LAB REAPORT – 1

Course Code: EEE 1102

Course Title: Electrical Circuits I Lab

Experiment Name: Verification of Ohm’s Law

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OBJECTIVE:

This experiment is intended to verify Ohm's law and its applications.

THEORY:

According to the Ohm's law, "The current flowing through a conductor is directly proportional to the potential difference across its ends provided the physical conditions (temperature, dimensions, pressure) of the conductor remains the same."

If I be the current flowing through a conductor and V be the potential difference across its ends, then according to Ohm's Law,

$$I \propto V \text{ or, } V \propto I$$

$$V = IR$$

Where, R is the constant of proportionality. It is known as resistance of the conductor. This equation can also be written as,

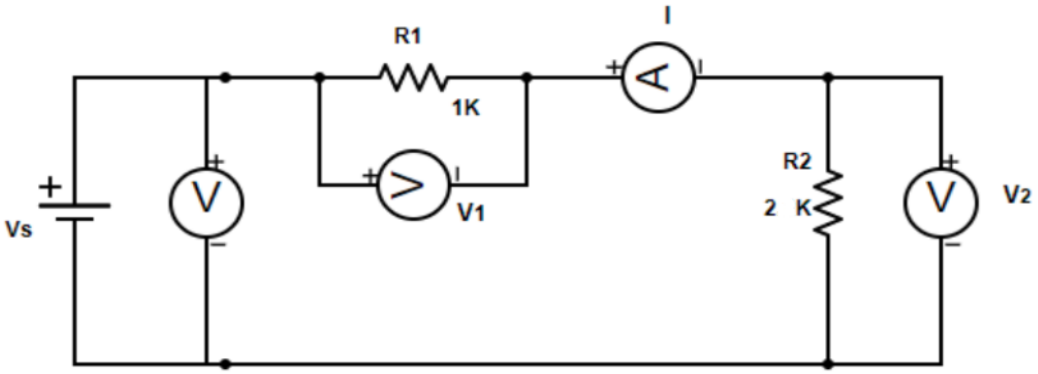
$$I = \frac{V}{R}$$

APPARATUS:

- Resistances: R_1 = 1 kΩ, R_2 = 2 kΩ
- Multimeter as Voltmeter
- Ammeter
- DC power supply
- Bread Board
- Wires
- Tinkercad

PROCEDURE:

1. The circuit was assembled as shown in Figure - 01 by connecting resistors in series on a breadboard. An ammeter was included in the series circuit to measure the current. Figure – 01



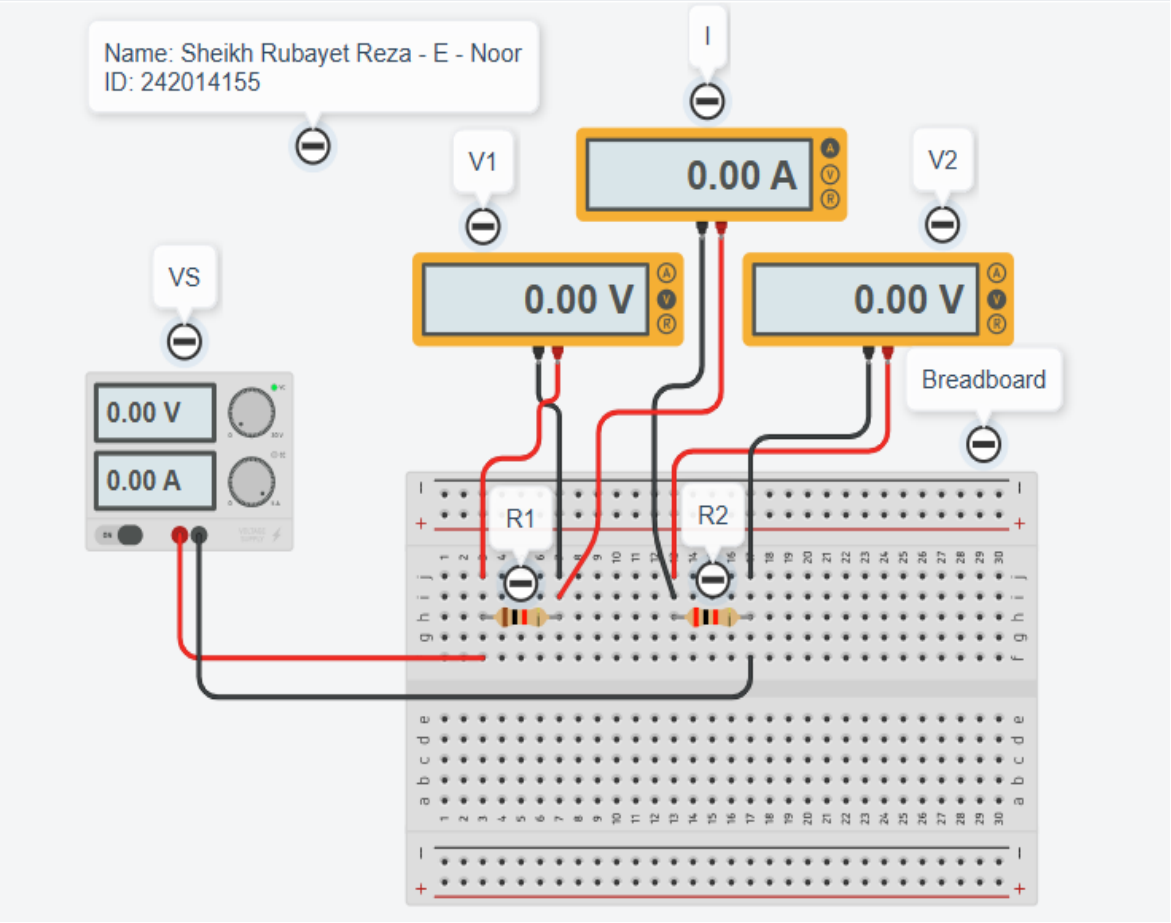


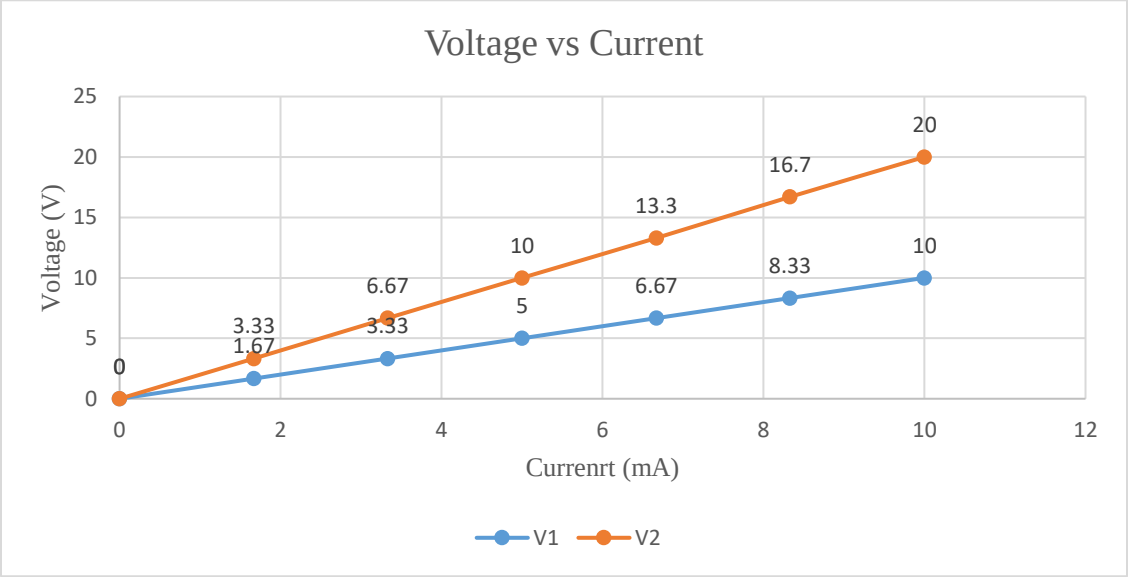
Figure – 01

2. A power supplier was connected to the breadboard as the power source, and we set the voltage to 0 V. The voltage and current readings were recorded.
3. The supply voltage was increased by 5 V, and the corresponding voltage and current values were measured.
4. This process was repeated seven times, each time noting the voltage and current readings.
5. Finally, the current was calculated using Ohm's Law, and the measured the values.

TABLE:

No of obs	V_S Volts	I Amps mA	Measured values		R_T=R_1+R_2 Ohm's kΩ	I=$\frac{V_S}{R_T}$ Amps mA
			V_1 Volts	V_2 Volts		
1	0	0	0	0	3	0
2	5	1.67	1.67	3.33		1.67
3	10	3.33	3.33	6.67		3.33
4	15	5	5	10		5
5	20	6.67	6.67	13.3		6.67
6	25	8.33	8.33	16.7		8.33
7	30	10	10	20		10

GRAPH:



DISCUSSION:

In this experiment our primary objective was to verify Ohm's law by measuring the values of current on fixed resistance but on different voltage levels. To conduct this experiment, we were provided with two resistances (R_1 = 1 kΩ, R_2 = 2 kΩ), three multimeter was used, two as a voltmeter throughout the experiment, and another one as ammeter which used to measure the current of the circuit on different voltages, a DC power supply to power the circuit, a breadboard where our resistances R_1 = 1 kΩ, R_2 = 2 kΩ were connected in series connection so we got R_T = R_1 + R_2 = 3 kΩ resistance on our circuit and connected the whole system with ammeter and DC power supply with some wires.

While experimenting we have set our supply voltage on seven different levels and took the readings and the different current and voltage differences on both sides of $R_1 and\ R_2$ which are respectively V_1 V_2. To demonstrate:

For 0 V, we have measured I = 0 mA, V_1 = 0 V and V_2 = 0 V. For 5 V, we have measured I = 1.67 mA, V_1 = 1.67 V and V_2 = 3.33 V.

In this case we can see the measured value was as it was supposed to be. So, this is an indication that current and voltage are proportional to each other on fixed resistance.

Based on the values we have plotted a current vs voltage graph where we can visualize the table data properly and can also calculate the circuit resistance from the slope of the graph.

REFERENCES:

- Fundamentals of Electric Circuits
  By Charles K. Alexander & Matthew N. O. Sadiku