INDUSTRIAL MAINTENANCE MECHANICS - PILOT

Test Code: 3074
Version: 01

Specific Competencies and Skills Tested in this Assessment:

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

**Tools and Safety**
- Select and demonstrate appropriate use and care of various hand tools
- Select and demonstrate appropriate use and 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, presses)
- 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

**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
Industrial Maintenance Mechanics - PILOT (continued)

**Motors and Motor Controls**
Apply basic electrical principles of motors
Interpret appropriate applications for types of motors (i.e., linear, servo, AC induction, DC motors, transformers)
Select appropriate applications for frequency drives
Identify motor components
Identify motor control and safety components in accordance with NEC (i.e., circuit breakers, fuses, wire sizing, contactors, overloads)

**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**
Interpret various lines found on blueprints
Exhibit knowledge of legends
Interpret blueprint and schematic components, including ladder and power diagrams
Demonstrate knowledge of computer aided drafting (CAD)
Interpret title block information
Demonstrate knowledge of views, angles, and tolerances
Written Assessment:

Administration Time: 3 hours
Number of Questions: 185

Areas Covered:

12% Machinery and Equipment
19% Tools and Safety
12% Electronics and Electrical Principles
12% Hydraulics and Pneumatics
12% Motors and Motor Controls
9% Mechanical Drives
9% Industrial Robotics Systems
15% Blueprints and Schematics

Sample Questions:

In an industrial setting, the letters PM mean
A. preventive maintenance
B. possible machines
C. production machining
D. possible maintenance

The correct tool for fitting a new bearing on a shaft is a/an
A. vise
B. arbor press
C. hydraulic ram
D. hammer and sleeve

The basic unit of potential difference is the
A. volt
B. amp
C. ohm
D. watt

In hydraulic schematics, circles represent pumps or
A. filters
B. motors
C. reducers
D. valves

A split-phase induction motor
A. uses a starting capacitor
B. has a split-ring commutator
C. uses starting and running windings
D. needs three-phase voltage
Experimentally, the torque of a motor is measured directly by a device called a
A. dynamic wrench
B. prony meter
C. dynamic brake
D. prony brake

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

A solid line indicates
A. a visible edge of something
B. a hidden edge of something
C. a wire routing
D. pointing to something of interest

Robot controllers are air logic, programmable, or
A. transponder
B. encoder
C. microprocessor
D. pulse generator

The average drawing contains
A. one view
B. two views
C. three views
D. more than three views
Industrial Maintenance Mechanics - PILOT (continued)

Performance Assessment:

Administration Time: 3 hours
Number of Jobs: 4

Areas Covered:

21%  Connect and Operate a Circuit
Participant will connect and operate a circuit using the ladder and power diagram provided. Use the components provided to assemble the system and make necessary adjustments.

28%  Assemble a Multiple Shaft Gear Drive System
Participant will follow schematic instructions to mount and level the electric gear motor provided. Steps will include install, align, mount, level, and check of parts.

30%  Read and Interpret an Industrial Blueprint
Participant will use the blueprint provided to record specifications.

21%  Troubleshoot an Electrical Control System
Participant will use the motor control system provided to identify malfunctioning component with a diagnostic tool.

Sample Job:  Read and Interpret an Industrial Blueprint

Maximum Job Time: 20 minutes

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