

Name: _____

_____ / 23

Chapter 12.3 Homework

Conceptual Physics

Parent Signature: _____

Each numbered question is worth one point unless otherwise noted.

Reviewing Concepts

14. The greater the resistance in a circuit, the less the _____.
15. A circuit contains one light bulb and a battery. What happens to the total resistance in the circuit if you replace the one light bulb with a string of four identical bulbs? Why?
16. What does it mean to say that current and resistance in a circuit are inversely related?
17. What does it mean to say that current and voltage in a circuit are directly related?
18. According to Ohm's law, the current in a circuit increases if the _____ increases. The current decreases if the _____ increases.
19. A battery is connected to a light bulb, creating a simple circuit. Explain what will happen to the current in the circuit if
 - a. The bulb is replaced with a bulb having a higher resistance.
 - b. The bulb is replaced with a bulb having a lower resistance.
 - c. The battery is replaced with a battery having a greater voltage.
20. Why does a light bulb's resistance increase if it operates for a long period of time?
21. Why can you safely handle a 1.5-V battery without being electrocuted?

22. What is the difference between a conductor and an insulator?
23. Why is it important to always have dry hands when working with electric circuits?
24. Explain why electrical wires are made of copper covered in layers of rubber insulation.
25. What is a semiconductor?
26. Classify each of the following as conductor, semiconductor, or insulator.
- a. Ice
 - b. Plastic
 - c. Carbon
 - d. Iron
 - e. Glass
 - f. Silver
27. What is the difference between a fixed resistor and a variable resistor?
28. What is another name for a variable resistor?

Solving Problems

5. What happens to the current in a circuit if the *resistance* triples? What happens to the current if the *voltage* triples?
6. A hair dryer draws a current of 10 A when plugged into a 120-V outlet. What is the resistance of the hair dryer?

7. A television runs on 120-V and has a resistance of $60\ \Omega$. How much current does it use?
8. A digital camera uses one 6-V battery. The circuit that operates the flash and takes the pictures has a resistance of $3\ \Omega$. What is the current of the circuit?
9. The motor in a toy car has a resistance of $3\ \Omega$ and needs 1.5 A of current to run properly.
- What battery voltage is needed?
 - How many 1.5-V batteries would the car require?
10. Find the current in each of the circuits shown at the bottom of page 311.
- -
 -
11. Household circuits in the US operate at 120-V. Circuit breakers and fuses commonly break such a circuit if the current is greater than 15 A. What is the minimum amount of resistance needed in a circuit to prevent the circuit breaker from tripping?
12. A flashlight bulb has a resistance of about $6\ \Omega$. It works in a flashlight with two 1.5-V batteries. How much current is in the flashlight's circuit when the bulb is lit?