Due 3/30 no 1

Electricity 5

1. Give four ways you could connect wires to make sure they have a good connection.

2. When a switch is up in a circuit is the light on or off?

3. Using this light bulb,
   A) Show me where the wires have to connect to make it light up.
   B) If for the light bulb to light, there must be a wire connected throughtout, *inside the light bulb*, show what path the electricity must take for the light bulb to be on.

4. Using electrical device symbols:
   A) Draw a battery with the positive end pointing to the right.

   B) Draw a resistor:

   C) Draw a switch:

   D) Draw a light bulb:

   E) Draw a battery connected to two light bulbs, then a switch.

5. Voltage, Current, or Resistance?

   A) _____Flowing electrons.
   B) _____Pushes electrons thru circuits.
   C) _____Is like a pump for water.
   D) _____Measured in Ohms.
   E) _____Measured in Amps.
   F) _____A battery gives this.
   G) ____Slows down the electricity.
   H) ____Does work in the circuit.
   I) ____Measured in volts.
   J) _____12 ohms
   K) _____ 36 volts.
   L) _____ 5 amps.

6. If a light bulb doesn't light, is the circuit open or closed?

7. If electrons flow thru the wires is the circuit open or closed?

8. A bit of review: Go thru your notes and find the UNITS for the following (give the abbreviations):

   A) Mass is measured in _____.
   B) Voltage is measured in _____.
   C) Acceleration is measured in _____.
   D) Electric field is measured in _____.
   E) Work is measured in _____.
   F) Velocity is measured in _____.
   G) Current is measured in _____.
   H) Momentum is measured in _____.
   I) Kinetic Energy is measured in _____.
   J) θ (angles) are measured in _____.
   K) Weight is measured in _____.
   L) Resistance is measured in _____.
   M) Distance is measured in _____.
   N) Time is measured in _____.
   O) Focal length is measured in _____.
   P) Any force will be measured in _____.

Remember how we are going to use water to understand the flow of electricity.

9. What part of a water system is a battery?

10. What part of a water system is a light bulb? (*Don't just use your notes. We talked about something that really is like a light bulb: something that does useful work.)*

11. What part of a water system is the electricity flowing?

12. Use the above to do the following. Your choices are: Voltage, Current, or Resistance?

   A. ____ If you increase resistance what decreases?
   B. ____ If you increases voltage what increases?
   C. ____ If the current decreased what increased?
   D. ____ If current increased what increased?
   E. ____ If current increased what decreased?
   F. ____ If resistance is decreased, what increases?
   G. ___ More batteries will increase these two quantities.
   H. ___ More light bulbs will increase this.

Types of Energy

There are many times of energy. All of them can create forces and motion. Often there are multiple types of energy present. Energy can be converted from one type to another.

Thermal Energy—Heat energy. A product of most other forms of energy. Can be created by friction.

Mechanical Energy—Any kind of Kinetic or Potential Energy. Includes Elastic Potential Energy due to springs.

Chemical Energy—Stored in chemical bonds; transferred during by chemical reactions. Includes energy in food, plants, and batteries (which produce electricity by combining chemicals).

Electrical Energy—Energy of moving electrons: lightening, static electricity, electric current (electricity).

Radiant Energy—Light energy. Electromagnetic radiation from light bulbs or the sun (renewable solar energy).

Nuclear Energy—Energy from nuclear reactions (radiation): fission (splitting the atom in nuclear reactors), or fusion (combining atoms in the sun); makes huge amounts of energy, but also long-term, radioactive waste.

13. Using the above information:
    A) What kind of energy does a battery give?
    B) How does a battery store energy?
    C) What two kinds of energy are given off by a light bulb?
    D) What kind of energy do you have to use to put together an electrical circuit?
    E) Which of the above is the only kind of energy you did not see or use in the electrical circuit?

Equation
$V = IR$
$P = VI$ OR $P=I^2R$
$I = \frac{Q}{t}$

Variable	Unit	Var Name	Notes
V	Volt (V)	Voltage	Only a change of voltage matters
I	Amps (A)	current	Flow of electrons
R	Ω (ohms)	resistance	
P	w (watts)	power	

14. *Put the above on your variable and equation sheets. 5 points off for each if you don't take the time to do so. (I will check that as I check the homework.)*

15. (*Using the above equations.*) A 12 volt battery is put into a circuit with a 240 Ω resistor. Find the current in the circuit.
    Variables: Equation: Solve:

16. A circuit has 24 A running thru it. If there is a 350 Ω of resistance in the circuit, find the strength of the battery.
    Variables: Equation: Solve:

17. How much power does a 600 Ω resistor use that has 0.4 A flowing thru it?
    Variables: Equation: Solve:

18. From our discussion in class: A bird lands on a 20,000 volt high power wire.
    A) What voltage is their left leg when touching the wire?
    B) What voltage is their right leg when touching the wire?
    C) What is the voltage difference between the bird's feet?
    D) Does the bird feel a shock?
    E) Why?