ABU DHABI UNIVERSITY

ELECTRIC CIRCUITS

Lab Report 1
Ohm's Law

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Section 1

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Abstract

In this lab we examined and verified Ohm's Law experimentally. We were also introduced to resistors, potentiometer, and Multimeter.

1   Introduction

In First Exercise, we were introduced multimeter and resistors. We connected resistor in series with ammeter and changed the Voltage supplied and took note of current in the circuit.

In Second Exercise, we were introduced to potentiometer. We connected the potentiometer in series with the ammeter and took note of the current as we changed the resistance of the potentiometer while keeping the Voltage across it fixed.

2   Experiment Set-up

The components were placed and fixed onto the training board and wires were used to connect the components in the circuit. A multimeter was used to calculate all the values as the multi-meter can calculate Current, resistance, and voltage.

3   List of Equipment used

- Breadboard.

- Digital Multimeter.

- Wires.

- Training Board.

- Resistors.

- Potentiometer.

4   Procedure

4.1   Exersice 1 - Verifying Ohm's Law when R is constant and V is varying

- Disconnect the circuit from Ground terminal.

- Using the voltmeter connected across the power supply change the Voltage according to the values in the table.

- Connect ground to circuit.

- Connect the ammeter in series with the resistor and measure the current.

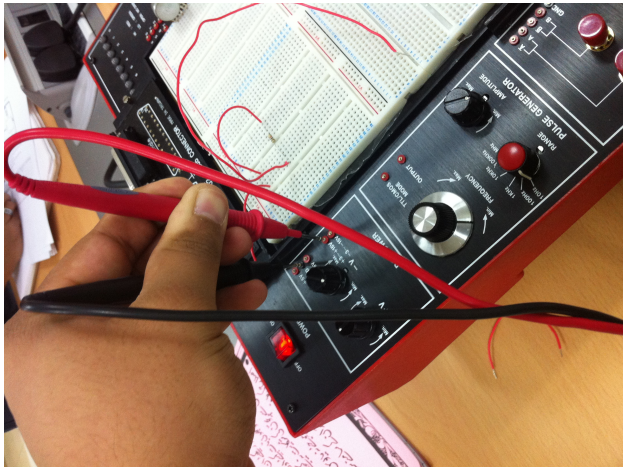- We Repeated these steps again until we had the required values in the table .
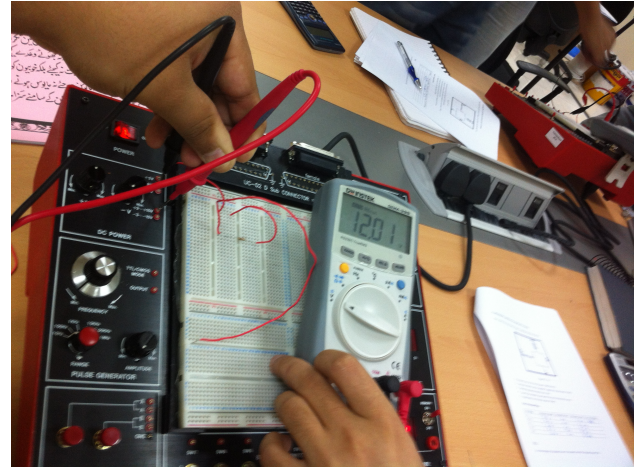
Figure 1: Measuring the voltage supplied

Figure 2: Choosing the right voltage to be supplied

4.2   Exercise 2 - Verifying Ohm's Law when V is constant and R is varying

- Disconnect the potentiometer and turn off the power.

- Using the Multimeter set to ohm meter measure the resistance of it.

- Connect the potentiometer to the circuit and measure the current.

- Connect Ammeter in series with the circuit to measure the current flowing in the resistor.

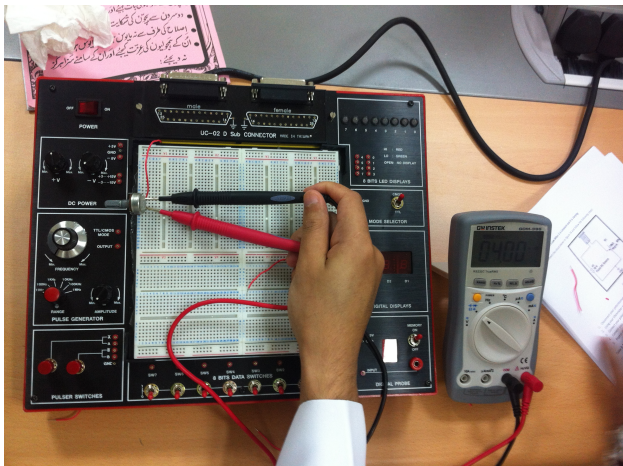- We repeated the steps until all the the values required are calculated.

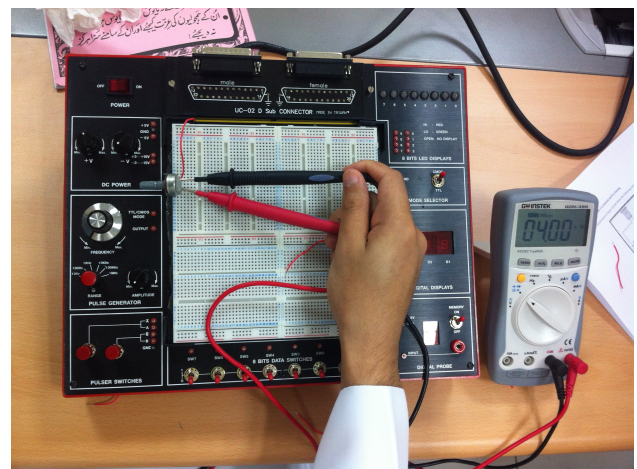Figure 3: Measuring the resistance of potentiometer

Figure 4: Multimeter set to measure Ohms

5   Results and Discussions

At the end of these exercises we got the following results:-

Set Voltage	Measured Voltage	Calculated Current	Measured Current	Error Percentage
3 V	2.96 V	3 mA	3.01 mA	1.35%
4.5 V	4.43 V	4.5 mA	4.51 m A	1.10%
6 V	6.00 V	6 mA	6.14 mA	1.45%
9.7 V	9.71 V	9.7 mA	9.92 mA	1.50%
12 V	12.02 V	12 mA	12.36 mA	1.20%

Figure 5: Experiment 1 Results

Set Resistance	Measured Resistance	Calculated Current	Measured Current	Error Percentage
2 kΩ	2.008 kΩ	2.5 mA	2.47 mA	1.20%
4 kΩ	4.000 kΩ	1.25 mA	1.24 mA	0.80%
5.5 kΩ	5.500 kΩ	0.91 mA	0.90 mA	1.09%
8 kΩ	8.000 kΩ	0.635 mA	0.62 mA	0.80%
9 kΩ	9.020 kΩ	0.56 mA	0.55 mA	1.79%

Figure 6: Experiment 2 Results

- Ohms law is applicable on resistors, potentiometers, and pretty much every electric component.

- The relation between the V and I is that they both are directly proportional to each other. Thus keeping the resistance constant, if Voltage in the circuit increases, Current increases too and vice versa.

- The relation between the I and R is that they both are Inversely proportional to each other. Thus keeping the Voltage constant, if Resistance in the circuit increases, Current decreases and vice versa.

6 Conclusion

- Ohm's Law is valid for both experiments. Thus V=IR.

- The calculated and measured values are different because of experimental errors.

- Potentiometer works using the idea of a voltage divider, which divides the voltage across the two resistors according to the knob on it.
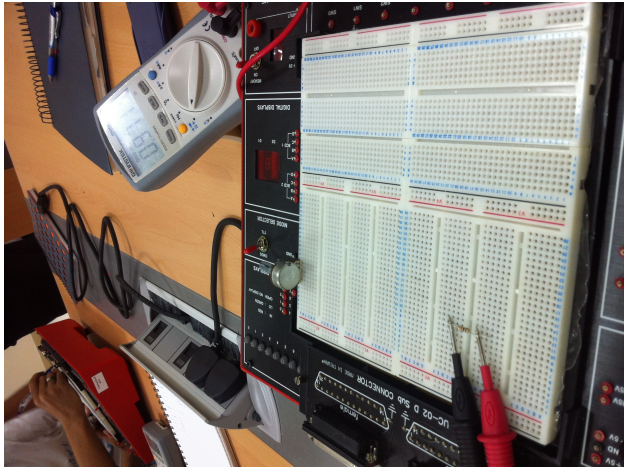
Figure 7: Measuring the voltage across the resistor

Figure 8: Multimeter set to measure Ohms