Automotive Electrical and Engine Performance 9th Edition
Chapter 33 – Narrow and Wide-Band Oxygen Sensors
Multiple Choice Questions Quiz B

1. What is the purpose of the oxygen sensor in a vehicle's exhaust system?

a. To control air pressure in the exhaust manifold

b. To monitor the oxygen content in exhaust gases and adjust fuel trim

c. To measure nitrogen levels in combustion

d. To regulate throttle position in closed-loop operation

2. How does a narrow-band oxygen sensor detect air–fuel mixture variations?

a. By using an onboard reference voltage circuit

b. By switching between rich and lean conditions at 450 mV

c. By directly measuring oxygen concentration in parts per million

d. By generating current proportional to the air–fuel ratio

3. Which type of sensor is capable of detecting air–fuel ratios beyond stoichiometric limits?

a. Narrow-band oxygen sensor

b. Cylinder head temperature sensor

c. Wide-band oxygen sensor

d. Knock sensor

4. What is the typical voltage range of a zirconia oxygen sensor when the exhaust is lean?

a. 0.2–0.3 volts

b. 0.6–1.0 volts

c. 2.2–3.3 volts

d. Below 0.1 volts

5. Why are heated oxygen sensors (HO2S) often used in modern vehicles?

a. To eliminate the need for wiring harnesses

b. To function without PCM control

c. To warm the sensor quickly for accurate closed-loop operation

d. To reduce the effects of carbon buildup

6. How does the PCM adjust fuel delivery using feedback from the oxygen sensor?

a. By relying solely on preprogrammed fuel maps

b. By modifying injector pulse width based on rich or lean signals

c. By varying ignition timing in response to engine speed

d. By controlling spark energy in the ignition coil

7. What could cause an oxygen sensor to indicate a false lean condition?

a. A clogged air filter

b. A faulty mass airflow sensor

c. An exhaust leak before the sensor

d. Low fuel pressure

8. Which type of diagnostic tool is commonly used to test the switching response of an oxygen sensor?

a. Multimeter

b. Scan tool

c. Digital storage oscilloscope

d. Vacuum gauge

9. What does long-term fuel trim (LTFT) indicate when diagnosing fuel system performance?

a. Rapid changes in air–fuel mixture based on sensor feedback

b. Adjustments made by the PCM to maintain proper air–fuel ratios over time

c. Engine response to throttle position changes

d. Inconsistent operation of the ignition system

10. How is an oxygen sensor tested for proper operation?

a. Using a propane enrichment test

b. By replacing the sensor and observing results

c. Using a vacuum gauge to monitor intake pressure

d. By cleaning the sensor with a solvent

Automotive Electrical and Engine Performance 9th Edition
Chapter 33 – Narrow and Wide-Band Oxygen Sensors
Answer Key Quiz B

Correct Answers:

1. b

2. c

3. c

4. a

5. d

6. b

7. c

8. a

9. b

10. a