

Name \_\_\_\_\_

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

1) Explain why a 50/50 mixture of antifreeze and water is commonly used as a coolant.

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2) What is normal operating coolant temperature?

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

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4) What are 5 common causes of overheating?

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5) Explain the operation of a thermostatic cooling fan.

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6) Explain the purpose of the coolant system bypass.

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7) Describe the three ways to test a thermostat.

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8) Why is a cooling system pressurized?

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9) Explain the flow of coolant through the engine and the radiator.

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## Answer Key

Testname: ENGINEPERF5\_SHORT8

- 1) 50/50 mixture of antifreeze and water is used because water is a better conductor of heat than antifreeze, and at a 50/50 mixture, the freezing temperature is low enough for most parts of the country.  
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- 2) 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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- 3) To service a cooling system, the coolant should be drained, and then a water hose or flushing machine is attached and allowed to operate until all of the old coolant has been removed. New coolant of the specified type is then added to achieve a 50/50 mixture of antifreeze and water.  
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- 4) Common 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 problemPage Ref: 147
- 5) A thermostatic cooling fan uses a silicone coupling between the drive and the blades of the fan. When the temperature reaches a predetermined point, the silicone expands into a chamber, locking the drive to the fan blades.  
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- 6) The purpose of the bypass is to allow coolant flow through the engine when the thermostat is closed.  
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- 7) The three ways to test a thermostat include:
  1. Hot water method
  2. Infrared pyrometer method
  3. Scan tool methodPage Ref: 134
- 8) The cooling system is pressurized because under pressure, the coolant boiling temperature is increased.  
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- 9) The flow of coolant through the engine and the radiator starts when the thermostat opens. Coolant flows through the thermostat to the upper radiator hose and then through the radiator. After the coolant is cooled in the radiator, it is drawn into the water pump. It is then forced out and through the block and cylinder head(s) and then back to the thermostat.  
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