P1320L, Ohm's Law
Lab 7, Raw Data Sheet

Submitted by: _____ Experiment's date: _____

Team members:

1.- _____ 2.- _____

3.- _____ 4.- _____

Instructor must initial:_____

Introduction

Write a short paragraph about the purpose of this lab[1].

Data

Instructions: Collect your data using your lab manual as a guide, unless directed to do otherwise by your lab instructor. Each measurement must have units. If a table is used, then it must have headers (for rows or columns) that include units

Common resistor

1. Obtain three resistors of nominal values 1, 5, and 10 K Ohms. Measure their actual resistance, and record their values in the following table.

2. For power supply voltages between 1 and 13 V with 2 V increments, measure the voltage across and the current passing through the 1 K Ohm resistor. Record your measurements in the following table (headers must have units). Use the first column to record the power supply voltage.

Measured Resistor Value:		

3. Collect the same kind of data for another resistor, selected by your instructor. Record your measurements in the following table (headers must have units). Use the first column to record the power supply voltage.

Measured Resistor Value:		

Resistors in Series

4. Referring to the Lab's Manual figure 7.1, connect the 3 resistors in series with the power supply, and set the power supply to 10V. Set the DMM as follows: for measuring voltage, set it to DC Voltage; for measuring current, rewire the DMM and set it to measure Direct Current (DC) in mA. *Recall that for measuring voltage, the DMM behaves like a very large resistor that is connected in parallel to any part of a circuit where the voltage drop is needed; the very large resistance minimizes any current trying to flow through the DMM. In contrast, for current measurements, the DMM behaves like a very small resistor that must be connected in series with the part of the circuit where the current is needed; the very small resistance minimizes the energy lost through the DMM.* Ask your instructor if you have questions about how to connect the DMM to collect your measurements.

   Record the data for this section in the following table. Use the first row for descriptive headers including units. Each row must have the following data for each resistor: actual value of the resistance, voltage across the resistor, the current flowing through it.

Resistors in parallel

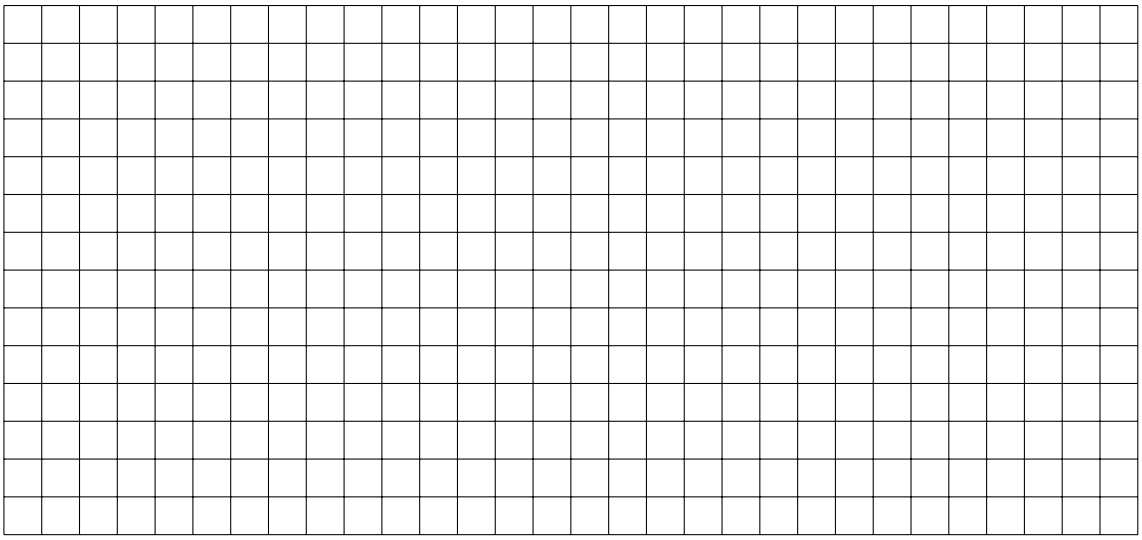
5. Referring to the Lab Manual's figure 7.2, connect the 3 resistors in parallel with the power supply, and set the power supply to 5 V. Set the DMM for measure voltage or current as in the previous section. Ask your instructor if you have questions about how to connect the DMM to collect your measurements.

   Record all data for this section in the following table. Use the first row for descriptive headers including units. Each row must have the following data for each resistor: actual value of the resistance, voltage across the resistor, the current flowing through it.

Analysis

Common resistor

1. Make a voltage vs. current plot for each resistor. Draw a linear fit for each of your resistors.



2. Determine the slope of the fitted lines; show your work.

3. Compare the slopes values to the resistance values measured with the DMM for each resistor.

Resistors in Series

4. For the resistor indicated by your instructor, use Ohm's Law and your measurements of current and resistance to calculate the voltage drop across the resistor. Compare with the value measured directly with the DMM.

5. Form the resistance values, calculate the theoretical value of the equivalent resistance for the three resistors connected in series.

6. Use Ohm's Law and your measurements of Voltage, and current supplied by the power supply to determine the equivalent resistance and compare with your calculated value in the previous point

Resistors in parallel

7. For the resistor indicated by your instructor, use your voltage and resistance measurements along with Ohm's Law to calculate the current through the resistor. Compare with your measured value.

8. Calculate the theoretical value of the equivalent resistance for the three resistors connected in parallel.

9. Use Ohm's Law to determine the equivalent resistance and compare it with your calculated value in the previous point. (Note that here you need the input voltage and current from the power supply.)

Questions

1. According to your analysis, which resistor conducts more charge per unit time per unit volt? Explain.

2. Examine the value of the currents flowing through the circuit with the resistors in series, and determine if the electric charge could accumulate in any of the resistors. Explain.

3. Based on your data for the resistors connected in parallel, determine if it takes the same energy to transport a given amount of charge through any of the resistors. Explain.