

**Automotive Electrical and Engine Performance 8th 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?
- The ball-ends deform and will not seal properly if reused.
  - They become structurally weak after prolonged use.
  - High torque during removal damages the line's integrity.
  - Fuel pressure cannot be maintained in reused lines.
6. What is a major cause of carbon buildup in GDI systems?
- Poor-quality fuel
  - Residual combustion deposits on injector tips and intake valves
  - Excessive injector pulse width
  - Overuse of lower-octane fuels
7. In GDI systems, what is the typical range of voltage required to activate the fuel injectors?
- 12–15 volts
  - 50–90 volts
  - 100–120 volts
  - 200–250 volts
8. What is the purpose of the stratified catalyst heating mode in GDI operation?
- To reduce carbon buildup on injectors
  - To rapidly warm the catalytic converter
  - To enhance combustion chamber cooling
  - To minimize injector wear during cold starts
9. How does the PCM control injector pulse width in a GDI system?
- By modulating low-pressure pump speed
  - Through adaptive memory and real-time feedback from sensors
  - By adjusting the mechanical valve timing
  - 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

**Automotive Electrical and Engine Performance 8th Edition**  
**Chapter 23 – Gasoline Direct-Injection (GDI) Systems**  
**Quiz B**

**Correct Answers:**

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