Automotive Electrical and Engine Performance 9th Edition
Chapter 23 – Gasoline Direct-Injection (GDI) Systems
Quiz B

1. What are the two main advantages of Gasoline Direct Injection (GDI) over port fuel injection systems?

a. Improved fuel economy and reduced emissions

b. Enhanced injector spray pattern and durability

c. Less carbon buildup and higher injector resistance

d. Simplified components and lower maintenance costs

2. How is fuel pressure regulated in a GDI system?

a. Through a vacuum-biased regulator

b. With an electronic pressure-control valve

c. Using a mechanical returnless system

d. By a combination of spring and diaphragm action

3. What powers the high-pressure fuel pump in most GDI systems?

a. A dedicated electric motor

b. The engine's camshaft

c. The vehicle's crankshaft

d. An auxiliary drive belt

4. Which mode of operation in GDI systems results in the richest air–fuel mixture near the spark plug?

a. Stratified mode

b. Homogeneous mode

c. Knock protection mode

d. Catalyst heating mode

5. Why must high-pressure fuel lines in a GDI system be replaced after removal?

a. The ball-ends deform and will not seal properly if reused.

b. They become structurally weak after prolonged use.

c. High torque during removal damages the line's integrity.

d. Fuel pressure cannot be maintained in reused lines.

6. What is a major cause of carbon buildup in GDI systems?

a. Poor-quality fuel

b. Residual combustion deposits on injector tips and intake valves

c. Excessive injector pulse width

d. Overuse of lower-octane fuels

7. In GDI systems, what is the typical range of voltage required to activate the fuel injectors?

a. 12–15 volts

b. 50–90 volts

c. 100–120 volts

d. 200–250 volts

8. What is the purpose of the stratified catalyst heating mode in GDI operation?

a. To reduce carbon buildup on injectors

b. To rapidly warm the catalytic converter

c. To enhance combustion chamber cooling

d. To minimize injector wear during cold starts

9. How does the PCM control injector pulse width in a GDI system?

a. By modulating low-pressure pump speed

b. Through adaptive memory and real-time feedback from sensors

c. By adjusting the mechanical valve timing

d. Using throttle position data only

10. What piston design is used in GDI systems to enhance air–fuel mixing?

a. Flat-top pistons for even distribution

b. Spray-guided or swirl combustion pistons

c. High-turbulence pistons for high-load conditions

d. Variable geometry pistons

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Correct Answers:

1. a

2. c

3. b

4. a

5. d

6. d

7. a

8. b

9. c

10. a