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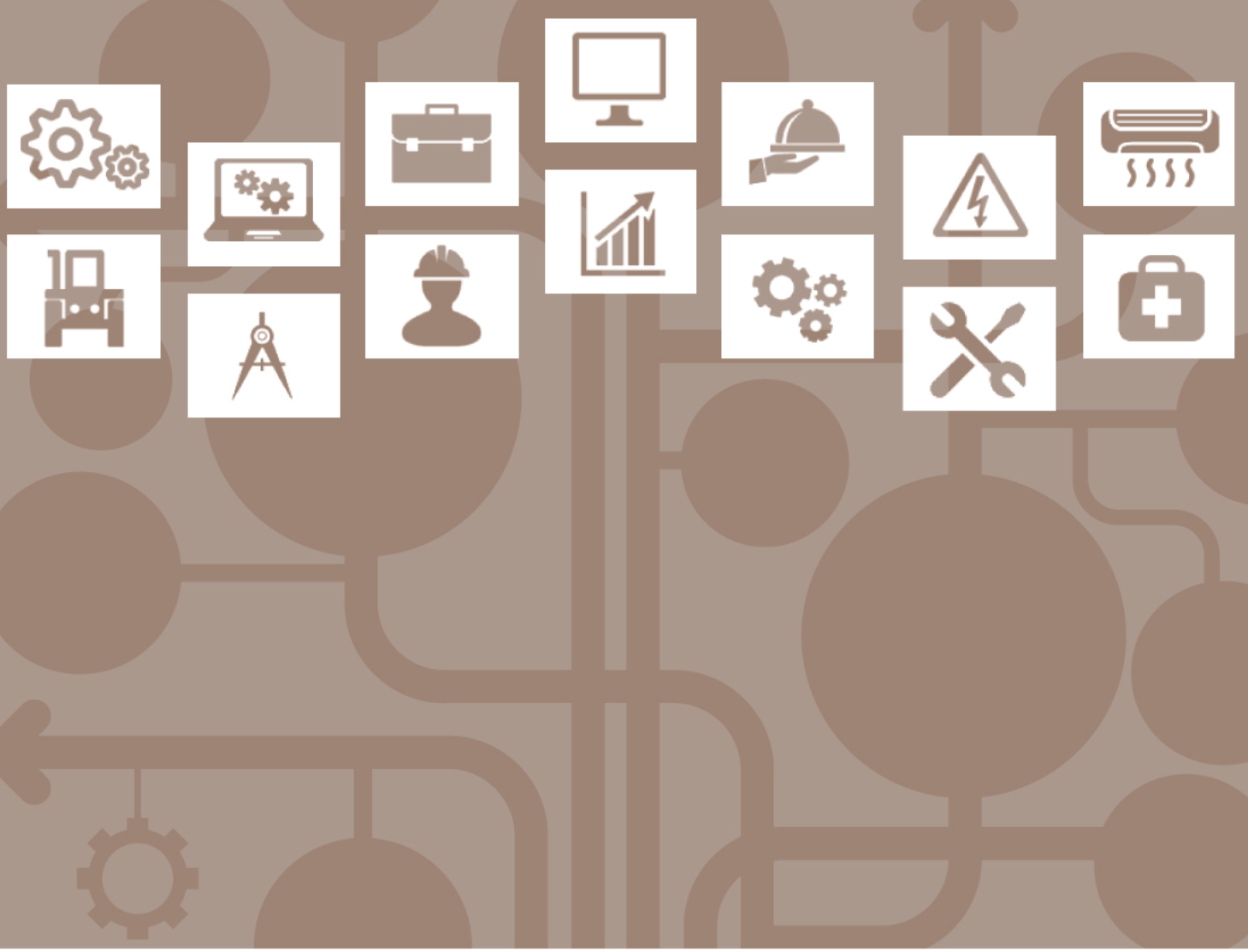
Entry Level Assessment Blueprint

Electronics Technology



Test Code: 4135 / Version: 01

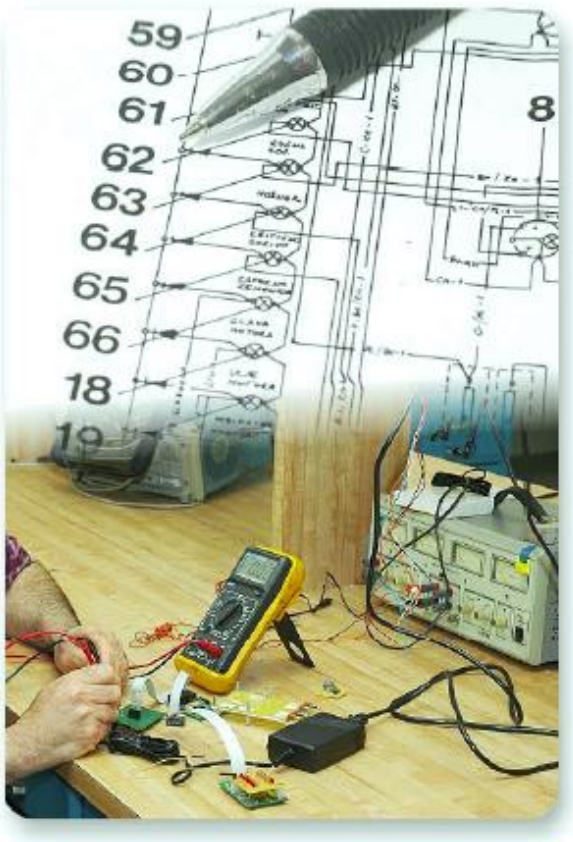
Specific Competencies and Skills Tested in this Assessment:

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

Specific Competencies and Skills continued:

Electronic Device Analysis and Applications

- Identify diodes, rectifier, 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

Alternate 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

Specific Competencies and Skills continued:

Prototyping and Fabrication Techniques

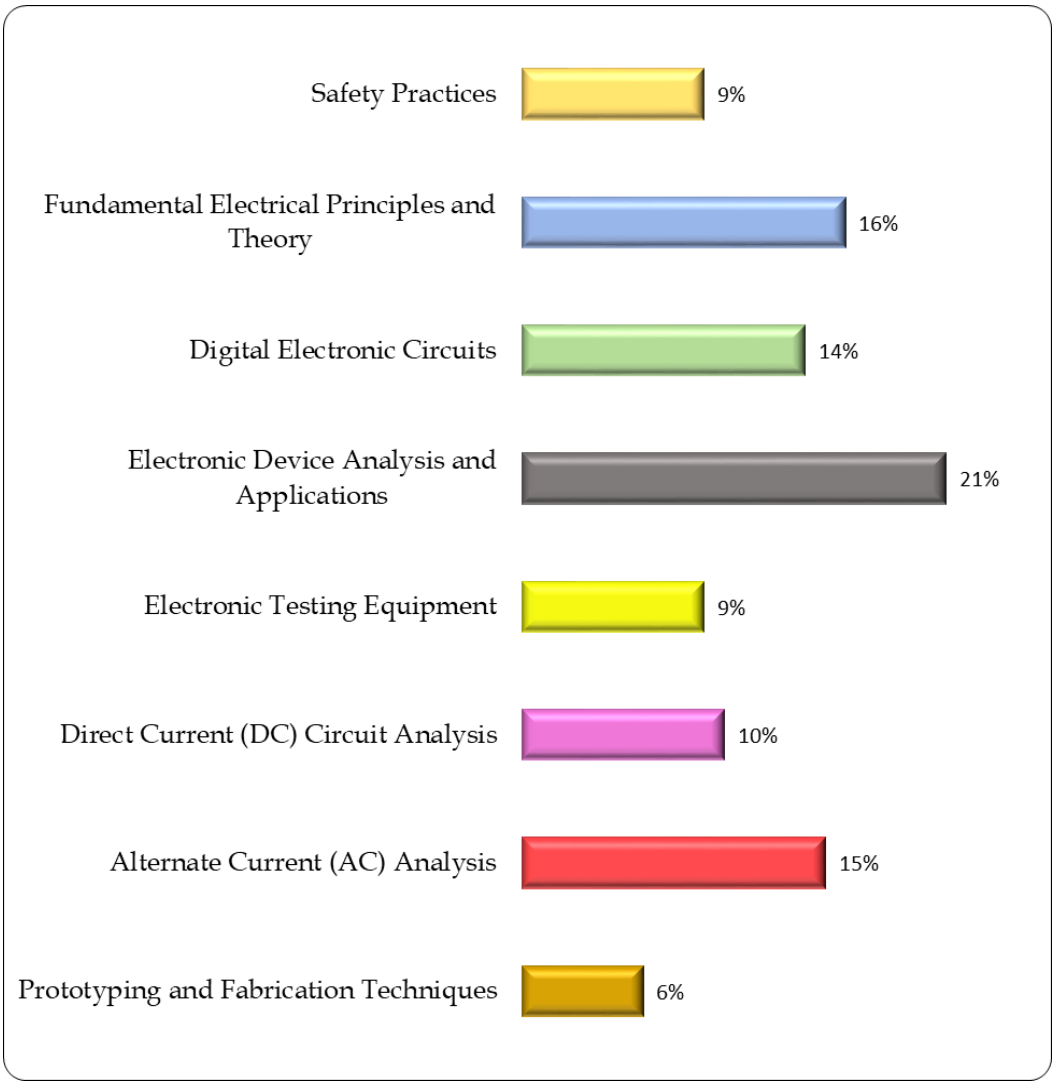
- Layout components on a printed circuit board according to a schematic
- Demonstrate knowledge of proper soldering and de-soldering techniques
- Repair or replace a component or foil on a printed circuit board

Written Assessment:

Administration Time: 3 hours
Number of Questions: 182

Areas Covered:

9% Safety Practices
16% Fundamental Electrical Principles and Theory
14% Digital Electronic Circuits
21% Electronic Device Analysis and Applications
9% Electronic Testing Equipment
10% Direct Current (DC) Circuit Analysis
15% Alternate Current (AC) Analysis
6% Prototyping and Fabrication Techiques



Sample Questions:

SDS stands for
A. Safety Data Sheet
B. Synchronization Dynamic Status
C. Series Data Strand
D. Source Dimensional Standard

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

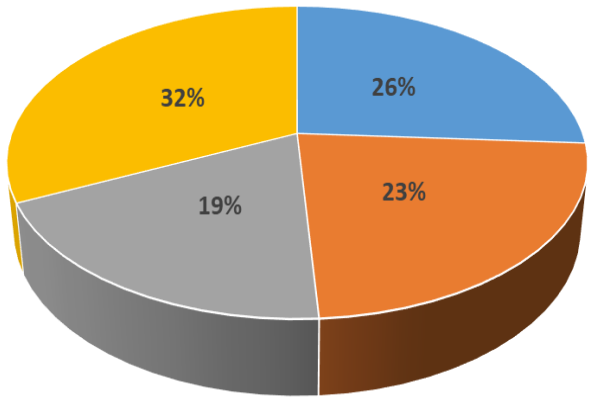
Areas Covered:

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 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 ground, use an oscilloscope to measure and record the peak-to-peak voltage, add a 100 µF capacitor from each output point to ground, power up and measure the voltage with the meter from point X to ground and from Y to ground, and record the voltage and polarity.