

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE: PHY 4242 (PHYSICS – II LAB)

EXPERIMENT NO. 1

TASK 1-A

NAME OF THE EXPERIMENT: FAMILIARIZATION WITH SIMPLE ELECTRICAL CIRCUITS.

OBJECTIVE:

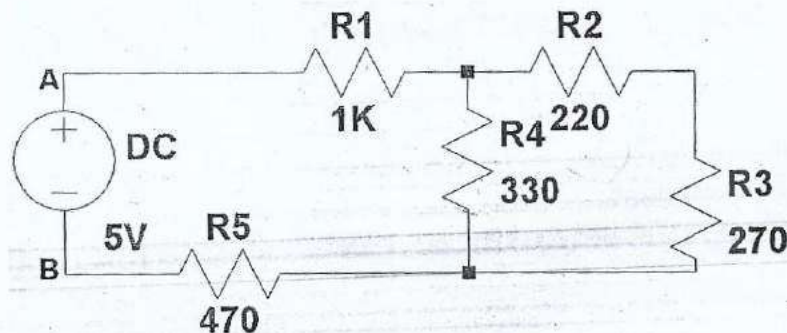
The purpose of this experiment is to acquaint the students with the fundamentals of electrical circuits. This experiment will help students to perform future experiments. Through this experiment they will learn how to construct circuits and draw circuit diagram.

The other objective of this experiment is to make students familiar with commonly used measuring equipment.

LABORATORY TASKS

1. Construct the following circuits and study.

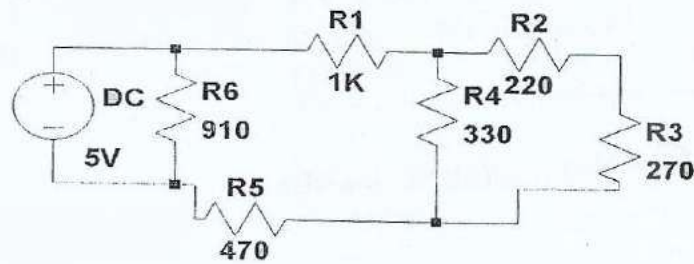
(a)



- i) Name the two sides of the DC source A & B. Does the circuit work?
- ii) Measure the individual resistance and the equivalent resistance between A and B. Does it agree with the theoretical calculation?
- iii) Comment on your result.

N. B. Before measuring equivalent resistance, disconnect the DC source.

b) Construct the following circuit:



- i) What is the difference of this circuit with the circuit of (a)?
- ii) Measure current through each branch.
- iii) In which branch current is maximum?

2. Check whether you have taken all necessary data.

3. Before leaving, show completed data sheet to your teacher. You have to include the data with your final report.

Sample Data sheet:

Name of the circuit element	Value	Current/Voltage
R1		
R2		
R3		
R4		
R5		
R6		

Report:

- i) Answer all the questions.
- ii) Show all calculations.
- iii) For each setup identify which elements are connected in series and which are connected in parallel.
- iv) What would be the problem if DC source were not disconnected before measuring the equivalent resistance by multimeter?
- v) Discuss on your result.

TASK 1-B

NAME OF THE EXPERIMENT: STUDY OF OHM'S LAW

OBJECTIVE:

The purpose of this experiment is to introduce **Ohm's law** to the students. After completion of this experiment the students will be able to understand the importance of **Ohm's** in electrical circuits.

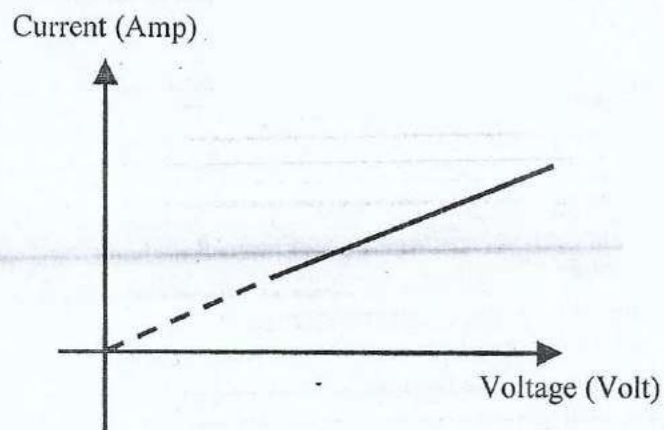
Ohm's Law: *At any constant temperature the current through any conductor is directly proportional to the voltage across it.*

If the voltage is represented by V and current by I then according to **Ohm's law**:

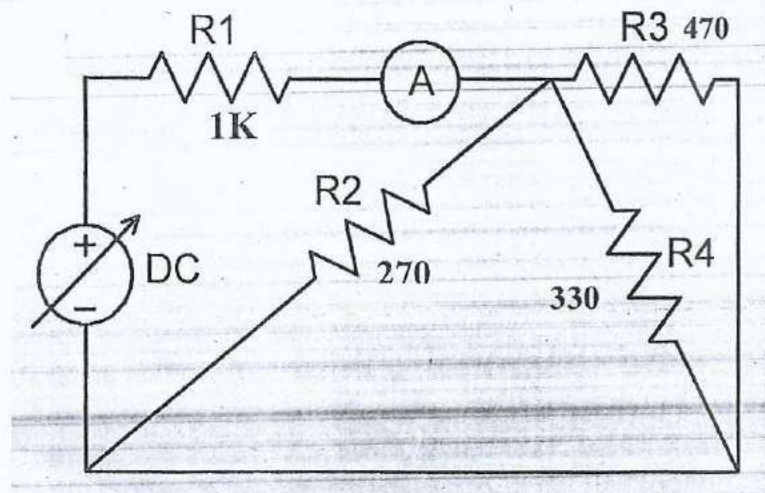
$$I \propto V$$

$$\text{or, } I = V/R$$

where $1/R$ is a constant and R is the resistance of the conductor.



Circuit Diagram:



Laboratory Tasks:

- Calculate maximum allowable DC voltage for the above circuit. The power rating of each resistor is 0.25 Watt.
- Measure individual resistances and record their values. Construct the circuit.
- Measure current through R1 resistor and voltage across the same for different values of supply voltage up to maximum allowable voltage calculated before (increment by 2V at each step from 0V).
- Submit completed data sheet to your teacher for verification.

Sample Data Sheet

Supply Voltage	Voltage across R1	Current Through R1
0 V	0	0
2 V	.	.
4 V	.	.
6 V	.	.
8 V	.	.
10 V	.	.
12 V	.	.
14 V	.	.

Report

- i. Plot *Current* vs. *Voltage* and explain the shape. The plot should be straight line and if extrapolated it will pass through origin. What does the slope of the line represent?
- ii. Define *conductance* and *resistance*.
- iii. Calculate resistance from the curve and compare with measured resistance value. Show calculations in your report.
- iv. Discuss on your result.