

Power Electronics

1. The internal resistance of the HV battery modules _____.

- a. Can be determined by using a scan tool
- b. Can be measured using an ohmmeter after removing the modules from the battery pack
- c. Has to be determined using a special high-voltage tester
- d. Can be calculated from using the current draw of the traction motor and the HV battery SOC

2. The ICE does not stop running when warm and at idle speed. What could be the cause?

- a. Any problem with the ICE MAF sensor
- b. A low SOC of the HV voltage battery
- c. A fault with the HV battery
- d. Either b or c

3. When working on a hybrid electric vehicle (HEV), what type of meter leads should be used with the DMM?

- a. Leads with alligator clips
- b. CAT III rate leads
- c. DOT-approved leads
- d. SAE-approved leads

4. A factory-level aftermarket scan tool was used to retrieve two diagnostic trouble codes (DTCs). There were a P0A80 and P3006. These codes mean _____

- a. The P0A30 is a false code because it has a letter instead of all numbers
- b. The P3006 is a factory DTC
- c. Both codes could be retrieved using a global (generic) scan tool (code reader)
- d. The P0A30 is a factory code

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5. The master warning lamp on the dash is on. There are many DTCs set and the driver stated that the vehicle was run out of gas when the warning light came on. What is the best approach to fix this problem?

- a. Perform a circuit check of the high-voltage system checking for loss of insulation
- b. Disconnect the HV battery service plug and check the system for damage related to the HV system and electronic drive system
- c. Clear the codes and verify that they do not return
- d. Check the ICE fluids and restore to proper level

6. Before disconnecting the high-voltage service plug, what should be done?

- a. Wear HV gloves
- b. Disconnect the 12-volt auxiliary battery or specified fuse/relay
- c. Check service information to determine how to gain access to the high-voltage plug
- d. All of the above

7. The start button is pushed and the dash lights up but the vehicle does not move and the ready to move light is not on. What is the most likely cause?

- a. A weak (low charge) 12-volt auxiliary battery
- b. The driver did not depress the brake pedal and the system is in the accessory mode
- c. A discharge HV battery pack
- d. A fault with the ignition on switch

8. What is used to conduct heat from the inverter–converter to the area where the coolant flows?

- a. Heat conductive grease
- b. Engine oil
- c. ATF
- d. Silicone grease

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9. A hybrid electric vehicle (HEV) has been in an accident. The service technician wants to check to make sure that the high voltage (HV) cables have not been hurt or have lost their electrical isolation (insulation). How is this test performed?

- a. Disconnect both cables at both ends and measure the resistance between the two cables. It should be more than 10k ohms
- b. Remove the service plug and allow the capacitors to discharge and then measure the voltage between the two terminals
- c. After removing the HV cable from the vehicle, measure the resistance and they should be less than 0.1 ohm per foot of length
- d. Use an insulator tester and after disconnecting the high-voltage cable, connect one tester lead to the terminal of the cable and the other to a good chassis ground. The results should be greater than one million ohms

10. The 12-volt auxiliary battery has been charged and even replaced several times due to low charge. The voltage of the battery as shown on a scan tool display and a DMM shows 11.2 volts. What is the most likely cause?

- a. A too small auxiliary battery
- b. A defective DC/DC converter
- c. A defective alternator
- d. A defective inverter

11. Where are the high-voltage capacitors located?

- a. Under the HV battery pack on most HEVs
- b. Inside the inverter/converter compartment
- c. Usually attached to the ICE and they share the ICE cooling system
- d. Under the vehicle between the HV battery and the ICE

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12. The AC/DC inverter cooling pump is being replaced because it stopped functioning. What type of coolant should be used when refilling the system?

- a. Premixed universal coolant only
- b. The coolant that is recommended
- c. Blue coolant that has a dielectric additive included
- d. Any of the above

13. The system main relays (SMR) may trip and disable the vehicle if what occurs?

- a. An airbag deploys
- b. The vehicle is submerged in water
- c. The system detects a fault in the insulation (isolation) between the HV system and the chassis ground
- d. Any of the above

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Answer Key

1. a

2. d

3. b

4. b

5. c

6. d

7. b

8. a

9. d

10. b

11. b

12. b

13. d