

*Entry Level Assessment Blueprint*

***Industrial Maintenance Mechanics***



## Specific Competencies and Skills Tested in this Assessment:

### Machinery and Equipment

- Disassemble, repair, and reassemble machinery/equipment
- Maintain operating condition and perform preventive maintenance of the machinery/equipment
- Identify and troubleshoot component defects and malfunctions
- Test operation of newly repaired machinery/equipment
- Analyze test results, machine error messages, and information from operators in order to diagnose machinery/equipment problems
- Maintain record of repairs and maintenance performed

### Tools and Safety

- Select and demonstrate appropriate use of various hand tools
- Select and demonstrate appropriate care of various power tools
- Demonstrate knowledge, use and care of measuring tools
- Identify and safely use large machine tools (i.e., lathes, mills, hoists, rigging equipment)
- Identify safe use of ladder, scaffolding, and mobile lifts
- Demonstrate understanding of lockout/tagout procedures
- Exhibit understanding of shop safety and machine guarding
- Demonstrate appropriate use of personal protection equipment (PPE)



### Electronics and Electrical Principles

- Apply basic electrical principles
- Demonstrate knowledge of electrical measuring devices
- Demonstrate knowledge of basic computer numerical control (CNC) operations
- Demonstrate knowledge of basic programmable logic controllers (PLCs)
- Exhibit basic knowledge of electrical symbols

## ***Specific Competencies and Skills continued:***

### **Hydraulics and Pneumatics**

- Interpret basic hydraulic and pneumatic symbols
- Apply knowledge of hydraulic and pneumatic components
- Interpret hydraulic and pneumatic principles, including Pascal's Law

### **Motors and Motor Controls**

- Apply basic electrical principles of motors
- Interpret appropriate applications for types of motors (i.e., linear, servo, AC induction)
- Select appropriate applications for frequency drives
- Identify motor components
- Identify motor control and safety components in accordance with NEC

### **Mechanical Drives**

- Apply principles of mechanical drives
- Identify appropriate applications of various gears, chain and belt drives
- Demonstrate knowledge of appropriate set-up procedures
- Apply principles of mechanics

### **Industrial Robotics Systems**

- Interpret appropriate industrial robotic functions and applications
- Interpret basic robotic programming
- Identify various industrial robotic design features



### **Blueprints and Schematics**

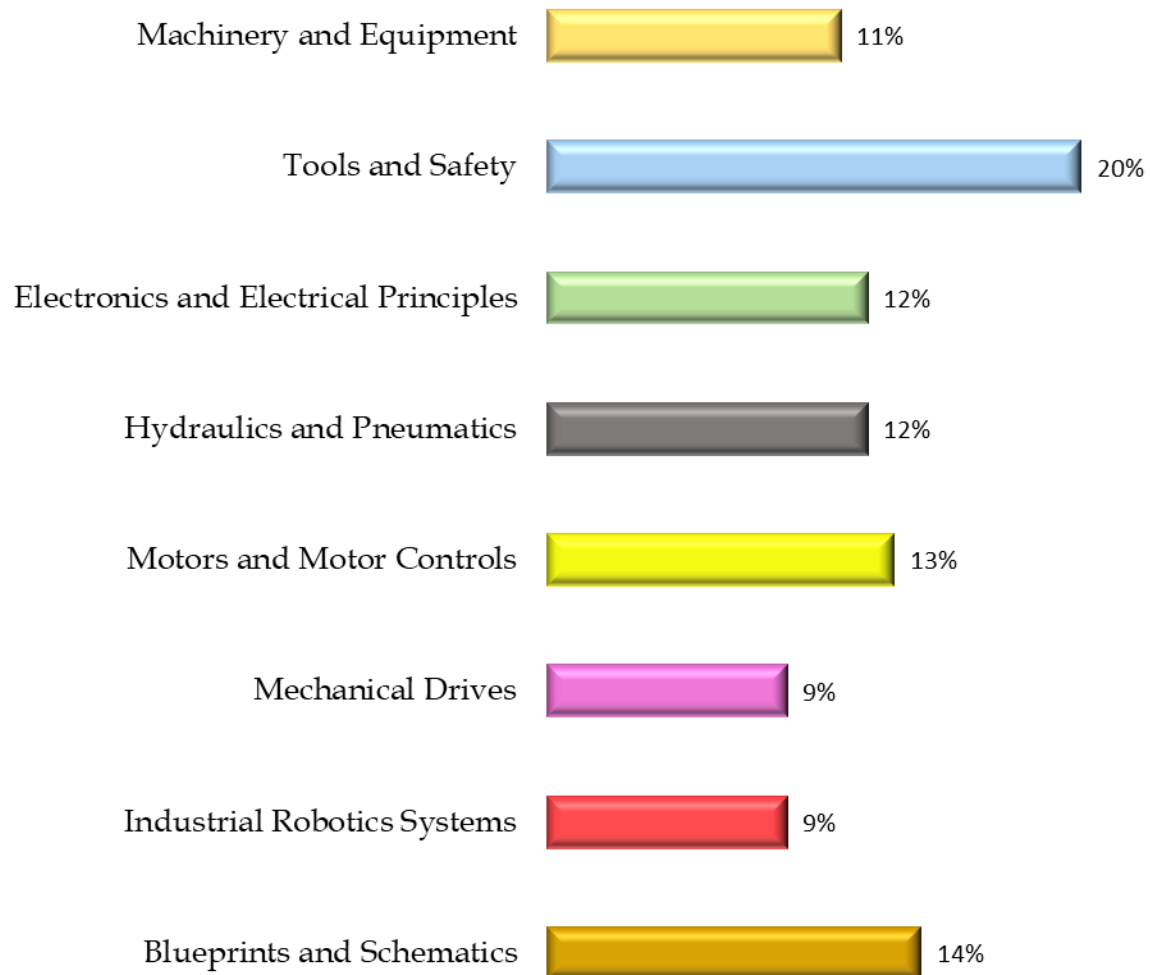
- Identify various lines found on blueprints
- Exhibit knowledge of legends
- Interpret blueprint and schematic components, including ladder and power diagrams
- Interpret title block information
- Demonstrate knowledge of views, angles, and tolerances

## Written Assessment:

**Administration Time:** 3 hours

**Number of Questions:** 182

### Areas Covered:



## Sample Questions:

Preventive maintenance is the responsibility of

- A. the machine operator
- B. repair department employees
- C. the job scheduler
- D. anyone involved in the process

A combination square is marked with a 90-degree angle and a \_\_\_\_\_ angle.

- A. 45-degree
- B. 180-degree
- C. 270-degree
- D. 360-degree

An ammeter is used to measure

- A. current
- B. resistance
- C. voltage
- D. inductance

Most tanks contain baffles because they

- A. act as cooling fins for heat transfer
- B. ease the flow from inlet to outlet
- C. filter airborne impurities
- D. are used as filters

The best type of gear to use for high torque is a \_\_\_\_\_ gear.

- A. helical
- B. hypoid
- C. worm
- D. spur

What is the major symptom of a faulty resolver or encoder?

- A. jerky or bumpy movement
- B. total power failure
- C. lack of feedback
- D. lack of feed forward

ECO on a title block refers to

- A. engineer change order
- B. environmental code option
- C. elective check operation
- D. engineering code orientation

## Performance Assessment:

**Administration Time:** 3 hours

**Number of Jobs:** 4

### Areas Covered:

#### 20% **Connect and Operate a Circuit**

Assemble pneumatic circuit, test functionality of automatic mode, adjust flow control, switch to manual mode, safety, and time to complete Job 1.

#### 31% **Assemble a Multiple Shaft Gear Drive System**

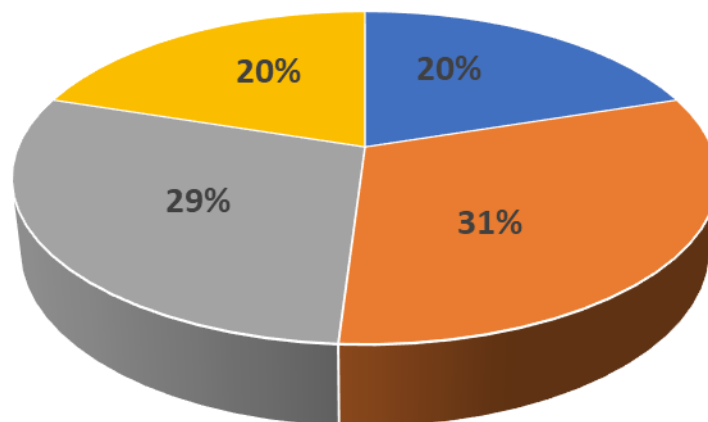
Mount and level motor, install and align flexible coupling, install and adjust gears, install prony brakes, start and run motor, record motor current, torque down prony brakes, record motor current rise, safety, and time to complete Job 2.

#### 29% **Read and Interpret an Industrial Blueprint**

Material use, surface finish, surface tolerance, identify "Line B", include angle on taper, safety, and time to complete Job 3.

#### 20% **Troubleshoot an Electrical Control System**

Determine the malfunction, remove faulty fuse, replace fuse, start and run motor, safety, and time to complete Job 4.



**Sample Job:** Read and Interpret an Industrial Blueprint

**Maximum Time:** 30 minutes

**Participant Activity:** The participant will read the blueprint provided and properly record specifications.

