

Name : Hunaid Siamwala S.

Subject : Physics

Subject Code : 102001213

Class : 2-CE-1

Enrollment No : 12002040701067



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120024051067 (1)  
Hunaid

### \* Experiment - 3 [LED] (Forward bias) :

Objective:- Study the characteristics of Light Emitting diode in forward bias.

Equipments

needed: Measurement unit, patch cords.

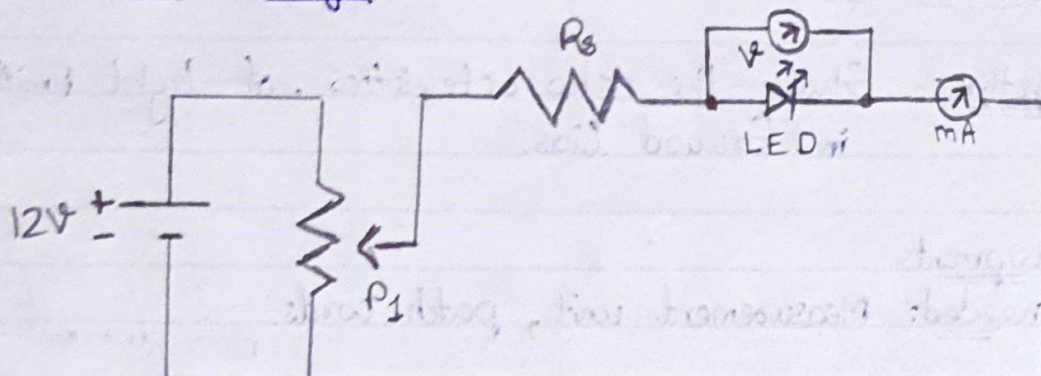
Procedure:-

1. Before switch 'ON' measurement unit, connect the circuit as shown in circuit diagram.
2. Switch 'ON' the power supply.
3. Rotate potentiometer  $P_1$  fully in counter clockwise direction.
4. Vary the potentiometer  $P_1$  so as to increase the value of diode  $V_0$  from 0 to 1V in step 2 measure the corresponding values of diode current  $I_0$  in an Observation Table.
5. Plot a curve between diode voltage  $V_0$  & current  $I_0$  as shown in nature of graph.

Conclusion:-

- We can conclude that the imp. characteristics of LED in forward bias and also get to know about the nature of graph.



Circuit Diagram:- (LED) Forward biasObservation Table:-

S.No	Diode Voltage $V_0$ (Volts)	Diode Current $I_0$ (mA)
1	0.1	0.0
2	0.21	0.0
3	0.33	0.0
4	0.42	0.0
5	0.53	0.0
6	0.66	0.0
7	0.77	0.0
8	0.86	0.0
9	0.97	0.0
10	1.08	0.0
11	1.2	0.00
12	1.31	0.27
13	1.41	1.52
14	1.53	3.44

Result:-

- Forward resistance of silicon diode  $R_f = 48.14 \Omega$
- Knee Voltage of silicon diode = 0.27



LED

(Forward Bias)

Scale:-

X-axis - 1 unit = 0.1V

Y-axis - 1 unit = 0.5mA

$$AB = 2.7 \text{ mA}$$

$$BC = 1.5 - 1.37 = 0.13 \text{ V}$$

$$\text{Slope} = \frac{AB}{BC} = \frac{2.7}{0.13}$$

$$R_f = \frac{1}{\text{Slope}} = \frac{0.13}{2.7 \times 10^{-3}}$$

$$= \underline{\underline{48.14 \Omega}}$$

