Review 34-35 b

1. A 20 ohm lamp and a 5 ohm lap are connected in series and placed across a potential difference of 50 V. What is:
   a. the equivalent resistance of the circuit?

   $R = 20 + 5 = \boxed{25\Omega}$

   b. The current in the circuit?

   $I = \frac{V}{R} = \frac{50}{25\Omega} = \boxed{2\ A}$

   c. The voltage drop across each lamp?

   $V_{20} = R \cdot I$
   $= 20 \cdot 2 = \boxed{40\ A}$

   $V_5 = 5 \cdot 2 = \boxed{10\ AMP}$

2. The load across a 12 V battery consists of a series combination of three resistors of 15 ohm, 21 ohm and24 ohm. $R = 15 + 21 + 24 = \boxed{60\Omega}$
   a. What is the total resistance of the load?

   b. What is the voltage of the battery if the current in the circuit is 0.1 A?

   $60\Omega = \frac{V}{.1A}$ $\boxed{V = 6V}$

3. A string of eighteen identical Christmas tree lights are connected in series to a 120 V source. The string dissipates 64 W.
   a. What is the equivalent resistance of the light string?

   $P = V\ I$
   $64W = 120\ I$ $I = 0.533\ A$

   $R = \frac{V}{I}$

   b. What is the resistance of a single light?

   $\frac{120}{0.533} = \frac{V}{I} = R = 225\Omega = \frac{18}{R_1}$ $\frac{1}{R} = \frac{18}{225}$ $\boxed{0.\ \Omega}$

   $\boxed{R = 12.5\Omega}$

   c. What power is dissipated by each lamp?

   $P = V\ I$
   $P = (6.66)(.533A) = \boxed{3.55\ W}$

   $R = \frac{V}{I}$ $12.5 = \frac{V}{.533}$ $V = 6.66\ V$

4. A 16 ohm and a 20 ohm resistor are connected in parallel. A difference in potential of 40 V is applied to the combination.
   a. draw the circuit

   b. compute the equivalent resistance of the parallel circuit.

   c. What is the current in the circuit

   d. How large is the current through the 16 ohm resistor?