NAME:- PRATHAPANI SATWIKA

REG.NO:- 20BCD7160

Title of the experiment:-

Wavelength of Light Emitting Diodes.

Objectives:-

To determine the wavelengths of the given LEDs

Equipment list:-

Power Supply, LED's, multimeter, milli ammeter, patch cords etc.

Formula:-

Energy of the photons emitted by LED = $E = h\nu = \frac{hc}{\lambda} = eV_k$

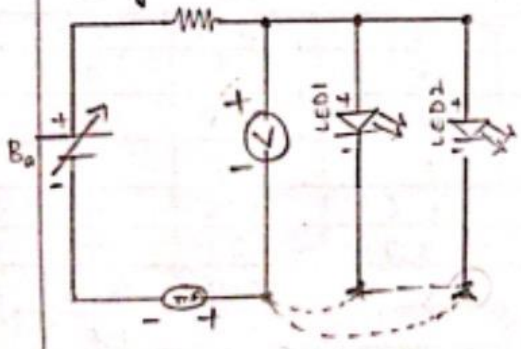
The wavelength of LED is $\lambda = \frac{hc}{eV_k}$ nm

Where h is planck's constant = 6.63×10^{-34} Js;

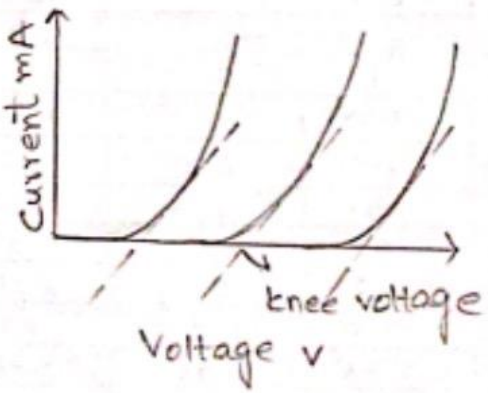
e is charge on electron = 1.602×10^{-19} C; V_k is the knee voltage of the LED

c is speed of light = 3×10^8 m/s.

Diagram:-



Model Graph:-



S.NO	LED1 (BLUE)		LED 2 (RED)		LED 3 (GREEN)	
	voltage v (volts)	current I (mA)	voltage v (volts)	current I (mA)	voltage (volts)	current I (mA)
1	0	0	0	0	0	0
2	0.25	0	0.25	0	0.25	0
3	0.5	0	0.5	0	0.5	0
4	0.75	0	0.75	0	0.75	0
5	1	0	1	0	1	0
6	1.25	0	1.25	0	1.25	0
7	1.5	0	1.5	0	1.5	0
8	1.75	0	1.75	0.6	1.75	0
9	2	0	2	3.7	2	0
10	2.25	0	2.25	5	2.25	0.3
11	2.5	0.1	2.5		2.5	1.6
12	2.75	0.95	2.75		2.75	4
13	3	2.8	3		3	5

Result:- The wavelengths of LED's

colour of LED	wavelength (nm)
BLUE	477
RED	727
GREEN	535

$\rightarrow \lambda_{(blue)} = \frac{hc}{eV_k} = \frac{6.602\times10^{-34}\times3\times10^{8}}{1.602\times10^{-19}\times2.6} = \frac{19.89\times10^{-34+8+19}}{4.1652}$

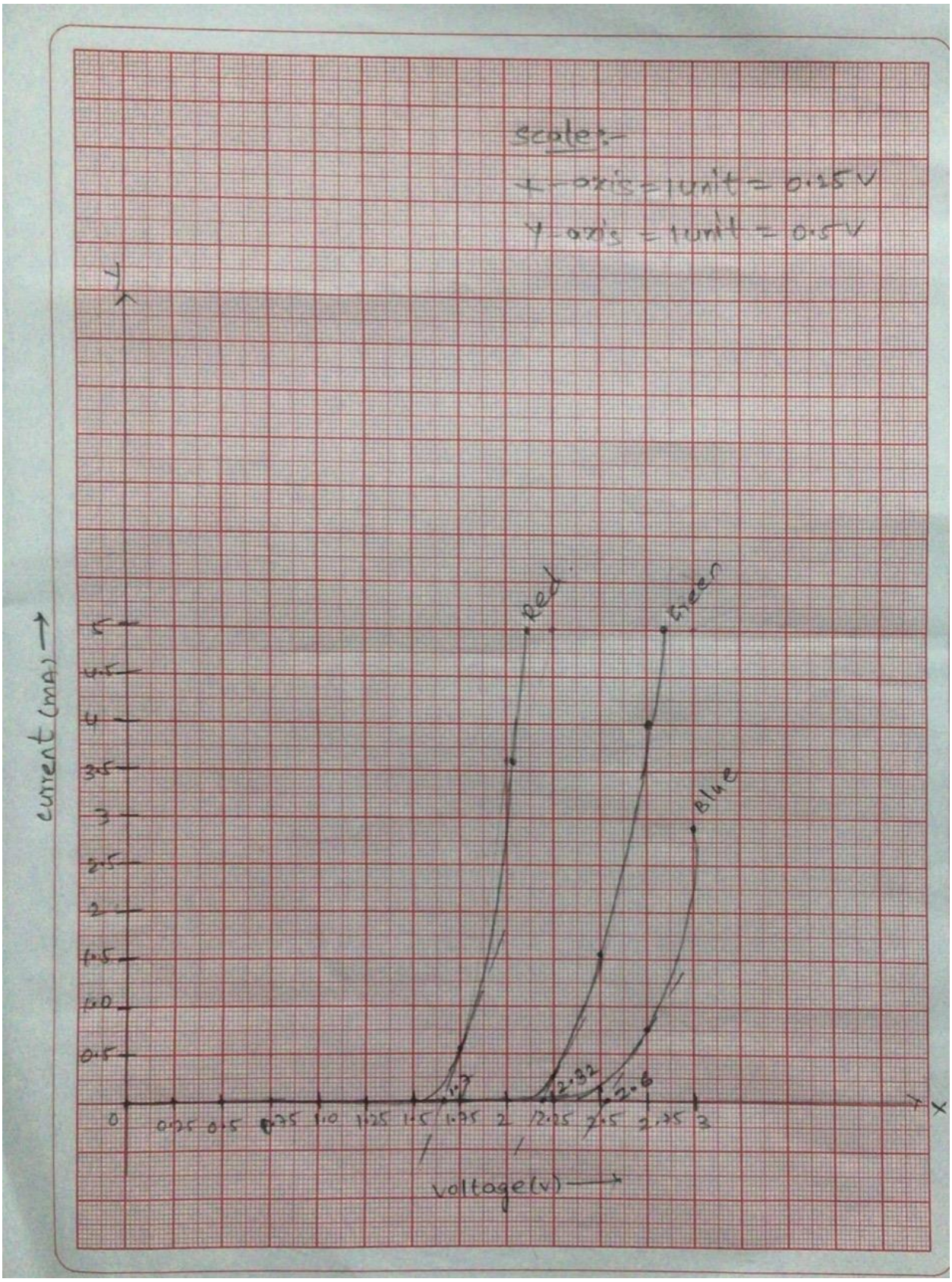
$= 4.77\times10^{-7} = 477\ nm.$

$\rightarrow \lambda_{(Red)} = \frac{hc}{eV_k} = \frac{6.602\times10^{-34}\times3\times10^{8}}{1.602\times10^{-19}\times1.7} = \frac{19.89}{2.7234}\times10^{-7} = 7.27\times10^{-7}$

$= 727\ nm$

$\rightarrow \lambda_{(green)} = \frac{hc}{eV_k} = \frac{6.602\times10^{-34}\times3\times10^{8}}{1.602\times10^{-19}\times2.32} = \frac{19.89\times10^{-7}}{3.71664} = 5.35\times10^{-7}$

$= 535\ nm$


scale:-
x-axis = 1 unit = 0.25 V
y-axis = 1 unit = 0.5 V
Y
X
current (mA) →
voltage (v) →
Red
Green
Blue
5
4.5
4
3.5
3
2.5
2
1.5
1.0
0.5
0
0.25
0.5
0.75
1.0
1.25
1.5
1.75
2
2.25
2.5
2.75
3
1.7
2.32
2.6