

# **Teacher Assessment Blueprint**

# Small Engine Technology



Test Code: 5277 / Version: 01

# **General Assessment Information**

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ocific Competencies Covered in the Test	Sample Performa	

Sample Written Items Performance Assessment Information Sample Performance Job

**Test Type:** The Small Engine Technology 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: Idaho, Maine, Michigan, Pennsylvania, and Virginia.



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47.0606- Small Engine Mechanics and Repair Technology/Technician



Career Cluster 16-Transportation, Distribution, and Logistics



49-3053.00- Outdoor Power Equipment and Other Small Engine Mechanics

NATIONAL COLLEGE CREDIT RECOMMENDATION SERVICE University of the State of New York - Regents Research Fund In the lower division baccalaureate/associate degree category, 3 semester hours in Small Engine Technology or General Technology

# Written Assessment

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

Administration Time: 3 hours Number of Questions: 192 Number of Sessions: This assessment may be administered in one, two, or three sessions.



Specific Standards and Competencies Included in this Assessment

## Safety

- · Identify and test all equipment safety devices
- Demonstrate proper techniques for hand tools (e.g., screwdriver, torque wrenches)
- Demonstrate proper techniques for power tools and machinery
- Demonstrate proper handling, containment, and clean-up of hazardous materials (MSDS)
- Demonstrate proper usage of personal protective equipment (gloves, goggles, ear protection)
- Demonstrate safe operation of small engines and equipment

# **General Shop Practices**

- · Locate parts and equipment information using printed and electronic media
- Write a parts and labor invoice
- Calculate materials mark-up, labor time, and state tax
- Demonstrate time keeping and parts usage on worksheet and job ticket

## Maintenance

- Identify manufacturer's recommended service intervals
- Sharpen and balance blades and adjust levers and controls
- Inspect, test, and adjust safety-stop devices
- Inspect and service intake and exhaust system
- Inspect drive train and suspension system
- Inspect and service belts, hoses, and cooling system (air and liquid cooled)
- Identify types, uses, and recommended service of transmission and driveline components

# **Lubrication Systems**

- Inspect and service engine lubrication system
- Identify types of lubricating mechanisms
- · Identify proper types of oil and lubricants
- Service crankcase breathers, filters, and strainers



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# Specific Standards and Competencies (continued)

#### **Fuel System**

- Check fuel tank, lines, and filters
- · Identify and service fuel injection components
- Adjust and service fuel systems controls and linkages

#### **Carburetor Fundamentals**

- Inspect and service air intake system
- · Identify parts and functions of carburetors
- Explain carburetor theory
- Disassemble, clean, inspect, and reassemble carburetor (diaphragm and float bowl)

#### Governor

- Inspect, service, and adjust governor
- Identify governor functions and types
- Identify governor-related problems

#### Ignition

- · Identify, inspect, test, and adjust ignition components
- Disassemble, service, and reassemble ignition system
- Explain ignition theory and coil output

#### **Starters and Alternators**

- · Identify, inspect, and test charging and starting systems
- Service and repair charging and starting systems
- Inspect and perform battery service

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Specific Standards and Competencies (continued)

## **Cylinder Head and Valve Service and Maintenance**

- Explain theory of compression
- Perform cylinder leak down test
- Remove, inspect, reinstall, and adjust valves
- · Identify valve guide and valve stem measurements
- Diagnose and correct compression problems
- Remove, inspect, and reinstall cylinder head to manufacturer's specifications

# **Engine Assembly**

- Identify correct timing of crankshaft, camshaft, balance shaft, gears, and flywheel
- Identify and inspect, crankshaft, camshaft, balance shaft, gears, and flywheel
- Identify, inspect and measure piston, rings, and connecting rod assemblies
- Check cylinder diameter and measure piston ring end gap
- · Identify, inspect, and measure bearing clearances and journal diameter
- Identify proper usage of gaskets and sealants

# Troubleshooting

- Troubleshoot starting problems
- Troubleshoot charging system problems
- Troubleshoot cooling system problems
- Troubleshoot fuel system problems
- Troubleshoot lubrication system problems
- Diagnose erratic or rough running conditions
- · Diagnose low engine power complaints



## Sample Questions

#### **Carbon Monoxide is**

A. heavier than air and falls as it is warmed

B. measured in percentage per thousand

C. toxic and is produced by incomplete combustion

D. odorous and tasty, which provides warning

#### If a throttle cable is rusted, loosen the cable by applying

- A. penetrating oil
- B. kerosene
- C. grease
- D. warm water

#### The most common lubrication system found in small engines is the \_\_\_\_\_ system.

- A. vacuum
- B. splash
- C. external
- D. pressurized

#### The EFI System refers to the

- A. Engine Fouling Intake
- **B.** Equal Flame Indicator
- C. Exhaust Flow Indicator
- D. Electronic Fuel Injection

#### A fuel pump-equipped carburetor can be operated by

- A. a governor
- B. magnetos
- C. a vacuum
- D. gravity

18%

11%

18%

12%

21%

20%

# 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: 3 hours Number of Jobs: 6

#### Areas Covered:

#### 18% Check and Start Engine

Participants will locate loose engine parts, determine proper oil and fuel level, start engine, check/adjust carburetor, idle rpms, high speed rpms, record rpms, run engine for 30-60 seconds, and then return engine to pre-test condition.

#### **18% Ignition Service**

Participants will disassemble the engine ignition system, inspect and clean engine components, locate and record manufacturer specs, reinstall ignition components, make necessary adjustments, notify evaluator, reassemble remaining engine parts and start the engine.

#### **11% Measure Parts**

Participants will check and record ring end gap, crankpin journal, cylinder bore and ring side clearance.

#### 21% Valve Service

Participants will remove cylinder head and gasket, and valves, inspect, measure and record seat width, margin, intake valve guide, and exhaust valve guide, install valves, check tappet clearance, install cylinder head and gasket, and record cylinder head torque specifications.

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# Areas Covered (continued)

#### 20% Carburetor Service

Participants will disassemble and inspect float-type carburetor, obtain float setting, reassemble the carburetor, disassemble and inspect diaphragm carburetor, check parts for operation and condition, and reassemble the carburetor.

#### 12% Invoicing Parts

Participants will look up cost of engine parts and make calculations with complete information.

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# Sample Job

# **Invoicing Parts**

# Maximum Time: 20 minutes

**Participant Activity:** The participant will look up four engine parts that have been assigned and invoice those items including various requirements.

