

**Directions:** Complete the following questions. Be sure to show all work and label with correct units.

1. What is an ampere? (amp) and what is it measuring?
2. What is the formula to calculate resistance? Current? Voltage?
3. Calculate the voltage of a battery that provides a current of 10 A through a circuit with a resistance of 20  $\Omega$ .
4. Calculate the resistance of a circuit that has a battery with 9 V and a current of 3A.
5. Calculate the current of a circuit that has 120V and a resistance of 12  $\Omega$ .
6. Metric Conversions:  
1000 mA = \_\_\_\_\_ A  
  
5.5 A = \_\_\_\_\_ mA
7. If a toaster produces 12 ohms of resistance in a 120-volt circuit, what is the amount of current in the circuit?
8. A circuit contains a 1.5 volt battery and a bulb with a resistance of 3 ohms. Calculate the current.
9. If your skin has a resistance of 100,000 ohms, and you touch a 9-volt battery, what current will flow through you?
10. According to Ohm's Law what effect will cutting the resistance have on the current?
11. If the voltage stays the same and the resistance is  $\frac{1}{4}$  its original, what will happen to the current?
12. If the power source is 12 V and the flow of electrons is 3A, what is the resistance?

13. A hair dryer uses a wire that is hot because of the current in it to warm the air that blows through the dryer. The resistance of this wire is  $7.7 \Omega$ . If the current through the wire equals  $15.6 \text{ A}$ , what is the voltage across the terminals of the hair dryer?
14. A battery-powered electric lantern is used as a light source for campers. The light bulb in the lantern has a resistance of  $6.4 \Omega$ . Assume the rest of the lantern's circuit has no resistance and that the current in the circuit is  $0.75 \text{ A}$ . Calculate the voltage across the terminals of the lantern's battery.
15. A window-unit air conditioner has an overall resistance of  $22 \Omega$ . If the voltage across the air conditioner equals  $115 \text{ V}$ , what is the current in the air conditioner's circuit?
16. A medium-sized household oscillating fan draws  $0.52 \text{ A}$  of current when the potential difference across its motor is  $120.0 \text{ V}$ . How large is the fan's resistance?
17. While in another country, you should always find out the voltage that is used in that country before you plug in an appliance.
- To understand the reason for this precaution, calculate the resistance of a laptop computer that is designed to draw  $3.0 \text{ A}$  at  $115 \text{ V}$ .
  - Then calculate the current that the same computer would draw if you plugged it into a  $220 \text{ V}$  outlet, which is common in other countries.
18. A washing machine motor works because of a current of  $9.80 \text{ A}$  in a circuit with a resistance of  $12.2 \Omega$ . What is the voltage across the terminals of the motor?
19. A flashlight uses three batteries of equal voltage. The batteries are connected in series, so the overall voltage of the light is equal to the sum of the voltages of each battery.
- If the resistance of the light bulb's filament is  $3.5 \Omega$  and the current in the filament is  $1.3 \text{ A}$ , what is the total voltage across the filament?
  - What is the voltage across each battery?