

Specific Competencies and Skills Tested 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



Specific Competencies and Skills continued:

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

Fuel Systems

- 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



Specific Competencies and Skills continued:

Starters and Alternators

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

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

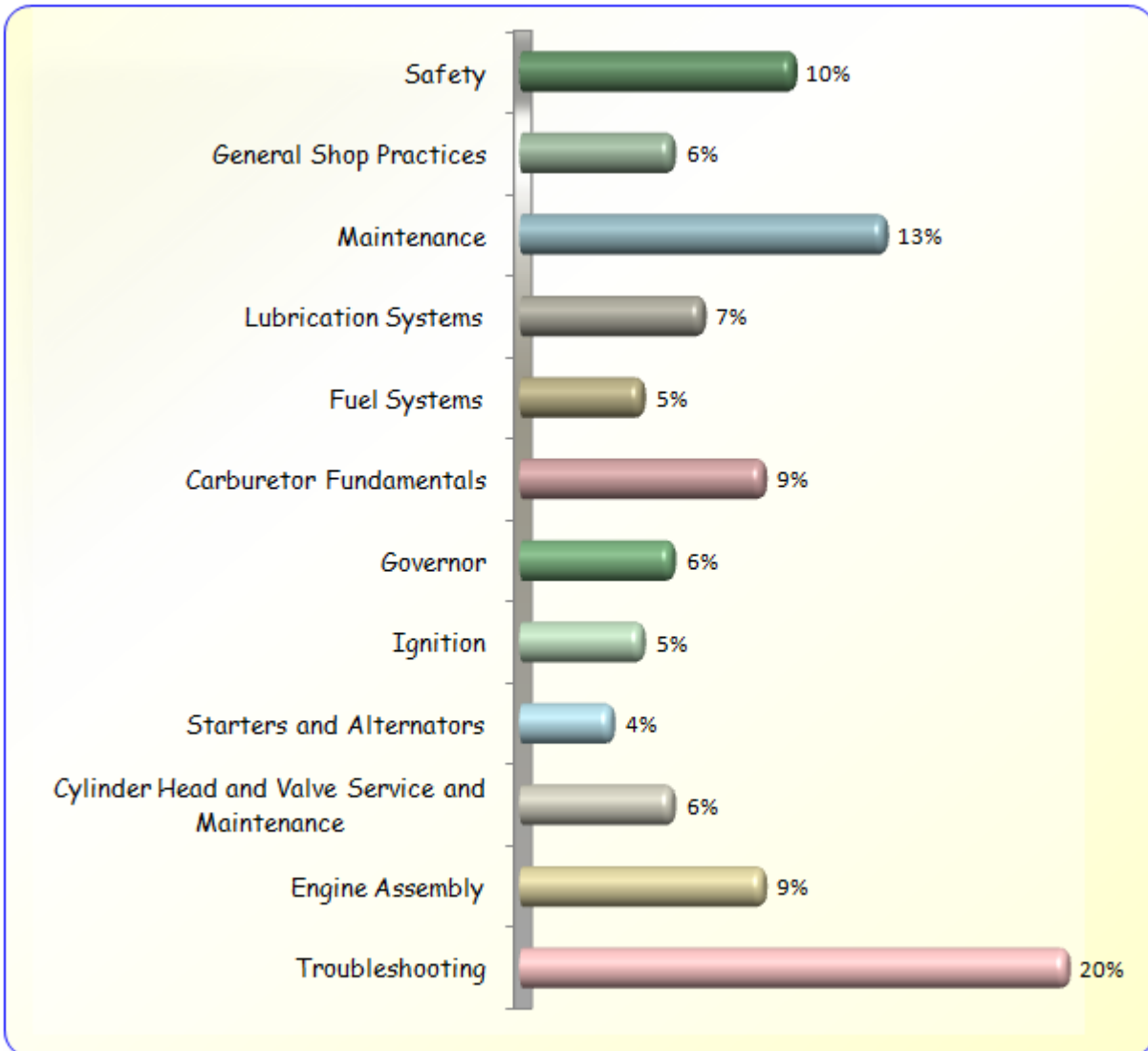


Written Assessment:

Administration Time: 3 hours

Number of Questions: 197

Areas Covered:



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, it can be loosened by applying

- A. penetrating oil
- B. gasoline
- 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

Performance Assessment:

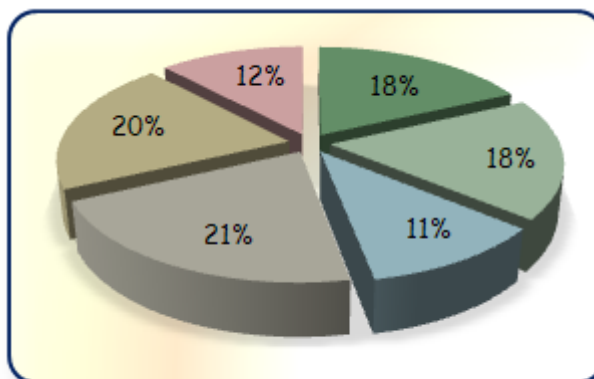
Administration Time: 3 hours

Number of Jobs: 6

Areas Covered:

18% Check and Start Engine

Locate loose engine parts and components, determine proper oil and fuel level, start and run engine, check and adjust carburetor, idle rpms and high speed rpms, record idle rpms and high speed rpms, run engine, return engine to pre-test condition, and time to complete Job 1.



18% Ignition Service

Disassemble the engine ignition system, inspect and clean engine components, locate and read manufacturer specifications, make necessary adjustments to meet specifications, reinstall ignition components, reassemble remaining engine parts, start engine, and time to complete Job 2.

11% Measure Parts

Check and record ring end gap, crankpin journal, cylinder bore, ring side clearance, and time to complete Job 3.

21% Valve Service

Remove and inspect cylinder head and gasket, remove valves, inspect, measure, and record seat width, margin, valve guide intake, valve guide exhaust, install valves, check and record tappet clearance, install cylinder head gasket, torque, record cylinder head torque specifications, and time to complete Job 4.

Performance Assessment continued:

20% Carburetor Service

Disassemble/inspect float-type carburetor, obtain floating setting, check and adjust carburetor float, reassemble float type-carburetor to original condition, disassemble diaphragm carburetor, inspect diaphragms and other carburetor components, check moveable parts for operation and condition, begin reassemble - adjust inlet metering lever height and the diaphragm carburetor to original condition, and time to complete Job 5.

12% Invoicing Parts

Look up cost of four engine parts in provided price list, calculations, completeness of information, and time to complete Job 6.



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.



The Association for Career and Technical Education (ACTE), the leading professional organization for career and technical educators, commends all students who participate in career and technical education programs and choose to validate their educational attainment through rigorous technical assessments. In taking this assessment you demonstrate to your school, your parents and guardians, your future employers and yourself that you understand the concepts and knowledge needed to succeed in the workplace. Good Luck!

