

Chapter 35 Electric Circuits

Exercises

35.1 A Battery and a Bulb (pages 703–704)

1. A _____ is a complete path along which charge can flow.
2. Circle the letter of each statement that is true about a completed electric circuit consisting of a battery, a lightbulb, and two wires.
 - a. Electrons flow from the positive terminal of the battery to the negative terminal.
 - b. The battery acts like a pump, causing current to flow through the circuit.
 - c. The conduction electrons tend to pile up inside the bulb.
 - d. The conduction electrons that drift through the circuit originate from the wires and the bulb filament.

35.2 Electric Circuits (page 704)

3. A gap in a circuit is usually provided by an electric _____.

Match each switch position with the correct effect on the circuit.

Switch Position	Effect
_____ 4. open	a. cuts off electron flow
_____ 5. closed	b. allows electron flow
6. When connected in _____, devices in a circuit form a single pathway for electron flow.	
7. When connected in _____, devices in a circuit form branches, each of which is a separate path for the flow of electrons.	

35.3 Series Circuits (pages 705–706)

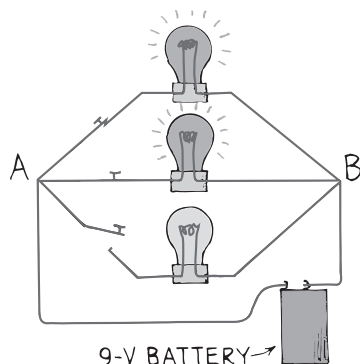
8. Suppose you have a completed circuit with three lamps connected in series. Circle the letter of the statement that correctly describes what happens if the filament of the middle lamp burns out.
 - a. Current ceases, and the remaining two lamps will also go out.
 - b. Both of the remaining lamps will stay lit.
 - c. Only one of the remaining lamps will stay lit.
 - d. The amount of current flowing through the circuit drops by one third.
9. The total resistance to current in a series circuit is the _____ of the individual resistances along the circuit path.
10. The voltage drop across each device in a series circuit depends directly on its _____.
11. Describe the main disadvantage of a series circuit.

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Chapter 35 Electric Circuits

35.4 Parallel Circuits (pages 707–708)

Use the figure below to answer Questions 12–17.



12. Circle the letter of the correct answer. How many *possible* pathways for current are there between points A and B?
 - a. 1
 - b. 3
 - c. 4
 - d. 5

13. Is the following sentence true or false? In a parallel circuit like the one shown, each device operates independent of the other devices.

14. Circle the letter of the correct answer. What is the voltage across each lit bulb in the circuit shown?
 - a. 3 volts
 - b. 4.5 volts
 - c. 6 volts
 - d. 9 volts

15. Suppose I is the total current in the circuit. Circle the letter of the amount of current through each lit bulb.
 - a. $\frac{I}{2}$
 - b. $\frac{I}{3}$
 - c. $2I$
 - d. $3I$

16. If the switch next to the unlit bulb were closed, the total current through the battery would _____.

17. Is the following sentence true or false? The overall resistance of the circuit is less than the resistance of any one of the branches.

Chapter 35 Electric Circuits

35.5 Schematic Diagrams (page 709)

18. What is a schematic diagram?

19. Describe how the positive and negative terminals of a battery are indicated on a schematic diagram.

Match each circuit element with the description of its symbol in a schematic diagram.

Circuit Element	Symbol
_____ 20. resistance	a. zigzag line
_____ 21. connecting wire	b. broken line with one end tilted up at an angle
_____ 22. battery	c. set of short and long parallel lines
_____ 23. open switch	d. solid straight line

35.6 Combining Resistors in a Compound Circuit (pages 710–711)

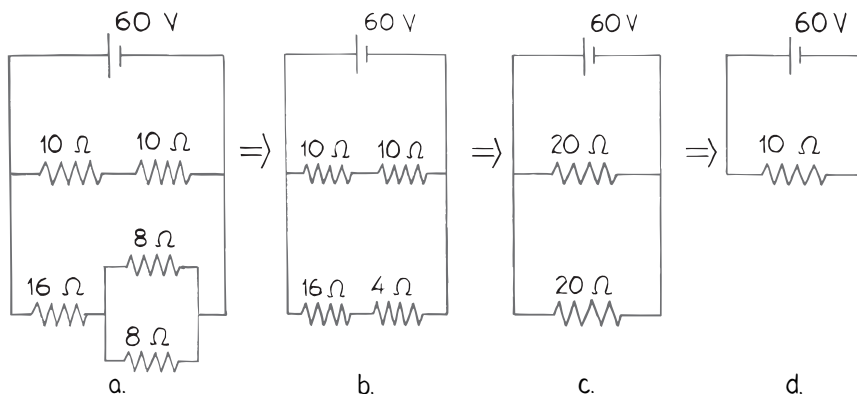
24. Define equivalent resistance.

25. The equivalent resistance of resistors in series is _____

26. The equivalent resistance of two resistors in parallel is _____

Chapter 35 Electric Circuits

The diagrams below show how a complex schematic diagram can be simplified by using equivalent resistances. Use these diagrams to answer Questions 27–29.



27. Describe how diagram (a) was simplified to make diagram (b).

28. Describe how diagram (b) was simplified to make diagram (c).

29. Describe how diagram (c) was simplified to make diagram (d).

35.7 Parallel Circuits and Overloading (pages 711–712)

30. Is the following sentence true or false? The more devices you connect in parallel to your household supply line, the more you increase the total line current. _____

31. What is the purpose of connecting a fuse or circuit breaker in series along the supply line?
