**Test Type:** The Electrical Construction Technology industry-based credential is included in NOCTI's Job Ready assessment battery. Job Ready assessments measure technical skills at the occupational level and include items which gauge factual and theoretical knowledge. Job Ready assessments typically offer both a written and performance component and can be used at the secondary and post-secondary levels. Job Ready assessments can be delivered in an online or paper/pencil format.

**Revision Team:** The assessment content is based on input from secondary, post-secondary, and business/industry representatives from the states of Georgia, Michigan, New York, Pennsylvania, Virginia, and West Virginia.
NOCTI written assessments consist of questions to measure an individual’s factual theoretical knowledge.

**Administration Time:** 3 hours  
**Number of Questions:** 174  
**Number of Sessions:** This assessment may be administered in one, two, or three sessions.

### Areas Covered

- **Introduction to the Electrical Construction Technology Career**  
  - OSHA Regulations and Electrical Safety Practices: 13%  
- **Meters, Measurements, and Testing**  
  - 7%
- **Identification and Selection of Tools, Materials, and Components**  
  - 14%
- **Blueprints, Specifications, and Estimations**  
  - 9%
- **AC/DC Theory**  
  - 8%
- **Circuit Theorems and Conversions**  
  - 9%
- **Wiring, Circuits, and Installation**  
  - 12%
- **Green and Renewable Technology**  
  - 4%
- **Transformers**  
  - 6%
- **Motors**  
  - 7%
- **Motor Controls**  
  - 7%
Specific Standards and Competencies Included in this Assessment

Introduction to the Electrical Construction Technology Career
- Identify various electrical construction technology positions and responsibilities
- Identify career-related professional organizations and their purpose

OSHA Regulations and Electrical Safety Practices
- Identify proper use of personal protective equipment (PPE) according to NFPA 70E standards
- Explain the purpose of OSHA
- Identify procedures for fire, ladder, and environmental safety according to OSHA standards
- Identify procedures for lock-out/tag-out
- Explain basic first-aid procedures

Meters, Measurements, and Testing
- Identify characteristics, uses, and connections of meters and measuring devices
- Identify meter safety procedures
- Interpret meter readings

Identification and Selection of Tools, Materials, and Components
- Identify and correctly use hand and power tools
- Identify and select proper conductor cable type
- Identify and select proper conduit, boxes, and fittings
- Identify the function and purpose of various specialty equipment, including Ground Fault Circuit Interrupter (GFCI), Arc-Fault Circuit Interrupter (AFCI)
- Identify commonly used listed and labeled equipment (UL or CSA)
Specific Standards and Competencies (continued)

Blueprints, Specifications, and Estimations
- Identify and interpret electrical symbols and specifications in blueprints and plan symbols
- Identify and interpret wiring and schematic diagrams
- Demonstrate planning and layout of a circuit

AC/DC Theory
- Identify characteristics of AC circuits
- Explain amperage, power, voltage, and resistance
- Identify materials as insulators, conductors, and semi-conductors
- Identify characteristics and components of DC circuits

Circuit Theorems and Conversions
- Identify and apply various circuit theorems, including Ohm’s Law, Kirchhoff’s Law, Watt’s Law, and electron theory
- Identify and apply various mathematical conversions, including scientific, engineering, and notations/conversions (milliamps to amps; kilowatts to horsepower)

Wiring, Circuits, and Installation
- Explain the NEC and how it is organized
- Select appropriate wiring for specific installations (residential and commercial)
- Install various switching arrangements
- Install cabling, raceways, conduit, boxes, wiring, devices, and trims
- Test and troubleshoot completed installation

(Continued on the following page)
Green and Renewable Technology
• Discuss wind turbine, solar energy, and other renewable sources of energy
• Describe energy management devices (e.g., LED lighting, CFLs, occupancy sensors)

Transformers
• Identify and calculate voltage/current for primary and secondary windings
• Determine KVA capacity of a single-phase and 3-phase transformer
• Differentiate between Delta and Wye connections

Motors
• Describe operating characteristics of basic single-phase and 3-phase induction motors
• Identify and connect motor connections per nameplate (3-phase and single-phase)
• Identify and interpret motor nameplate information (e.g. voltage and phases)

Motor Controls
• Explain basic operation of circuitry
• Test, troubleshoot, and reverse 3-phase motor rotation
• Identify commonly used symbols in motor controls
Sample Questions

An apprentice electrician should
A. be supervised while on the job site
B. be pre-qualified to operate hand tools
C. hold a journeyman license
D. pass local standards electrical test

A ladder may be used in front of a door only if
A. no one is at home
B. no glass is present
C. the door is locked or blocked
D. it is the last fixture to hang

Measure electromotive force with a/an
A. ammeter
B. anemometer
C. galvanometer
D. voltmeter

AWG units are used to express conductor sizes and represent the
A. Associated Wire Gauge
B. American Wire Gauge
C. Absolute Wire Gauge
D. Approximate Wire Gauge

The symbol normally used for a single receptacle is a
A. circle with two parallel lines drawn through it
B. circle with one line drawn through it
C. square box with an X drawn inside
D. square box with the letter R next to it

(Continued on the following page)
Sample Questions (continued)

The AC voltage waveform is called a _____ wave.
   A. cosine
   B. full
   C. half
   D. sine

The basic law for current in a series circuit states that current is the
   A. sum of the branch circuits
   B. same in all parts of the circuit
   C. vector sum of all the parts of the circuit
   D. reciprocal of the individual parts

What terminal on a three-way switch is identified with a color different from the others?
   A. common
   B. neutral
   C. traveler A
   D. traveler B

Power transformers are rated in
   A. amps or kiloamps
   B. volts or kilovolts
   C. VA or KVA
   D. KVAR

Multiple stop switches in a three-wire motor control circuit are wired
   A. normally open
   B. in series
   C. in parallel
   D. normally bypassed
NOCTI performance assessments allow individuals to demonstrate their acquired skills by completing actual jobs using the tools, materials, machines, and equipment related to the technical area.

**Administration Time:** 3 hours and 20 minutes  
**Number of Jobs:** 3

**Areas Covered:**

**34%  Bend Conduit**  
Participants will safely install boxes onto the wall, and use proper bending and cutting techniques to install conduit.

**42%  Switching and GFCI Receptacle in a Residential Setting**  
Participants will properly mount boxes, install wiring and devices, and complete the job in a neat operational manner following safety standards.

**24%  Install Two Smoke Alarms in a Commercial Setting**  
Participants will install interconnected components to operate properly following safety standards.
Sample Job

Install Two Smoke Alarms in a Commercial Setting

**Maximum Time:** 1 hour

**Participant Activity:** The participant will install two smoke alarms in a commercial setting referring to the drawings provided, using MC 14-2 and 14-3 AWG, install two interconnected smoke alarms, use a separate circuit, and home run first smoke alarm; interconnect between the two smoke alarms.