

Chapter 21

Wiring Diagrams and Wiring Repairs



Name _____ Date _____

Instructor _____ Score _____

Objective: After studying this chapter, you will be able to compare wire types and explain the effects of wire size on resistance.

Automotive Wiring

- The wire used in automotive circuits consists of a _____ central _____ conductor surrounded by _____ insulation. _____

For questions 2–8, match the following terms and identifying phrases.

- | | | |
|-------|--|----------------------------------|
| _____ | 2. Has a single conductor inside the plastic insulation. | (A) Secondary wire |
| _____ | 3. Has numerous individual metal strands twisted together inside the insulation. | (B) Parallel wire |
| _____ | 4. Has two or more individually insulated conductors or wires molded into one flat or round body of multicolor insulation. | (C) Secondary nonresistance wire |
| _____ | 5. Small wire that carries low voltage to the components, circuits, and ECUs in a vehicle. | (D) Solid wire |
| _____ | 6. Used to carry high voltage (but little current) in the engine's ignition system. | (E) Secondary resistance wire |
| _____ | 7. Has internal resistance designed into the metal conductor. | (F) Primary wire |
| _____ | 8. Has a stranded metal conductor with no extra carbon resistance. | (G) Stranded wire |

- Name three types of cables.
 - (A) _____
 - (B) _____
 - (C) _____
10. A battery's positive cable usually connects to the _____. _____
11. Coaxial cable has a center _____ surrounded by a braided metal shield. _____
12. _____ consists of multiple insulated conductors wrapped around each other in a spiral pattern. _____

- 13. Upon acceleration, the hybrid power cables feed _____ electrical current back into the _____ to help accelerate and propel the vehicle.
- 14. What color are hybrid power cables?

- 15. _____ consist(s) of copper foil bonded onto a plastic or fiber base to form a compact conductor.
- 16. Wire size limits how much _____ a wire can carry without overheating.
- 17. What is the range for wire gages in an automobile?

- 18. List the factors that determine the resistance in a wire.

- 19. Smaller diameter wire has (more, less) _____ resistance than a larger diameter wire of the same material and design.
- 20. Name three rules that apply to wires and their ability to carry current.

- 21. A set of several wires wrapped together with tape or enclosed together in a plastic sheath for protection is called a(n) _____.

Soldering

- 22. _____ is an alloy that has a relatively low melting point that is used to join electric components or wires.
- 23. Acid-core solder (should, should not) _____ be used for electrical repairs.
- 24. Placing a thin coat of solder on the soldering gun tip or the parts to be soldered is known as _____.
- 25. Identify an alternative to electrical tape.

Name _____

Connectors

For questions 26–28, match the following terms and identifying phrases.

- | | |
|--|-------------------------------|
| _____ 26. Cuts through a wire's insulation and locks onto the conductor. | (A) Crimp connectors |
| _____ 27. Multi-terminal connectors that join several wires and have a special locking feature. | (B) Self-stripping connectors |
| _____ 28. Quick and easy way of joining wires by crushing a metal lug around the wire conductor. | (C) Harness connectors |

29. Apply _____ to the terminals before refastening connectors. _____

30. What causes a "dead short"?

Wiring Repairs

31. You may need to _____ a connector if the connector is damaged and a new one is not available. _____

32. A splice in which the wires are placed end-to-end is called a(n) _____. _____








33. A(n) _____ protects the wiring before it gets to the fuse box. _____

34. Wires should be twisted in the (same, opposite) _____ direction before soldering. _____

Wiring Diagrams

35. In a wiring diagram, symbols represent _____ and lines represent _____. _____

36. Identify the electrical symbols shown.

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

37. Define *wire code identification system*.

38. _____ are places where two or more wires are connected.

39. A (remote, chassis) _____ ground has an extra wire running from the circuit to ground.

40. A (remote, chassis) _____ uses the metal part of a component to attach to ground.

41. Wiring provided in a circuit that may not be in use is known as _____.

42. A junction block is a component that allows several wires to be connected to a common _____.

For questions 43–48, match the following terms and identifying phrases.

- | | | |
|-------|--|--------------------------------|
| _____ | 43. Shows how 12-volt battery current feeds to the main components or sections of the vehicle’s electrical system. | (A) Harness routing diagram |
| _____ | 44. Uses boxes and symbols to illustrate components. | (B) Connector diagram |
| _____ | 45. Shows the location of connectors and identify each terminal in a connector. | (C) Power distribution diagram |
| _____ | 46. A large diagram that contains symbols for all major wiring and electric/electronic components on a vehicle. | (D) Main wiring diagram |
| _____ | 47. Shows how major wiring is arranged and where it is located in the vehicle. | (E) System wiring diagram |
| _____ | 48. Contains only the components and wires for a particular circuit. | (F) Block diagram |

49. A(n) _____ is used to locate components or connections quickly on a large wiring diagram.
