AMERICAN INTERNATIONAL UNIVERSITY–BANGLADESH (AIUB)
FACULTY OF SCIENCE & TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
INTRODUCTION TO ELECTRICAL CIRCUITS
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LAB REPORT ON

Familiarizing with the basic DC circuit terms & concepts: Introduction to laboratory equipment.

Supervised By

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Submitted By:

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3. Farhin Zahra	22-46829-1	Error Calculation Conclusion

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Title: Familiarizing with the basic DC circuit terms & concepts. Introduction to Laboratory Equipment.

Objective: In this experiment the basic equipment like resistors, trainer board, multi meter etc. was observed and their operation were studied. Also some basic laws like Ohm's law, the definition of voltage and current were studied and their operation was verified with the basic equipment.

Introduction: The main objective of this experiment was to verify the ohms law. In doing so, followings were performed:

a) To design an electrical circuit with relevant parameters and sources.

b) To set up the circuit with appropriate connections, sources, and instruments.

 c) To compare the measured value with the theoretical estimated value.

d) To find the reason for error in result, and to draw conclusion on how to overcome.

Theory and Methodology:

Ohm's Law: Ohm's Law deals with the relationship between voltage and current in an ideal conductor. This relationship states that: At fixed temperature in an electrical circuit, the current passing through a conductor between two points is proportional to the potential difference) across the two points, and inversely proportional to the resistance between them. In mathematical terms, this is written as:

$$V = IR$$

 Where I is the current in amperes, V is the potential difference in volts and R is a constant measured in ohm's, called the resistor. The potential difference is also known as the voltage drop and is sometime denoted by E or U instead of V.

Current: The amount of electric current through some surface, a section through a copper conductor, is defined as the amount of electric charge flowing through that surface over time. The average current I is:

$$I=Q/T$$

Where Q is the amount of charge that passed through the surface in the time T.

Voltage: Voltage is the difference of electrical potential between two points of an electrical or electronics circuit, express in volts. It measures the potential energy of an electric field to cause an electric current in an electrical conductor. Depending on the difference of electrical potential it is called extra low voltage, low voltage, high voltage, extra high voltage.

Ammeter: Ammeter is a device that is used to measure the current level of the circuit.

Voltmeter: Voltmeter is a device that is used to measure the voltage difference between two points. The potential difference can be measured by simply connecting the leads of the across the two points
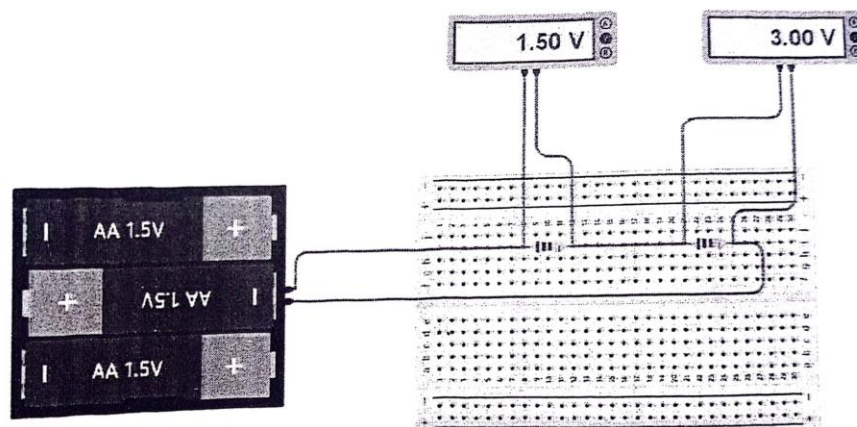

Figure: Circuit Diagram

Apparatus:

1. Trainer Board

2. Voltmeter

3. Ammeter

4. AVO meter or Multi meter

5. DC source

6. Resistors

Theoretical Calculation:

$R_T = R_1 + R_2 = 1.5 + 0.56 = 2.06 K\Omega$

From 1st Experiment,

$I = \frac{V}{R} = \frac{4.5}{2.06} = 2.18$ mA

$V_a = I \times R_1 = 2.18 \times 1.5 = 3.27$ V

$V_b = I \times R_2 = 2.18 \times 0.56 = 1.2208$ V

From 2nd Experiment,

$I = \frac{V}{R} = \frac{9}{2.06} = 5.37$ mA

$V_a = I \times R_1 = 5.37 \times 1.5 = 3.27$ V

$V_b = I \times R_2 = 5.37 \times 0.56 = 1.2208$ V

Data-Table:

Table:1

Resistor	Value using color code chart (kΩ)	Value using Multimeter (kΩ)
R_1	0.56	0.555
R_2	1.5	1.479
R_3	0.56	0.554
R_4	10	10
R_5	1	0.974

Table:2

E(V)	R_T(kΩ)	Theoretical Calculation			Multimeter Readings		
		I(mA)	V_a(V)	V_b(V)	I(mA)	V_a(V)	V_b(V)
4.5	2.06	2.18	3.27	1.2208	2.32	4.78	1.303
9		5.37	8.005	2.4472	4.49	9.18	2.502

Error Calculation:

Resistor	Error Calculation (%)
R_1	1.784
R_2	1.4
R_3	1.785
R_4	0
R_5	2.6

Conclusion:

In this experiment the basic idea of DC terms and circuits was observed and verified with specific theory. At a time, we come to know how to measure the voltages and current using multimeter and resistance by using the color code chart. The trainer board and the multimeter were checked before the start of the experiment. The value of the voltage was increased gradually as applying a large voltage can damage the resistors. During the experiment some error was taken place due to the fault of voltage source. Finally, all the data was placed in the data table. For the given equation, a result was obtained. The values in both instances (Experimental & Theoretical) were about same, but giving some error. So, the experiment became successful.