

# NOCTI

## Job Ready Assessment Blueprint

### Electrical Occupations



Test Code: 2031 / Version: 01

**“Measuring What Matters”**

## Specific Competencies and Skills Tested in this Assessment:

### Safety

- Apply shop safety rules and ergonomics
- Describe protection procedures when working in confined spaces
- Explain fire prevention guidelines and methods
- Demonstrate lock-out/tag-out procedures
- Describe procedures for responding to electrical hazards and shock emergencies
- Explain the OSHA requirements of grounding on a job site
- Demonstrate the proper use of ladders and scaffolding



### Wiring Methods

- Demonstrate the proper use of cable
- Demonstrate the proper use of conduit and other raceways
- Install devices according to specifications and code
- Identify and select appropriate rough-in hardware
- Select and install proper service entrance materials
- Display understanding of low-voltage wiring systems
- Explain premise wiring, basic computer, and wireless principles
- 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 Control**

- Identify types of single-phase and three-phase AC motors and DC motors
- Identify types of motor controls
- Install and test a motor control circuit according to a given ladder diagram
- Identify programmable logic controller (PLC) applications and functions
- Discuss protection devices and their purposes
- Identify conductors, capacitors, relays, switches, and contacts
- Identify types of alternators and generators

**National Electrical Code**

- Read 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
- Install outlet boxes in conformance with NEC
- Identify residential and commercial areas requiring GFCI protection
- Indicate clearances for services according to NEC
- Identify installation methods and types of grounding electrodes
- Explain NEC color coding requirements

**Blueprint Reading and Estimating**

- Interpret and use specifications, prints, drawings, and diagrams
- Convert architectural scales
- Compare wiring diagrams, schematic diagrams, and cable layouts
- Identify electrical symbols and drawing conventions
- Draw a working circuit according to specifications
- Estimate the amount of materials and labor hours required
- Calculate volt-amps requirements from a given drawing

## Specific Competencies and Skills continued:

### Applied Mathematics

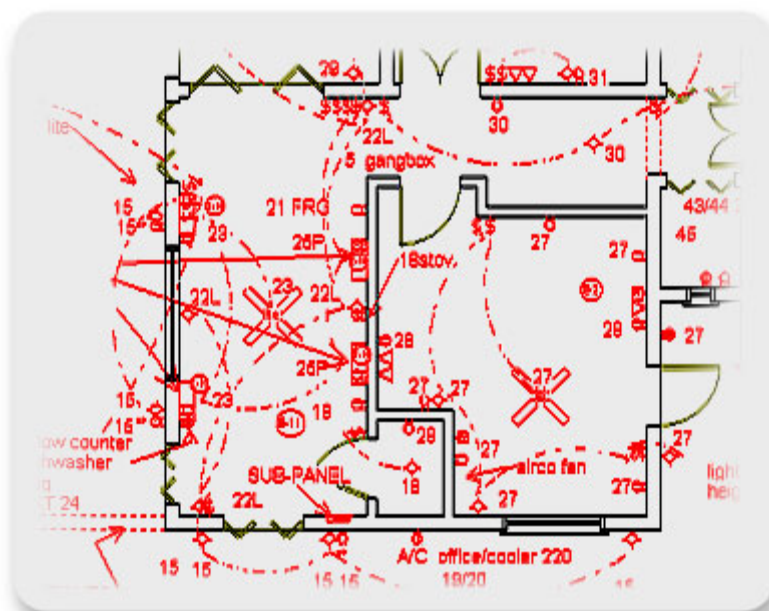
- Demonstrate knowledge of basic mathematical operations
- Perform calculations involving fractions, decimals, and percents
- Demonstrate knowledge of basic algebra, geometry, and trigonometry

### Alternating Current (AC)

- Explain transformers and their functions
- State function and characteristics of rectifiers and filters
- Identify the characteristics of AC series and parallel circuit
- Describe and calculate capacitance, reactance, impedance, current, voltage, resistance
- Contrast characteristics of AC and DC

### Direct Current (DC)

- Identify the characteristics of DC series and parallel circuit
- Identify basic electronic components
- Describe and calculate resistance, current, voltage, and power
- Use resistor to subdivide voltage or limit current
- Use Ohm's Law charts

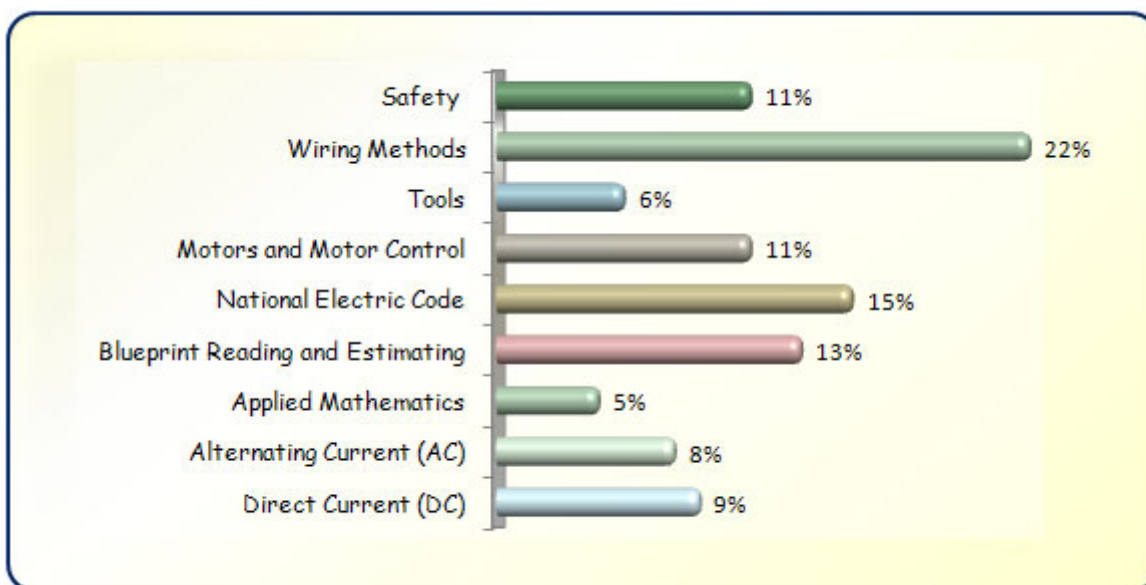


## Written Assessment:

Administration Time: 3 hours

Number of Questions: 190

### Areas Covered:



**Sample Questions:**

When classifying a confined space, evaluate

- A. only external conditions to the space
- B. only external conditions in the space
- C. all external and internal conditions to the space
- D. all external and internal conditions to the job site



A clamp-on ammeter is used to determine \_\_\_\_\_ in a motor lead.

- A. power
- B. torque
- C. current
- D. voltage

The minimum demand load rating for an electric clothes dryer is

- A. 3,500 watts
- B. 4,000 watts
- C. 5,000 watts
- D. 5,500 watts

A conduit run is 150 feet long and a 3-wire circuit must be installed with single strand wire. What would be the total length of the wire allowing for 1 foot at each end?

- A. 150 feet
- B. 450 feet
- C. 453 feet
- D. 456 feet

Which of the following units is used for identifying capacitance values?

- A. farad
- B. ohms
- C. amps
- D. kilovolt

## Performance Assessment:

**Administration Time:** 3 hours and 40 minutes

**Number of Jobs:** 4

### Areas Covered:

#### 40% Install Cable from Meter Base to Service Entrance Panel

Select tools, mount and install meter base and panel, install and attach SEU cable and ground system, insert a GFCI circuit breaker, test cable, and timeliness of job.

#### 22% Wire Lighting Control

Select tools, drawing complete, wire for three and four-way switches, test lighting control, and timeliness of job.

#### 14% Install Door Chimes

Select tools, install door chime, test door chimes, and timeliness of job.

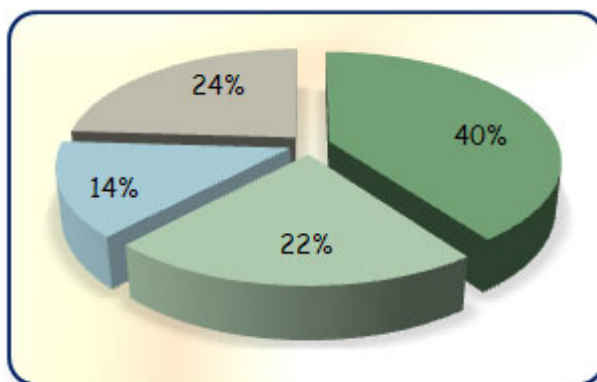
#### 24% Calculate, Build, and Test a DC Circuit

##### Part 1 Circuit Analysis:

Calculate parallel resistance of R2 and R3, total resistance of the circuit, current voltage through R1 and across R2 and total power in the circuit.

##### Part 2 Build and Test:

Select resistors, R1 R2 and R3, connect resistors and wire, measure total resistance and actual battery voltage, current through R1 and across R2, actual total power of the circuit, and timeliness of job.



**Sample Job:** Wire Lighting Control

**Maximum Time:** 1 hour

**Participant Activity:** The participant will complete a drawing provide before beginning to work. Power is brought into the box enclosing the light first. Using the proper tools, materials, and methods, wire and connect one light from three switching locations using 2 three-way switches and 1 four-way switch.



The Pennsylvania Builder's Association utilizes this assessment to assist in determining competencies for granting skill certificates to students graduating from Pennsylvania secondary trade programs that have been endorsed by the Pennsylvania Builders Association (PBA).

PBA's services include support to workforce training and education by linking industry employers with educators to grow the workforce of tomorrow. PBA serves Pennsylvania communities and consumers through its steadfast efforts to protect homeownership rights and advocate for affordable housing options. PBA is affiliated with the National Association of Home Builders.