PHYSICS

Name: _____

Date: _____

Chapter 19 Review

1. You must bring your own equation sheet for the final. Check your Chpt 19 Eqtns.
2. What is current? What are its units?
   how fast current moves Amperes (A)
3. What is the conventional current direction for and electron moving to the right?
   ←
4. What is the conventional current direction for and proton moving to the left?
   ←
5. How is drift velocity different from the average speed of an electron?
   very slow due to collisions (.246 mm/s)
6. What does resistance measure? What are its units?
   how easily current can move ohms (Ω)
7. Which wire has more resistance? (Short / Long) (Thick / Thin)
   (Copper / Aluminum) (Low Temp / High Temp)
8. What does electrical power measure? What are its units?
   how fast energy is converted Watts (W)
9. What do electrical companies charge you for? (and don't tell me kW-hr)
   Energy (not power)
10. What is the difference between direct current and alternating current? Give a electrical source for each.
    ↓ (battery) charged particles move in one direction ↓ no net motion of e⁻ (Power Lines)
11. A 1.5 V battery creates a current of 210 mA in through a resistor. What is the resistance?
    $R = \frac{V}{I} = \frac{1.5V}{.210A} = \boxed{7.1\ \Omega}$

12. A net of 25 mC passes through the cross-sectional area of a wire in 15 s. How many electrons pass the cross-sectional area in 1.0 min at the same current?

$$I = \frac{\Delta Q}{\Delta t} = \frac{.025C}{15\,sec} = .0017A$$

$$I = \frac{\Delta Q}{\Delta t} \qquad .0017A = \frac{\Delta Q}{60.\,sec} \qquad \Delta Q = .10C$$

$$.10C \left| \frac{1\,e^-}{1.60\times10^{-19}C} \right. = \boxed{6.3\times10^{17}\ electrons}$$

13. A 55 Ω resistor has a current of 3.0 A when a potential difference of 165 V is placed across it. What will the current be with a 7.9 Ω resistor?

$R = \frac{\Delta V}{I}$ $\quad I = \frac{V}{R} = \frac{165\,V}{7.9\,\Omega} =$ **21 A**

14. What is the power and potential difference of a device that has a resistance of 87 Ω and a current of 1.8 A?

$P = I^2 R = (1.8\,A)^2 (87\,\Omega)$

$= \boxed{280\,W}$

$V = IR = (1.8\,A)(87\,\Omega) = \boxed{160\,V}$

15. If the cost of electricity is 12.0 cents per kW-h, calculate the cost of running a halogen lamp (300. W) for 8 hours exactly

Find kW·h $\quad (.300\,kW)(8\,hr) = 2.40\,kW\cdot h$

$\frac{12.0\,¢}{kW\cdot h} \cdot 2.40\,kW\cdot h = \boxed{28.8\,¢}$

16. An X-ray tube used for cancer therapy operates at 4.0 MV with a beam resistance of .16 GΩ striking a metal target. Calculate the power of this beam.

$P = \frac{V^2}{R} = \frac{(4.0 \times 10^6\,V)^2}{(.16 \times 10^9\,\Omega)} = \boxed{1.0 \times 10^5\,W}$