEMS		0	0	0	0	0	0	0
T1192 T2-07 DO YOU TROUBLESHOOT MAJOR ASSEMBLIES OF LASER SYSTEMS		0	0	0	0	0	0	0
T1193 T2-08 DO YOU TROUBLESHOOT TO COMPONENT PARTS OF LASER SYSTEMS		0	0	0	0	0	0	0
T1194 T2-09 DO YOU REMOVE OR REPLACE MAJOR ASSEMBLIES OF LASER SYSTEMS		0	0	0	0	0	0	0
T1195 T2-10 DO YOU REMOVE OR REPLACE COMPONENT PARTS OF LASER SYSTEMS		0	0	0	0	0	0	0
T1196 T2-11 DO YOU USE OR REFER TO ANGSTROMS (A)		0	0	0	0	0	0	0
T1197 T2-12 DO YOU USE OR REFER TO ELECTRON ENERGY LEVELS		0	1	0	0	0	2	0
T1198 T2-13 DO YOU USE OR REFER TO GROUND STATE		0	1	0	0	0	2	0
T1199 T2-14 DO YOU USE OR REFER TO EXCITED STATE		0	0	0	0	0	0	0
T1200 T2-15 DO YOU USE OR REFER TO PACKET OF RADIATION		0	0	0	0	0	0	0
T1201 T2-16 DO YOU USE OR REFER TO PHOTONS		0	0	0	0	0	0	0
T1202 T2-17 DO YOU USE OR REFER TO SPONTANEOUS EMISSION		0	0	0	0	0	0	0
T1203 T2-18 DO YOU USE OR REFER TO STIMULATED EMISSION		0	0	0	0	0	0	0
T1204 T2-19 DO YOU USE OR REFER TO COHERENCE OR INCOHERENCE		0	0	0	0	0	0	0
T1205 T2-20 DO YOU USE OR REFER TO INVERSION LEVEL		0	0	0	0	0	0	0
T1206 T2-21 DO YOU USE OR REFER TO MONOCHROMATIC		0	0	0	0	0	0	0
T1207 T2-22 DO YOU WORK WITH ACTIVE MATERIALS		0	0	0	0	0	0	0
T1208 T2-23 DO YOU WORK WITH PUMPING SOURCES		0	0	0	0	0	0	0
T1209 T2-24 DO YOU WORK WITH FULL SILVERED (100% REFLECTIVE) MIRRORS		0	0	0	0	0	0	0

LASERS

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
T1210	T2-25 DO YOU WORK WITH HALF SILVERED (92% REFLECTIVE) MIRRORS	0	0	0	0	0	0	0	
T1211	T2-26 DO YOU WORK WITH HELICAL FLASHTUBES	0	0	0	0	0	0	0	
T1212	T2-27 DO YOU WORK WITH RUBY	0	0	0	0	0	0	0	
T1213	T2-28 DO YOU WORK WITH HELIUM-NEON	0	0	0	0	0	0	0	
T1214	T2-29 DO YOU WORK WITH HELIUM-XENON	0	0	0	0	0	0	0	
T1215	T2-30 DO YOU WORK WITH XENON	0	0	0	0	0	0	0	
T1216	T2-31 DO YOU WORK WITH CESIUM-HELIUM	0	0	0	0	0	0	0	
T1217	T2-32 DO YOU WORK WITH ARGON	0	0	0	0	0	0	0	
T1218	T2-33 DO YOU WORK WITH NEODYMIUM IN GLASS	0	0	0	0	0	0	0	
T1219	T2-34 DO YOU WORK WITH GALLIUM ARSENIDE	0	1	0	1	0	0	0	
T1220	T3-01 IN YOUR PRESENT JOB DO YOU WORK WITH DISPLAY TUBES, SUCH AS DIRECT VIEW STORAGE (DVST) OR MULTIPLE MODE STORAGE TUBES (MMST)	22	18	31	50	5	13	0	DISPLAY TUBES
T1221	T3-02 DO YOU INSPECT DVST OR MMST	20	16	27	44	5	9	0	
T1222	T3-03 DO YOU CLEAN DVST OR MMST	16	14	20	35	5	9	0	
T1223	T3-04 DO YOU ADJUST OR CALIBRATE DVST OR MMST	16	14	20	37	2	6	0	
T1224	T3-05 DO YOU OPERATE SYSTEMS THAT CONTAIN DVST OR MMST	22	18	30	49	5	13	0	
T1225	T3-06 DO YOU TROUBLESHOOT DVST OR MMST CIRCUITS	17	15	22	38	5	9	0	
T1226	T3-07 DO YOU REMOVE OR REPLACE DVST OR MMST TUBES FROM MAJOR ASSEMBLIES OR UNITS	17	15	22	37	5	9	0	
T1227	T3-08 DO YOU PERFORM TASKS THAT MAKE IT NECESSARY TO NAME THE VARIOUS ELEMENTS OF DVST	10	8	14	21	2	6	0	
T1228	T3-09 DO YOU PERFORM TASKS THAT MAKE IT NECESSARY TO NAME THE VARIOUS ELEMENTS OF MMST	4	3	4	9	0	2	0	
T1229	T3-10 DO YOU PERFORM TASKS ON FLOOD GUNS	9	7	14	19	5	2	0	
T1230	T3-11 DO YOU PERFORM TASKS ON WRITE GUNS	8	7	9	15	5	2	0	
T1231	T3-12 DO YOU PERFORM TASKS ON ATTACK GUNS	2	2	1	6	0	0	0	
T1232	T3-13 DO YOU PERFORM TASKS ON ERASE GUNS	9	7	12	18	5	2	0	
T1233	T3-14 DO YOU PERFORM TASKS ON STORAGE GRIDS	7	5	11	13	5	2	0	
U1234	U1-01 IN YOUR PRESENT JOB, DO YOU PERFORM ANY PROGRAMMING TASKS	29	26	35	65	25	6	0	PROGRAMMING
U1235	U1-02 DO YOU USE OR REFER TO DECIMAL SYSTEMS	19	18	22	43	16	0	0	
U1236	U1-03 DO YOU USE OR REFER TO PROGRAMS	28	27	30	63	25	4	0	
U1237	U1-04 DO YOU USE OR REFER TO HEXIDECIMAL SYSTEMS	5	6	1	4	14	0	0	
U1238	U1-05 DO YOU USE OR REFER TO 8-4-2-1 SYSTEMS	8	8	7	13	9	0	0	
U1239	U1-06 DO YOU USE OR REFER TO FOUR SYSTEMS	2	3	1	4	2	0	0	
U1240	U1-07 DO YOU USE OR REFER TO BINARY SYSTEMS	23	22	26	57	14	2	0	
U1241	U1-08 DO YOU USE OR REFER TO TIME-SHARING	11	11	12	26	7	0	0	
U1242	U1-09 DO YOU USE OR REFER TO DATA WORDS	26	23	31	60	18	4	0	
U1243	U1-10 DO YOU USE OR REFER TO ADDRESS WORDS	25	23	31	60	16	4	0	
U1244	U1-11 DO YOU USE OR REFER TO ADDRESS/SUBADDRESS	22	19	27	53	16	2	0	
U1245	U1-12 DO YOU USE OR REFER TO STEERING/INFORMATION	15	14	18	35	16	0	0	
U1246	U1-13 DO YOU USE OR REFER TO INFORMATION WORDS	24	21	28	54	20	2	0	
U1247	U1-14 DO YOU PERFORM TASKS ON SINGLE LEVEL PROGRAMMING	18	16	20	38	14	4	0	
U1248	U1-15 DO YOU PERFORM TASKS ON MULTI-LEVEL PROGRAMMING	11	12	8	25	11	2	0	

TASK GROUP SUMMARY
PERCENT MEMBERS PERFORMING

	BY-TSK	SPC 176	SPC 177	SPC 178	SPC 179	SPC 180	SPC 181	SPC 182	
U1249	U1-16 DO YOU PERFORM TASKS ON INPUT DEVICES	20	20	22	50	11	0	0	
U1250	U1-17 DO YOU PERFORM TASKS ON STORAGE DEVICES	20	20	22	53	7	0	0	
U1251	U1-18 DO YOU PERFORM TASKS ON ARITHMETIC SECTIONS	20	21	18	49	9	0	0	
U1252	U1-19 DO YOU PERFORM TASKS ON CONTROL SECTIONS	21	21	22	54	11	0	0	
U1253	U1-20 DO YOU PERFORM TASKS ON OUTPUT DEVICES	21	21	22	53	14	0	0	
U1254	U1-21 DO YOU PERFORM TASKS ON POWER SUPPLIES	22	21	23	53	14	0	0	
U1255	U2-01 DO YOU USE DECIBELS TO EXPRESS AMPLIFICATION AND ATTENUATION	48	51	42	63	44	33	7	
U1256	U2-02 DO YOU USE LOGARITHMS TO COMPUTE OUTPUT POWER IN DECIBELS	8	10	4	13	9	4	0	DB AND POWER RATIOS
U1257	U2-03 DO YOU USE LOGARITHMS TO COMPUTE ATTENUATION IN DECIBELS	8	10	4	13	11	4	0	
U1258	U2-04 DUMMY TASK TO IDENTIFY INCUMBENTS WHO PERFORMED NO TASKS	0	0	1	0	0	0	3	

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AVIONIC INERTIAL AND RADAR NAVIGATION SYSTEMS SPECIALIST AFSC 3--ETC(U)
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Avionics	Teaching methods
Electronic equipment	Training
Electronic technicians	

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report summarizes the results of the administration of the Electronic Principles Inventory to airmen assigned as Avionic Inertial and Radar Navigation Systems Specialist (AFSC 32854). The report gives a detailed listing of the technical tasks and knowledge needed to perform the jobs within the specialty or career ladder.

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This specialty has the following functions:

Installs, maintains, and repairs avionic inertial and radar navigational equipment. Performs preventive maintenance on avionic inertial and radar navigational equipment. Installs avionic inertial and radar navigational equipment. Repairs avionic inertial and radar navigation equipment. Maintains inspection and maintenance records. Supervises avionic inertial and radar navigation systems personnel.