

Job Ready Assessment Blueprint

Industrial Electricity



Test Code: 2050 / Version: 01

General Assessment Information

Blueprint Contents

General Assessment Information	Sample Written Items
Written Assessment Information	Performance Assessment Information
Specific Competencies Covered in the Test	Sample Performance Job

Test Type: The Industrial Electricity 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 Connecticut, Kentucky, New Jersey, North Carolina, Ohio, and Pennsylvania.



47.0105- Industry Electronics
Technology/Technicians



Career Cluster 15-
Science, Technology, Engineering,
and Mathematics



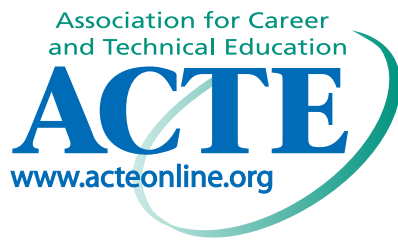
49-2094.00- Electrical
and Electronic Repairers



In the lower division
baccalaureate/associate degree
category, 3 semester hours in
Industrial Electricity

(Continued on the following page)

General Assessment Information (continued)



The Association for Career and Technical Education (ACTE), the leading professional organization for career and technical educators, commends all students who participate in career and technical education programs and choose to validate their educational attainment through rigorous technical assessments. In taking this assessment you demonstrate to your school, your parents and guardians, your future employers and yourself that you understand the concepts and knowledge needed to succeed in the workplace. Good Luck!



INTERNATIONAL SIGN ASSOCIATION

www.signs.org

The International Sign Association (ISA) represents manufacturers, suppliers and users of on-premise signs and sign products from all 50 states and around the globe. The sign and visual communications industry is a \$37.5 billion business that employs more than 200,000 individuals. One of ISA's long term goals is to showcase and promote the many exciting and diverse career opportunities that exist within the sign and visual communications industry and to apprise students of the abundant employment opportunities that are present to skilled and qualified candidates. ISA strongly encourages and supports students that work to enhance their educational achievements by completing NOCTI assessments.

Written Assessment

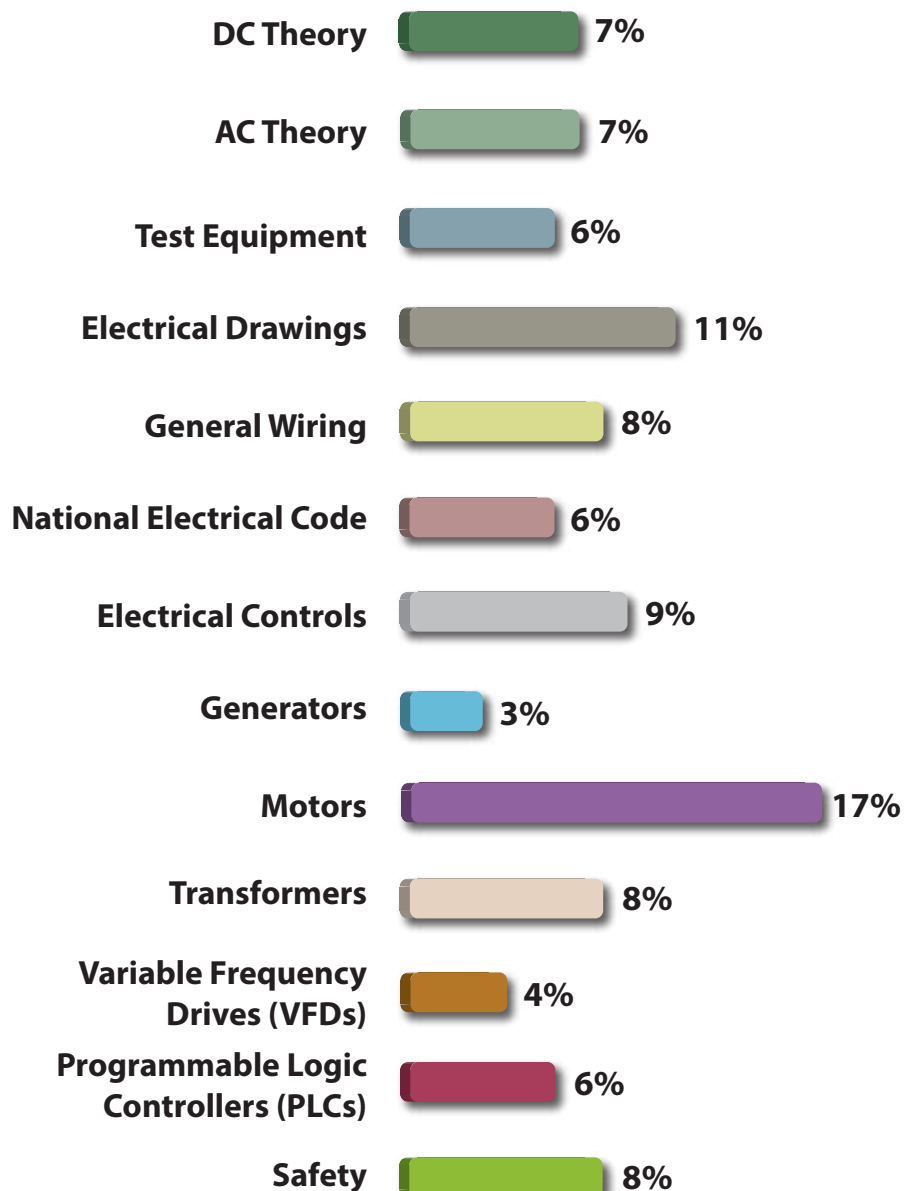
NOCTI written assessments consist of questions to measure an individual's factual theoretical knowledge.

Administration Time: 3 hours

Number of Questions: 191

Number of Sessions: This assessment may be administered in one, two, or three sessions.

Areas Covered



Specific Standards and Competencies Included in this Assessment

DC Theory

- Demonstrate knowledge of principles of DC theory
- Apply Ohm's Law and Kirchoff's Law
- Solve series and parallel circuits
- Calculate power formulas

AC Theory

- Calculate inductive reactance
- Calculate capacitive reactance
- Demonstrate knowledge of principles of AC theory
- Calculate waveforms and frequency

Test Equipment

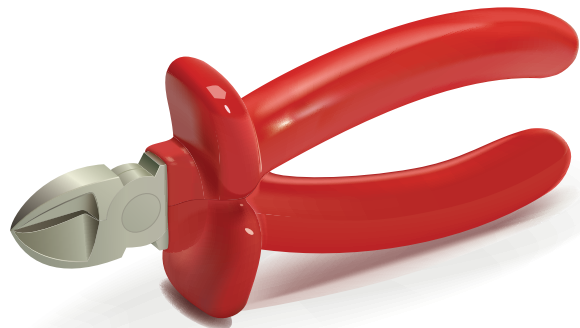
- Test circuits for opens and continuity
- Test circuits for voltage, current, and resistance
- Demonstrate proper care and use of test equipment

Electrical Drawings

- Identify electrical symbols
- Interpret electrical wiring drawings
- Troubleshoot from electrical drawings

General Wiring

- Select, measure, and cut conduit
- Ream, thread, and bend conduit
- Install boxes, fixtures, and hardware
- Select proper enclosures
- Identify and use electrical fittings



(Continued on the following page)

Specific Standards and Competencies (continued)

National Electrical Code

- Define the purpose, intent, and jurisdiction of the NEC
- Identify proper conductor type and size
- Size pull boxes
- Demonstrate proper grounding and bonding procedures

Electrical Controls

- Identify and connect switches, sensors, and relays
- Exhibit understanding of motor starters
- Understand principles of circuit protection

Generators

- Determine the output of a generator
- Identify the internal components of a generator

Motors

- Identify motor circuits
- Identify and define types of motors
- Identify and explain motor components
- Connect leads for operation
- Test for operation
- Troubleshoot and diagnose problems

Transformers

- Identify types of transformers
- Identify leads and connections
- Calculate voltage
- Calculate amperage
- Calculate KVA capacity

(Continued on the following page)

Specific Standards and Competencies (continued)

Variable Frequency Drives (VFDs)

- Demonstrate proper set up and installation
- Exhibit knowledge of basic programming
- Troubleshoot VFDs

Programmable Logic Controllers (PLCs)

- Demonstrate proper set up and installation
- Exhibit knowledge of basic programming
- Troubleshoot PLCs

Safety

- Exhibit basic knowledge of OSHA standards
- Identify appropriate personal protective equipment (PPE)
- Demonstrate knowledge of correct scaffolding and ladder procedures
- Demonstrate proper selection and use of hand and power tools



Sample Questions

Materials with a low resistance are called

- A. insulators
- B. potential
- C. emf
- D. conductors

Conductors at the junctions of switchpoints or outlets must have a minimum length of

- A. 3 inches
- B. 6 inches
- C. 9 inches
- D. 12 inches

Shaded-pole motors have _____ starting torque.

- A. very high
- B. very low
- C. medium
- D. maximum

The primary winding of a transformer is rated at 480V and 600 turns. If the secondary is rated at 120Vs, the secondary has _____ turns.

- A. 150
- B. 400
- C. 1600
- D. 2400

A _____ is a device used to safely remove cartridge fuses from electrical enclosures.

- A. insulated side cutter
- B. pulling pliers
- C. insulated cartridge pliers
- D. fuse puller

(Continued on the following page)

Sample Questions (continued)

One form of the equation for electrical power in a DC circuit is

- A. $P = I2E$
- B. $E = P \div I$
- C. $E = P \times I$
- D. $R = P \div E$

A generator

- A. changes electrical energy to mechanical energy
- B. changes mechanical energy to electrical energy
- C. is always self-excited
- D. is always separately excited

The direction of rotation of a shaded-pole motor is

- A. clockwise
- B. counterclockwise
- C. from main pole to shaded pole
- D. from shaded pole to main pole

Select the correct wiring configuration on a 120 VAC output card for a programmable logic controller (PLC).

- A. L2 (N) to the card and L1 (H) to the field devices
- B. L1 (H) to the card and L2 (N) to the field devices
- C. L2 (N) to the card and ground to the field devices
- D. L1 (H) to the card and ground to the field devices

A GFCI on a 120V circuit operates by sensing an imbalance of

- A. voltage between hot and ground
- B. voltage between hot and neutral
- C. current between hot and ground
- D. current between hot and neutral

Performance Assessment

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: 4

Areas Covered:

14% Tools and Materials Identification

Participants will identify tools and materials correctly, and write neatly and legibly on the identification form.

27% Conduit Bending

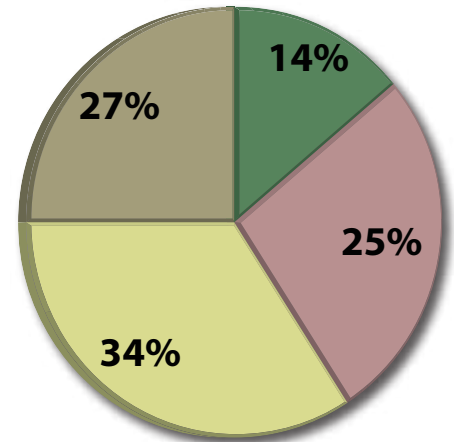
Participants will safely use the tools, ream and thread the conduit, and accurately measure lengths for a correct appearance of the conduit.

34% Wiring a Motor Starter

Participants will safely use the correct tools and conductors to label and number wires correctly, meet workmanship criteria, operate the motor and clean up the work area.

25% Replacing Ballast in a Fluorescent Fixture

Participants will safely use the correct tools to install a ballast, meet the criteria for professional work, and operate the fluorescent fixture.¹



Sample Job

Replacing Ballast in a Fluorescent

Maximum Time: 20 minutes

Participant Activity: The participants will go to a designated station, remove and replace the ballast in the fluorescent fixture that is provided, test for operation, and notify the evaluator so that the work can be inspected.

