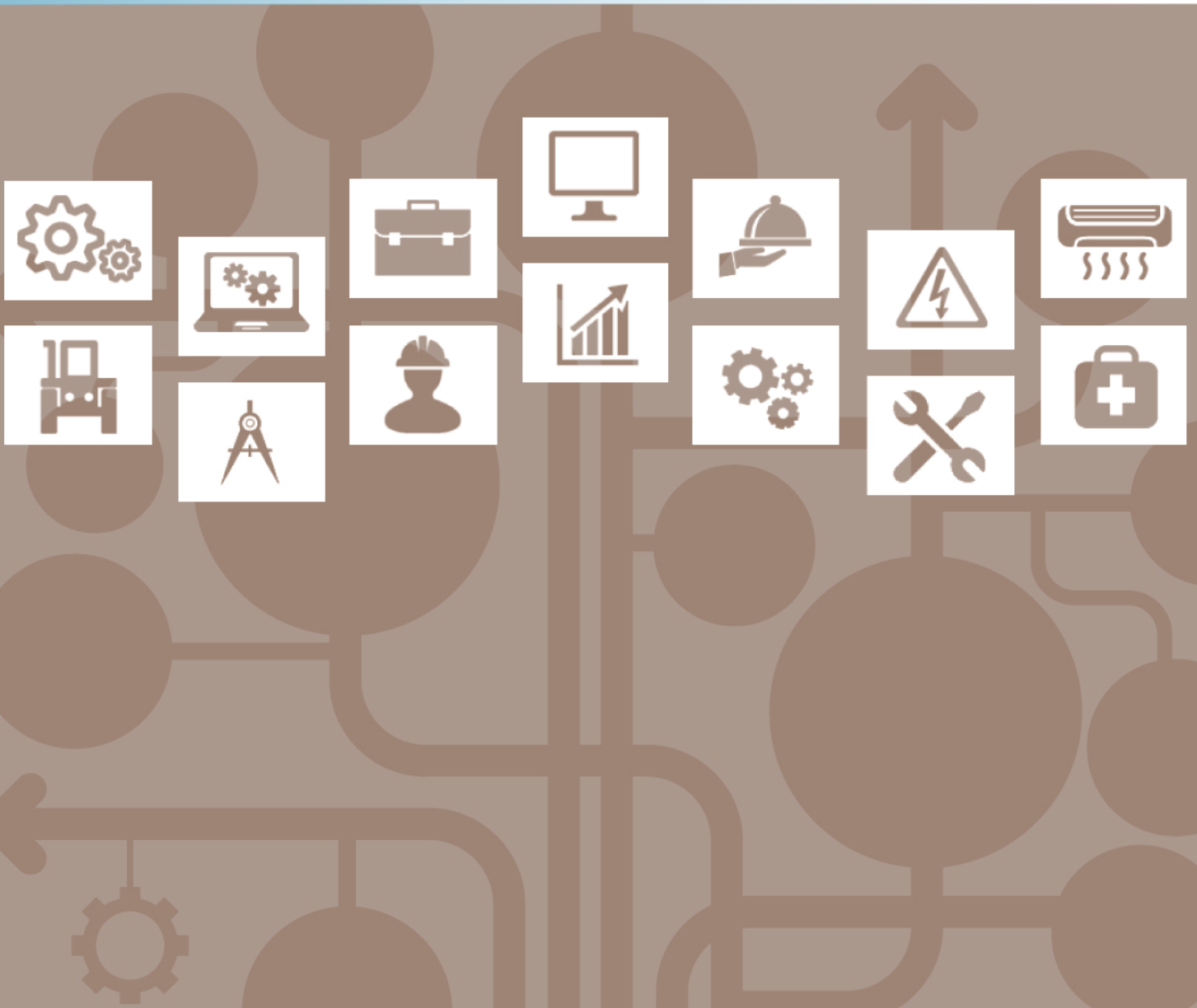




Entry Level Assessment Blueprint

Electrical Occupations



Test Code: 3029 / Version: 01

Specific Competencies and Skills Tested in this Assessment:**Safety**

- Apply shop safety rules and ergonomics
- Explain fire prevention guidelines and methods
- Describe lock-out/tag-out procedures
- Describe procedures for responding to electrical hazards and shock emergencies
- Explain OSHA job site requirements
- Demonstrate the proper use of ladders, scaffolding, and fall protection

**Wiring Methods**

- Describe and demonstrate the proper installation and use of cable
- Describe and demonstrate the proper use of conduit and other raceways
- Install devices according to manufacturer's specifications and applicable codes
- Identify and select appropriate rough-in materials
- Select and install proper service entrance materials
- Display understanding of low-voltage wiring systems (doorbells, landscape, lighting systems)
- Identify and install communications cable applications
- Demonstrate proper grounding methods and concepts

**Tools**

- Identify and use hand and power tools
- Identify and use measuring devices and instruments



Specific Competencies and Skills continued:

Motors and Motor Controls

- Identify types of single-phase and three-phase AC motors
- Identify types of motor control circuits and components
- Describe the operation of a motor control circuit given a ladder diagram
- Identify overcurrent protection devices and their purposes
- Identify capacitors, relays, switches, and contacts



National Electrical Code

- Locate and reference the National Electrical Code (NEC)
- Identify minimum wire sizes according to NEC ampacity charts
- Identify NEC requirements for appliances and special circuits
- Cite physical layout requirements for receptacles in accordance with NEC
- Identify areas requiring GFCI protection
- Indicate clearances for services according to NEC
- Identify installation methods and types of grounding in accordance with NEC
- Explain NEC color coding pertaining to identification of conductors
- Identify areas requiring ARC fault protection
- Identify box sizing requirements

Blueprint Reading

- Interpret and use specifications, prints, drawings, diagrams, and scales
- Identify electrical and electronic symbols and drawing conventions
- Identify and draw a working circuit according to specifications

Specific Competencies and Skills continued:

Applied Mathematics

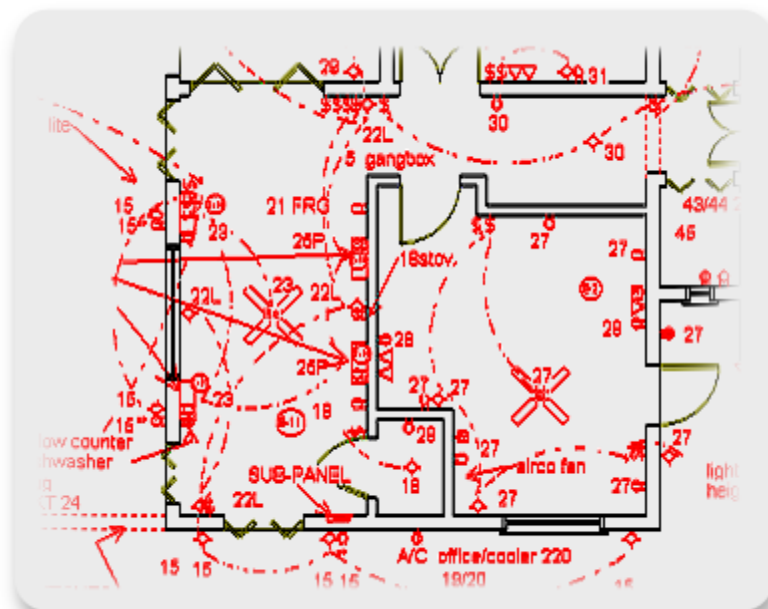
- Demonstrate knowledge of basic mathematical operations
- Perform calculations involving fractions, decimals, and percents
- Demonstrate knowledge of basic algebra and geometry
- Estimate the amount of materials required
- Calculate requirements from a given drawing using Ohm's/Watt's Law

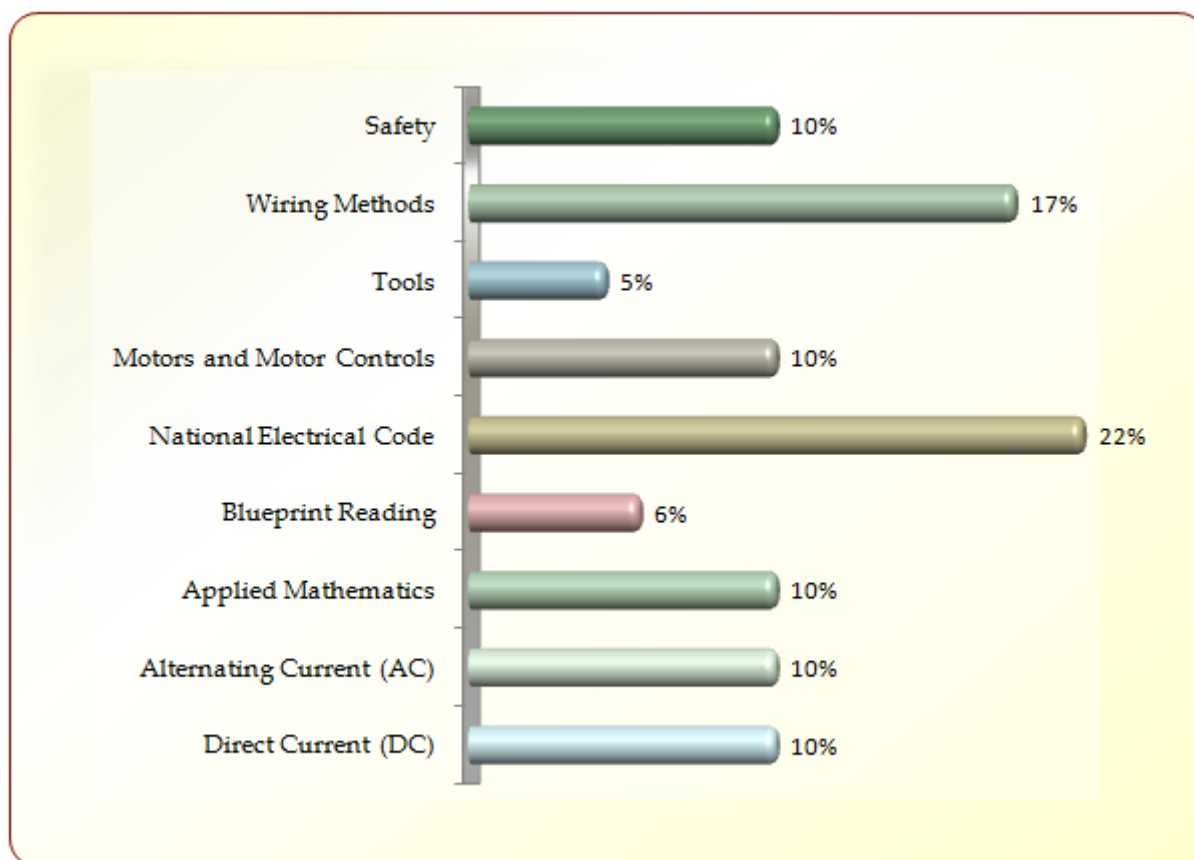
Alternating Current (AC)

- Explain transformers and their functions
- Identify the characteristics of AC circuits
- Describe and calculate capacitance, reactance, impedance, current, voltage, and resistance
- Compare and contrast characteristics of AC and DC

Direct Current (DC)

- Identify the characteristics of DC circuits
- Identify resistor values based on color codes
- Describe and calculate resistance, current, voltage, and power
- Apply Ohm's Law



Written Assessment:**Administration Time:** 3 hours**Number of Questions:** 171**Areas Covered:**

Sample Questions:

On scaffolding, the toe-boards must be a minimum of _____ high.

- A. 1-1/2 inches
- B. 3-1/2 inches
- C. 5-1/2 inches
- D. 6-1/2 inches

A service drop to a building refers to a service that is

- A. underground
- B. overhead
- C. terminated
- D. disconnected

The insulation value of a motor's windings is tested with a/an

- A. megohmmeter
- B. voltmeter
- C. ammeter
- D. wattmeter

The start switch used to energize a magnetic contactor in a motor control is

- A. normally open
- B. normally closed
- C. a high voltage switch
- D. a low voltage switch

For small appliance circuits, the smallest size wire allowed is

- A. #10
- B. #12
- C. #14
- D. #16

Liquid tight flexible metal conduit may be used in

- A. extreme heat
- B. place of MC
- C. place of Romex®
- D. wet locations

The mechanical bonding wire of a service panel must be connected to the

- A. breaker
- B. neutral bus
- C. ground bar
- D. ground fault circuit interrupter

Sample Questions (continued)

The term "overcurrent" refers to a motor control current in

- A. excess of normal or full-load operation
- B. a ceiling or attic
- C. volts or Ohms in Ohm's Law
- D. a ground fault

The branch circuit's _____ must be greater than the load.

- A. length
- B. conduit size
- C. ampere rating
- D. wire nuts

GFCI is required in residential bathrooms, kitchens, and

- A. hallways
- B. bedrooms
- C. attics
- D. garages

Performance Assessment:

Administration Time: 3 hours and 25 minutes

Number of Jobs: 4

Areas Covered:

38% Install Cable from Meter Base to Service Entrance Panel

Select tools, mount and install meter base and panel, install and attach SEU cable and bond the panel, check phases, and time to complete Job 1.

10% Install GFCI Circuit Breaker in Existing 100 AMP Panel

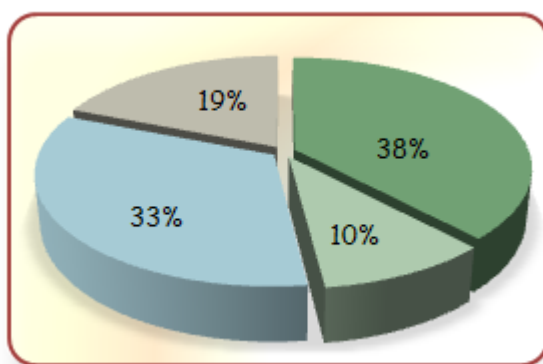
Insert a GFCI circuit breaker, and time to complete Job 2.

33% Wire Lighting Control

Selection of tools, drawing completion, wire for three-way switches, wire for four-way switch, identify white wire, test lighting control, and time to complete Job 3.

19% Install Door Chimes

Drawing completion, selection of tools, door chime installation, test door chimes, verify voltage, and time to complete Job 4.



Sample Job: Install GFCI Circuit Breaker in Existing 100 AMP Panel

Maximum Time: 15 minutes

Participant Activity: The participant will insert a 20 AMP single-pole GFCI circuit breaker in existing 100 AMP panel.

