

Chapter 33

Charging System Diagnosis, Testing, and Repair



Name _____ Date _____

Instructor _____ Score _____

Objective: After studying this chapter, you will be able to inspect a 12-volt and high-voltage (HV) charging system to locate obvious troubles.

Charging System Diagnosis

- _____ 1. Technician A says a charging system problem will have little effect on other vehicle systems. Technician B says that sometimes, another system fault will appear to be caused by charging system problems. Who is right?
- (A) A only.
 - (B) B only.
 - (C) Both A and B.
 - (D) Neither A nor B.

- _____ 2. A problem described as a no-charge condition may be caused by a ____.
- (A) shorted starting motor
 - (B) battery drain
 - (C) worn starter pinion
 - (D) Both A and B.

3. *True or False?* A heated windshield produces enough _____ voltage to cause electrocution.

4. Describe three or more things you would check during an inspection of a charging system.

5. How do you check for abnormal noise from an alternator?

6. On most vehicles with self-diagnostic systems, you _____ can connect a(n) _____ to the vehicle to aid in troubleshooting.

12-Volt Charging System Precautions

7. List five precautions to follow when working on a charging system.
- (A) _____

- (B) _____

- (C) _____

- (D) _____

- (E) _____

- _____ 8. Technician A says you should disconnect the battery before connecting it to a battery charger. Technician B says electronic components have internal protection from the high voltages of the battery charger. Who is right?
- (A) A only.
(B) B only.
(C) Both A and B.
(D) Neither A nor B.

- _____ 9. All of the following will occur if battery polarity is reversed, *except*:
- (A) damage to the diodes in the alternator.
(B) the battery will recharge faster.
(C) damage to the voltage regulator circuits.
(D) damage to electronic components in computer systems.

10. Should you operate the alternator with the output wire disconnected? Explain your answer.
- _____

12-Volt Charging System Tests

11. When should a charging system test be performed?
- _____

Name _____

12. Explain the following common charging system tests.

Scan tool test: _____
_____*Load test:* _____
_____*Scope tests:* _____
_____*Voltmeter test:* _____
_____*Circuit resistance tests:* _____

- _____ 13. All of the following test equipment can be used to perform a charging system test,
- except*
- :

- (A) dwell-tach.
- (B) load tester.
- (C) scope tool.
- (D) common VOM.

14. A(n) _____ provides the most accurate method of checking a charging system. _____

15. Before testing the charging system, it is common practice to check the condition of the _____. _____

16. What should you suspect if alternator output current is low?
-
- _____
-
- _____

17. A charging system _____ test involves analyzing the alternator voltage waveform for signs of abnormal ripple. _____

- _____ 18. Two technicians are discussing scope meter usage. Technician A says you should connect both scope leads to the alternator output terminal. Technician B says you should connect one lead to the alternator output terminal and the other to ground. Who is right?

- (A) A only.
- (B) B only.
- (C) Both A and B.
- (D) Neither A nor B.

19. What is the base voltage reading of a fully charged battery?
-
- _____

20. List the seven steps involved in performing a voltmeter test of the charging system.

_____ 21. Technician A says a no-load voltage reading of 0.5–2 volts higher than the base voltage is normal. Technician B says if the no-load voltage is more than 2–3 volts higher than base voltage, the alternator is overcharging the battery. Who is right?
(A) A only.
(B) B only.
(C) Both A and B.
(D) Neither A nor B.

22. What is the purpose of a circuit resistance test?

23. List three wiring problems a circuit resistance test can locate.

24. An insulated-circuit resistance test indicates a portion of the charging system circuit has a voltage drop of 1.9 volts. What does this indicate?

25. How is a ground-circuit resistance test different from an insulated-circuit resistance test?

Name _____

Alternator Service

26. When removing an alternator, what should be done first?

_____ 27. Technician A says, depending on vehicle design, the alternator can come out from the top. Technician B says, depending on vehicle design, the alternator can come out from the bottom. Who is right?

- (A) A only.
- (B) B only.
- (C) Both A and B.
- (D) Neither A nor B.

28. List the steps typically involved with an alternator rebuild.

29. With the battery _____, fit the alternator onto the _____ engine.

_____ 30. All of the following steps should be performed when installing an alternator, *except*:

- (A) check the condition of the alternator belt and replace if needed.
- (B) install and torque the mounting bolts.
- (C) measure the resistance of the ignition coil windings.
- (D) reconnect the wiring harness.

Hybrid Charging System Service

31. *True or False?* HV PCMs generate equal amounts of _____ voltage for the various electrical systems.

32. Name two of the most common problems with HV charging systems.

33. What is the best way to determine the strength of a hybrid's charging system?

- _____ 34. Technician A says that if a hybrid vehicle battery fails to take or hold a proper electrical charge, a trouble code will be set. Technician B says that the best way to become properly trained to diagnose and repair a hybrid charging system is to attend factory training courses or read manufacturer instructions on the specific make and model. Who is right?
- (A) A only.
 - (B) B only.
 - (C) Both A and B.
 - (D) Neither A nor B.