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Question: 1

Two technicians are discussing the engine cooling system. Technician A says all coolant contains ethylene glycol. Technician B says coolant color reflects the additives it contains. Who is correct?

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

Answer: D

Explanation:

Neither technician is correct. Until the mid-1990s, ethylene-glycol-based engine coolant was standard. Since then, most automakers have switched to propylene-glycol-based coolant, which is less toxic and lasts longer. All coolant and additives start out transparent and nearly colorless. Coolant color, such as yellow, pink, red, blue, and others, is simply the result of dye added to differentiate one brand from another.

Question: 2

Two technicians are discussing air conditioner performance. The air outlet is cold, but not much air is coming out of the vents. Technician A says to check the cabin air filter. Technician B says the fuse for the blower motor is blown. Who is correct?

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

Answer: C

Explanation:

Only technician A is correct. A clogged cabin air filter can restrict airflow, leading to poor heater and air conditioning performance. If the blower motor fuse was blown, there would be no airflow at all.

Question: 3

CV axles are being discussed. Technician A says the inner joint allows 40 degrees or more of movement for the front wheels to turn. Technician B says the outer CV joint allows the front wheels to move up and down during regular suspension travel.

Who is correct?

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

Answer: D

Explanation:

Only technician B is correct. The outer CV joint allows for up to 40 degrees of articulation for both suspension travel and front wheel turning.

Question: 4

The fluid level on an automatic transmission registers at the "add" mark. Generally, this indicates the fluid is down by how much?

- A. 0.25 quarts
- B. 1 quart
- C. 0.5 quarts
- D. 0.75 quarts

Answer: C

Explanation:

Generally, if the automatic transmission fluid level is to the "add" mark on the dipstick, it is about 0.5 quarts low.

Question: 5

Two technicians are considering a typical dual chamber master cylinder. Technician A says hydraulic pressure pushes the pistons back when the driver releases the brake pedal. Technician B says internal springs push the pistons back when the driver releases the brake pedal.

Who is correct?

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

Answer: D

Explanation:

Only technician B is correct. When the driver releases the brake pedal, springs force the pistons back into the master cylinder bore faster than brake fluid can return, uncovering the compensating port and allowing fluid to bleed back into the master cylinder reservoir.

Question: 6

Technician A says a TP reading of 4.24 volts means the throttle is closed. Technician B says a TP reading of 0.50 volts means the throttle is wide open.

Who is correct?

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

Answer: B

Explanation:

Both technicians are incorrect. The throttle position sensor receives a 5-volt reference from the PCM. It then varies this voltage according to throttle position. TP voltage is proportional to throttle position. So, at wide open throttle, TP voltage should be close to 5 volts. When the throttle is closed, TP voltage should be close to 0 volts.

Question: 7

Technician A says binary logic is used in analog systems. Technician B says the binary number system is referred to as a base 16 numbering system.

Who is correct?

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

Answer: B

Explanation:

Both technicians are incorrect. A computer changes analog input signals into digital bits via an analog-to-digital converter. The binary number system consists of just the numbers 1 and 0, a base-2 numbering system.

Analog systems run on variable voltage, and hexadecimal is a base-16 numbering system using digits 0-9 and letters A-F.

Question: 8

Technician A says a variable geometry turbocharger requires a waste gate. Technician B says the variable turbo's adjustable vanes mount to a unison ring that allows them to move.

Who is correct?

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

Answer: D

Explanation:

Correct answer: Technician B

Only technician B is correct. A variable turbocharger is used for boost control and does not require a waste gate. The variable turbo works by changing the position of the vanes as the unison ring rotates. The vanes are opened to minimize flow and closed to increase turbine speed.

Question: 9

What is the outside diameter of a 205/75R15 tire?

- A. 381 mm
- B. 205 mm
- C. 688.5 mm
- D. 154 mm

Answer: C

Explanation:

The outside diameter is calculated by adding the diameter of the rim to twice the sidewall height. In our example, the sidewall height is 75% of the section width, 205 mm, or 153.75 mm. Twice that would be 307.5 mm. Added to the 15" rim diameter (381 mm), it totals 688.5 mm. This is a nominal number, as tread depth and tire pressure affect installed diameter.

The other measurements are incorrect:

- 205 mm is the section width
- 154 mm is approximately the sidewall height
- 381 mm is the wheel diameter

Question: 10

Technician A says a wide-band O₂ sensor heater circuit requires 8 to 10 amps. Technician B says a conventional O₂ sensor heater circuit requires 0.8 to 2.0 amps.

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. A conventional O₂ sensor operates at about 600 degrees and the heater circuit requires 0.8 to 2.0 amps. A wide-band sensor operates from 1,200 to 1,400 degrees and the heater circuit requires 8 to 10 amps.

Question: 11

What type of actuator always uses a potentiometer?

- A. Dual-position
- B. Single-position
- C. Variable-position
- D. Three-position

Answer: C

Explanation:

A variable-position actuator can move to any position in its range. All variable-position actuators use a feedback sensor, or potentiometer, to detect actual position.

Question: 12

A rebound test is being performed. During the test, the steering wheel moves while the vehicle is being bounced.

All of the following could be the cause except:

- A. A damaged steering rack
- B. A damaged control arm
- C. A bent tie rod
- D. A worn strut

Answer: D

Explanation:

If the steering wheel moves during a rebound test, suspect a bent control arm, bent steering rack, or bent tie rod. Worn struts would be indicated by lack of suspension dampening on the first rebound of the test.

Question: 13

Which two methods can be used to repair a crack in an aluminum cylinder head?

- A. Heliarc (TIG) welding and stick welding
- B. Flux welding and MIG welding
- C. Metal-stitching and mig welding
- D. Both metal-stitching and Heliarc (TIG) welding

Answer: D

Explanation:

Some cracks in aluminum heads can be repaired by metal-stitching, drilling, and tapping specialized bolts into the crack to seal it. Cracks in aluminum can also be repaired by TIG welding, also called Heliarc, developed specifically for use on aluminum.

Question: 14

A technician has just finished setting up a ring and pinion set. While turning the pinion gear back and forth, he does not hear any sound.

This indicates:

- A. Proper backlash
- B. Too little backlash
- C. None of these
- D. Too much backlash

Answer: B

Explanation:

No sound indicates too little backlash. If backlash is set correctly, a clicking noise will be heard. If backlash is excessive, a clunking noise will be heard.

Question: 15

Refrigerant changes from a gas to a liquid inside the:

- A. Orifice tube
- B. Suction line
- C. Condenser
- D. Compressor

Answer: C

Explanation:

The condenser is a radiator that dissipates heat from the refrigerant to the outside air. When the hot refrigerant leaves the compressor, it enters the condenser, where it is cooled, turning from a gas into a liquid.

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