Skilled Trades

ASE-L3

Automotive Service Excellence: Light Duty Hybrid/Electric Vehicle

Latest Version: 6.0

Question: 1

Which of the following is true regarding performing a compression test on a hybrid vehicle?

A. The inverter must be disconnected before performing the test.
B. The engine will have a higher compression reading than that of a typical vehicle.
C. The engine will have a higher vacuum reading than that of a typical vehicle.
D. A scan tool must often be used to perform the test.

Answer: D

Explanation:
On many hybrid vehicles, a scan tool must be used before performing a compression test. This is done to place the vehicle in a specific diagnostic mode.

Question: 2

The Toyota Prius is an example of which of the following?

A. Micro hybrid
B. Series hybrid
C. Series-parallel hybrid
D. Parallel hybrid

Answer: C

Explanation:
The Toyota Prius is an example of a series-parallel hybrid. This design incorporates a power split device that allows for the power path from the engine to the wheels to be connected to either of the motor/generators.

Question: 3

The general procedure of compression testing an Atkinson engine is to

A. disable the fuel while having a scan tool connected to the vehicle.
B. disable the spark while having a lab scope connected to the battery.
C. disable the spark while having the scan tool connected to the vehicle.
D. disable the fuel while having a lab scope connected to the battery.

Answer: D

Explanation:
Disabling the fuel while having a lab scope connected to the battery is the general procedure for compression testing an Atkinson cycle engine.

Question: 4

All the following are true regarding hybrid electric motors except:

A. They utilize three circuit conductors that reach their peak values at different times.
B. They carry three alternating currents of different frequencies.
C. They can produce a magnetic field that rotates in a specific direction.
D. They produce a constant power level throughout each cycle of current.

Answer: B

Explanation:
Hybrid vehicles typically use three-phase AC motors. In this design, three circuit conductors carry an AC current of the same frequency, but different phases. This means the current cycles will reach their peak values at different times. All the other options are true.

Question: 5

On a hybrid, the 12-volt battery is charged by what?

A. DC-to-DC converter
B. Inverter
C. Generator
D. Alternator

Answer: A

Explanation:
All hybrids use the DC-to-DC converter to charge the 12-volt battery and run the 12-volt system after start up.

Question: 6

Technician A says all hybrid motors have brushes. Technician B says all hybrid motors are three-phase. Who is correct?

A. Neither A nor B
B. Both A and B
C. Technician A
D. Technician B

Answer: D

Explanation:
Only technician B is correct. All hybrid motors are three-phase, brushless motors.

Question: 7

Technician A says a high-voltage battery cell can be tested with a CAT III multimeter. Technician B says cotton clothing should be worn when working on HV batteries. Who is correct?

A. Both A and B
B. Neither A nor B
C. Technician A
D. Technician B

Answer: A

Explanation:
Both technicians are correct. Battery cell voltage can be checked with a CAT III multimeter. Cotton clothing should be worn because it is less flammable than synthetic clothing.

Question: 8

All the following are true regarding a compression test on an HEV Atkinson cycle ICE EXCEPT:

A. Performing a relative compression test on an Atkinson cycle HEV is a complicated procedure.
B. A lab scope can be used for relative compression testing an Atkinson cycle ICE engine.
C. Some factory scan tools make relative compression testing available through the scan tool.
D. The specifications for relative compression testing are located in the vehicle owner's manual.

Answer: D

Explanation:
The specifications for compression testing vehicles are located within the service manual, not the owner's manual.

Question: 9

Technician A says some hybrid vehicles use direct fuel injection. Technician B says some hybrid vehicles use port fuel injection. Who is correct?

A. Both A and B
B. Neither A nor B
C. Technician A

D. Technician B

Answer: A

Explanation:
Both technicians are correct. Some hybrid vehicles use direct fuel injection, and others use port fuel injection.

Question: 10

During A/C system testing, a technician finds a high-side pressure reading that is too low and a low-side pressure reading that is too high. Which of the following is the most likely cause?

A. Refrigerant overcharge
B. Expansion valve stuck open
C. Damaged compressor
D. Condenser restriction

Answer: C

Explanation:
A high-side pressure reading that is too low and a low-side pressure reading that is too high typically indicates either a failed compressor or a loose drive belt. All the other options would result in both the high and low side being too high.

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