INDUSTRIAL ELECTRICITY – PILOT

Test Code: 3050
Version: 01

Specific Competencies and Skills Tested in this Assessment:

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

DC (Direct Current) Theory
Demonstrate knowledge of principles of DC theory
Apply Ohm’s Law and Kirchoff’s Law
Solve series and parallel circuits
Calculate using power formulas

AC (Alternating Current) Theory
Demonstrate knowledge of principles of AC theory
Calculate inductive reactance
Calculate capacitive reactance
Calculate power factor and frequency

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

Electrical Drawings
Identify electrical symbols
Interpret electrical schematic drawings
Troubleshoot from electrical schematic 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

National Electrical Code
Define the purpose, intent, and jurisdiction of the NEC
Identify proper conductor type and size
Exhibit ability to appropriately size electrical boxes
Demonstrate proper grounding and bonding procedures

Electrical Controls
Identify and connect switches, sensors, and relays
Exhibit understanding of motor starters
Demonstrate knowledge of overcurrent protection

Generators
Demonstrate knowledge of generator components
Calculate generator output

Motors
Identify and define various types of motors
Identify and explain motor components
Connect leads for operation
Test, diagnose, and demonstrate troubleshooting techniques

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

Variable Frequency Drives (VFDs) and Programmable Logic Controllers (PLCs)
Demonstrate knowledge of proper set up and installation
Exhibit basic knowledge of VFD and PLC operations
Troubleshoot VFDs and PLCs
**Written Assessment:**

Administration Time: 3 hours  
Number of Questions: 190

**Areas Covered:**

- 8% Safety  
- 6% DC (Direct Current) Theory  
- 12% AC (Alternating Current) Theory  
- 6% Test Equipment  
- 9% Electrical Drawings  
- 8% General Wiring  
- 12% National Electric Code  
- 9% Electrical Controls  
- 4% Generators  
- 12% Motors  
- 7% Transformers  
- 7% Variable Frequency Drives (VFDs) and Programmable Logic Controllers (PLCs)

**Sample Questions:**

Before using ladders of any type, always check the  
A. conductivity rating  
B. rigid factor  
C. load capacity  
D. rung size

What test instrument provides a visual representation of a waveform?  
A. RF signal generator  
B. sweep generator  
C. fluoroscope  
D. oscilloscope

Blueprints that are most frequently used by electricians are called  
A. elevations  
B. details  
C. sections  
D. floor plans

The size of an outlet box to be installed is determined by the  
A. outlet box style  
B. location and atmosphere  
C. number and size of conductors installed  
D. current and voltage ratings
A 5 kW generator running at full load with a 20V output produces
A. 36.2A
B. 38.2A
C. 41.66A
D. 50.0A

Materials with a low resistance are called
A. insulators
B. potential
C. EMF
D. conductors

The reading on a voltmeter displays 1500 watts and 12 amperes. The voltage should read
A. 60V
B. 125V
C. 150V
D. 220V

All enclosures for electrical installations must be _____ approved.
A. OSHA
B. NEMA
C. UL
D. NFPA

Current limiting fuses provide
A. undervoltage
B. overvoltage
C. a means of reducing total current
D. high-speed fault current interruption

The current drawn by a motor is
A. low on starting
B. high when torque is low
C. high on starting
D. low when torque is high
Industrial Electricity – PILOT (continued)

Performance Assessment:

Administration Time: 2 hours 55 minutes
Number of Jobs: 4

Areas Covered:

15%  Tools and Materials Identification
Participants will identify tools and materials and legibly write the names of the items in the time provided.

28%  Wiring a Motor Starter
Participants will follow safety standards using tools to wire a motor starter. Steps will include selecting conductors, reading a wiring diagram, motor operation, and clean-up of the work area in the time provided.

30%  Bending Electrical Metallic Tubing (EMT)
Participants will follow safety standards using tools to perform the job. Steps include reaming, length accuracy, overall appearance of EMT, and clean-up of the work area in the time provided.

27%  Replacing Ballasts in a Fluorescent Fixture
Participants will follow safety standards using tools to install ballasts, demonstrate work professionalism, and verify operation of the fluorescent fixture in the time provided.

Sample Job: Bending Electrical Metallic Tubing (EMT)

Maximum Job Time: 30 minutes

Participant Activity: The participant will go to a designated area, bend a 3-inch offset at one end of a 10-foot length of 1/2-inch electrical metallic tubing (EMT) that will be provided, bend a 15-inch stub-up at the other end of the pipe, so that the overall length of the EMT is 3 feet, ream the cut end of the EMT, check measurements for accuracy, clean up the area and return the workstation to pretest condition.