



HVAC

Flexible Instruction Day

Assignment #2

Learning Standard	Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
Task # 602	Calculate basic electrical quantities using Ohm's law.

CONTACT INFORMATION/ASSISTANCE

Instructor Name: Mr. Collins/ Mr. Barnes

Instructor E-Mail:

collinse@butlertec.us barnesm@butlertec.us

We will be available by email from 7:40-12, and 12:30-3:10 to answer your questions. Please reach out if you are having difficulty completing your assignments.

INSTRUCTIONS

✓ All work is due on the day we return to school. This is counted towards your attendance **and** as a classroom assignment.

Please use Unit 12 Basic Electricity and Magnetism Part 1 Notes to complete the form. Find Ohms law in your packet, it should be page five. You should follow the steps on your worksheet. The steps are at the top of the worksheet. Make sure you complete all of the packet and put your name on the worksheet and the front page.

Name: _____

Session: _____

_____/____ points

Inclement Weather: Assignment 2

Ohm's Law and Power Equation Practice

Name: _____ Session: _____ Date: _____

Please use Unit 12 Basic Electricity and Magnetism Part 1 Notes to complete the form. Find Ohms law in your packet, it should be page five. You should follow the steps on your worksheet. The steps are at the top of the worksheet. Make sure you complete all of the packet and put your name on the worksheet and the front page.

Please note that this assignment will be part of your participation grade for the day. This needs to be returned completed the day of return. If this is not returned you will NOT receive your participation grade for the day. You will also be marked absent for the day if not completed.

Example : Find the current through a 12-Ohm resistive circuit when 24 volts is applied.

Step 1: Find Current, 12 Ohms, 24 Volts

Step 2: $I \text{ (Intensity)} = E \text{ (Electromotive Force/ Volts)} / R \text{ (Resistance)}$

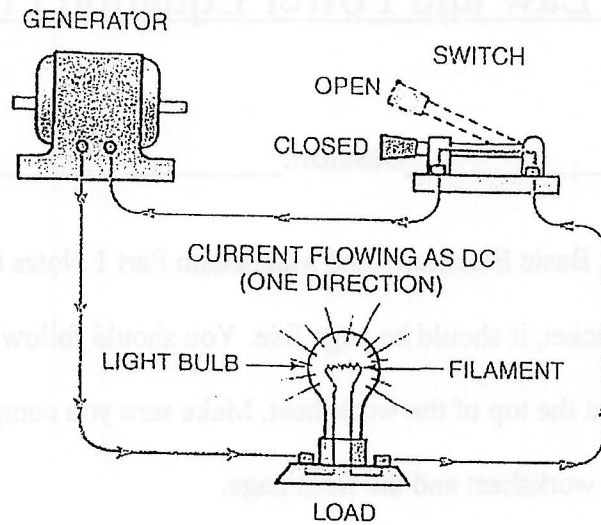
$$I = E / R$$

Step 3: $I = 24 \text{ volts} / 12 \text{ Ohms}$

Step 4: $I = 2 \text{ Amps}$

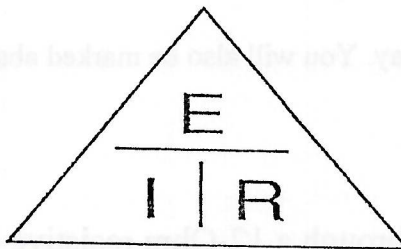
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____ COMPLETE



Ohms Law

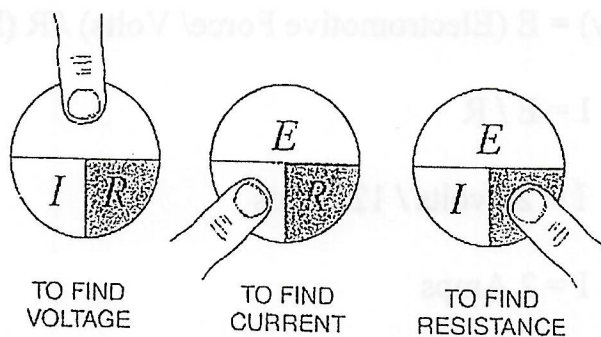
-Relationship between voltage, current, and resistance.



E=Electromotive force (volts)

I=Intensity (amps)

R=Resistance

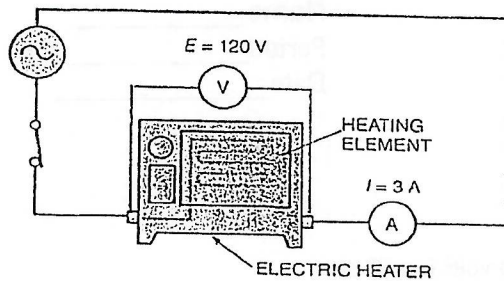


$E = I \times R$ to calculate voltage

$I = E/R$ to calculate Amperage

$R = E/I$ to calculate resistance

Problem 1



Calculate the heaters resistance.

Math:

$$E = 120 \text{ V}$$

$$I = 3 \text{ A}$$

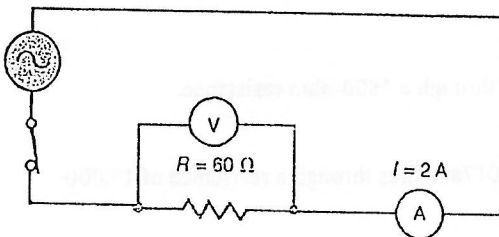
$$R = ?$$

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

$$R = \frac{120 \text{ V}}{3 \text{ A}}$$

$$R = 40 \Omega$$

Problem 2



Calculate the circuit voltage.

Math:

$$E = ?$$

$$I = 2 \text{ A}$$

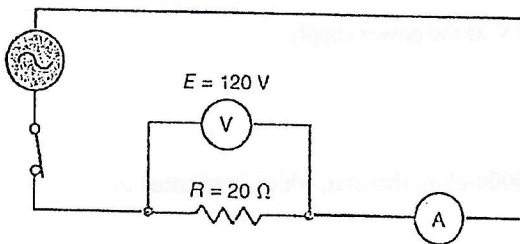
$$R = 60 \Omega$$

$$E = I \times R$$

$$E = 2 \text{ A} \times 60 \Omega$$

$$E = 120 \text{ V}$$

Problem 3



Calculate the circuit amperage.

Math:

$$E = 120 \text{ V}$$

$$I = ?$$

$$R = 20 \Omega$$

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

$$I = \frac{120 \text{ V}}{20 \Omega}$$

$$I = 6 \text{ A}$$

Electrical Power Calculations

-Most load devices are rated by the power they consume.

Watts= Power consumed

Watts= Volts x Amps

Ohm's Law and Power Equation Practice Worksheet

Name _____
Period _____
Date _____

Show all four steps for each problem

STEP 1 - RECORD INFO

STEP 2 - WRITE EQUATION

STEP 3 - SUBSTITUTE IN THE EQUATION

STEP 4 - SOLVE

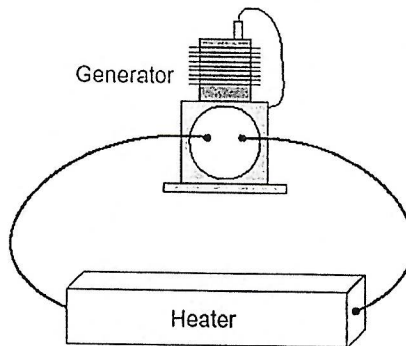
1. Find the current through a 12-ohm resistive circuit when 24 volts is applied.
2. Find the resistance of a circuit that draws 0.06 amperes with 12 volts applied.
3. Find the applied voltage of a circuit that draws 0.2 amperes through a 4800-ohm resistance.
4. Find the applied voltage of a telephone circuit that draws 0.017 amperes through a resistance of 15,000 ohms.
5. A 20-volt relay has a coil resistance of 200 ohms. How much current does it draw?
6. A series circuit has 1200-ohms of total resistance with 12 V as the power supply. What is the total current of this circuit?
7. What is the **increase** of current when 15 V is applied to 10000-ohm. rheostat, which is adjusted to 1000-ohm value?
8. A transformer is connected to 120 volts. Find the current if the resistance is 480-ohms?
9. A resistive load of 600-ohms is connected to a 24 V power supply. Find the current through the resistor.
10. A circuit consists of a 12 V battery connected across a single resistor. If the current in the circuit is 3 A, calculate the size of the resistor.
11. If a small appliance is rated at a current of 10 amps and a voltage of 120 volts, the power rating would be _____ Watts. ($P = I V$)

Ohm's Law and Power Equation Practice Worksheet

12. If a blender is plugged into a 110 V outlet that supplies 2.7 A of current, what amount of power is used by the blender?
13. If a clock expends 2 W of power from a 1.5 V battery, what amount of current is supplying the clock?
14. Tommy runs his juicer every morning. The juicer uses 90 W of Power and the current supplied is 4.5 A. How many volts are necessary to run the juicer?
15. Amanda's hair dryer requires 11 A of current from a 110 V outlet. How much power does it use?
16. A DC electric motor transforms 1.50 kW of electrical power into mechanical form. If the motor's operating voltage is 300 volts, how much current does it "draw" when operating at full load (full power output)?

Challenge

Calculate the amount of power dissipated by this electric heating element, if the generator's output voltage is 110 volts and the heater's resistance is 2.5 ohms: ($P = V^2 / R$)



Now, calculate the power dissipated by the same heater if the generator's output voltage is doubled.

