Circuits Review

1. What is meant by a complete circuit?

A complete circuit exists when you have a closed conducting path from the positive terminal of a battery or power source to the negative terminal.

- 2. Find the missing quantities in each of the following:
 - a) Potential difference is 120 V and the current is 25 A, what is the resistance?

b) R = 30 Ω and the battery supplies 1.5 V, What it the current?

c) If a 6 A current flows through a circuit with 100 Ω resistance, what is the potential difference across the circuit?

3. a) Would you be electrocuted if you fell from a building but stopped your fall by catching hold of just one high voltage power line? Explain your answer.

No, you need a potential difference (voltage) across your body in order to make the current flow through it. This is why birds can sit on a power line, as long as they don't touch two lines.

b) Would it make a difference if the line sagged until your feet touched the ground? Explain your answer.

Yes, if you become grounded you have a path (to the ground) for the electricity to flow through you.

- 4. a) What type of current is supplied by batteries such as those found in your car or a flashlight? Direct Current (DC) We will learn more about this next unit.
 - b) What are some possible sources of voltage? Batteries, Power supplies, Solar
 - c) What causes charges to move through a conductor? Potential Difference (Voltage)
 - d) What are the appropriate units for voltage, current, resistance and power?

| | Units | Symbol |
|--------------------------------|-----------------|--------|
| Voltage (potential difference) | Volts | V |
| Current | Amps | I |
| Resistance | Ohms (Ω) | R |
| Power | Watts | Р |

- 5. Find the missing quantities in each of the following:
 - a) What would the current be through a 102 W bulb that operated on a 120 v source?

b) What is the power rating for a television that operates on 120 V at 5A?

c) What is the voltage across a 70 W light bulb that has a current of 2 A?

6. Two 40 watt light bulbs are connected in parallel in a light fixture and powered by 120 volts of electricity. If the light is on for 5 hours a day, how much energy is used in a 30 day month? If the energy costs \$0.12 per Kw-hr, what is the monthly cost of operating the light?

7. What are the rules for a series circuit?

Current stays the same, Voltage Drops add up, Resistors add up $R = R_1 + R_2 + \cdots + R_n$

8. What are the rules for a parallel circuit?

Current adds up, Voltage stays the same, Resistors $\rightarrow \frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_1} + \frac{1}{R_2} + \cdots + \frac{1}{R_N}$

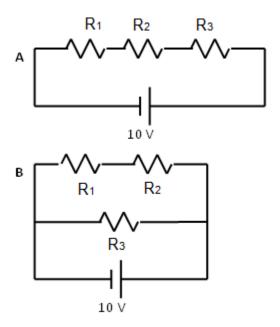
9. Are the appliances in your home wired in parallel or series? How do you know?

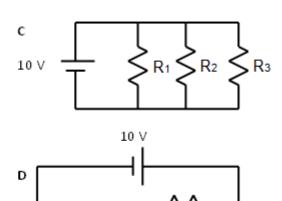
Parallel; We know this because if a light goes out or an appliance is turned everything else stays on.

10. Why are fuses usually placed in a series between the power supply and a parallel circuit?

There are placed in series in front of a parallel circuit because this is the location with the greatest amount of current

- 11. For the following questions assume that all the resistors in the circuits below have the same resistance:
 - a) Which resistor in each circuit would have the most current?
 - A) They are all the same.
 - B) R₃
 - C) They are all the same
 - D) R
 - b) Which circuit has the largest total resistance? Circuit "A"
 - c) Which circuit has the largest total current? Circuit "C"





R₁

 R_2

Rз