

Name \_\_\_\_\_

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

1) What is the function of a PTC heater, and why is it used in an HEV heating system?

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2) What is the difference between IAT and OAT/HOAT coolants?

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3) What is the operation of the coolant heat storage system?

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4) Why is the motor-electronics cooling system separate from that of the ICE?

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## Answer Key

Testname: HYBRID4\_SHORT12

- 1) A PTC (positive temperature coefficient) heater is an electric-powered heater that uses a resistance element. In hybrid-electric vehicles, a PTC heater can be used to boost cabin heat when the ICE operating temperature is low. This can be accomplished through use of a heating element located in the vehicle's heater core, or with heating grids in the air ducting.  
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- 2) IAT (inorganic additive technology) coolants use silicates for corrosion inhibitors. The abrasive nature of silicates and the relatively short service life of IAT coolants prompted automobile manufacturers to develop corrosion inhibitor packages that reduced or eliminated silicates. OAT (organic acid technology) and HOAT (hybrid organic acid technology) are examples of corrosion inhibitors that are used in today's extended-life coolants.  
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- 3) The coolant heat storage system is used in the 2nd generation Toyota Prius to enable quicker starts and reduce cold-start emissions. When the ICE is at operating temperature, hot coolant is stored in a storage tank that is constructed similar to a Thermos® bottle. This coolant is then used to warm the cylinder head of the ICE prior to a cold start.  
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- 4) The motor-electronics cooling system is separate from the ICE cooling system because electronic components tend to operate more efficiently at lower temperatures. While the ICE should be operated at close to 200 degree F at all times, electronic components should be kept cooler than this and thus must use a separate cooling system.  
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