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# **LAB REPORT 1**

**Ohm’s law**

**Date of Experiment: 13/10/2023**

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**Ohm’s Law**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| No | Resistance, ohm | | Current, amp | Voltage, volt | Voltage/ Current | %Error |
| Average value of R | The tolerance limit of R |
| 1 | 22\*10^1 | 5% | 5.86\*10^-3 | 1.318 | 224.915 | 2.234 |
| 2 | 10\*10^2 | 5% | 1.34\*10^-3 | 1.362 | 1016.417 | 1.641 |
| 3 | 39\*10^2 | 5% | 0.34\*10^-3 | 1.365 | 4014.705 | 2.941 |
| 4 | 47\*10^2 | 5% | 0.29\*10^-3 | 1.364 | 4703.448 | 0.073 |
| 5 | 15\*10^2 | 5% | 0.90\*10^-3 | 1.362 | 1513.333 | 0.888 |

**1. Construct a graph of Current (vertical axis) vs. Resistance**

**2. From your graph, what is the mathematical relationship between Current and Resistance?**

The mathematical relationship between current (I), voltage (V), and resistance (R) is described by Ohm's Law, which states:

V = I x R

Where,

V represents the voltage across a component (measured in volts, V).

I represents the current flowing through the component (measured in amperes, A).

R represents the resistance of the component (measured in ohms, Ω).

This equation indicates that the voltage across a component is equal to the current flowing through it multiplied by its resistance. It's a fundamental principle in electrical engineering and is used extensively in analyzing and designing electrical circuits.

**3.Ohm’s Law states that current is given by the ratio of voltage/resistance. Does your data concur with this? Use your data to prove your conclusion**

Our data concur with Ohm's law. According to Ohm's law, current is calculated by the ratio of voltage/resistance, which infers resistance is also calculated by the ratio of voltage/current:

The first resistor has a resistance of 22\*10^1 Ω with a tolerance of 5%. The measured current and voltage are 5.86\*10^-3 A and 1.318 V, respectively. Applying Ohm's law to the resistance, we get: 1.318/5.86\*10^-3 = 224.915 Ω or 22.5\*10 ^1 Ω, error is 2.234% - within the allowed tolerance.

The remaining resistors also have similar results, with errors always within the allowable tolerance range (Show in Talbe). Although there are errors, the results from the measurements are not too different from the original numbers. That shows Ohm's law is correct.

**4.What were possible sources of experimental error in this lab? Would you expect each tomake your results larger or to make them smaller?**

There are two main sources of experimental error: systematic and random

Systematic errors are caused by a problem with the experiment itself, such as a faulty instrument or an incorrect procedure.

Random errors are caused by unpredictable factors, such as environmental conditions or human error.

Each of the sources of experimental error could make your results larger or smaller, depending on the specific error.