

Automotive Technology II: Automotive Service (Two Credits) (2015)

- Knowledge and skills. D**
- 1 The student relates core academic skills to the requirements of automotive technology. The student is expected to: D.1**
- A demonstrate effective written communication skills throughout the course, including documenting on a repair order customer concern/compliant, root cause of the failure, and corrective action to complete the repair; **D.1.A**
 - B estimate the cost of parts and labor operations on repair orders throughout the course, including the flat rate system; **D.1.B**
 - C demonstrate mathematical skills in performing addition, subtraction, multiplication, division, and measurements using decimals and fractions in the metric and U.S. standard systems as appropriate; and **D.1.C**
 - D research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. **D.1.D**
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- 2 The student demonstrates the technical knowledge and skills that form the core of knowledge of automotive service. The student is expected to: D.2**
- A diagnose the major components of powered vehicles; **D.2.A**
 - B diagnose automotive chassis and driveline components; **D.2.B**
 - C locate, read, and interpret documents such as schematics, charts, diagrams, graphs, parts catalogs, and service-repair information and technical bulletins; **D.2.C**
 - D locate the manufacturer recommended preventative maintenance schedule; **D.2.D**
 - E perform a preventative maintenance inspection; **D.2.E**
 - F perform common fastener and thread repair, including removing broken bolt, restoring internal and external threads, and repairing internal threads with thread insert; **D.2.F**
 - G perform precision measurements and use published specifications to diagnose component wear and determine necessary repairs; and **D.2.G**
 - H employ critical-thinking skills and structured problem-solving skills to diagnose vehicle malfunctions, solve problems, and make decisions. **D.2.H**

3 The student knows the functions and applications of the tools, equipment, technologies, and materials used in automotive technology. The student is expected to: **D.3**

- A** demonstrate the proper and safe use of hand and power tools and equipment commonly employed in the maintenance and repair of vehicles; **D.3.A**
- B** discuss and demonstrate the proper handling and disposal of environmentally hazardous materials used in servicing vehicles; **D.3.B**
- C** demonstrate proper use of diagnostic tools and equipment; and **D.3.C**
- D** locate, read, and interpret service repair information such as schematics, charts, diagrams, graphs, parts catalogs, and service-repair bulletins. **D.3.D**

4 The student applies the technical knowledge and skills related to suspension in simulated or actual work situations. The student is expected to: **D.4**

- A** inspect and replace power steering hoses and fittings; **D.4.A**
- B** remove, clean, inspect, repack, and install wheel bearings; replace seals; install hubs; and adjust bearings; **D.4.B**
- C** replace wheel bearing and race; **D.4.C**
- D** disable and enable supplemental restraint system (SRS); **D.4.D**
- E** inspect, remove, and replace shock absorbers and struts and inspect mounts and bushings; **D.4.E**
- F** dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system (TPMS); **D.4.F**
- G** inspect rear suspension system lateral links/arms, trailing arms, leaf springs, spring insulators, shackles, brackets, center pins, and mounting bolts; **D.4.G**
- H** inspect tire condition and wear patterns, check for correct size and application based on load and speed rating, and adjust air pressure; **D.4.H**
- I** perform pre-alignment inspection and measure vehicle ride height; **D.4.I**
- J** inspect tire and wheel assembly for air loss; **D.4.J**
- K** identify and test indirect and direct TPMSs and operation of the instrument panel lamps; **D.4.K**
- L** demonstrate knowledge of steps required to remove and replace sensors in a TPMS; and **D.4.L**
- M** inspect, remove, and replace front wheel drive (FWD) bearings, hubs, seals, shafts, boots, and universal/constant velocity (CV) joints. **D.4.M**

5 The student applies the technical knowledge and skills related to electrical systems in simulated or actual work situations. The student is expected to: D.5

- A demonstrate knowledge of the causes and effects from shorts, opens, and resistance in electrical/electronic circuits; D.5.A
- B measure key-off battery drain/parasitic draw; D.5.B
- C perform solder repair of electrical wiring; D.5.C
- D replace electrical connectors and terminal ends; D.5.D
- E demonstrate the ability to maintain or restore electronic memory functions; D.5.E
- F perform slow and fast battery charges according to manufacturer recommendations; D.5.F
- G identify electronic modules, security systems, radios, and other accessories that require re-initialization or code entry after reconnecting a vehicle battery; D.5.G
- H perform starter current draw test and starter circuit voltage drop tests and inspect and test starter relays and solenoids; D.5.H
- I remove and install a starter in a vehicle; D.5.I
- J inspect and test switches, connectors, and wires of starter control circuits; D.5.J
- K perform charging system output test; D.5.K
- L remove, inspect, and re-install alternator; D.5.L
- M identify system voltage and safety precautions associated with highintensity discharge headlights; D.5.M
- N disable and enable airbag system for vehicle service and verify indicator lamp operation; D.5.N
- O remove and reinstall a door panel; and D.5.O
- P describe the operation of keyless entry and remote-start systems. D.5.P

6 The student applies the technical knowledge and skills related to brakes in simulated or actual work situations. The student is expected to: D.6

- A describe procedure for performing a road test to check brake system operation, including an anti-lock brake system (ABS); D.6.A
- B measure brake pedal height, reserve distance, travel, and free play; D.6.B
- C identify components of brake warning light system; D.6.C
- D bleed and flush brake system; D.6.D
- E identify and check the operation of brake stop light system; and D.6.E
- F identify traction control and vehicle stability control system components. D.6.F

7 The student applies the technical knowledge and skills related to engine performance in simulated or actual work situations. The student is expected to: **D.7**

- A describe the importance of operating all on board diagnostics II (OBDII) monitors for repair verification; **D.7.A**
- B perform cylinder power balance test; **D.7.B**
- C perform cylinder cranking and running compression tests; **D.7.C**
- D perform cylinder leakage test; **D.7.D**
- E verify engine operating temperature; **D.7.E**
- F remove and replace spark plugs and inspect secondary ignition components for wear and damage; and **D.7.F**
- G retrieve and record diagnostic trouble codes and OBD II monitor status, freeze frame data, and clear trouble codes when applicable. **D.7.G**

8 The student applies the technical knowledge and skills related to engines in simulated or actual work situations. The student is expected to: **D.8**

- A install engine covers using gaskets, seals, and sealers as required; **D.8.A**
- B remove and replace timing belt and verify correct camshaft timing; **D.8.B**
- C perform cooling system pressure and dye tests to identify leaks, check coolant condition and level, and inspect and test radiator, pressure cap, coolant recovery tank, and heater core; and **D.8.C**
- D remove, inspect, and replace thermostat and gasket or seal. **D.8.D**

9 The student applies the technical knowledge and skills related to heating ventilation and air conditioning (HVAC) in simulated or actual work situations. The student is expected to: **D.9**

- A identify, locate, and replace cabin air filters; **D.9.A**
- B inspect air conditioning (A/C) condenser for airflow restrictions; **D.9.B**
- C identify the source of A/C system odors; and **D.9.C**
- D identify hybrid vehicle A/C system electrical circuits and safety precautions. **D.9.D**