

# Chapter 35

## Ignition System Diagnosis, Testing, and Repair



Name \_\_\_\_\_ Date \_\_\_\_\_

Instructor \_\_\_\_\_ Score \_\_\_\_\_

**Objective:** After studying this chapter, you will be able to troubleshoot and repair common ignition system troubles.

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### Ignition System Diagnosis

1. Name three obvious problems to look for when visually inspecting the ignition system.

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2. What ignition system circuits and components can a scan tool be used to check?

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3. What does it mean if your scan tool displays a misfire code?

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4. Which test is a quick and easy way of checking the general operation of the ignition system?

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5. Why should the engine only be run for a short period of time with a spark plug wire or direct ignition coil off?

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6. What qualities indicate a strong spark?

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- \_\_\_\_\_ 7. If a strong spark is present, the engine no-start problem may be due to \_\_\_\_\_.  
(A) ignition switch problems  
(B) fouled spark plugs  
(C) fuel system problems  
(D) All of the above.
8. A weak spark or no spark indicates that something is \_\_\_\_\_  
wrong in the \_\_\_\_\_ circuit.
9. What are the symptoms of a dead cylinder?  
\_\_\_\_\_  
\_\_\_\_\_
10. How do you check for a dead cylinder?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
11. How do you check for high-voltage leakage?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
12. The ignition primary voltage test checks the voltage \_\_\_\_\_  
being fed to the \_\_\_\_\_.

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## Spark Plug Service

13. List some of the problems caused by bad spark plugs.  
\_\_\_\_\_  
\_\_\_\_\_
14. How do you "read" spark plugs?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Name \_\_\_\_\_

15. With a high-mileage engine, what can happen to the spark plug tip and electrodes?

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16. In your own words, how do you gap spark plugs?

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17. Why is it incorrect to use the ratchet to start spark plug threads?

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## Secondary Wire Service

18. Why is secondary wire leakage a problem?

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19. A(n) \_\_\_\_\_ test is used to check for sparks arcing \_\_\_\_\_ through the insulation to ground.

20. Explain what to look for when testing secondary wire resistance readings with an ohmmeter.

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- \_\_\_\_\_ 21. All of the following are true about installing new spark plug wires, *except*:

- (A) compare the old wire's length with the new wire's length.
- (B) make sure the new wire is fully attached in the coil module.
- (C) replace each wire with one of a longer or shorter length.
- (D) make sure the new wire is fully attached on the plug.

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## Ignition Timing Service

22. What are the symptoms of over-advanced ignition timing?

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- 23. The engine will be sluggish during acceleration, and the engine will have poor fuel economy if the ignition timing is too \_\_\_\_\_. \_\_\_\_\_
- 24. *True or False?* In late-model vehicles, ignition timing cannot be adjusted mechanically. \_\_\_\_\_
- 25. With difficult-to-locate ignition timing-related problems, compare the signals from the \_\_\_\_\_ and \_\_\_\_\_ sensors with scan tool live timing data to get more information that will help you find a solution. \_\_\_\_\_
- 26. *True or False?* Make and model specific software on a personal computer or laptop must be downloaded into the engine ECM to change the ignition timing of late-model vehicles. \_\_\_\_\_

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## Ignition Coil (Coil Pack) Service

- 27. What will a faulty ignition coil cause?  
\_\_\_\_\_  
\_\_\_\_\_
- 28. If you find misfiring or dead cylinders that correspond to one coil in a coil pack, suspect the \_\_\_\_\_.
- 29. Normally, a bad coil pack winding will show \_\_\_\_\_ resistance. \_\_\_\_\_
- 30. Explain how a direct ignition coil is tested.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- \_\_\_\_\_ 31. After extended service, the \_\_\_\_\_ on a direct ignition coil can harden and crack, which can allow moisture to enter the spark plug hole.
  - (A) rotor
  - (B) rubber boot
  - (C) contact points
  - (D) windings

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## Ignition Switch Service

- 32. What problems could a bad ignition switch cause?  
\_\_\_\_\_  
\_\_\_\_\_
- 33. When testing an ignition switch, a test light should glow when the key has been turned to \_\_\_\_\_.

Name \_\_\_\_\_

34. How do you remove a steering column-mounted ignition switch?

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## Ignition Control Module Service

35. What problems will a faulty ignition control module produce?

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36. When do ignition control unit problems typically occur and why?

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37. With modern computer-controlled ignition systems, the dwell time is controlled by the \_\_\_\_\_ and varies with vehicle make and model.

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38. Modern ignition systems electronically vary the dwell and ignition timing with changes in \_\_\_\_\_ and \_\_\_\_\_.

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For questions 39–41, match the following terms and identifying phrases.

- \_\_\_\_\_ 39. Means the dwell time should remain the same at all engine speeds. (A) Variable dwell  
 \_\_\_\_\_ 40. Means the engine control module sends high current through the ignition coil windings until a strong magnetic field is developed around the coil windings then reduces current to the coil. (B) Fixed dwell  
 \_\_\_\_\_ 41. Means the engine control module alters ignition coil dwell time with engine speed. (C) Current-limiting dwell

42. The ignition control module is one of the \_\_\_\_\_ (first/last) components to test when problems occur.

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43. Why do many technicians use a heat gun or lightbulb to warm the ignition control module?

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44. Why is the bottom of an ignition control module commonly coated with special grease before installation?

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## Ignition System Sensor Service

45. List the steps to adjust crankshaft position sensor air gap.

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46. How do you check a knock sensor?

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