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HW 4.1 Ohm's Law

Per \_\_\_\_ Name \_\_\_\_\_

1. The compressor on an air conditioner draws 90 A when it starts up. If the start up time is about 0.5 seconds, how much charge passes a cross-sectional area of the circuit in this time?

2. A circuit contain a 9 V battery and a 500  $\Omega$  Resistor. What is the current in this circuit?

3. A person notices a mild shock if the current along a path through the thumb and index finger exceeds 80  $\mu\text{A}$ . What is the maximum allowable voltage without shock if your dry skin resistance is  $4.0 \times 10^5 \Omega$ ? What is the maximum allowable voltage without shock if your wet skin resistance is 2000  $\Omega$ ?

4. All electrical devices are required to have an identifying plate that specifies their electrical characteristics. For example, the plate on an iron might state that the iron carries a current of 6 A when connected to a 120 V source. What is the resistance in the iron?

5. A typical color TV draws about 2.5 A when connected to a 120 V source. What is the overall resistance of the TV set?

6. To charge the battery used for a boat trolling motor, a charger provides 4.5 A for 7 hours. How much charge passes through the battery?

7. The sticker on a portable CD player says it draws 300 mA of current at 9 V. What power does it dissipate?

8. How much charge runs through a 100 W light bulb connected to a 120 V source for one hour?

9. An Ipod draws 0.900 Amps at 3 Volts. How much resistance does the Ipod have?

10. A 1500 watt electric penguin draws 83 mA of current. What is the resistance of the penguin?

11. If 5 mA of current runs through a wire in a CD player, how long would it take for  $1.25 \times 10^{19}$  electrons to pass a point in this wire? (1 electron =  $1.6 \times 10^{-19}$  Coulombs)

12. In a particular television tube, the beam current is 60 mA. How long does it take for  $3.75 \times 10^{14}$  electrons to strike the screen?

13. Find the current in the following devices when they are connected across a potential difference of 120 V.

- a. A hot plate with a resistance of  $48 \Omega$ .
- b. A microwave oven with a resistance of  $20 \Omega$ .