MARKS:

AMERICAN INTERNATIONAL UNIVERSITY-BANGLADESH (AIUB)

Electronic Devices Laboratory

LAB REPORT

ON

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

Experiment No: 1

Section: R

Semester: Fall 2019-20

Submitted To: SUSMITA GHOSH

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

Abstract: 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.

Background Body:

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 (i.e. voltage drop or voltage) across the two points, and inversely proportional to the resistance between them. In mathematical terms, ths 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.

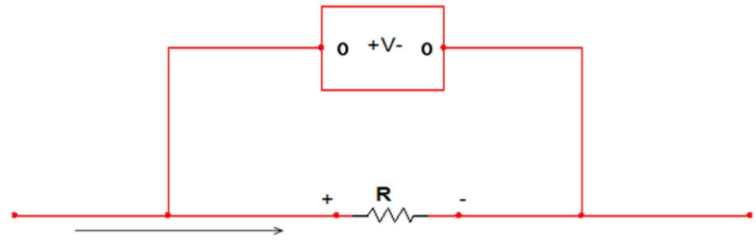
Current: The amount of electric current through some surface, a section through a copper conductor, is defined as the amount of electric charge flowing through that surface over time. If Q is the amount of charge that passed through the surface in the time T, then the average current I is :

$$I=Q/T$$

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.

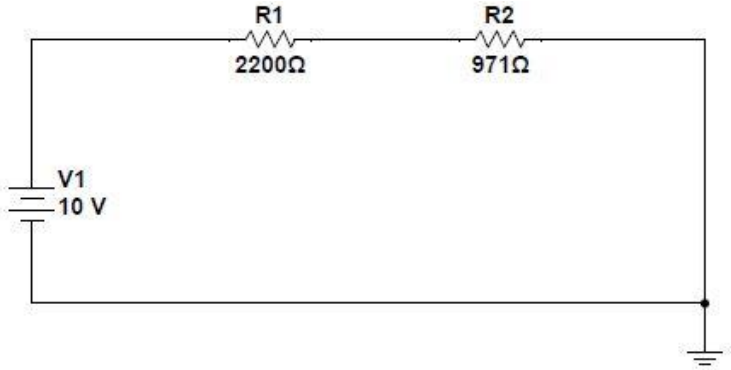
Voltmeter: Voltmeter is a device that is used to measure the voltage difference between two points. The potential difference can be measured by simply connecting the leads of the across the two points.



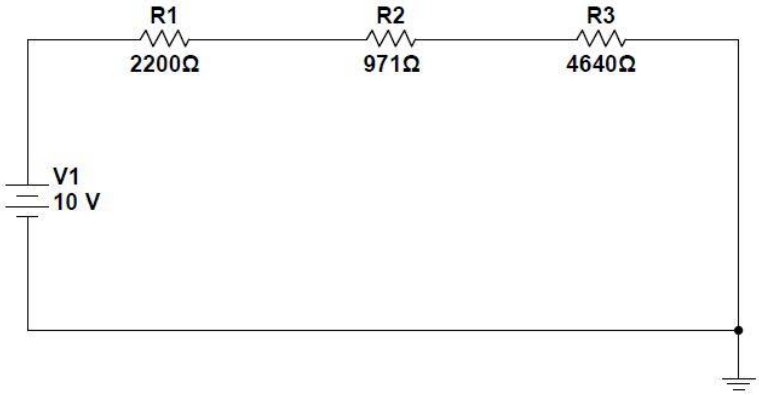
Apparatus List:

1. Trainer Board,
2. Voltmeter,
3. Ammeter,
4. AVO meter or Multi meter,
5. DC source,
6. Resistors.

Circuit Diagram:



Circuit: 1



Circuit: 2

Experimental Procedure:

1.The Value of the supplied resistors was calculated using the color code chart theoretically. Then the value was measured using a multi meter and the following table:

Resistor	Value using color code chart	Value using Multi meter
R1. R-R-R-G	$22\times10^2\ \Omega$	$21.83\times10^2\ \Omega$
R2. Br-Gre-R-G	$10\times10^2\ \Omega$	$9.73\times10^2\ \Omega$
R3. Br-R-R-G	$47\times10^2\ \Omega$	$46.26\times10^2\ \Omega$

2. The circuits like the diagram was constructed. Theoretically R_{T1},R_{T2} (Total Resistance), I_1,I_2 (Total Current), V_1, V_2 and V_3 was calculated.

Result & Calculation:

For circuit 1:

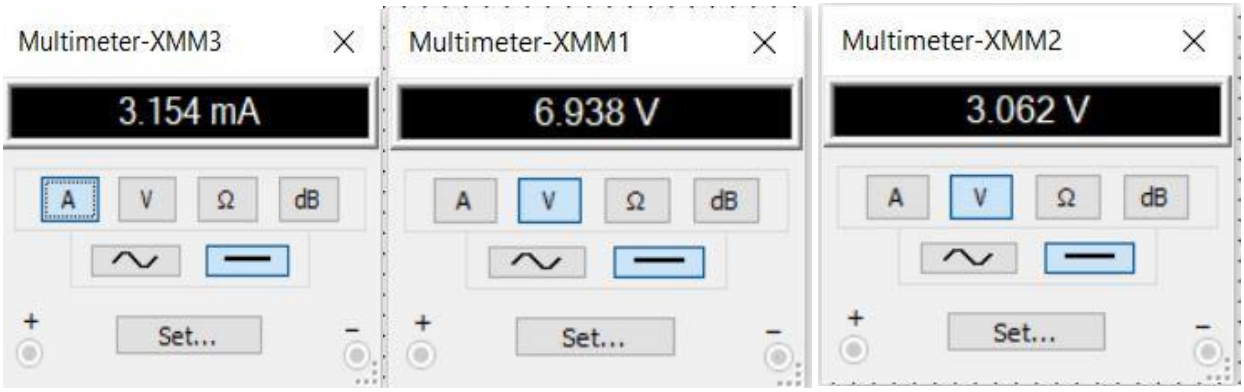
Theoretical	**Experimental**
$R_1 = 2.2\ k\Omega$ $R_2 = 0.971\ k\Omega$ $E = 10v$ $R_{T1} = R_1 + R_2 = 3.171\ k\Omega$ $I = E/ R_{T1} = 10v/3.171 = 3.15mA$ $V_1 = I \times R_1 = 6.93v$ $V_2 = I \times R_2 = 3.05865v$	$I = 3.15mA$ $V_1 = 6.98v$ $V_2 = 3.092v$

For circuit 2:

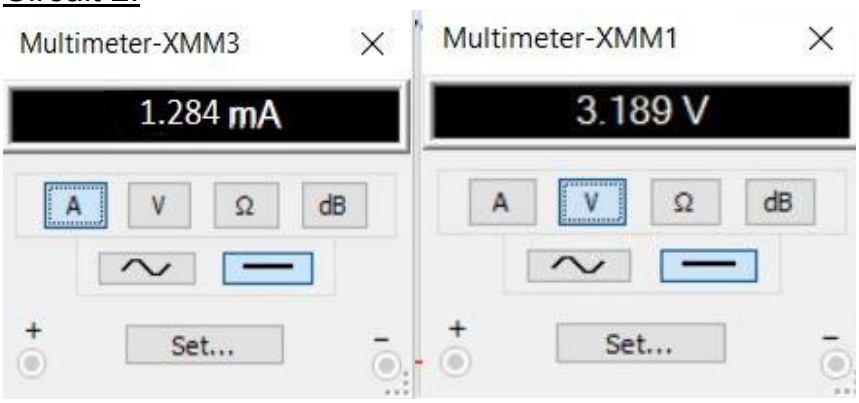
Theoretical	**Experimental**
$R_1 = 2.2\ k\Omega$ $R_2 = 0.971\ k\Omega$ $R_3 = 4.7\ k\Omega$ $E = 10v$ $R_{T2} = R_1 + R_2 + R_3 = 7.871\ k\Omega$ $I = E/ R_{T2} = 1.27mA$ $V_1 = I \times R_1 = 2.794v$ $V_2 = I \times R_2 = 1.23v$ $V_3 = I \times R_3 = 5.969v$	$I = 1.27mA$ $V_1 = 2.82v$ $V_2 = 1.253v$ $V_3 = 6v$

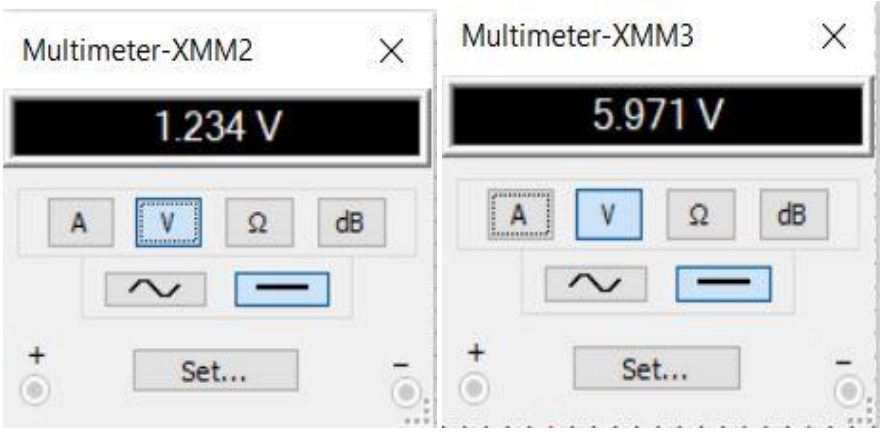
Simulation:

Circuit 1:



Circuit 2:





Questions & Answers:

1.Show the difference between your theoretical value and Multi meter Value.

Ans:

Circuit 1:

Theoretical Value:	Multimeter Value:
I = 3.15mA	I = 3.15mA
V_1 = 6.93v	V_1 = 6.98v
V_2 = 3.05865v	V_2 = 3.092v

Circuit 2:

Theoretical Value:	Multimeter Value:
I = 1.27mA	I = 1.27mA
V_1 = 2.794v	V_1 = 2.82v
V_2 = 1.23v	V_2 = 1.253v
V_3 = 5.969v	V_3 = 6v

2. Do you have difference between in these values? If you have, then explain the reason.

Ans: Yes, I have. Because of the tolerance of the resistance and taking smaller value.

3.Why an ammeter can be damaged if it is connected in parallel to the load resistor?

Ans: An ammeter has a tolerance almost zero. When it is connected in parallel, huge current enter into the ammeter and for this it could be damaged.

Discussion:

1.The bread board and the multimeter was checked before the start of the experiment.

2.The resistor was placed properly according to the figure.

3.The value of the voltage was increased gradually as applying a large voltage can damage the resistors.

4.During the experiment some error was taken place. It was solved with the help of course instructor.

5.Finally all the data was calculated. By the given equation, a result was obtained.

Conclusions: In this experiment the basic idea of DC terms and circuits was observed and verified with specific theory. Also we come to know how to measure the voltages and current using multimeter. So the experiment is successful.

Reference :

[1]http://zebu.uoregon.edu/disted/ph162/lec04.html

[2]Robert L. Boylestad, “ Introductory Circuit Analysis ‘’ , Pearson , Twelfth Edition ,pp#101-109 ,ISBN 978-81-317-6476-3.