AGRICULTURE MECHANICS - PILOT

Test Code: 2202
Version: 01

Specific Competencies and Skills Tested in this Assessment:

Safety
Demonstrate positive safety attitudes and responsibilities
Demonstrate knowledge of basic first-aid procedures
Demonstrate knowledge of equipment safety and maintenance
Demonstrate structural and environmental safety

Welding and Mechanics
Exhibit knowledge SMAW (shielded metal arc welding), GMAW (gas metal arc welding), and GTAW (gas tungsten arc welding) procedures
Exhibit knowledge of gas cutting and welding procedures (e.g., brazing and soldering)
Exhibit knowledge of plasma cutting procedures
Exhibit knowledge of plastic welding procedures
Exhibit knowledge of milling machines, lathes, grinders, and saws

Power and Machinery
Exhibit knowledge and proficiency of fluid power systems
Exhibit knowledge and proficiency of engine systems
Exhibit knowledge and proficiency of machinery electrical systems
Exhibit knowledge and proficiency of power train systems
Identify, service, and maintain machines, tools, and equipment
Identify and analyze machines and equipment components
Troubleshoot and diagnose machines and equipment
Disassemble and reassemble machines and equipment, test operation, and make adjustments as necessary

Electrical Systems
Solve problems to determine voltage, amperage, resistances, and wattages
Exhibit knowledge and show proficiency with use of a voltmeter, ohmmeter, ammeter, or wattmeter
Exhibit knowledge and proficiency of structural wiring
Identify components and properties of electric motors

Precision Measurements
Measure accurately with tape measures, rulers, micrometer, and calipers
Read and accurately interpret gauges and dial indicators
Agriculture Mechanics - PILOT continued

**Agricultural Structures**
- Exhibit knowledge and proficiency of plumbing procedures
- Demonstrate knowledge of framing process and identify appropriate building materials
- Calculate board feet and cost of materials
- Demonstrate knowledge of concrete structures
- Read and interpret blueprints and plans
- Demonstrate knowledge of roofing systems
- Demonstrate knowledge of heating, cooling, and ventilation systems

**Agribusiness**
- Create a bill of materials
- Determine cost of a project
- Accurately record and interpret equipment identification information
- Calculate cost of operating equipment
- Calculate, maintain, and analyze accurate business records
- Display knowledge of basic information management skills

**Environmental and Natural Resource Systems**
- Set up and adjust field survey equipment
- Calculate, measure, maintain, and analyze data from field survey
- Complete differential or profile leveling problem
- Read and interpret maps including property, township, zoning, and topographical maps
- Demonstrate familiarity with national environmental agencies such as NRCS (Natural Resource Conservation Service), EPA (Environmental Protection Agency), or DEQ (Department of Environmental Quality)

**Technology**
- Identify various uses, components, and set-up of precision agriculture technologies (e.g., GIS, GPS, sensors)
- Identify and describe uses of robotic systems (e.g., milking apparatus, robotic welding, drones)
- Identify types of alternative energy (e.g., solar, wind, hybrids)

**Careers in Agriculture Mechanics**
- Examine career opportunities in the agriculture power and systems technologies
- Identify advanced training or post secondary education needed for careers in agriculture power and systems technologies
- Demonstrate knowledge of personal characteristics important to specific occupations in power and systems technologies
Agriculture Mechanics - PILOT continued

Written Assessment:

Administration Time: 3 hours
Number of Questions: 203

Areas Covered:

- 6% Safety
- 13% Welding and Mechanics
- 20% Power and Machinery
- 10% Electrical Systems
- 5% Precision Measurements
- 16% Agriculture Structures
- 10% Agribusiness
- 7% Environmental and Natural Resource Systems
- 8% Technology
- 5% Careers in Agriculture Mechanics

Sample Questions:

One possible symptom of shock is
A. dilated pupils
B. slow pulse
C. wet feet
D. red ears

A _____ is an instrument used for drawing and measuring angles.
A. level
B. protractor
C. compass
D. ruler

Nails used for moulding and cabinet work are known as _____ nails.
A. box
B. finishing
C. duplex
D. common

What type of energy is produced by wind?
A. potential
B. kinetic
C. thermal
D. electromagnetic

Which one of these career choices will require at least a bachelor’s degree?
A. machine operator
B. agricultural engineer
C. equipment/parts manager
D. heavy equipment maintenance technician
Some electric motors are designed with built-in capacitors. The reason is that the capacitor
A. gives additional starting torque even though it requires additional amperage
B. helps maintain running efficiency after the motor reaches operating speed
C. provides the motor with extra power when the load is increased
D. allows the operator to set the speed of the motor

A short weld used for temporarily holding metal in place is called a
A. spacer weld
B. temporary fusion weld
C. tack weld
D. temporary braze weld

The control device used to regulate engine speed is referred to as the
A. carburetor
B. governor
C. throttle
D. intake valve

A square of roofing material will cover
A. 10 square feet
B. 25 square feet
C. 50 square feet
D. 100 square feet

A rod reading taken on a point of known elevation is
A. backsight
B. line of sight
C. foresight
D. hindsight
Agriculture Mechanics - PILOT continued

**Performance Assessment:**

Administration Time: 2 hours and 30 minutes  
Number of Jobs: 5

**Areas Covered:**

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<th>Percentage</th>
<th>Description</th>
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| 24%        | **Horizontal Butt Weld - SMAW**  
Safety, attach the ground clamp, set amperage correctly, set the gap, tack, position metal, quality of bead, and time to complete Job 1. |
| 22%        | **Oxyacetylene Cutting**  
Safety, adjust regulators, light and adjust flame, cutting, product evaluation, and time to complete Job 2. |
| 24%        | **Troubleshoot and Diagnose a Gas Engine**  
Safety, engine model number, compression reading, gap measurement, spark intensity, determination of engine performance, explanation, and time to complete Job 3. |
| 15%        | **Install Two 3-Way Switches to Control a Light**  
Safety, circuit grounded, boxes grounded, attach wires to switch terminals, light controlled, and time to complete Job 4. |
| 15%        | **Cut, Mark, and Drill Lumber**  
Safety, correct measurements, lay out cuts and hole, cut and drill correctly, and time to complete Job 5. |

**Sample Job:** Cut, Mark, and Drill Lumber

**Maximum Job Time:** 20 minutes

**Participant Activity:** The participant will receive a 1 by 4-inch piece of lumber to lay out cuts and a hole to cut and drill correctly.