

NOCTI

Job Ready Assessment Blueprint

Electrical Construction Technology



Test Code: 4030 / Version: 01

“Measuring What Matters”

Specific Competencies and Skills Tested in this Assessment:

Introduction to the Electrical Construction Career

- Match electrical positions and responsibilities
- Identify professional organizations and their purpose

OSHA Regulations and Electrical Safety Practices

- Identify proper use of personal protective equipment (PPEs)
- Identify procedures for fire and environmental safety
- Define procedures for ladder safety
- Identify correct protocol for working on live circuits
- Explain the purpose of OSHA and how it relates to electrical construction

Meters, Measurements, Testing

- Identify characteristics and uses of meters and measuring devices
- Identify materials as insulators, conductors, and semi-conductors
- Explain connection and use of electrical test equipment
- Use formulas to determine current and voltage output
- Interpret and convert meter readings

Identification of Tools, Materials, and Components

- Identify and correctly use hand tools
- Select proper conductor cable size and type
- Identify types and characteristics of conduit
- Cut, ream, deburr, and bend conduit
- Identify boxes and fittings
- Identify the function and purpose of various specialty devices, including Ground Fault Circuit Interrupter (GFCI), Arc-Fault, and Transient Voltage Surge Suppressor (TVSS)



Specific Competencies and Skills continued:

National Electric Code (NEC)

- Explain and apply Article 90 (Introduction) of the NEC
- Identify and explain NEC general application
- Explain procedures involved in NEC wiring and protection regulations
- Cite NEC regulations relating to wiring methods and materials
- Identify and select equipment for general use according to NEC regulations
- Properly apply NEC tables and charts

Blueprints, Specifications, and Estimations

- Identify and interpret electrical symbols
- Identify and interpret wiring and schematic diagrams
- Interpret and use specifications, print and job site drawings
- Perform basic math calculations and conversions
- Demonstrate planning and layout of a circuit

AC Theory and Magnetic Theory

- Identify characteristics of AC circuits
- Explain capacitance, impedance, current, voltage, and resistance
- Explain the function and characteristics of rectifiers, inverters, and filters
- Calculate power consumption, dissipation, and loss
- Determine principles of magnetic theory



Specific Competencies and Skills continued:

Motor Control Circuits, Logic Circuits, and Programmable Logic Controllers (PLCs)

- Identify characteristics of various types of controls
- Identify and interpret terms, abbreviations, acronyms, and symbols
- Apply knowledge of signal and control systems
- Install, test, and troubleshoot logic circuits
- Understand programmable logic circuits (PLCs)
- Create a motor control circuit diagram
- Develop a logic control circuit

DC: Basic Electric and Electron Theories

- Identify characteristics and components of DC circuits
- Design a basic DC circuit
- Explain the relationship of electricity, electrons, and atoms

Circuit Theorems and Conversions

- Identify and apply various circuit theorems, including Ohm's Law, Kirchoff's Law, and Watt's Law
- Identify and apply various mathematical conversions, including scientific and engineering notations



Specific Competencies and Skills continued:

Wiring, Circuits, and Installation

- Select wiring appropriate for specific installations
- Explain the correct applications of switched circuits
- Install proper boxes, devices, and trim
- Install rough-in wiring
- Perform finish work
- Wire switched outlets
- Pull, splice, terminate, and connect wire
- Test and troubleshoot completed installation
- Identify basic service entrance requirements
- Install fittings, connectors, and components

Transformers

- Identify primary and secondary windings
- Calculate voltage and current for primary/secondary windings
- Explain and calculate transformer efficiency
- Determine KVA capacity and load

Motors

- Describe characteristics of various types of motors
- Distinguish between capacitor run and capacitor start
- Wire a three-phase motor
- Identify and connect motor connections
- Install, test, and troubleshoot motors
- Reverse motor rotation properly
- Calculate motor efficiency
- Select short-circuit and overload protection for specific purposes
- Identify and interpret motor nameplate information

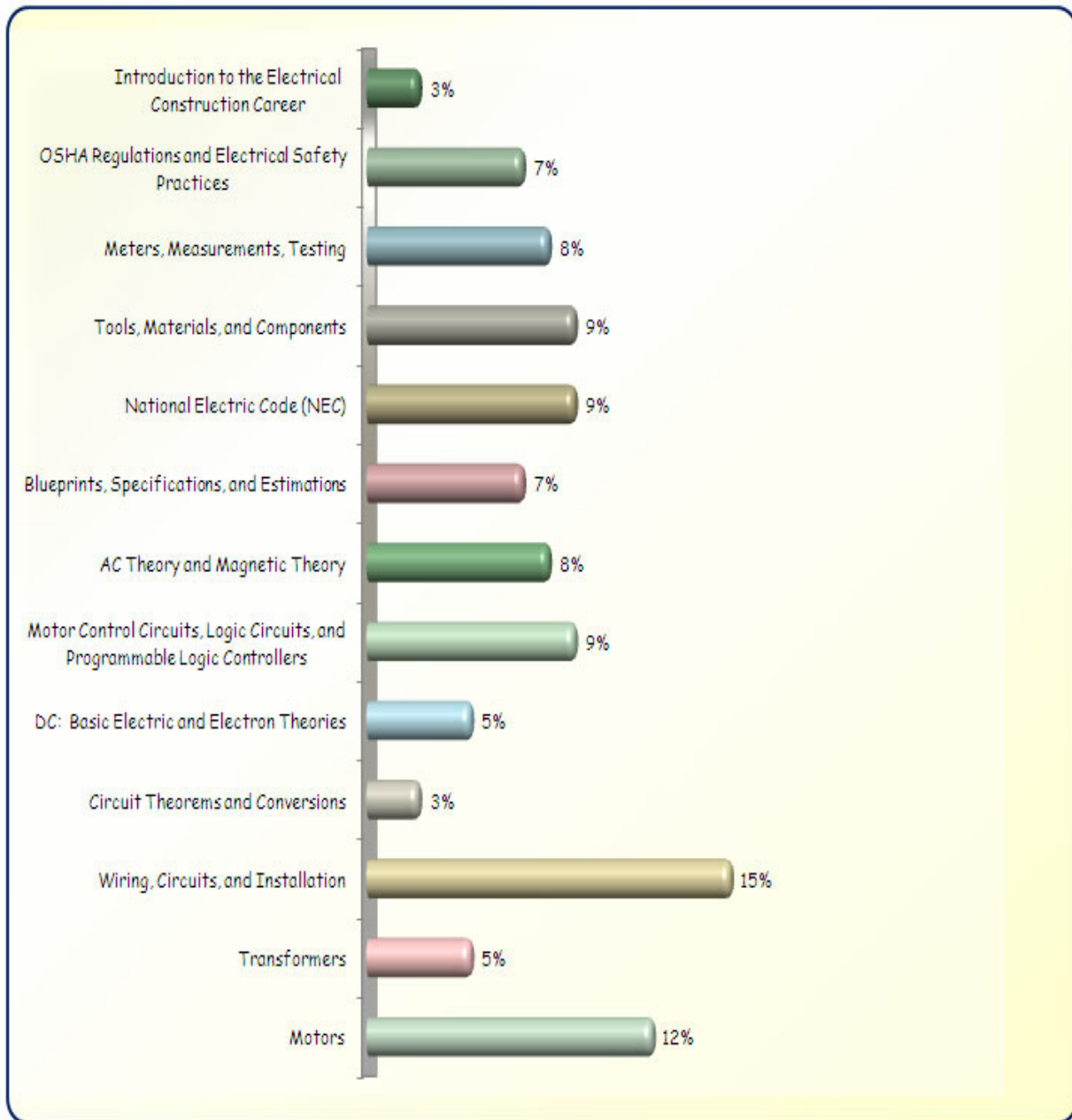


Written Assessment:

Administration Time: 3 hours

Number of Questions: 207

Areas Covered:



Sample Questions:

NEC Article 100 is a list of

- A. electrical safety requirements
- B. qualifications an electrician must meet before becoming certified
- C. definitions used in the NEC
- D. organizations that administer the NEC

The National Electric Code is based on

- A. part 70 of the NFPA Codes
- B. part 80 of the NFPA Codes
- C. part 70 of OSHA Regulations
- D. part 80 of OSHA Regulations

If 689 feet of conduit is required for a job, how many lengths of conduit are needed?

- A. 60
- B. 68
- C. 69
- D. 70

The inner circle of an atom is called the

- A. valance ring
- B. floating ring
- C. nucleus
- D. atom ring

Power transformers are rated in

- A. amps or kiloamps
- B. watts or kilowatts
- C. volt-amps or KVA
- D. KVAR



Performance Assessment:

Administration Time: 3 hours

Number of Jobs: 2

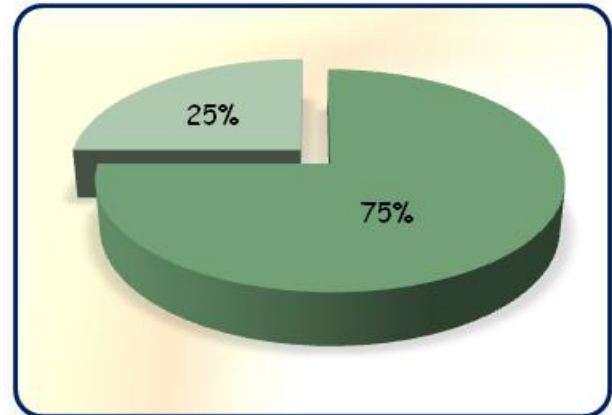
Areas Covered:

75% **Switch Controls, Conduit Bending, and GFCI Receptacles**

Draw product wiring diagram, select appropriate material, installation of boxes, wiring installation methods, installation of device, functionality, accuracy of measurement, proper bending and cutting techniques, installation of conductors, installation of GFCI, and safety/workmanship.

25% **Doorbell Circuit**

Identify and select components, installation of components, functionality, and safety/workmanship.



Sample Job: Doorbell Circuit

Maximum Time: 40 minutes

Participant Activity: The participant will select the appropriate materials for the job and follow a project plan to successfully install a functioning doorbell circuit according to electrical codes and specifications.



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.