

Electronics

General Assessment Information

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Test Type: The Electronics 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 California, Kentucky, Mississippi, New Jersey, North Carolina, Ohio, and Pennsylvania.



15.0399- Electrical and
Electronic Engineering
Technologies/Technicians, Other



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



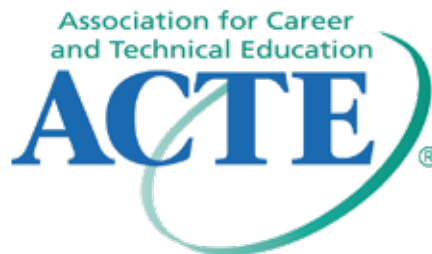
17-3023.01- Electronics
Engineering Technicians



In the lower division
baccalaureate/associate degree
category, 3 semester hours in
Electronics.

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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!



Electronics Technicians Association® International (ETA®) represents and supports electronics professionals with over 80 industry-recognized and accredited technical certifications. An ETA certification validates the technical knowledge and hands-on skills necessary to be successful in today's electronics industry. Employers worldwide choose ETA-certified professionals because of ETA's certification programs' competency criteria and testing benchmarks that conform to the highest international electronics standards. Students passing NOCTI assessments in the area of electronics, industrial electronics and electronics technology are prime candidates to achieve success earning ETA certifications and will be qualified to enter today's workforce. www.eta-i.org

Written Assessment

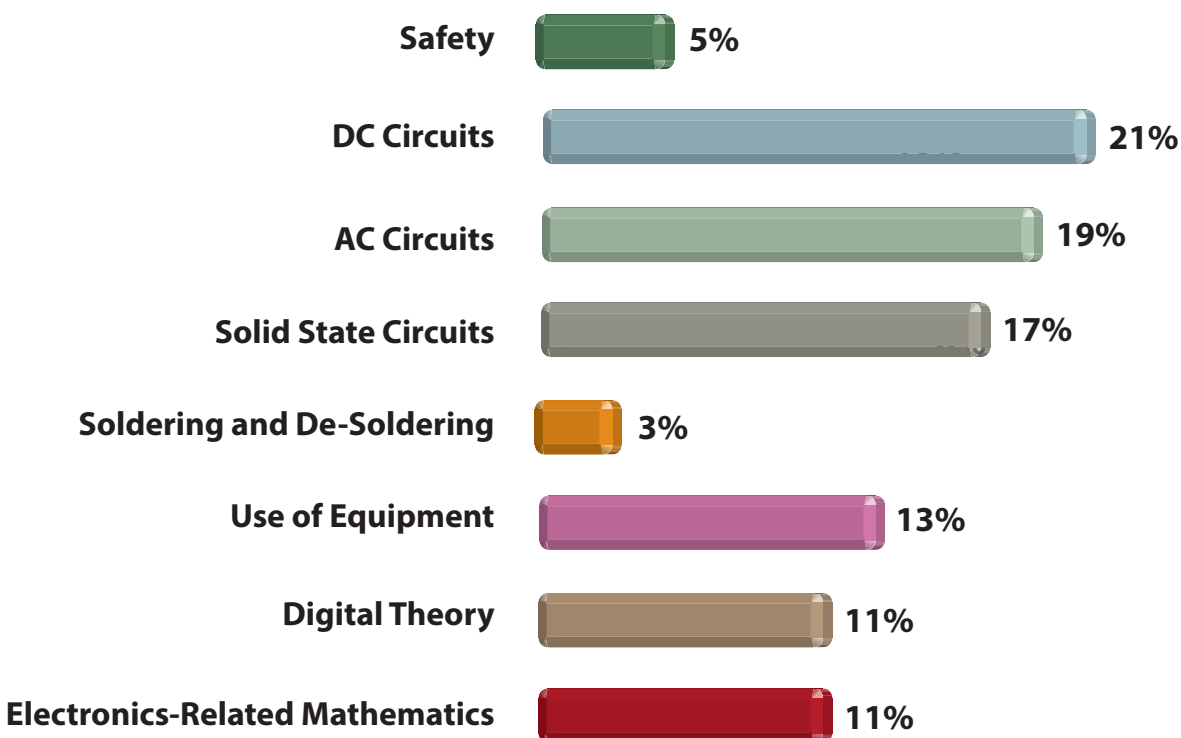
NOCTI written assessments consist of questions to measure an individual's factual theoretical knowledge.

Administration Time: 3 hours

Number of Questions: 180

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

Areas Covered



Specific Standards and Competencies Included in this Assessment

Safety

- Demonstrate understanding of SDS
- Exhibit understanding of ESD protection (electrostatic discharge)
- Exhibit understanding of PPEs (personal protective equipment)

DC Circuits

- Identify color-coded and SMT resistor codes
- Identify DC components
- Identify and understand DC circuitry
- Explain voltage and current relationships in series and parallel circuits
- Identify, calculate, and connect resistors in series, parallel, and combinational circuits
- Identify and understand DC schematic symbols
- Demonstrate understanding of Ohm's Law (DC circuitry)
- Demonstrate understanding of DC power, energy, and sources

AC Circuits

- Identify AC components
- Identify and understand AC circuitry
- Demonstrate understanding of properties of electricity and magnetism
- Explain current and voltage phase relationships
- Identify and understand AC schematic symbols
- Demonstrate understanding of Ohm's Law (AC circuitry)
- Analyze waveforms
- Understand AC power, energy, and sources
- Demonstrate understanding of transformers
- Demonstrate understanding of power factor (apparent vs true power)

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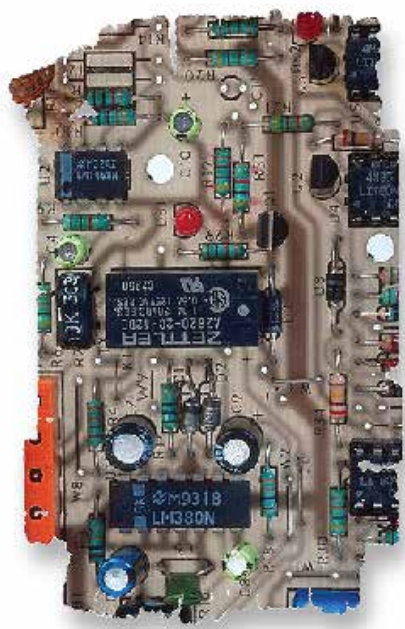
Specific Standards and Competencies (continued)

Solid State Circuits

- Identify and understand solid state symbols
- Identify and understand diode types and circuits
- Demonstrate understanding of transistor operations (NPN-BJT, PNP-BJT, and FET)
- Identify and understand the functions of regulator circuits
- Identify and understand the functions of amplifier circuits
- Identify and understand the functions of oscillator circuits
- Identify and understand the functions of SCR circuits
- Identify and understand the functions of thyristor circuits (triac and diac)

Soldering and De-Soldering

- Identify and explain operation of soldering and de-soldering equipment
- Demonstrate through-hole and SMT soldering techniques



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Specific Standards and Competencies (continued)

Use of Equipment

- Demonstrate the care and use of hand tools
- Demonstrate the care and use of multimeters (transistor, capacitance, and frequency)
- Demonstrate the care and use of oscilloscopes
- Demonstrate the care and use of power supplies
- Demonstrate the care and use of isolation transformers and variacs
- Demonstrate the care and use of function generators
- Demonstrate the care and use of logic probes

Digital Theory

- Use appropriate reference material
- Identify and understand digital symbols
- Demonstrate understanding of digital logic (gates, counters, and flip-flops)
- Recognize sequential and combinational digital circuits



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Specific Standards and Competencies (continued)

Electronics-Related Mathematics

- Demonstrate knowledge of basic Boolean algebra
- Identify and understand gates and truth tables
- Demonstrate understanding of percentages and fractions
- Demonstrate understanding of basic algebra, geometry, and trigonometry
- Perform conversions of number systems and unit measurements



Sample Questions

The physical size of a resistor indicates

- A. resistance value
- B. voltage rating
- C. tolerance
- D. wattage rating

A battery generates electricity by

- A. thermoenergy
- B. proton potential
- C. electron potential
- D. chemical reaction

Zener diodes normally operate

- A. forward-biased
- B. reverse-biased
- C. without voltage
- D. non-biased

Which meter is always wired in series?

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

An ampere of current is the same as

- A. .001 mA
- B. 10 mA
- C. 100 mA
- D. 1000 mA

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Sample Questions (continued)

To help prevent eye injuries,

- A. wear safety glasses
- B. clip wires and components away from the body
- C. wear a safety shield
- D. look away while clipping wires and components

Conducting a magnetic field around a circuit or device is called

- A. shielding
- B. permeability
- C. hysteresis
- D. flux

To properly store a solder pencil or start any soldering procedure, the technician should

- A. tin the tip
- B. sweat the tip
- C. wipe the tip
- D. unplug the pencil

A triangle followed by a circle (bubble) describes a/an

- A. amplifier
- B. inverter
- C. AND gate
- D. NAND gate

A circuit allows 1 mA of current to flow with 1 volt applied. The resistance of the circuit equals

- A. 0.001 m Ω
- B. 0.001 Ω
- C. 1 Ω
- D. 1,000 Ω

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 10 minutes

Number of Jobs: 5

Areas Covered:

12% IC Identification

Participant will use the reference sheet, and identify digital functions.

26% DC Circuit Construction and Analysis

Participant will choose components correctly, construct protoboards, complete calculations and measurements.

21% Power Supply Construction and Analysis

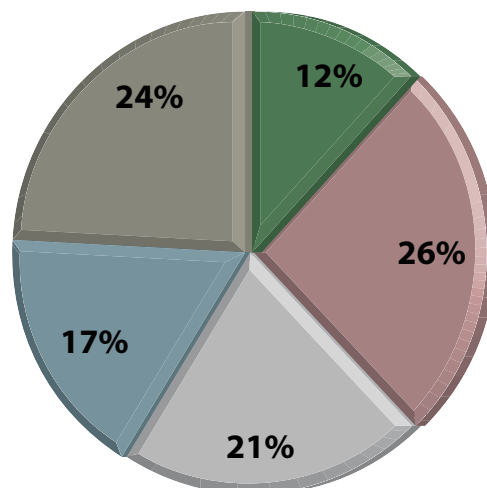
Participant will construct power supply, complete measurements and calculations.

17% De-Soldering and Soldering

Participant will de-solder, solder (re-solder), and identify components.

24% CE Amplifier Construction and Analysis

Participant will construct the CE amplifier, complete calculations, and measure voltage.



Sample Job

IC Identification

Maximum Time: 10 minutes

Participant Activity: The participant will go to the designated station and use the manual provided to identify integrated circuits.

