TEACHER ASSESSMENT BLUEPRINT

ELECTRONICS TECHNOLOGY

Test Code: 5947
Version: 01

Specific Competencies and Skills Tested in this Assessment:

Safety Practices
Demonstrate safe working procedures
Explain the purpose of OSHA and how it promotes safety on the job
Identify electrical hazards and how to avoid or minimize them in the workplace
Explain safety issues concerning lockout/tagout procedures
Safely discharge electronic equipment

Fundamental Electrical Principles and Theory
Explain basic electrical theory, including Ohm's Law, Watt's Law, Kirchhoff's Law
Describe magnetism and electromagnetism
Identify schematic symbols
Identify sources of electricity, including renewable sources
Interpret component values
Describe conductors, resistors, insulators, and semiconductors
Apply proper engineering notations; SI and metric prefixes

Digital Electronic Circuits
Identify and compare digital to analog signals and circuits
Demonstrate knowledge of different number systems
Convert between different number systems
Demonstrate knowledge of fundamental logic gates and functions
Demonstrate knowledge of Boolean logic
Demonstrate knowledge of sequential logic (flip flops)
Demonstrate knowledge of digital circuitry

Electronics Technology (continued)

Electronic Device Analysis and Applications
Identify diodes, rectifiers, and power supply circuits
Identify bipolar transistors and bipolar transistor circuits
Demonstrate knowledge of Field Effect Transistors (FETs) and FET circuits
Demonstrate knowledge of thyristors and control circuits
Identify optoelectronic devices and light functions
Identify Op-Amps, principles, and applications
Describe circuit protection methods including Electromagnetic Interference (EMI)
Interpret a manufacturer's data sheet

Electronic Testing Equipment
Identify, select, and demonstrate proper hand tool use
Display knowledge and proper use of multimeters
Display knowledge and proper use of oscilloscopes
Display knowledge and proper use of function generators, frequency counters, and testers

Direct Current (DC) Circuit Analysis
Analyze and troubleshoot DC series circuits
Analyze and troubleshoot DC parallel circuits
Demonstrate knowledge of inductors and capacitors in DC circuits
Analyze and troubleshoot DC combination circuits

Alternating Current (AC) Analysis
Analyze AC circuits and waveforms
Troubleshoot an AC circuit
Demonstrate knowledge of inductance, capacitance, and resonance
Identify, analyze, and troubleshoot filter circuits
Explain current and voltage phase relationships
Describe the operation of transformers, including troubleshooting

Prototyping and Fabrication Techniques
Layout components on a printed circuit board according to a schematic
Demonstrate knowledge of proper soldering and de-soldering techniques
Repair or replace a component or foil on a printed circuit board

Electronics Technology (continued)

Written Assessment:

Administration Time: 3 hours
Number of Questions: 175

Areas Covered:

9%	Safety Practices
15%	Fundamental Electrical Principles and Theory
15%	Digital Electronic Circuits
21%	Electronic Device Analysis and Applications
8%	Electronic Testing Equipment
10%	Direct Current (DC) Circuit Analysis
16%	Alternate Current (AC) Analysis
6%	Prototyping and Fabrication Techniques

Sample Questions:

Information regarding toxicity of chemical or environmental hazards of electronic components may be found

A. in a textbook
B. posted on Craigslist©
C. published in the SDS
D. on standard manufacturer labels

Impedance is measured in

A. farads
B. joules
C. henries
D. ohms

The binary numbering system is base

A two
B. four
C. eight
D. ten

What does an FET do?

A. makes the silicon on PCBs
B. amplifies weak signals
C. maintains a stable voltage
D. works in parallel with a capacitor

Which meter is always wired in series?

A. ohmmeter
B. ammeter
C. wattmeter
D. voltmeter

Performance Assessment:

Administration Time: 2 hours and 55 minutes
Number of Jobs: 4

Areas Covered:

26% **Soldering and De-Soldering**
Participant will select components, solder and de-solder using appropriate tools, and adhere to safety procedures.

23% **Power Supply Construction and Circuit Analysis**
Participant will select components, use tools and equipment correctly following safety procedures, construct circuit with correct measurements, install capacitors, and measure voltages.

19% **Operational Amplifier Construction and Analysis**
Participant will select correct components, use tools and equipment properly following safety procedures, measure output voltage, display input versus output, and calculate and measure gain.

32% **Design and Build a Combinational Logic Circuit**
Participant will develop and simplify a Boolean expression, draw the gate logic diagram, and build and test the circuit.

Sample Job: Power Supply Construction and Circuit Analysis

Maximum Job Time: 45 minutes

Participant Activity: The participant will refer to the diagram provided and build the circuit, choose proper components from the selection given, measure and record the full RMS Secondary Voltage, measure the DC voltage and record the correct polarity from X to the ground and from Y to the ground.