ISLAMIC UNIVERSITY OF TECHNOLOGY

Organization of Islamic Cooperation

Board Bazar, Gazipur

Course Name: Physics II Lab

Course No. PHY 4242

Experiment No. 01

Name of Experiment:

FAMILIARIZATION WITH SIMPLE ELECTRICAL CIRCUITS AND STUDY OF OHM’S LAW

Date of Performance: 01 July, 2019

Date of Submission: 15 July, 2019

Task 1A

Name of Experiment:

Familiarization with Simple Electrical Circuits

Objective:

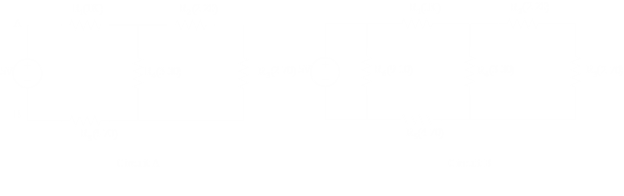
The purpose of this experiment is to be acquainted with the fundamentals of electrical circuits. This experiment will help in performing future experiments. The experiment will show how to construct circuits and draw circuit diagrams.

The other object of the experiment is to be familiarized with commonly used measuring equipment.

Equipment Used:

Jumpers, Multi-meter, Ammeter, Bread Board, Variable Voltage Source, Resistors

Circuit Diagrams:



Data Table:

|  |  |  |
| --- | --- | --- |
| Name of Circuit Element | Value () | Current / Voltage () / () |
|  |  | / |
|  |  | / |
|  |  | / |
|  |  | / |
|  |  | / |
|  |  | / |

Calculations:

For Circuit A,

Total Resistance (Theoretical)

Total Resistance (Practical)

Percentage Error

Result:

The equivalent resistance for Circuit A is .

Questions and Answers:

* Does the circuit work?

Yes

* Does the equivalent resistance of Circuit A agree with theoretical calculations?

No

* Comment on the above result.

The equivalent resistance was found to be just greater than theoretical calculations. This discrepancy was caused by the resistance of the connecting wired, which had not been taken into account.

* What is the difference between Circuit A and Circuit B?

Circuit B has an additional resistor connected in parallel to all of the resistors present in Circuit A.

* In Circuit B, in which branch is current maximum?

Current is maximum through .

* For each setup, identify which elements are connected in series and which are connected in parallel.

Circuit A has and connected in series with in parallel to them. These in turn are connected in series with , and a voltage source.

Circuit B has the same setup as Circuit A, with an additional resistor, , connected in parallel to the voltage source.

* What would be the problem if the DC source were not disconnected before measuring the equivalent resistance with the multi-meter?

The multi-meter measures the resistance by applying a small current and measuring the resulting voltage. If a separate voltage source were present, the multi-meter would measure that voltage instead.

Discussions:

The results deviated slightly from theoretical results. This is due to human and systematic errors, along with resistance from connecting wires. However, the error is small enough to be disregarded, so the results are still reliable.

Task 1B

Name of Experiment:

Study of Ohm’s Law

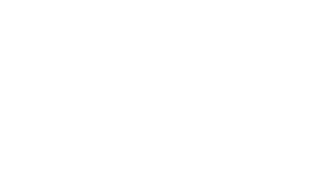
Objective:

The purpose of this experiment is to be introduced to Ohm’s law.

Equipment Used:

Jumpers, Multi-meter, Ammeter, Bread Board, Variable Voltage Source, Resistors

Circuit Diagram:



Maximum Allowable DC Voltage

Data Table:

|  |  |  |
| --- | --- | --- |
| Supply  Voltage / | Voltage Across  / | Current Through  / |
|  |  |  |
|  |  |  |
|  |  |  |
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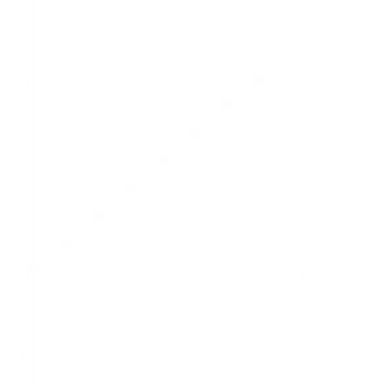
Calculations:

Slope ()

Measured Resistance

Percentage Error

Graph:



Questions and Answers:

* Explain the shape of the Current VS Voltage graph. What does the slope of the line represent?

The graph is a straight line passing through the origin. This shape is due to the fact that the current and voltage increase proportionally.

The slop of the line represents the resistance of the resistor .

* Define conductance and resistance.

Conductance is the ability of a material to allow electric current to flow through it.

Resistance is the ability of a material to prevent electric current from flowing through it.

Discussions:

The graph passes through nearly all the points, so the results can be assumed to be fairly accurate. Any errors are most likely human and can safely be ignored, since they do not seem to affect the results significantly.