



## National Craft Assessment and Certification Program S P E C I F I C A T I O N S

### INDUSTRIAL ELECTRICIAN V6

#### ELEC26\_O6

Released August 2017

#### Focus Statement

An Industrial Electrician must be able to interpret job specifications, interpret industrial drawings, install, connect, and troubleshoot power distribution and control equipment, install raceway and cable distribution systems, install and connect transformers, install and connect medium voltage splices and terminations, and recognize electrical hazards.

#### Overview

- Two-hour closed-book examination
- May use downloadable Electrical Formula sheet found on Electrical craft page of NCCER website or in Arkiv “News and Updates” section
- May use a basic function, non-printing calculator
- No extra papers, books, notes or study materials are allowed
- The minimum passing score is 75
- A Performance Verification is available

#### Study Materials

All NCCER written assessments are referenced to NCCER’s curriculum listed in the content. You may order modules from Pearson (800.922.0579) or from NCCER's Online Catalog at [www.nccer.org](http://www.nccer.org).

#### Assessment Development

All questions are developed and approved by subject matter experts under the direction of NCCER and Prov™, NCCER’s testing partner.

#### Credentials

NCCER will send appropriate credentials to the assessment center for successful completions.

#### Training Prescription Reports

Each candidate will have access to individual results of the written assessment from Prov’s website at [www.provexam.com](http://www.provexam.com).

#### Registry

Assessment results will be maintained in NCCER’s Registry and become a portable record of the candidate’s training and assessment achievements.

#### Written Assessment Contents:

Content Domain	Number of Questions
Electrical Safety [26102-17]	8
Introduction to Electrical Circuits [26103-17]	4
Electrical Theory [26104-17]	4
Raceways & Fittings [26108-17]	4
Conductors & Cables [26109-17]	4
Basic Electrical Construction Drawings [26110-17]	5
Electrical Test Equipment [26112-17]	5
Alternating Current [26201-17]	4
Motors: Theory and Application [26202-17]	4
Conduit Bending [26204-17]	4
Pull & Junction Boxes [26205-17]	4
Conductor Installations [26206-17]	4
Cable Tray [26207-17]	4
Conductor Terminations & Splices [26208-17]	5
Grounding & Bonding [26209-17]	8

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Conductor Selection and Calculations [26302-17]	5
Hazardous Locations [26304-17]	4
Overcurrent Protection [26305-17]	4
Distribution Equipment [26306-17]	4
Transformers [26307-17]	4
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<b>Total Number of Questions</b>	<b>100</b>



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S P E C I F I C A T I O N S

Learning Objectives related to Assessment:

	<b>Electrical Safety</b>
<b>Registry ID Number:</b>	<b>Module Title and Objectives:</b>
<b>26102-17</b>	<b>Electrical Safety</b>
	1. Identify electrical hazards and their effects.
	2. Use PPE to reduce the risk of injury.
	3. Identify the standards that relate to electrical safety.
	4. Recognize the safety requirements for various hazards.
	<b>Introduction to Electrical Circuits</b>
<b>Registry ID Number:</b>	<b>Module Title and Objectives:</b>
<b>26103-17</b>	<b>Introduction to Electrical Circuits</b>
	1. Describe atomic structure as it relates to electricity.
	2. Identify electrical units of measurement.
	3. Read schematic diagrams.
	<b>Electrical Theory</b>
<b>Registry ID Number:</b>	<b>Module Title and Objectives:</b>
<b>26104-17</b>	<b>Electrical Theory</b>
	1. Calculate values in resistive circuits.
	2. Apply Kirchhoff's laws to various types of circuits.
	<b>Raceways and Fittings</b>
<b>Registry ID Number:</b>	<b>Module Title and Objectives:</b>
<b>26108-17</b>	<b>Raceways and Fittings</b>
	1. Select and install raceway systems.
	2. Select fasteners and anchors for the installation of raceway systems.
	3. Select and install wireways and other specialty raceways.
	4. Select and install cable trays.
	5. Handle and store raceways.
	<b>Conductors and Cables</b>
<b>Registry ID Number:</b>	<b>Module Title and Objectives:</b>
<b>26109-17</b>	<b>Conductors and Cables</b>
	1. Classify conductors by wire size, insulation, and application.

	2. Install conductors in a conduit system.
	<b>Basic Electrical Drawings</b>
<b>Registry ID Number:</b>	<b>Module Title and Objectives:</b>
<b>26110-17</b>	<b>Basic Electrical Drawings</b>
	1. Identify types of construction drawings.
	2. Work with scale drawings.
	3. Read electrical drawings.
	<b>Electrical Test Equipment</b>
<b>Registry ID Number:</b>	<b>Module Title and Objectives:</b>
<b>26112-17</b>	<b>Electrical Test Equipment</b>
	1. Identify various types of electrical test equipment.
	2. Select a meter with the correct category rating for an application.
	<b>Alternating Current</b>
<b>Registry ID Number:</b>	<b>Module Title and Objectives:</b>
<b>26201-17</b>	<b>Alternating Current</b>
	1. Identify AC waveforms.
	2. Determine unknown values in AC circuits.
	3. Make power calculations in AC circuits.
	4. Identify transformers and explain how they operate.
	<b>Motors: Theory and Application</b>
<b>Registry ID Number:</b>	<b>Module Title and Objectives:</b>
<b>26202-17</b>	<b>Motors: Theory and Application</b>
	1. Identify direct current (DC) motors and describe their operating characteristics.
	2. Identify alternating current (AC) motors and describe their operating characteristics.
	3. Identify variable-speed drives and describe their operating characteristics.
	4. Identify motor enclosures, frame designations, and operating characteristics.
	5. Identify the connections and terminal markings for AC motors.
	6. Identify the <i>NEC</i> ® requirements for motors.
	<b>Conduit Bending</b>
<b>Registry ID Number:</b>	<b>Module Title and Objectives:</b>
<b>26204-17</b>	<b>Conduit Bending</b>
	1. Identify the <i>NEC</i> ® requirements for conduit bends.
	2. Use equations to find bend distances.
	3. Use mechanical benders.

	4. Use electric and hydraulic conduit benders.
	5. Install PVC conduit.
	<b>Pull and Junction Boxes</b>
<b>Registry ID Number:</b>	<b>Module Title and Objectives:</b>
<b>26205-17</b>	<b>Pull and Junction Boxes</b>
	1. Identify boxes and fittings.
	2. Size pull and junction boxes.
	3. Identify specialty enclosures.
	<b>Conductor Installations</b>
<b>Registry ID Number:</b>	<b>Module Title and Objectives:</b>
<b>26206-17</b>	<b>Conductor Installations</b>
	1. Install cable in conduit systems.
	2. Set up for high-force cable pulling.
	3. Identify cable limitations when pulling.
	<b>Cable Tray</b>
<b>Registry ID Number:</b>	<b>Module Title and Objectives:</b>
<b>26207-17</b>	<b>Cable Tray</b>
	1. Identify cable tray components.
	2. Calculate the load on a cable tray.
	3. Determine cable tray fill.
	<b>Conductor Terminations</b>
<b>Registry ID Number:</b>	<b>Module Title and Objectives:</b>
<b>26208-17</b>	<b>Conductor Terminations</b>
	1. Strip and train conductors.
	2. Make wire connections.
	3. Reinsulate electrical connections.
	<b>Grounding and Bonding</b>
<b>Registry ID Number:</b>	<b>Module Title and Objectives:</b>
<b>26209-17</b>	<b>Grounding and Bonding</b>
	1. Identify grounding requirements and applications.
	2. Identify service grounding methods.
	3. Size and select equipment grounding.
	4. Bond service equipment.
	5. Ground and bond separately derived systems.

	6. Test for effective grounds.
	<b>Conductor Selection and Calculations</b>
Registry ID Number:	Module Title and Objectives:
26302-17	<b>Conductor Selection and Calculations</b>
	1. Select conductors for various applications.
	2. Size conductors based on expected load and voltage drop.
	<b>Hazardous Locations</b>
Registry ID Number:	Module Title and Objectives:
26304-17	<b>Hazardous Locations</b>
	1. Identify hazardous locations.
	2. Prevent ignitions and explosions in hazardous locations.
	<b>Overcurrent Protection</b>
Registry ID Number:	Module Title and Objectives:
26305-17	<b>Overcurrent Protection</b>
	1. Recognize overcurrent conditions.
	2. Identify fuses and their applications.
	3. Identify circuit breakers and their applications.
	4. Size and select overcurrent devices.
	5. Test and troubleshoot circuit breakers and fuses.
	<b>Distribution Equipment</b>
Registry ID Number:	Module Title and Objectives:
26306-17	<b>Distribution Equipment</b>
	1. Identify electrical distribution system components.
	2. Identify the installation requirements for distribution equipment.
	3. Test and maintain switchgear.
	<b>Transformers</b>
Registry ID Number:	Module Title and Objectives:
26307-17	<b>Transformers</b>
	1. Identify the construction and operation of a transformer.
	2. Apply the <i>NEC</i> <sup>®</sup> requirements for transformers and capacitors.
	3. Troubleshoot and maintain transformers.
	<b>Motor Controls</b>
Registry ID Number:	Module Title and Objectives:
26311-17	<b>Motor Controls</b>

	1. Identify relays and contactors.
	2. Select magnetic and manual motor starters.
	3. Identify control transformers and pilot devices.
	4. Identify installation considerations for motor controls.
	<b>Heat Tracing and Freeze Protection</b>
<b>Registry ID Number:</b>	<b>Module Title and Objectives:</b>
<b>26409-17</b>	<b>Heat Tracing and Freeze Protection</b>
	1. Describe heat-tracing applications, components, controls, and selection/installation considerations related to piping.
	2. Describe roof, gutter, and downspout de-icing systems and the relevant selection/installation considerations.
	3. Describe snow-melting and anti-icing systems and the relevant selection/installation considerations.
	4. Describe other electric heat-tracing and warming systems and the relevant selection/installation considerations.