

Name \_\_\_\_\_

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

1) What are the differences in the operation of an automatic transmission that has been modified for use in a hybrid electric vehicle?

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2) What are the three elements in a torque converter, and how is torque increased during vortex flow?

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3) Why does a CVT maximize the efficiency of an internal combustion engine?

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4) What is the difference between torque and horsepower?

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## Answer Key

Testname: HYBRID4\_SHORT11

1) An automatic transmission in a hybrid-electric vehicle will have two primary modifications. First, an electric auxiliary pump will be installed that maintains transmission line pressure during idle stop mode. Second, the transmission will prevent “coasting” during slowdown and braking and will allow torque to be transmitted from the drive wheels to the ICE to enable regenerative braking.

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2) The three elements in a torque converter are the pump (impeller), the turbine, and the stator. During vortex flow, the pump is turning faster than the turbine. The pump sends fluid into the turbine, and the fluid flows through the turbine assembly and then enters the stator. The stator assembly redirects the fluid flow into the pump inlet in such a way that the pump is “supercharged” and torque is thus increased across the torque converter assembly. During vortex flow, the stator assembly is locked on its one-way clutch and remains stationary.

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3) A continuously variable transmission (CVT) maximizes the efficiency of an ICE by constantly varying its gear ratio so that the ICE can run in its most efficient RPM range for all vehicle speeds.

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4) Torque is twisting force. For instance, engine torque is the twisting force that is developed at the crankshaft when the engine is running. Horsepower is the rate at which work is done, and is a function of torque and engine RPM.

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