

Student Electronics Technician (SET) Competency Correlation Chart

Standard	Textbook Page(s)
1.0 Electrical Theory	
1.1 Describe atomic structure, the components of the atom, their charges and importance to electronics technology	18–20
1.2 List ten uses for magnetism in electronics technology	35–36, 181–183
1.3 Explain basic uses for electricity	11–12
1.4 Describe the basic methods of using electricity to operate a motor and how mechanical motion causes a generator to produce electrical current	235–242
1.5 Explain the differences between current, voltage and resistance	87–89
1.6 List different types of resistive materials and how resistors are used in electronics	62–66
1.7 Describe the purposes of capacitors. List common types and construction designs	74–83
1.8 Explain how inductance relates to magnetism and describe coil construction, cores and usages	213–223
1.9 Show a comparison between reactance and resistance and describe current/voltage relationships	248–250, 258–260
1.10 Compare impedance with reactance and resistance and explain the causes and effects of impedance	253–254
1.11 List voltage sources, AC and DC, batteries and natural generation	26–30, 186–187
1.12 List Ohms law formulas for current, voltage, resistance and power. Solve math problems utilizing each	87–93
1.13 Calculate power consumption and requirements	92–98
2.0 Electronic Components	
2.1 Identify resistor values from color code or other marks and list composition and reasons for different usages	68–73

Standard	Textbook Page(s)
2.2 Identify capacitor types; list common usages; methods of varying capacitance and explain the terms <i>charge</i> and <i>coulomb</i>	74–83
2.3 Identify inductor types and reasons for various core materials; how diameter and wire size affects the values	213–222
2.4 Identify common types of transformers and list uses for each; explain step up/down voltage methods; explain why laminations are used	223–230
2.5 Identify transistors as to type and usage, such as unijunction, FETs and MOSFETs; explain beta and alpha and provide common DC and bias voltage ranges; list common usage	287–288, 314–315, 317–321
2.6 Identify other semiconductors and explain their uses: Darlington pairs; unijunction transistors and Gunn diodes	
2.7 Compare thyristors with other semiconductors; Identify diacs, triacs and SCRs and explain their operation.	329–335
2.8 Explain diode ratings; describe usage in regulator circuits	299–301
2.9 List common optical devices (LEDs, LCDs, etc.) and describe how photovoltaic cells are activated. Draw symbols for photo resistors, photodiodes and phototransistors; list materials from which these devices are made	301–302, 321–322, 386–387,
2.10 Describe MOS, CMOS, FET applications	317–321, 384
3.0 Soldering-Desoldering and Tools	
3.1 Describe solder safety as it pertains to burns and potential fires or damage to facilities or customer products	53–54
3.2 Explain the cause of solder fumes and the effects of lead poisoning	
3.3 List causes and precautions to prevent or reduce solder splatter	54
3.4 Explain the reasons for flux usage and describe types	54
3.5 List types of solder and reasons for choosing each	54
3.6 Explain heat shunts, why and how they are used	54–55
3.7 Identify cold solder joints and explain causes	54

Standard	Textbook Page(s)
3.8 Describe the differences between good and bad mechanical and electrical solder connections	54
3.9 Demonstrate proper care of solder-desolder equipment and aids	
3.10 Explain desoldering principles	
3.11 Describe various types of desoldering equipment and how it is used	
3.12 Demonstrate the use of braid-wick solder removers	
4.0 Block Diagrams—Schematics-Wiring Diagrams	
4.1 Draw common electrical/electronic symbols	14–17
4.2 Explain how block diagrams are used for troubleshooting and maintenance of electronics products	
4.3 Explain the differences between wiring prints, schematics and block diagrams	
4.4 Describe the purpose and use of test points. Indicate their likely placement on schematics	
4.5 Explain how schematics are used to locate component and wiring failures in electronics products	
4.6 Explain the methods of using flow diagrams/charts	
5.0 Cabling	
5.1 List wire types and construction	40–47
5.2 List American wire gauges used for various purposes	43–44
5.3 Explain construction of coaxial cable and the impedance characteristics	42
5.4 List common identifications for copper cables, such as #18 and #24, and UTP telephone cable	42, 44
5.5 Explain major differences between copper, coaxial and fiber optic cables	42, 354
5.6 Describe impedance and its causes; explain reasons for maintaining a cable's characteristics	253–254
5.7 Explain the effects of proper and improper termination	
5.8 Explain the purposes of grounding and common conventions used in electrical and electronics	144–145

Standard	Textbook Page(s)
5.9 Demonstrate splicing knowledge and ability for coaxial and copper cable; explain two types of fiber splices	354–357
5.10 Demonstrate testing methods for all three types of cables and compare dB loss measurements and techniques	112–113
5.11 Compare the fittings and connectors used in cabling and list potential defects a technician may encounter	
5.12 Describe proper crimping of communications wiring connectors	
5.13 Explain how cable prep tools are used and demonstrate proper and improper crimping	
6.0 Power Supplies	
6.1 Explain shock hazards when servicing power supplies in electronic equipment	10
6.2 Describe the differences between transformer powered supplies and line connected supplies	
6.3 Describe battery supplies and list common usages; also explain recharging principles	26–30
6.4 Explain the reasons for filtering, describe hum, identify common filter types (pi, t, l, etc.)	281–283
6.5 Explain the reasons for power supply regulation and list common components used in regulated supplies	299–301, 335
6.6 Explain where fuses and circuit breakers are commonly and electrically located in circuits; approximate sizes for common circuits; house service box common fuses and circuit breaker configuration and precautions for replacement	48–50
7.0 Test Equipment and Measurements	
7.1 Describe how volt-ohm-current meters operate	89, 104, 171
7.2 Identify meter protection, safety and usage	55–56, 67, 98–100
7.3 Explain care of equipment and test leads	
7.4 List the purposes and types of signal generators	194–195
7.5 Describe meter loading and precautions	
7.6 Explain what R-C-L substitution equipment is and its purposes; explain ESR Capacitance-measurement equipment	
7.7 List the uses and precautions for logic test probes	

Standard	Textbook Page(s)
7.8 Explain how logic pulsers are used	
7.9 Describe oscilloscope usage; explain the purposes of each front panel control	196–198
7.10 List the uses for pattern generators	194–195
7.11 Define dummy load; show where and why used	
7.12 Explain reasons for using rheostats, isolation transformers and variacs and why size matters	65
8.0 Safety Precautions	
8.1 Describe the physiological reactions electrical shock causes; list various degrees of current the human body can tolerate	98–100
8.2 Explain the concept of First Aid and its particular importance to workers in electric and electronics fields; explain precautions for untrained people	
8.3 Explain what the National Electrical Code (NEC®) is and describe various rules technicians must abide by	56–57
8.4 Explain NFPA® rules and describe how technicians comply and may violate them	
8.5 Describe fusing and circuit breaker rules and reasons for different types of fuses	48–50
8.6 Explain static causes and CMOS damage prevention straps, mats and grounding	384
8.7 List tools hazards that are associated with technician activities in the workplace and in the field.	29, 102
8.8 Describe lockout and tagging rules for potentially unsafe electrical or mechanical hazards	
8.9 Explain eye and ear protection needed by technicians	
8.10 List ladder handling and usage and OSHA® heights safety rules	
8.11 List service vehicle safety concerns such as ladder or transporting security and flying objects, driver screens inside the vehicle	
8.12 Describe the types and usage of fire extinguishers	44
9.0 Mathematics and Formulas	
9.1 Quote Ohms law power, voltage, current and resistance formulas and solve for circuit values	87–92
9.2 List other common basic electronic formulas	121–126, 136–139, 242

Standard	Textbook Page(s)
10.0 Electronic Circuits: Series and Parallel	
10.1 Identify and describe the operation of common DC circuits	26–31, 204–205
10.2 Identify and describe the operation of common AC circuits	186–206
10.3 Explain how series circuits, R, L, C are used in electronics equipment	103–117
10.4 Explain the purpose of oscillators	
10.5 Show how oscillators and multivibrators are similar and how they differ	
10.6 Describe filter circuits, why and how they are used	275–283
11.0 Amplifiers	
11.1 List common amplifier devices	314–317
11.2 Describe the purpose of each component in an amplifier circuit	
11.3 List the usages and classes of amplifiers	315–317
11.4 Describe biasing and gain characteristics	314–315
11.5 Explain frequency response of an amplifier circuit and why it is important	277
11.6 Explain the uses of operational amplifiers and how they differ from other amplifiers	
11.7 Show causes of distortion in amplifiers and list ways to reduce or eliminate it	
11.8 Explain how inaccurate measurements can be experienced due to meter or scope loading. List ways to overcome loading problems	
12.0 Interfacing of Electronics Products	
12.1 List input circuit signal levels that may be expected for various common electronics products or test equipment	40, 270
12.2 List anticipated signal or voltage levels for output circuits in audio and video equipment	
12.3 Explain the importance of impedance matching; list causes of mismatches	253–254
12.4 Explain the purposes of plugs and connectors and why it is necessary to use the proper ones	
12.5 Explain grounding, proper and improper methods, and the results of power source mismatch	144–145

Standard	Textbook Page(s)
13.0 Digital Concepts and Circuitry	
13.1 Describe ASCII code	384–385
13.2 Identify each basic digital gate	343–345
13.3 Construct truth tables for common gates	344
13.4 Explain how counters operate	
13.5 Explain the purpose of flip-flops and list common types	
13.6 Explain the purpose of a digital bus and show how it is connected to various sections of a product	
13.7 List types of display circuitry and describe how numbers and letters are activated digitally	339, 343
13.8 Explain the purpose of computer clocks	
13.9 Show how pulsers are used for digital signal tracing and how logic probes are used to verify states in digital equipment	
13.10 Describe digital clock usage and circuitry	
13.11 Describe how microprocessors function and identify the basic components and pinouts	
14.0 Computer Electronics	
14.1 Describe the major sections of a computer	379–387
14.2 Demonstrate how the computer block diagram and flow charts are utilized	382
14.3 Describe different types of computer memory and how storage is accomplished	382–384
14.4 Define the word peripheral and list various types	381
15.0 Computer Applications	
15.1 Demonstrate knowledge of basic computer operation	384–387
15.2 List ways to backup data and the importance of doing so	385
15.3 Explain the causes of line surges and viruses and protection procedures against each	
15.4 Explain major components of the Internet, how it is accessed and common applications	387–389
15.5 Demonstrate how to download a service or application, data or programs	

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Standard	Textbook Page(s)
15.6 Explain how to use the Internet to locate parts and service literature	