



## Job Ready Assessment Blueprint

# Industrial Electronics



Test Code: 2051 / Version: 01

**“Measuring What Matters”**

## Specific Competencies and Skills Tested in this Assessment:

### DC Electricity

Demonstrate the ability to identify and use the principles of the following:

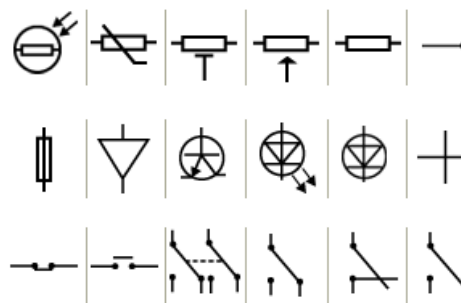
- Ohm's Law
- Kirchhoff's Law
- Watt's Law
- Series, parallel, series-parallel
- Capacitance
- Inductance
- Voltage cells
- Schematic symbols
- Time constants



### AC Electricity

Demonstrate the ability to identify and use the principles of the following:

- Transformer action
- Resonance
- Voltage conversion (RMS, peak, etc.)
- Waveform analysis
- Degrees of displacement
- Reactance
- Impedance
- Filters
- Power factor
- Time/frequency



### Fundamentals (covered in the performance test)

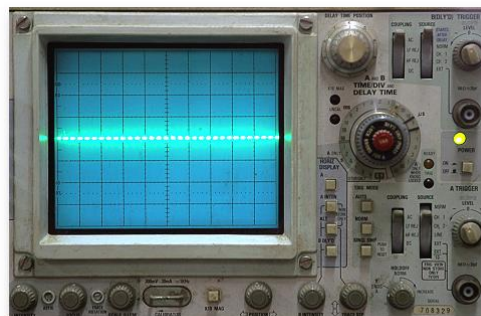
Demonstrate the ability to identify and use the principles of the following:

- Component identification
- Circuit characteristics
- Wiring specifications
- Circuit protection

**Specific Competencies and Skills continued:****Test Equipment**

Demonstrate the ability to identify and use the principles of the following:

- Meter fundamentals
- Oscilloscope operation
- Digital meters
- Milliohm meter
- Transfer curve tracer
- IC analyzer
- Logic probe/pulser probe

**Semiconductors**

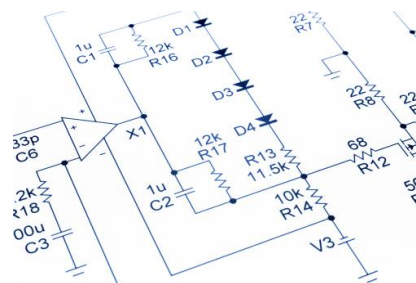
Demonstrate the ability to identify the use of the principles of the following:

- Diode fundamentals (bipolar-zener applications)
- Transistor fundamentals
- Field effect transistor (FET) fundamentals

**Electronic Circuits**

Demonstrate the ability to identify and use the principles of the following:

- Transistor amplifier fundamentals
- Operational amplifier fundamentals
- Differentiator/integrator op-amps circuits
- Voltage regulators
- 555 Timers
- Power supplies
- Oscillators
- Phase-lock loop circuits

**Digital/Micro**

Demonstrate the ability to identify and use the principles of the following:

- Basic gates
- Boolean expression
- Gate circuits
- Logic specifications
- Circuit identification
- Counter circuits

**Specific Competencies and Skills continued:**

- Microprocessor fundamentals
- Latches/flip-flops
- Binary numbering systems
- Discrete gates
- D/A, A/D
- Multiplexers/demultiplexers

**Transducers**

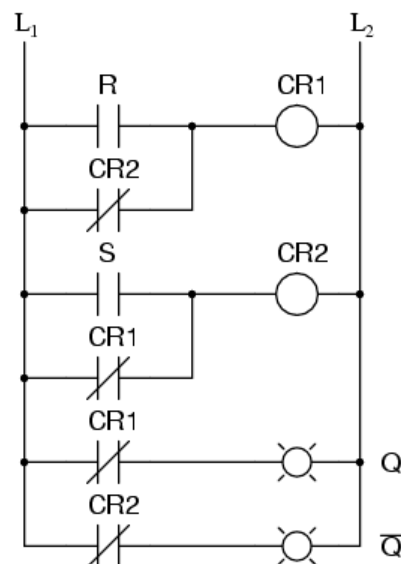
Demonstrate the ability to identify and use the principles of the following:

- Thermistors
- Resistive temperature detectors (RTDs)
- Optical devices
- Thermocouples
- Proximity and resistive devices

**Ladder Logic and Motors**

Demonstrate the ability to identify and use the principles of the following:

- DC motors
- Synchro-systems
- AC induction motors
- Horsepower ratings
- Three-phase power
- Motor starter circuits
- Ladder diagrams
- JIC symbols

**Safety**

Demonstrate the ability to use principles of safety for the following:

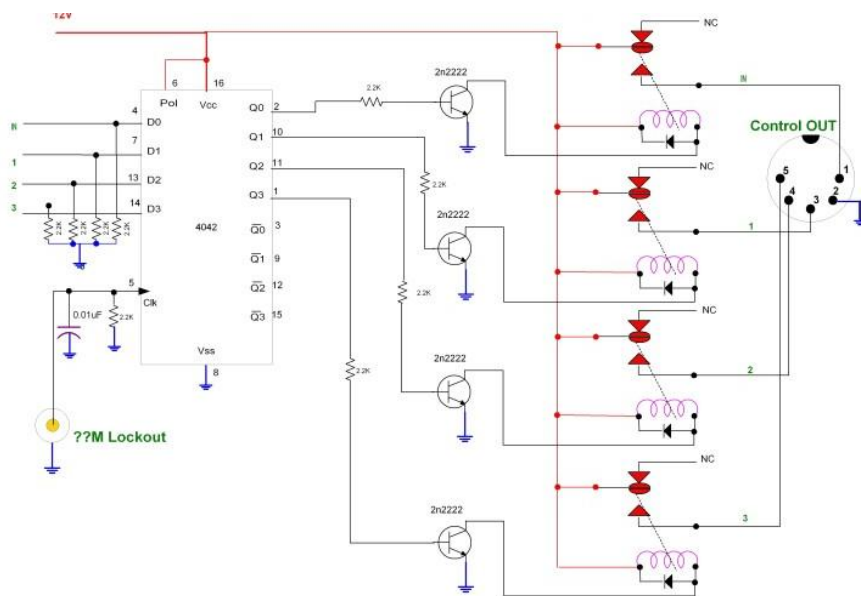
- Personal/ shop/equipment

## Specific Competencies and Skills continued:

### Programmable Logic Controllers

Demonstrate the ability to identify and use the principles of the following:

- PLC programming (ladder logic)
- PLC input/output capabilities
- PLC field wiring
- PLC trouble shooting



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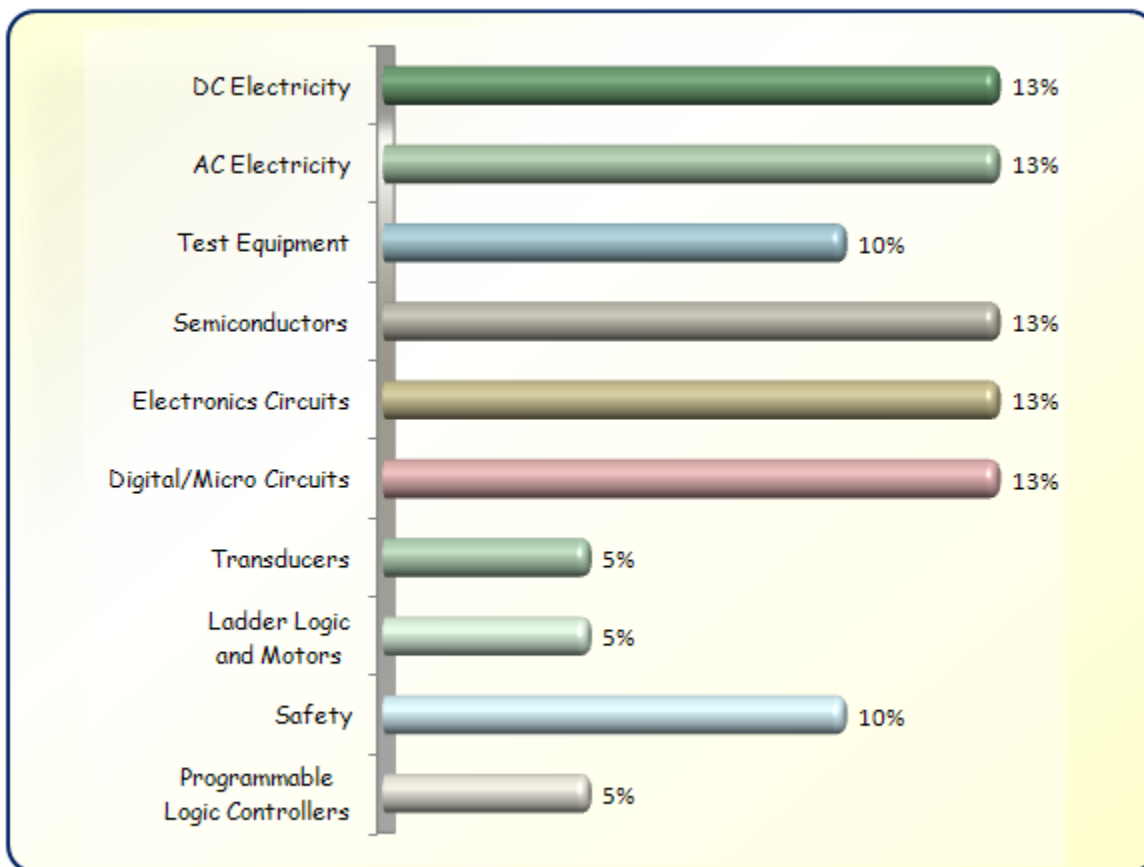
Courtesy CNTR.net

### Written Assessment:

Administration Time: 3 hours

Number of Questions: 197

### Areas Covered:



**Sample Questions:**

A positive ion is produced when an atom

- A. loses an electron
- B. loses a proton
- C. gains an electron
- D. gains a proton

If a transformer with a 1:5 ratio is rated at 500 volt-amperes and has an input voltage of 100 volts, what would be the output current assuming 100 percent efficiency?

- A. 1.0 amp
- B. 2.5 amps
- C. 5 amps
- D. 25 amps

To remove a DC offset from the output of a frequency generator connected to a test circuit, the technician must

- A. change the DC bias on the test circuit
- B. place a capacitor in series with the output of the generator and the test circuit
- C. change the scope probe setting to times 10
- D. set the scope to measure AC

The junction field effect transistor (JFET) operates in the \_\_\_\_\_ mode.

- A. depletion
- B. enhancement
- C. depletion or enhancement
- D. depletion and enhancement

A 4-input NOR gate has how many possible input conditions?

- A. 2
- B. 4
- C. 8
- D. 16



## Performance Assessment:

**Administration Time:** 3 hours

**Number of Jobs:** 7

### Areas Covered:

#### 14% Semiconductor Testing

Identification of components. Determination of component quality and lead configuration. Use of test equipment. Economy of time.

#### 14% Soldering/De-soldering

Techniques for soldering and desoldering components. Choice, preparation and use of tools and equipment. Economy of time. Safety.

#### 14% Test Equipment

Use of meters. Measurement of voltage, resistance, current. Use of schematic. Economy of time.

#### 14% Circuit Construction

Principles of AC and DC electricity. Use of schematics. Assembly procedures and techniques. Component selection. Economy of time. Safety.

#### 16% Oscilloscope Usage

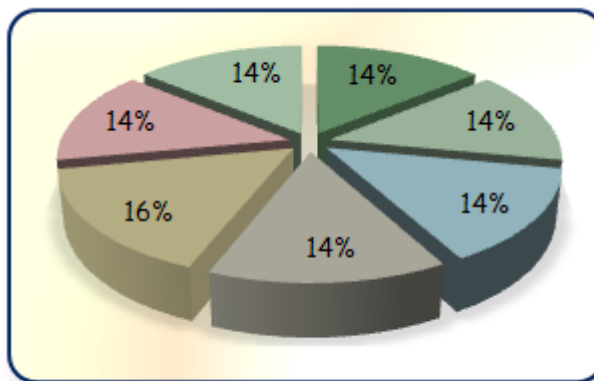
Use and care of equipment. Calibration procedures. AC and DC measurements. Interpretation of waveforms. Use of schematics. Economy of time.

#### 14% Troubleshooting

Problem diagnosis. Identification of components (satisfactory or defective). Use of test equipment. Procedures and techniques for restoring circuit operation. Economy of time.

#### 14% Digital/Micro

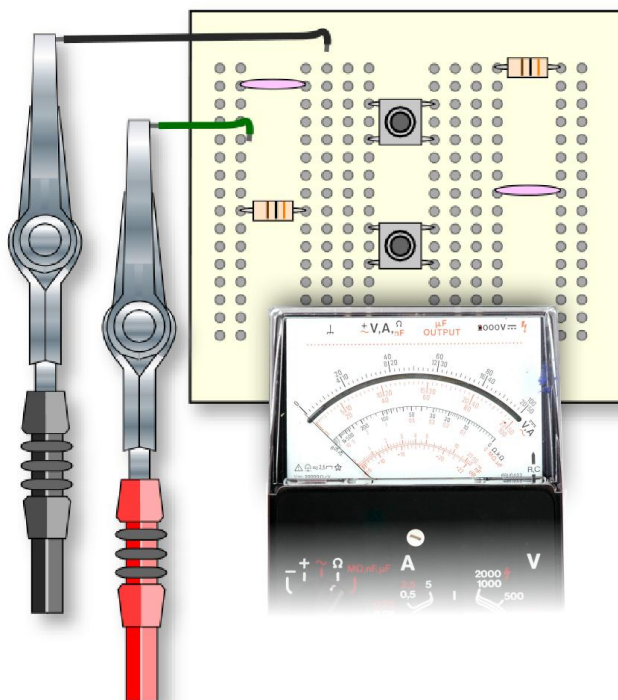
Application of gate logic. Gate substitution. Use of diagram. Circuit construction. Creation of truth table. Observation techniques. Economy of time.



**Sample Job:** Test Equipment

**Maximum Time:** 25 minutes

**Participant Activity:** The participant will measure the voltage drop, the current and the resistance for each resistor. Then the total voltage, current and resistance will be measured for the entire circuit.



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