Dhaka International University

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DEPARTMENT OF CSE

LAB REPORT

COURSE NAME : Physics Lab

COURSE CODE : 0533-102

REPORT NO : 01

REPORT ON : Varification of Ohm's Law

SUBMITTED BY	SUBMITTED TO
NAME : Mir Yeasir Abran **ROLL** : 35 **REG. NO** : CS-D-98-23-127358 **BATCH** : 98 **SEMESTER** : 1st	Md Rakib Hossain Lecturer Dept. of CSE

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Lab Report : Varification of Ohm's Law

Objective:

- To verify Ohm's Law experimentally.
- To establish the relationship between voltage, current and resistance.
- To analyze the linear relationship between voltage and current in a resistor.
- To plot a voltage vs current graph and calculate the resistance value.

Introduction:

Ohm's Law states that the current (I) flowing through a conductor between two points is directly proportional to the voltage (V) across the two points, provided the temperature remains constant. The mathematical expression for Ohm's Law is:

$$V = I \cdot R$$

where,

- V is the voltage (volts)
- I is the current (amperes)
- R is the resistance (ohm's)

In a simple circuit consisting of a resistor and a variable power supply, the voltage is varied while measuring the current. According to Ohm's Law, when the voltage increases, the current increases proportionally if the resistance remains constant.

Discussion:

... Circuit Diagram:

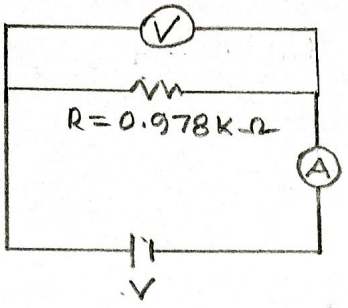


Fig: 01

The circuit consists of a 0.978 KΩ resistor connected in series with a variable power supply. The current flow measured with multimeter.

... circuit Analysis:

- Resistance used, R = 0.978 KΩ
- Voltage supply range: 1 to 20 volts (increment of 2V)
- Number of readings : 10 (from 1V to 20 V)

... Table of Measurements:

Voltage, V (V)	Current, I (mA)	Calculated Resistance, $\frac{V}{I}$ (KΩ)
1	1.02	0.978
3	3.07	0.978
5	5.11	0.978
7	7.16	0.978
9	9.20	0.978
11	11.25	0.978
13	13.29	0.978
15	15.33	0.978
17	17.38	0.978
19	19.42	0.978

... List of Components:

Here is the list of ingredients used in this experiment.

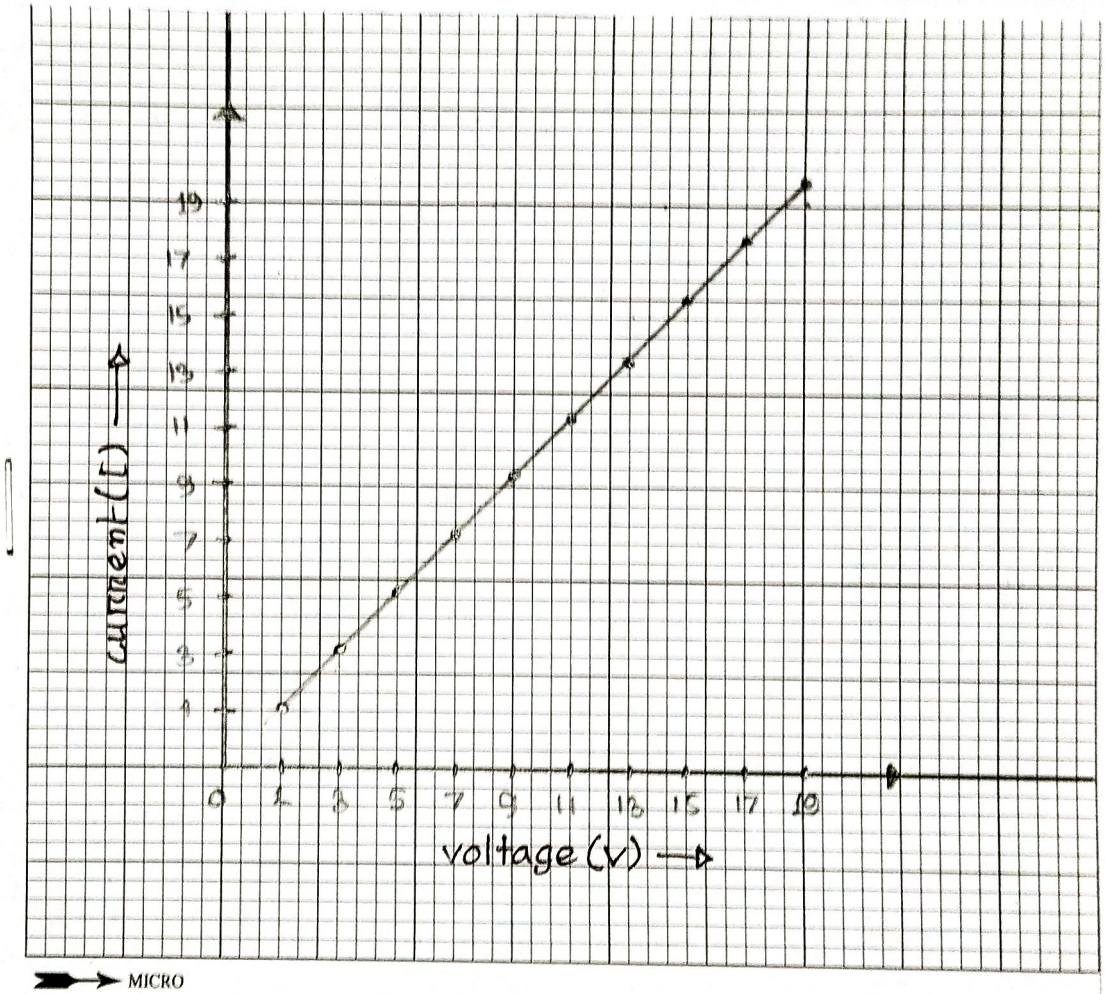
1. Variable DC power supply
2. Resistor
3. Jumper wire
4. Breadboard
5. Ammeter
6. Voltmeter
7. Calculator

... Procedure:

1. Implement the circuit on the breadboard as shown in the circuit diagram.
2. Initially set the DC supply to 1v and note the current on ammeter
3. Increase the voltage to 3v, observe the ammeter and note the readings.
4. Repeat the above step for, 5v, 7v, ..., 19v.
5. plot a graph for measured readings.

... Graphical Representation:

A plot of voltage (V) vs current (I) would produce a straight line, confirming the direct relationship between voltage and current as stated by Ohm's Law.



Here, 3 square box = 1 unit

Here is the graph of Voltage (V) vs current (I) from the experimental data. The straight line relationship confirms Ohm's Law, showing the current increases linearly as voltage increases.

Conclusion:

... **Result:** The data confirms Ohm's Law. The relationship between voltage and current is linear, and the measured resistance remains constant at 0.978 KΩ.

... **Limitations:**

- Minor inaccuracies may arise due to instrument precision (multimeter)
- Resistance values may affected by slight temperature changes in the resistor.

... **Applications:**

- Ohm's Law is a fundamental principle used in analyzing electrical circuits.
- It is applied in calculating current, voltage, and resistance in electrical systems such as household wiring, power distribution network, and electronic devices.

Precautions:

- All the connection should be tight
- Ammeter is always connected in series in the circuit while voltmeter is parallel to the conductor.
- The electrical current should not flow the current for a long time, otherwise its temperature will increse and the result will be affected.
- Maximum reading of voltmeter should be greater than the electromotive force of the cell.
- It should be care that the values of the components

of the circuit it does not exceed to their ratings (maximum value).

- Before connecting the circuit, it should be check out working condition of all the components.