**General Assessment Information**

**Test Type:** The apprenticeship level assessments are based on industry standards determined by Equipment Dealerships in the Northeast. Participants can earn certification and a digital badge.

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**CIP Code**

- 01.0201 Agriculture Mechanization, General
- Career Cluster 1-Agriculture, Food, and Natural Resources
- 49-3041.00 Farm Equipment Mechanics and Service Technicians
Written Assessment

This written assessment consists of questions to measure an individual’s factual theoretical knowledge.

**Administration Time:** 2 hours
**Number of Questions:** 54
**Number of Sessions:** This assessment may be administered in one session.

### Areas Covered

- **Basic Skills** 2%
- **Engine Systems: 4-Stroke Gasoline** 17%
- **Engine Systems: Diesel** 30%
- **Machinery Systems: Powertrains** 22%
- **HVAC** 3%
- **Farm Equipment Systems: Planting, Harvesting, Tillage** 2%
- **Hydraulic/Hydrostatic (Fluid Power) Systems** 17%
- **Electrical Systems** 7%
Specific Competencies and Skills Tested in this Assessment

Basic Skills
• Record details of repairs made

Engine Systems: 4-Stroke Gasoline
• Define mechanical power, work, torque, and horsepower
• Analyze, evaluate, and troubleshoot engine and internal engine components
• Demonstrate proper engine disassemble and re-assemble to working order
• Describe general engine repair procedures

Engine Systems: Diesel
• List fuel components for diesel engines with mechanical injection pumps
• List fuel components for diesel engines with common rail injection systems
• Demonstrate troubleshooting and engine maintenance procedures
• Describe the different after-treatment systems and their operations
• Describe the electronic control systems of current engines and their theory of operation
• Describe general engine repair procedures
Specific Competencies and Skills (continued)

**Machinery Systems: Powertrains**
- Describe the transfer of power from engine to equipment (PTO)
- Repair a slip clutch, a wet clutch, and a dry clutch
- Identify and locate components of a braking system
- Describe and identify power shift, CVT, hydrostat, and manual gear
- Analyze, evaluate, and troubleshoot transmission (fault codes if applicable)

**HVAC**
- Analyze, evaluate, troubleshoot, and properly repair HVAC systems
- Describe, identify, and practice application of mobile HVAC systems

**Farm Equipment Systems: Planting, Harvesting, Tillage**
- Adjust or set mechanical controls or components on equipment

(Continued on the following page)
Specific Competencies and Skills (continued)

Hydraulic/Hydrostatic (Fluid Power) Systems
- Describe the application and operation of major components, including pumps and motors
- Test and diagnose hydraulic systems
- Test and diagnose hydrostatic systems
- Identify applications, and the benefits of hydraulic/hydrostatic systems
- Repair different types of hydraulic systems
- Properly test a hydraulic system (flowrate, main relief, operating temperature) to diagnose an issue

Electrical Systems
- Define electrical components
Sample Questions

**A restricted exhaust system will cause a/an**
A. lean running condition  
B. low power condition  
C. engine to run cooler  
D. engine to have higher compression

**The engine is in a derate condition. The diagnostics tool shows 12 error codes. What should the technician do?**
A. review and prioritize codes  
B. check the sensor  
C. clear codes  
D. check engine wiring harness

**The number of splines on a 540 RPM PTO shaft is**
A. 6  
B. 12  
C. 20  
D. 21

**What AC component is located inside the cab?**
A. condenser  
B. evaporator  
C. AC compressor  
D. filter dryer

**When driving a machine with a hydraulically released parking brake, the parking brake comes on. What is the possible cause?**
A. hydraulic oil is cold  
B. park break spring is broken  
C. the system pressure is high  
D. low charge pressure
Performance Assessment

NOCTI performance assessments allow individuals to demonstrate their acquired skills by completing actual jobs using the tools, materials, machines, and equipment related to the technical area.

Administration Time: 1 hour and 15 minutes (3 hours and 15 minutes including preparation and evaluation time)
Number of Jobs: 2

Areas Covered:

64% Troubleshoot Agricultural Tractor Hydraulic Issue
Participants will use appropriate safety equipment, look up proper specs, hook up flow meter, and record all findings and determine issue(s).

36% Diagnose an Engine
Participants will determine proper connection point and cabling, hook up engine diagnostic tool.
Sample Job

Diagnose an Engine

**Maximum Time:** 30 minutes

**Participant Activity:** Participants will determine proper connection point and cabling. Participant will hook up engine diagnostic tool and perform cylinder cut out test, collect and save engine data, determine rail pressure, and NOx efficiency.