



Heavy Equipment Maintenance and Repair

General Assessment Information

Blueprint Contents

General Assessment Information	Sample Written Items
Written Assessment Information	Performance Assessment Information
Specific Competencies Covered in the Test	Sample Performance Job

Test Type: The Heavy Equipment Maintenance and Repair assessment is included in NOCTI's Teacher assessment battery. Teacher assessments measure an individual's technical knowledge and skills in a proctored proficiency examination format. These assessments are used in a large number of states as part of the teacher licensing and/or certification process, assessing competency in all aspects of a particular industry. NOCTI Teacher tests typically offer both a written and performance component that must be administered at a NOCTI-approved Area Test Center. Teacher assessments can be delivered in an online or paper/pencil format.

Revision Team: The assessment content is based on input from subject matter experts representing the following states: Kentucky, Michigan, and Pennsylvania.



47.0302- Heavy Equipment
Maintenance
Technology/Technician



Career Cluster 16-
Transportation, Distribution,
and Logistics



49-3031.00- Bus and Truck
Mechanics and Diesel
Engine Specialists

Written Assessment

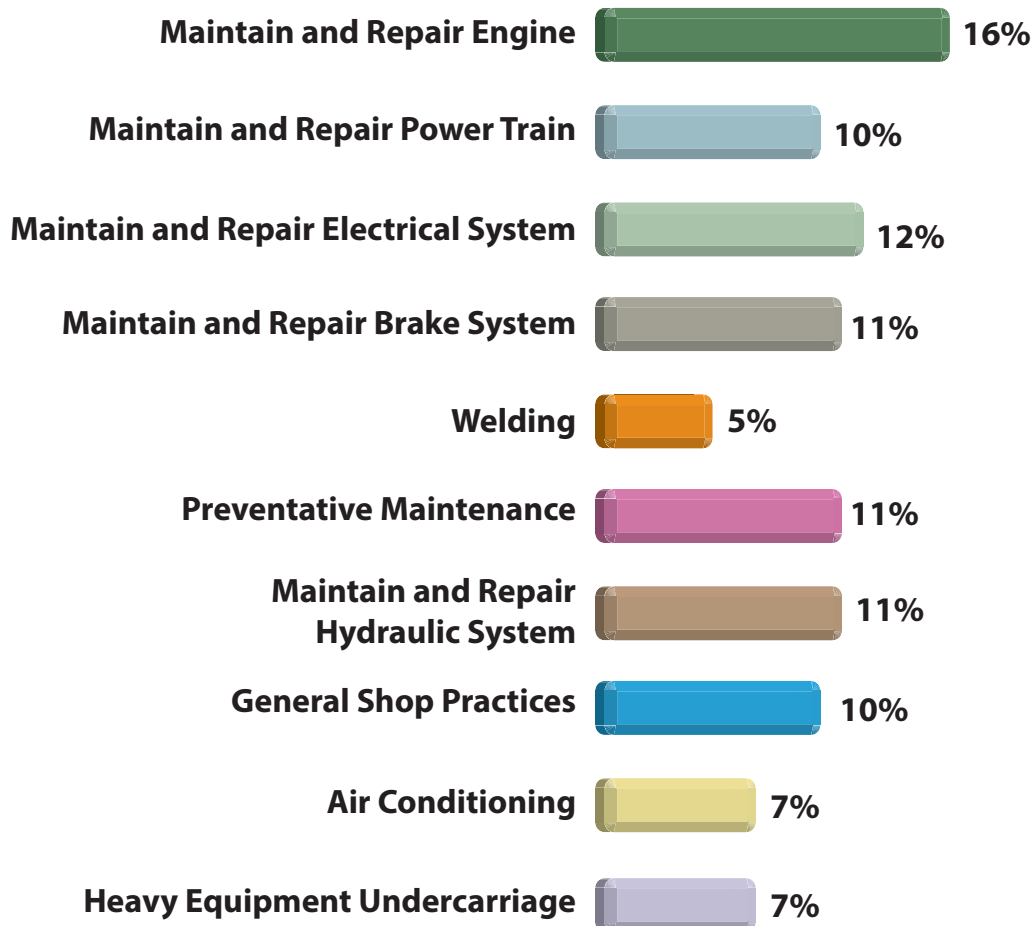
NOCTI written assessments consist of questions to measure an individual's factual theoretical knowledge.

Administration Time: 3 hours

Number of Questions: 169

Number of Sessions: This assessment may be administered in one, two, or three sessions.

Areas Covered



Specific Standards and Competencies Included in this Assessment

Maintain and Repair Engine

- Change oil and filters
- Maintain fuel system
- Apply knowledge of 4-stroke engines
- Maintain cooling system
- Maintain intake and exhaust systems

Maintain and Repair Power Train

- Demonstrate knowledge of hydrostatic power train
- Service and repair final drives
- Service power shift transmissions
- Service and inspect drive lines
- Service and maintain mechanical transmissions

Maintain and Repair Electrical System

- Maintain/repair electronic controls
- Service and test starting system
- Service and test charging system
- Service and test battery
- Maintain basic electrical system (lighting accessories)

Maintain and Repair Brake System

- Inspect air brake systems
- Apply knowledge of wet brake systems
- Apply knowledge of hydraulic brake systems
- Identify brake components

Welding

- Identify various types and components of metals
- Apply knowledge of shielded metal arc welding
- Demonstrate safe use of welding and fabrication tools

(Continued on the following page)

Specific Standards and Competencies (continued)

Preventive Maintenance

- Inspect and maintain tire performance
- Monitor gauges and warning lights
- Inspect hydraulic system
- Adhere to maintenance schedules and manage record keeping
- Measure and maintain oil and fluid levels
- Perform oil sampling

Maintain and Repair Hydraulic System

- Identify basic hydraulic system components
- Describe operation of various hydraulic pumps
- Service and troubleshoot hydraulic system, valves, and pressure controls
- Apply knowledge of hydraulic schematic symbols
- Apply knowledge of hydraulic circuits
- Service and rebuild hydraulic cylinders



(Continued on the following page)

Specific Standards and Competencies (continued)

General Shop Practices

- Identify personal protection equipment (PPEs)
- Select proper fasteners
- Select and use sealants properly
- Perform drilling and tapping operations
- Describe proper use of hand tools
- Demonstrate safe use of jacks and lifting equipment

Air Conditioning

- Identify air conditioning components
- Maintain air conditioning system
- Recover and recharge air conditioning systems
- Troubleshoot air conditioning malfunctions

Heavy Equipment Undercarriage

- Inspect undercarriage and components
- Demonstrate appropriate use of ground engaging equipment
- Perform track tension adjustments
- Demonstrate appropriate blocking/cribbing techniques



Sample Questions

Insufficient valve clearance can cause

- A. coolant leakage
- B. a burnt valve
- C. worn valve guides
- D. oil leakage

Spur gears have teeth that are

- A. curved
- B. straight
- C. herringboned
- D. beveled

The electrolyte in a battery is a solution of water and

- A. sulfuric acid
- B. baking soda
- C. viscous oil
- D. hydrogen sulfide

One sign of a defective hydraulic brake system is

- A. low gas mileage
- B. uneven tire wear
- C. non-operational stoplights
- D. low brake fluid level

The resistance of a liquid to flow is

- A. viscosity
- B. velocity
- C. reciprocity
- D. density

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: 2 hours and 25 minutes

Number of Jobs: 7

Areas Covered:

10% Test Cooling System

Cap pressure test, system pressure loss, leaks in system, and time to complete job 1.

19% Electrical Testing

Battery discharge test, starter draw test, alternator maximum output test, and time to complete job 2.

12% Adjust Valve Clearance

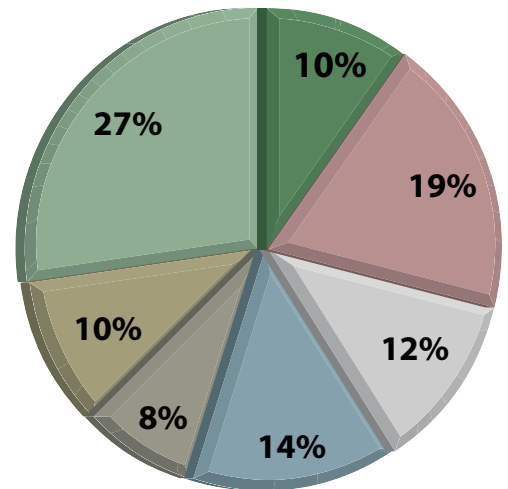
Accuracy of specifications, accuracy of positioning engine for valve adjustment, accuracy of initial measurement for valve clearance, accuracy of final measurement for valve clearance, and time to complete job 3.

14% Set Carrier Ring and Piston Backlash

Set carrier ring and pinion backlash, measure and record backlash, and time to complete job 4.

8% Identify Brake Components

Identify brake components, and time to complete job 5.



(Continued on the following page)

Areas Covered (continued)

10% Measure and Adjust Track

Lock-out/tag-out, record specification, measure and record track measurement, circle correction action needed, adjust track and record adjusted measurement, remove lock-out/tag-out, and time to complete job 6.

27% Cut and Weld Steel

Oxyacetylene cutting, welder set-up, accuracy of cut, accuracy of weld, penetration, appearance of weld, quality of cut edges, and time to complete job 7.



Sample Job

Cut and Weld Steel

Maximum Time: 20 minutes

Participant Activity: The participant will use the proper tools and equipment to cut steel using the pattern provided. Attach the cut piece as shown in the drawing using a butt weld. Inform the evaluator when completed to inspect the work.

