Name: _____

Date: _____

Electricity Unit Review

Key Terms

Make sure you understand and can explain the following terms.

Current	Parallel	Conductor
Voltage	Ammeter	Semiconductor
Resistance	Voltmeter	Open Circuit
~~Power~~	Load	~~Short Circuit~~
Potential Difference	Energy Source	~~Power~~
Series	Insulator	

State the symbol & unit of measurement for each quantity:

Quantity	Symbol	Unit of Measurement
Current	I	A or (mA)
Voltage	V	V
Resistance	R	Ω
Energy	E	J
~~Power~~		
Charge	Q	C
Time	t	s

you can have "milli" or "kilo" units of anything.

Remember: K H D m ÷10 d c m ×10

Questions

Provide complete answers to the following questions.

1. Use an analogy (ex. cars, water, football players, etc) to compare current, voltage and resistance.
2. Electrons lose energy as they move through a circuit. Where does this energy come from? Where does this energy go? What term do we use for the change in potential energy of the electrons?
3. What are the 3 factors that affect resistance? Explain how each affects the resistance.
4. You are choosing between two different types of Christmas lights. One set is wired in series, and the other is wired in parallel. Which set would you choose? Explain why.

Calculations

1. If there is a current of 15 A in a circuit for 5 minutes, what quantity of electric charge flow through the circuit?
2. Calculate the resistance of a light bulb that draws 1.0 A of current, if the voltage drop across the bulb is 3V.
3. A simple series circuit has a current of 2 A and a resistance of 0.5 Ω. Calculate the voltage drop across this circuit.

Questions

1. Answers may vary!

   Cars: • The # of cars passing every second. = Current.
   • The amount of gasoline in each car = Voltage.
   • The road reduces to one lane = resistance.
   or there is an accident / obstacle to go around. = Resistance.

2. Energy comes from the power source and goes into an element or load (uses energy).

   Change in potential energy = Potential difference

3. 1. Length of wire
   2. Diameter of wire
   3. Temperature of wire

   * Remember: Short, FAT, COLD wires = Least resistance.

4. Parallel, this type of circuit would permit for all of the lights to keep working even if one light is burned out. Yay!

calculations

1. $I = 15A$
   $t = 5min = 30s$
   $Q = ?$

   $Q = I \times t$
   $Q = 15A \times 30s$
   $\boxed{Q = 450C}$

2. $I = 1.0A$
   $V = 3V$
   $R = ?$

   $R = \frac{V}{I} = \frac{3V}{1.0A} = \boxed{3\Omega}$

3. $I = 2A$
   $R = 0.5\Omega$
   $V = ?$

   $V = I \times R$
   $= 2A \times 0.5\Omega$
   $= \boxed{1V}$

4. $Q = 1.2 \times 10^3 C$
   $t = 5min = 300s$

   a) $I = ?$ $\quad I = \frac{Q}{t} = \frac{1.2 \times 10^3 C}{300s} = \boxed{4A}$

   b) $R = ?$
   $V = 240V$
   $I = 4A$

   $R = \frac{V}{I} = \frac{240V}{4A} = \boxed{60\Omega}$

5. $V = 110V$
   $R = 1.25 \times 10^2 \Omega$
   $I = ?$

   Step 1: Find I

   $I = \frac{V}{R} = \frac{110V}{1.25 \times 10^2 \Omega} = \boxed{0.88A}$

   Step 2: Find t

   $Q = 1C$
   $I = 0.88A$
   $t = \frac{Q}{I}$
   $\boxed{= 1.1S}$