

**Automotive Electrical and Engine Performance 9th Edition**  
**Chapter 40 – Vehicle Emission Standards and Testing**  
**Multiple Choice Questions Quiz A**

1. In a properly functioning combustion process, what percentage of oxygen should ideally remain in the exhaust gases?

- a) 12% to 15%
- b) 5% to 7%
- c) 8% to 10%
- d) 0% to 2%

2. Technician A states that high levels of hydrocarbons (HC) in exhaust gases often indicate unburned fuel due to misfires. Technician B states that high HC levels suggest complete combustion. Who is correct?

- a) Technician A only
- b) Technician B only
- c) Both Technician A and Technician B
- d) Neither Technician A nor B

3. Which component in an emission control system reduces nitrogen oxides (NO<sub>x</sub>) by recirculating a portion of exhaust gases back into the intake manifold?

- a) Catalytic converter
- b) Exhaust manifold
- c) EGR (Exhaust Gas Recirculation) valve
- d) Air injection pump

4. In exhaust gas analysis, which compound is known as the "rich indicator" due to its increased presence in fuel-rich mixtures?

- a) HC
- b) CO
- c) CO<sub>2</sub>
- d) O<sub>2</sub>

5. When the oxygen sensor detects a high concentration of  $O_2$  in the exhaust, this typically indicates:
- a) A fuel-rich mixture
  - b) A lean mixture with excess air
  - c) Increased  $NO_x$  formation
  - d) Proper stoichiometric balance
6. Excessive carbon monoxide (CO) in the exhaust emissions is often caused by:
- a) Excessive EGR flow
  - b) Too lean of an air-fuel mixture
  - c) Too rich of an air-fuel mixture
  - d) High intake air temperatures
7. A catalytic converter's primary function in emission control is to:
- a) Add air to the exhaust stream
  - b) Cool exhaust gases before exiting
  - c) Facilitate chemical reactions to reduce HC, CO, and  $NO_x$
  - d) Reduce fuel consumption during idle
8. What is the effect of an improperly timed exhaust camshaft on  $NO_x$  emissions?
- a) No effect on  $NO_x$  levels
  - b) Increased  $NO_x$  due to higher combustion temperatures
  - c) Reduced  $NO_x$  due to lower combustion efficiency
  - d) Variable effect depending on fuel type
9. Technician A says that the OBD-II system activates the MIL when emissions exceed 1.5 times the federal limit. Technician B says the OBD-II system only tracks CO and HC emissions. Who is correct?
- a) Technician A only
  - b) Technician B only
  - c) Both Technician A and Technician B
  - d) Neither Technician A nor B

10. Which exhaust gas component is primarily responsible for smog formation and eye irritation at ground level?

a) CO<sub>2</sub>

b) NO<sub>x</sub>

c) HC

d) O<sub>3</sub> (ozone)

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**Answer Key Quiz A**

**Correct Answers:**

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