

Automotive Electrical and Engine Performance 9th Edition
Chapter 27 – Emission Control Devices Operation and Diagnosis
Quiz B

1. What are the four basic functions of a vehicle computer?
 - a. Input, processing, storage, and output
 - b. Reading, printing, timing, and output
 - c. Memory allocation, processing, resetting, and storage
 - d. Voltage conversion, memory, input, and calibration

2. What role does the exhaust gas recirculation (EGR) system play in emission control?
 - a. Increases combustion temperature to reduce hydrocarbons
 - b. Reduces engine load by routing exhaust gases
 - c. Lowers NOx emissions by reducing peak combustion temperature
 - d. Prevents catalytic converter clogging by reducing carbon buildup

3. What is the primary cause of smog formation?
 - a. Sunlight reacting with unburned hydrocarbons and NOx
 - b. Excessive carbon monoxide from poorly tuned engines
 - c. Sulfur compounds in low-quality fuel
 - d. Ground-level ozone reacting with particulate matter

4. Which type of catalytic converter design minimizes emissions during cold starts?
 - a. Dual-bed converter
 - b. Mini converter or light-off converter
 - c. Ceramic substrate converter
 - d. Rhodium-platinum-palladium converter

5. What is the purpose of a pressure feedback EGR (PFE) sensor?
- a. To measure the pressure difference in the EGR system for PCM feedback
 - b. To regulate exhaust pressure at wide-open throttle
 - c. To monitor valve position and exhaust flow rate
 - d. To detect and correct detonation in real time
6. How does cerium in catalytic converters enhance their functionality?
- a. Catalyzes NOx reduction at low temperatures
 - b. Stores oxygen for oxidation during rich conditions
 - c. Prevents substrate degradation from high temperatures
 - d. Enhances the mechanical durability of the converter
7. Which symptom indicates a stuck-open EGR valve?
- a. Rough idle and stalling at low speeds
 - b. Excessive NOx emissions during cold starts
 - c. Increased fuel economy and reduced engine temperature
 - d. Decreased CO and HC levels in the exhaust
8. What is the function of the PCV valve in crankcase ventilation?
- a. Controls oil flow to the rocker arms
 - b. Regulates air and vapor flow to maintain intake manifold vacuum
 - c. Seals the crankcase during backfire conditions
 - d. Allows free venting of combustion gases to the atmosphere
9. How is a clogged PCV system commonly diagnosed?
- a. Measuring crankcase vacuum using a manometer
 - b. Inspecting valve cover oil seals for damage
 - c. Checking PCV valve flow rate using a vacuum pump
 - d. Listening for abnormal engine sounds during idle

10. What is the primary function of a secondary air-injection (SAI) system?

- a. Introduces fresh air to promote oxidation of HC and CO
- b. Prevents NO_x formation by lowering combustion temperature
- c. Monitors oxygen storage in the catalytic converter
- d. Regulates exhaust backpressure to reduce engine load

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Correct Answers:

1. a
2. c
3. a
4. d
5. c
6. b
7. a
8. b
9. a
10. d