

## EXPERIMENT NUMBER – 3.9

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UID: 21BCS11270

BRANCH: CSE

DOP: 01/06/2022

SUBJECT: PHYSICS FOR ENGINEERS

GRP: 510 B

- **AIM OF THE EXPERIMENT –**

Determination of value of Planck's constant 'h'

- **APPARATUS-**

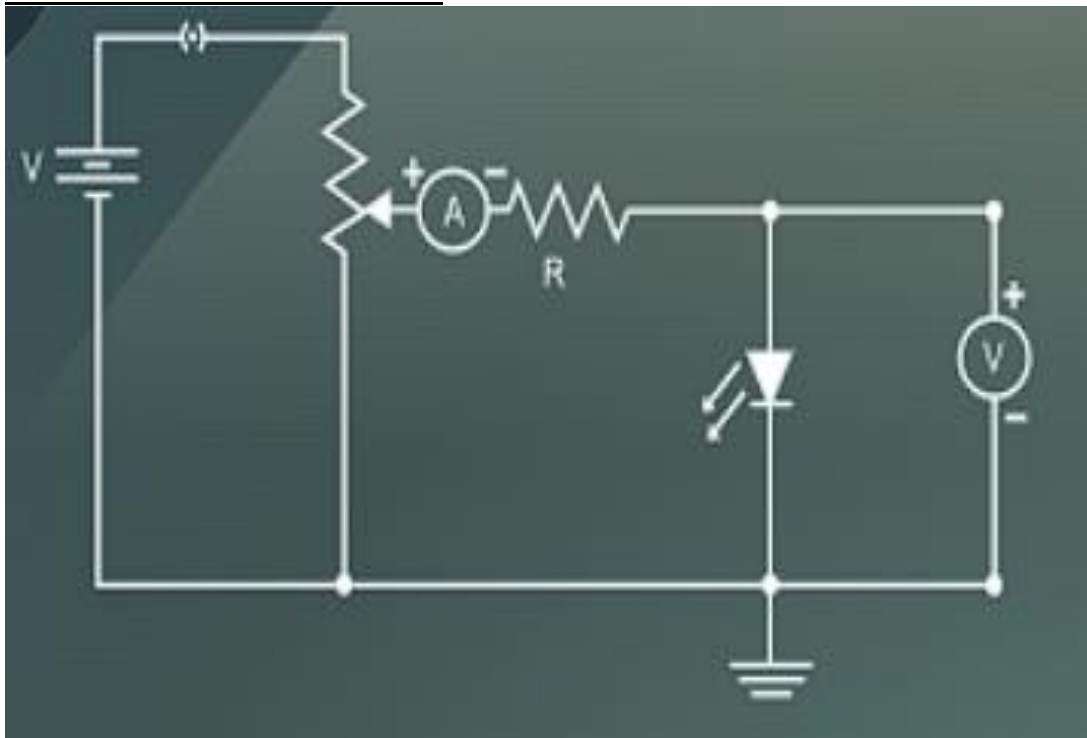
**Table 1: List of Equipments:**

S.N.	Equipment	Range	Quantity
1	Digital Voltmeter (DVM) to measure the voltage across the L.E.D.s	0-20V	1
2	Digital milli ammeter to determine the current through L.E.D.s.	30mA	1
3.	Rheostat	0-1000ohm	1
4.	Resistor	1K	1
5.	L.E.D.s	Different colors	4
6.	Power Supply	0-10V	1
7.	A one way Key	NA	1

● OBSERVATIONS-

Sr No.	LED	Wavelength ( $\lambda$ in nm)	$1/\lambda$ in $m^{-1}$	Stoppage Voltage(V)
1.	RED	650	$1.538 \times 10^6$	1.908
	GREEN	510	$1.960 \times 10^6$	2.434
3.	YELLOW	570	$1.754 \times 10^6$	2.178
	BLUE	475	$2.105 \times 10^6$	2.615

● CIRCUIT DIAGRAM -



**CALCULATIONS-**

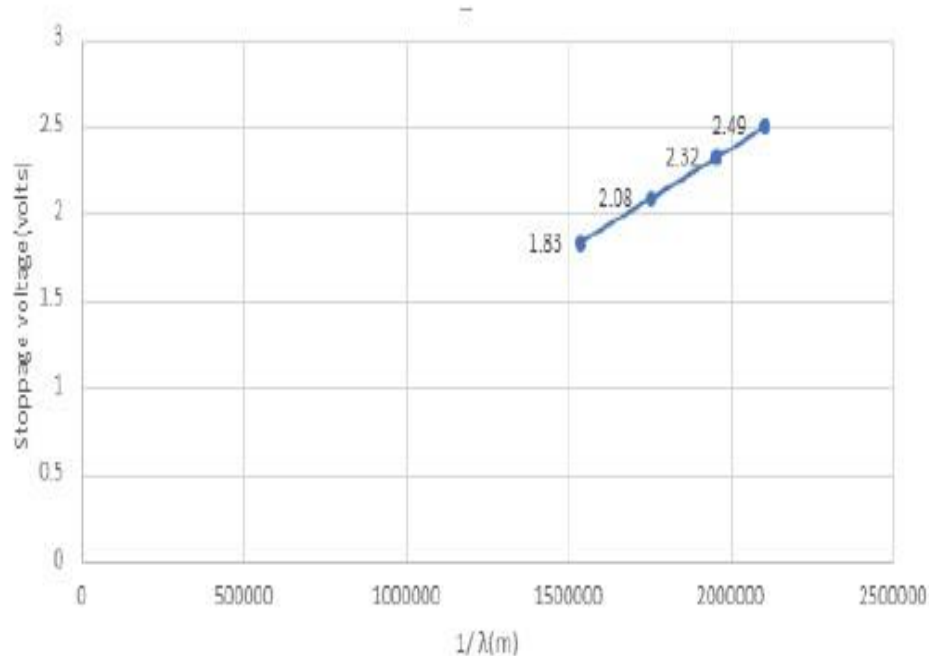
$$1) \frac{1.6 \times 1.908 \times 650}{3} \times 10^{-36} = 6.614 \times 10^{-34} \text{ kg m}^2/\text{s}$$

$$2) \frac{1.6 \times 510 \times 2.454 \times 10^{-36}}{3} = 6.62 \times 10^{-34} \text{ kg m}^2/\text{s}$$

$$3) \frac{1.6 \times 570 \times 2.178 \times 10^{-36}}{3} = 6.621 \times 10^{-34} \text{ kg m}^2/\text{s}$$

$$4) \frac{1.6 \times 475 \times 2.610 \times 10^{-36}}{3} = 5.47 \times 10^{-34} \text{ kg m}^2/\text{s}$$

**• GRAPH (ATTACH IF ANY)-**



## • SOURCES OF ERROR-

- The experiment should be performed such that the glow of LEDs is properly visible.
- The value of voltmeter and ammeter should be noted with least count.
  - The surface on which the apparatus rest should be flat with no surface leakage.  
Loose connections
  - Error in taking readings

## • RESULTS AND DISCUSSION-

- The value of Planck's constant  $h$  is  $6.6 \times 10^{-34}$  Js.
- Here we see one thing; highest the wavelength of light, lowest the voltage. On decreasing the wavelength of light, value of voltage increases.

## • LEARNING OUTCOMES

1. Remember the concepts related to fundamentals of C language, draw flowcharts and write algorithm/pseudocode.
2. Understand the way of execution and debug programs in C language.
3. Apply various constructs, loops, functions to solve mathematical and scientific problem.
4. Analyze the dynamic behavior of memory by the use of pointers.
5. Design and develop modular programs for real world problems using control structure and selection structure.

## **EVALUATION COLUMN (To be filled by concerned faculty only)**

<u>Sr. No.</u>	<u>Parameters</u>	<u>Maximum Marks</u>	<u>Marks Obtained</u>
1.	Worksheet Completion including writing learning objective/ Outcome	10	
2.	Post-Lab Quiz Result	5	
3.	Student engagement in Simulation/ Performance/ Pre-Lab Questions	5	
4.	Total Marks	20	