

# May 26, 2011

- 1) answers to pg 303 #1,2,4 and pg 315 #1,3,5
- 2) Ohms Law

Test Next Friday

## Warm-Up

What are the symbol and units for  
voltage?  $V$ , volts  
current? amps,  $A$   
resistance? ohms,  $\Omega$



## Answers Voltage Questions Pg 303 #1,2,4



- #1. a) It is necessary for electrons to move continuously around the circuit so that the electrons can release energy to the load in the circuit.  
b) Electric charges flow from the negative into the positive. Electrons are the only charge able to move and they are attracted back to the positive terminal.
- #2. a) Electric potential is the energy each electron has  
b) The SI unit is volt, the symbol is V
- #4. There is 20 times more energy in the electrons of 120 V source than there is on the negative terminal of a 6 V source.

# pg 315 #1,3,5

1. a) Electric current is measure of the rate at which electric charges move past a given point in a circuit.

b) the SI unit is ampere and the symbol used to represent it is A.

3. a) The ammeter needle will only indicate the current if its positive terminal is connected to that part of the circuit nearest the positive terminal of the source of electrical energy.

b) If the ammeter is connected incorrectly the meter needle will try to rotate in the wrong direction and you will not obtain useful data.

5. It is dangerous to help someone who is experiencing an electric shock, because the shock will move through the person into you.

## **Ohm's Law**

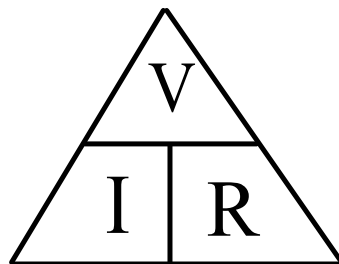
**When electrons flow through a conductor, the electrical resistance (R) causes a loss of electrical potential (V).**

**Ohm's Law states that the potential difference (V) across a conductor is proportional (directly related to the electric current (I) flowing through the conductor.**

$$V = I \times R$$

# Formulas

- **$V = I \times R$  (voltage = electrical current x electrical resistance)**
- **$I = V/R$  (elec. current = voltage/ resistance)**
- **$R = V/I$  (resistance = voltage/elec. current)**



## Example Question Ohm's Law

What is the voltage drop across the tungsten filament in a 100-W light bulb? The resistance of the filament is  $144\Omega$  and a current of  $0.8333\text{ A}$  is flowing through it.

Step 1: Read the problem carefully and record the given data

$$R = 144\Omega \quad V = ? \\ I = 0.8333\text{ A}$$

Step 2: Choose the formula that relates to the problem

$$V = IR$$

Step 3: Substitute given quantities into the formula

$$V = (0.8333\text{ A})(144\Omega)$$

Step 4: Compute using your calculator

$$119.9952$$

Step 5: Write your answer in the correct units/SD

$$V = 120. V$$

Sample Problem 2:

If an electric toaster is connected to a 120 V outlet in the kitchen and the heating element in the toaster has a resistance of  $14\Omega$ , calculate the current flowing through it.

$$I = ?$$

$$V = 120V$$

$$R = 14\Omega$$

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

$$I = \frac{120V}{14\Omega}$$

$$I = 8.6A$$

# Complete

Ohms Law WS Handout #1-12