

**Automotive Electrical and Engine Performance 8th Edition**  
**Chapter 27 – Emission Control Devices Operation and Diagnosis**  
**Quiz A**

1. What is the primary function of a catalytic converter in a vehicle?
  - a. Reduce harmful emissions through chemical reactions
  - b. Increase engine efficiency by altering fuel-air mixtures
  - c. Convert mechanical energy into electrical energy
  - d. Enhance exhaust sound quality through resonance
  
2. Which sensor is used in OBD-II systems to monitor catalytic converter efficiency?
  - a. Crankshaft position sensor
  - b. MAP sensor
  - c. Heated oxygen sensor (HO2S)
  - d. Exhaust gas temperature sensor
  
3. What is the effect of the EGR valve being stuck open?
  - a. Increased fuel efficiency
  - b. Smooth idle
  - c. Improved acceleration
  - d. Rough idle or stalling
  
4. What is the main purpose of the Positive Crankcase Ventilation (PCV) system?
  - a. Prevent oil leakage from the engine
  - b. Enhance engine cooling efficiency
  - c. Reduce HC and CO emissions by recirculating crankcase vapors
  - d. Maintain consistent engine vacuum levels

5. During which condition is the EGR system typically inactive?
- a. High engine load
  - b. Wide-open throttle (WOT)
  - c. Moderate cruising speed
  - d. During normal idle operation
6. What is the primary cause of premature catalytic converter failure due to excessive heat?
- a. Intake manifold leaks
  - b. Carbon deposits in the exhaust manifold
  - c. Defective vacuum-controlled solenoids
  - d. Unburned fuel entering the converter
7. What is the function of the cerium in modern catalytic converters?
- a. Improve fuel economy by altering combustion timing
  - b. Store oxygen to assist in oxidation during lean exhaust conditions
  - c. Prevent mechanical wear of the substrate
  - d. Enhance the structural integrity of the catalytic material
8. Why are EGR systems designed to lower combustion temperatures?
- a. To reduce CO and HC emissions
  - b. To enhance fuel vaporization
  - c. To limit the production of NOx emissions
  - d. To prevent thermal cracking of the intake manifold
9. What should the vacuum drop be when activating the EGR valve during engine diagnostics?
- a. 2-4 inch Hg
  - b. 4-6 inch Hg
  - c. 6-8 inch Hg
  - d. 8-10 inch Hg

10. Which condition can lead to catalytic converter efficiency codes (e.g., P0420)?

- a. Blocked fuel injectors
- b. Faulty ignition coil
- c. Oxygen sensor miscalibration
- d. Contaminants like engine oil or antifreeze in the exhaust

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**Correct Answers:**

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