

**General Physics**

**Experimental Lecture 1**

**Ohm’s Law**

**1st stage**

**by**

**Assistant lecturer**

**Ansam Fadil Ali Showard**

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**Objective:**

To find the relationship between voltage and current (investigate the Ohm's Law)

**Apparatus:**

 • Power supply

• Connecting wires

• resistances

• Ammeter

• Voltmeter

**Theory:**

In this lab, you will construct a simple circuit using a single known resistance, R. Then you will use an ammeter to measure the current, I, through the resistance and a voltmeter to measure the potential difference, V, across the resistance. With this data, you can check the validity of Ohm's Law (V = IR) in the circuit.

**Procedure:**

1. Connect the circuit shown below using a fixed resistance R.



2. Set the value of electromotive force into certain voltage (electromotive force).

3. You can get different readings of the current I and voltage V by varying the battery source.

4. Record the value of the current through the resistance and the voltage across it.

5. Repeat step 3 to get at least 6 different readings.

6. Record the data in the Table.

|  |  |
| --- | --- |
| **Voltage (V)** | **Current (A)** |
| 0.10 | 0.01 |
| 0.23 | 0.03 |
| 0.36 | 0.05 |
| 0.42 | 0.07 |
| 0.52 | 0.09 |

7. Plot a graph of the voltage (V) and the current (I), with V on vertical axis and (I) on horizontal axis. Draw the best straight line fit of the data.

8. Determine the slope of the straight line which is the resistance R in this case.

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**Example 1: If the resistance of an electric iron is 50 Ω and a current of 3.2 A flows through the resistance. Find the voltage between two points.**

**Solution:**

If we are asked to calculate the value of voltage with the value of current I and resistance R, we use the following formula to calculate the value of V:

**R = V/ I**

**V = I × R**

Substituting the values in the equation, we get

**V = 3.2 A × 50 Ω**

**V = 160 V**

**Example 2: An EMF source of 8.0 V is connected to a purely resistive electrical appliance (a light bulb). An electric current of 2.0 A flows through it. Consider the conducting wires to be resistance-free. Calculate the resistance offered by the electrical appliance.**

**Solution:**

When we are asked to determine the value of resistance when the values of voltage and current are given, we cover R in the triangle. This leaves us with only V and I, more precisely V ÷ I.

Substituting the values in the equation, we get

**R = V ÷ I**

**R = 8 V ÷ 2 A**

**R = 4 Ω**