

Steering System Fundamentals

Name: _____ Date: _____

Instructor: _____ Score: _____ Textbook pages 1287–1309

Objective: After studying this chapter, you will be able to summarize the construction and operation of steering systems.

Basic Steering Systems

1. Today's steering systems are very sophisticated. They may use _____ and _____ to improve steering precision. 1. _____

2. List five functions of a steering system.

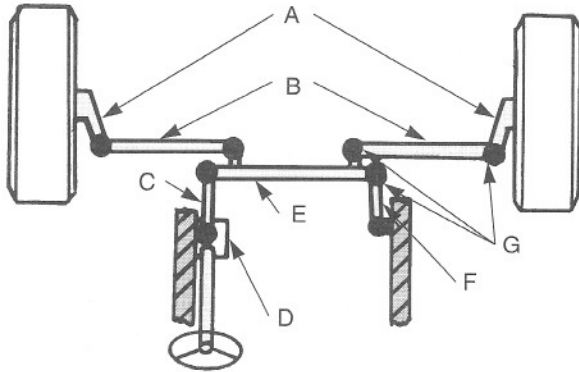
3. What are the two basic types of steering systems? _____

■ Match the linkage steering system part to its corresponding description.

- | | | |
|---|----------------------|----------|
| 4. Connects steering gearbox to steering knuckles and wheels. | (A) Steering wheel | 4. _____ |
| 5. Supports steering wheel and steering shaft. | (B) Steering shaft | 5. _____ |
| 6. Transfers turning motion from steering wheel to steering gearbox. | (C) Steering column | 6. _____ |
| 7. Allow linkage arms to swivel up and down for suspension action and from left to right for turning. | (D) Steering gearbox | 7. _____ |
| 8. Changes turning motion into straight-line motion to the left or right. | (E) Steering linkage | 8. _____ |
| 9. Used by driver to rotate steering shaft that passes through steering column. | (F) Ball sockets | 9. _____ |

10. Describe a rack-and-pinion steering system. _____

11. Label the parts of the linkage steering system.



- (A) _____
- (B) _____
- (C) _____
- (D) _____
- (E) _____
- (F) _____
- (G) _____

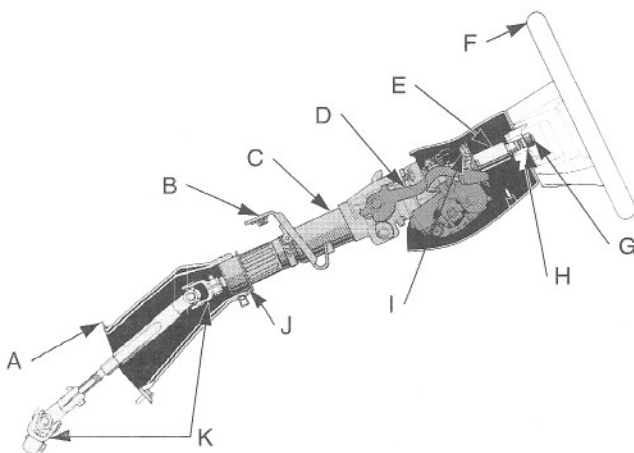
Steering Column Assembly

12. The steering column assembly consists of a _____.
 (A) column and ignition key mechanism
 (B) steering wheel and steering shaft
 (C) flexible coupling and universal joint
 (D) All of the above.

12. _____

13. What components typically make up the steering column assembly? _____

14. Label the steering column components.



- (A) _____
- (B) _____
- (C) _____
- (D) _____
- (E) _____
- (F) _____
- (G) _____
- (H) _____
- (I) _____
- (J) _____
- (K) _____

15. A(n) _____ steering wheel commonly uses a steel pin and a slotted disc to prevent the steering wheel from being turned. 15. _____
16. List the three types of collapsible steering columns in use today. _____

17. A(n) _____ steering wheel uses a flex joint that allows the top of the column and steering wheel to be positioned at different angles. 17. _____

Steering Gear Principles

18. The _____ gearbox is the most common type used with a linkage type system. 18. _____
19. *True or False?* The sector shaft is the input gear connected to the steering column shaft. 19. _____
20. A bearing _____ is usually provided to set worm shaft bearing preload. 20. _____
21. What is *gearbox ratio*? _____

22. A manual gearbox will have a _____ (high/low) gearbox ratio to reduce the amount of effort needed to turn the steering wheel. 22. _____
23. A(n) _____ gearbox changes the internal gear ratio as the front wheels are turned from the center position. 23. _____

Steering Linkage

24. The _____ transfers gearbox motion to the steering linkage. 24. _____
25. The steel bar that connects the right and left sides of the steering linkage is called the _____. 25. _____
26. What purpose does the *idler arm* serve? _____

27. What is used to fasten the center link to the steering knuckles? 27. _____

Rack-and-Pinion Steering

28. What function does the flexible coupling serve? _____

29. Power steering systems normally use a(n) _____ to assist steering action. 29. _____
 (A) hydraulic system
 (B) engine-driven pump
 (C) electric motor
 (D) All of the above.
30. A(n) _____ is used in a power steering system to control maximum oil pressure. 30. _____

31. Explain the difference between *integral* and *external* cylinder power steering.

32. Explain these four basic parts of a power rack-and-pinion system.

Power cylinder: _____

Power piston: _____

Hydraulic lines: _____

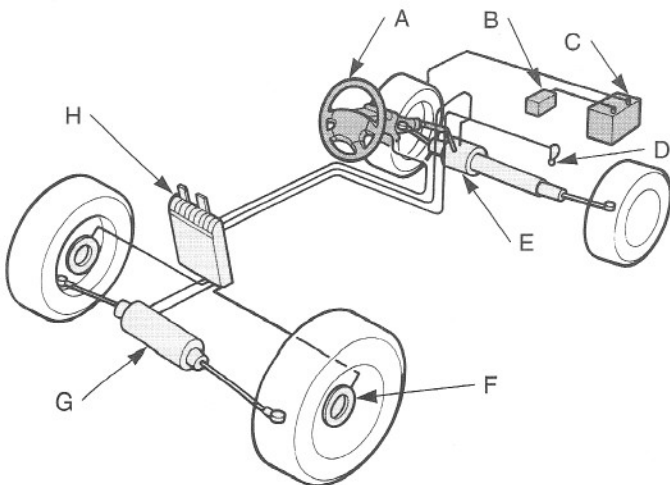
Control valve: _____

33. How can a steering system intentionally affect engine idle speed? _____

34. What is *road feel*? _____

35. _____ steering systems alter steering wheel effort as road speed changes. 35. _____

36. Label the parts of the four-wheel steering system.



- (A) _____
- (B) _____
- (C) _____
- (D) _____
- (E) _____
- (F) _____
- (G) _____
- (H) _____