

Lab 34-1: Ohm's Law

Purpose: 1. To determine the relationship between voltage and current for a resistor.

Materials:

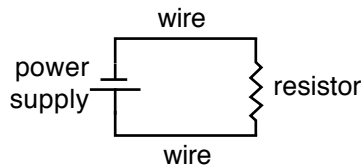
- 1 power supply 2 wires 2 alligator clips 2 different resistors

Warnings: The resistors you are using can become very hot if there are large currents passing through them for any length of time. To prevent burning your fingers, and/or destroying the resistors and meters, observe the following precautions:

1. *Always start with low voltages and currents, and work your way up. Stop if something starts to really heat up.*
2. *If you smell smoke, immediately disconnect the power supply.*

Procedure:

1. Turn on your common sense. Then set up the circuit as shown.



2. Vary the voltage until you are reading about .05 A in the resistor. Record the exact current and voltage.
3. Repeat #2 for current readings of up to 0.5 A at .05 A intervals.
4. Repeat for a second resistor, recording your data in the table below.

Data:

Resistor #1			
Voltage (V)	Current (A)	Voltage (V)	Current (A)

Resistor #2			
Voltage (V)	Current (A)	Voltage (V)	Current (A)

Calculations:

1. For each set of data, make a graph of voltage vs. current. These graphs should be straight, so put in the regression lines. Make sure the graphs are labeled and have units.



Lab 34-1: Ohm's Law

Questions:

1. For the resistors you were given, how does the current in a resistor depend on the applied voltage?

2. Define resistance, both in words and mathematically.

3. Did the resistors become charged in anyway; i.e., do they become positive or negative? Explain.

4. Define each item listed below.
 - a. voltage

 - b. current

 - c. resistance

5. Imagine you have a $20\ \Omega$ resistor with a potential difference of 10 volts across the ends.
 - a. What is the current in the resistor?

 - b. How much charge would pass through the resistor in one minute?

 - c. How many electrons would pass through the resistor in one minute?

 - d. If there was 40 V across the resistor, what would be the current?

6. How much voltage would it take to create a current of 0.75 A through a $3\ \Omega$ resistor?

7. What is the resistance of something if 5 V produces a current of 0.8 A?