Automotive Engines 10th

Chapter 13 Cooling System Operation and Diagnosis

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

1. What are 10 common causes of overheating?

2. How is a heater problem diagnosed?

3. Describe how to perform a drain, flush, and refill procedure performed on a cooling system.

4. Why is a cooling system pressurized?

5. Explain the operation of a thermostatic cooling fan.

6. What is the purpose of the coolant system bypass?

7. How does coolant flow through the engine and radiator?

8. What is normal operating coolant temperature?

Answer Key
Testname: ENGINES 10 SHORT13

1. Ten causes of overheating include:
   a. low coolant level
   b. clogged radiator
   c. defective cooling fan
   d. incorrect ignition timing
   e. defective coolant pump belt
   f. defective pressure cap
   g. defective coolant pump
   h. defective thermostat
   i. frozen coolant
   j. engine problem
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2. To diagnose a heater problem, first feel the radiator hoses to see that the coolant is hot enough. If the thermostat and coolant level is okay, feel the temperature of the heater hoses; both should be hot.
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3. Cooling system service involves draining the system and forcing water (sometimes with chemical cleaners) through the system and refilling the system with a 50/50 solution of antifreeze and water. Care should be exercised to be assured that all air is burped from the system.
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4. A cooling system is pressurized to prevent boiling until above the normal boiling point of the coolant and to help prevent cavitation (bubbles or foaming) inside the coolant pump.
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5. A thermostatic cooling fan senses air temperature and through a silicone coupling fan drive engages the engine-driven cooling fan only when needed.
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6. The bypass allows coolant to circulate (to prevent hot spots) by the coolant pump within the engine before the thermostat opens. Therefore, the bypass actually is a passage that bypasses the thermostat.
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7. Most automotive engines use the coolant pump to circulate coolant through the engine block then cylinder head(s) through the thermostat to the upper portion of the radiator. After losing its heat in the radiator, the coolant is drawn through the lower radiator hose to the inlet opening of the coolant pump where the cycle of events is repeated.
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8. Most engines are equipped with a 195 degree thermostat and as a result, will operate between 195 and 215 degrees, which is the opening point and the fully open temperature of the thermostat.
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