**COMET BAY COLLEGE**



**Physics - Unit 1 - Task 3**

**Laboratory Test**

**Name: Total Marks /40**

**15 minutes Reading and Writing time.**

**20 minutes to Setup and Collect Data from the Experiment**

**20 minutes to Finish the Report**

**Important:**

It is advisable that the Aim, Hypothesis, Prediction, Materials list and Method, plus an Idea on how to record your results be completed before starting your experiments. Also it is recommended that you read all the material on this sheet before beginning.

**Background:**

The simplest way of thinking about an operating electric circuit is to consider the potential difference to be the cause and the current to be the effect. The resistance is the property of a circuit component that determines the amount of current that will flow for a given potential difference. The resistance of a circuit component determines the way it will behave in a particular location in that circuit. The energy dissipated by a component depends on its resistance and the potential difference it experiences when placed into a circuit.

A simple example of how this might be used in designing a device is the selection of a heating element for a kettle, a heater, or stove. In each case mentioned above, the potential difference will be 240 V and a particular output of heat will be required. This is not the case in this experiment.

**Aim:**

To investigate the relationship between the potential difference and the current in a resistor.

**Apparatus:**

* power supply
* switch
* seven electrical leads
* voltmeter or multimeter
* ammeter or multimeter
* two resistors of known ohmic reading

**Pre-lab:**

In this practical exercise you will use electrical meters to make measurements of a potential difference and current in order to calculate the resistance of a resistor.

The voltmeter measures the potential difference across a component. This means that the voltmeter must be connected in parallel with that component.

The ammeter measures the current through a component. This means that the ammeter must be connected in series with that component.

You must still take care to connect the meter correctly when measuring potential difference and current.

**Lab Notes:**

1. Connect the equipment the way you think, in order to determine the resistance. Make sure that the meters are connected in the correct configuration.
2. Set the power supply to the lowest voltage setting.
3. Adjust the power supply to get a number of different readings of current and voltage (potential difference) for the resistor.
4. Record your measurements in a suitable table and then plot your results on a potential difference versus current graph.
5. Note: Do not run the circuit for more than ten seconds at a time. The current will cause an increase in the temperature of the resistor, giving unexpected results.

**Post-lab Requirement**

Calculate and record the resistance values, using the formula:

R = for each set of readings and compare this to the gradient of the graph plotted of current against potential difference for the resistor.



**Post-lab Discussions**

When the current is directly proportional to the potential difference, a conductor is called an ‘ohmic conductor’. Use this to explain the discrepancies in your results.

**Marks Distribution**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Section | Marks Available | Marks Received | Section | Marks Available | Marks Received |
| Aim | N/A |  | Method | N/A |  |
| Hypothesis | 4 |  | Results (exc Graph) | 4 |  |
| Prediction | 1 |  | Graph | 8 |  |
| Parameters | 3 |  | Discussion | 10 |  |
| Materials list  (The diagram only) | 5 |  | Conclusion | 5 |  |

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**Apparatus:**

* power supply
* switch
* seven electrical leads
* voltmeter or multimeter
* ammeter or multimeter
* one resistors of unknown ohmic readings

**Method**

1. Connect the equipment as shown in the circuit diagram (Figure 1). Make sure that the meters are connected in the correct configuration.
2. Set the power supply to the lowest voltage setting.
3. Adjust the power supply to get a number of different readings of current and voltage (potential difference) for the resistor.
4. Record your measurements in a suitable table and then plot your results on a potential difference versus current graph.
5. Note: Do not run the circuit for more than ten seconds at a time. The current will cause an increase in the temperature of the resistor, giving unexpected results.

Figure 1: Laboratory equipment set up