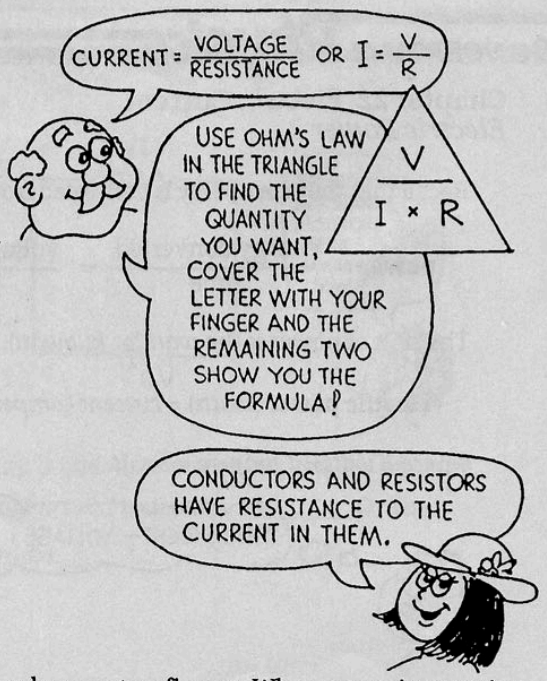
Ohm's Law



1. How much current flows in a 1000-ohm resistor when 1.5 volts are impressed across it?

   _____

2. If the filament resistance in an automobile headlamp is 3 ohms, how many amps does it draw when connected to a 12-volt battery?

   _____

3. The resistance of the side lights on an automobile are 10 ohms. How much current flows in them when connected to 12 volts?

   _____

4. What is the current in the 30-ohm heating coil of a coffee maker that operates on a 120-volt circuit?

   _____

5. During a lie detector test, a voltage of 6 V is impressed across two fingers. When a certain question is asked, the resistance between the fingers drops from 400 000 ohms to 200 000 ohms. What is the current (a) initially through the fingers, and (b) when the resistance between them drops?

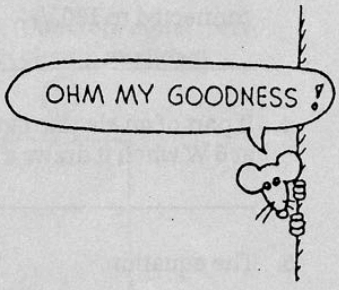
   (a) _____ (b) _____

6. How much resistance allows an impressed voltage of 6 V to produce a current of 0.006 A?

   _____

7. What is the resistance of a clothes iron that draws a current of 12 A at 120 V?

   _____



8. What is the voltage across a 100-ohm circuit element that draws a current of 1 A?

   _____

9. What voltage will produce 3 A through a 15-ohm resistor?

   _____

10. The current in an incandescent lamp is 0.5 A when connected to a 120-V circuit, and 0.2 A when connected to a 10-V source. Does the resistance of the lamp change in these cases? Explain your answer and defend it with numerical values.

    _____

    _____

WS 12

Name _____ Date _____

CONCEPTUAL Physics PRACTICE PAGE

Chapter 22 Electric Current
Electric Power

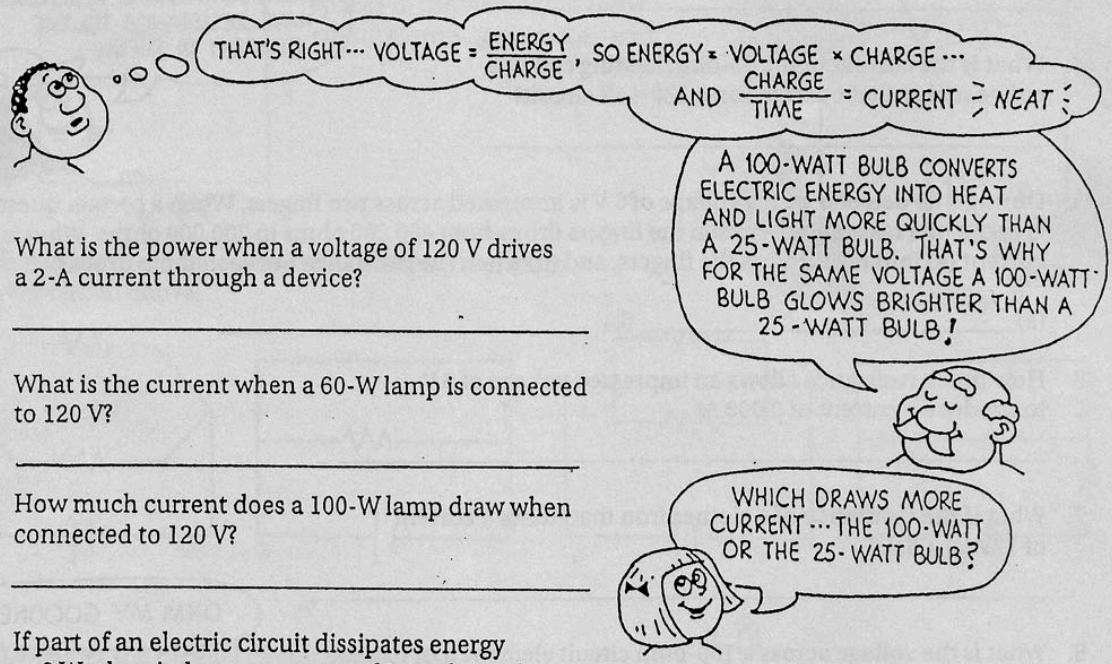
Recall that the rate energy is converted from one form to another is *power.*

$$\text{power} = \frac{\text{energy converted}}{\text{time}} = \frac{\text{voltage} \times \text{charge}}{\text{time}} = \text{voltage} \times \frac{\text{charge}}{\text{time}} = \text{voltage} \times \text{current}$$

The unit of power is the *watt* (or *kilowatt*). So in units form,

Electric power (*watts*) = current (*amperes*) x voltage (*volts*),

where 1 *watt* = *1 ampere* x *1 volt.*



1. What is the power when a voltage of 120 V drives a 2-A current through a device?

_____

2. What is the current when a 60-W lamp is connected to 120 V?

_____

3. How much current does a 100-W lamp draw when connected to 120 V?

_____

4. If part of an electric circuit dissipates energy at 6 W when it draws a current of 3 A, what voltage is impressed across it?

_____

5. The equation

$$\text{power} = \frac{\text{energy converted}}{\text{time}}$$

rearranged gives

$$\text{energy converted} =$$

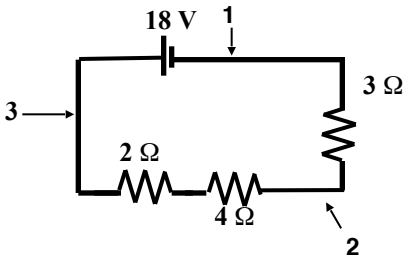
6. Explain the difference between a kilowatt and a kilowatt-hour.

_____

7. One deterrent to burglary is to leave your front porch light on all the time. If your fixture contains a 60-W bulb at 120 V, and your local power utility sells energy at 8 cents per kilowatt-hour, how much will it cost to leave the bulb on for the whole month? Show your work on the other side of this page.

Electric Current # _____ Name _____ Period_____

1. Answer the following questions about the Series circuit.



a. What is the voltage leaving the battery?

b. What is the total resistance of the circuit?

c. What is the current that goes past #1?

d. How much current goes through the 3 Ω resistor?

e. How much voltage is used by the 3 Ω resistor?

f. What is the current that goes past #2?

g. How much current goes through the 4 Ω resistor?

h. How much voltage is used by the 4 Ω resistor?

i. How much current goes through the 2 Ω resistor?

j. How much voltage is used at the 2 Ω resistor?

k. How much current goes through #3?

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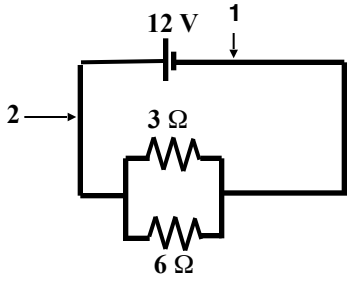
2. Answer the following questions about the Parallel circuit.



a. What is the voltage leaving the battery?

b. What is the total resistance of the circuit?

c. What is the current that goes past #1?

d. How much voltage is used by the 3 Ω resistor?

e. How much current goes through the 3 Ω resistor?

f. How much voltage is used at the 6 Ω resistor?

g. How much current goes through the 6 Ω resistor?

h. How much current goes through #2?