Automotive Electrical and Engine Performance 9th Edition
Chapter 36 – Gasoline Direct-Injection (GDI) System
Multiple Choice Questions Quiz B

1. What distinguishes gasoline direct injection (GDI) from port fuel injection?

a. Consistent fuel pressure with variable pulse width

b. Injection into the intake manifold upstream from the valve

c. Variable pressure with a fixed pulse width

d. Injection of high-pressure fuel directly into the combustion chamber

2. What is the typical pressure range of a high-pressure fuel pump in a GDI system?

a. 500 to 2,900 PSI

b. 35 to 60 PSI

c. 200 to 500 PSI

d. 3,000 to 5,000 PSI

3. What is one significant advantage of GDI compared to port fuel injection?

a. Simplified components and lower costs

b. Reduction in spark plug fouling

c. Improved fuel economy and reduced emissions

d. Decreased injector voltage requirements

4. What is the primary mode of operation in a GDI engine when air–fuel mixture is richer near the spark plug?

a. Stratified mode

b. Homogeneous mode

c. Knock protection mode

d. Catalyst heating mode

5. What function does the high-voltage capacitor in the PCM serve in a GDI system?

a. It provides additional voltage to increase the injector pulse duration.

b. It boosts injector voltage for opening and then maintains 12 volts for holding.

c. It stores data about injector timing and synchrony.

d. It stabilizes fluctuations in low-pressure fuel lines.

6. Which design helps GDI pistons guide the fuel spray for optimal combustion?

a. Tapered exhaust valves

b. Side-mounted injectors

c. Swirl combustion chamber shapes

d. Flat-bottom piston heads

7. Why is carbon buildup a common issue in GDI engines?

a. Poor cooling from water jackets around injectors

b. Low injector voltage resulting in incomplete combustion

c. Lack of fuel spray over intake valves to wash away deposits

d. Excessive use of Top Tier fuel

8. Which mode of operation is used in GDI systems to warm up the catalytic converter quickly?

a. Homogeneous lean mode

b. Knock protection mode

c. Stratified catalyst heating mode

d. Double-injection mode

9. Why is it critical to replace high-pressure fuel lines in GDI systems after removal?

a. To prevent fuel contamination from residual debris

b. Because the ball-ends deform and cannot reseal properly

c. To recalibrate the PCM for pressure optimization

d. To eliminate leaks caused by carbon buildup

10. What voltage is typically required to pulse GDI injectors open?

a. 50 to 90 volts

b. 12 to 14 volts

c. 24 to 36 volts

d. 100 to 110 volts

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Answer Key Quiz B

Correct Answers:

1. d

2. a

3. c

4. a

5. c

6. a

7. d

8. c

9. b

10. a