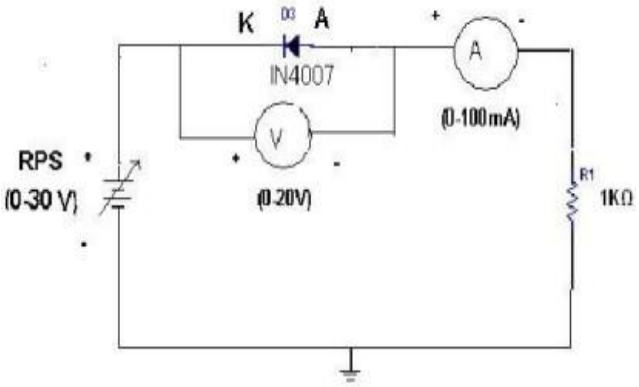
Assignment-6 Experiment-6 (a & b)

6a. Characteristic of PN junction diode under forward bias

AIM: To plot the characteristics curve of PN junction diode in Forward bias

Apparatus

A diode, DC voltage supplier, Bread board, 100Ω resistor, two multi-meters for measuring current and voltage and connecting wires



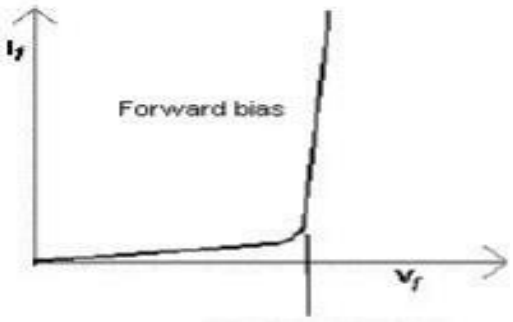


Fig. 6.1 PN Junction Forward Bias **Fig. 6.2.Model graph for I-V Characteristics**

Procedure:

For the forward bias of a P-N junction, P-type is connected to the positive terminal while the N-type is connected to the negative terminal of a battery. The potential at P-N junction can be varied with the help of potential divider. At some forward voltage (0.3 V for Ge and 0.7V for Si) the potential barrier is altogether eliminated and current starts flowing. This voltage is known as threshold voltage (V_{th}) or cut in voltage or knee voltage .It is practically same as barrier voltage V_B. For $V<V_{th}$, the current is negligible. As the forward applied voltage increase beyond threshold voltage, the forward current rises exponentially.

Table 6.1 I-V Characteristics of PN junction diode under forward bias

S. No	Forward Voltage V_f (Volt)	Forward Current I_f (mA)
1	0	0
2	0.2	0
3	0.4	0.5
4	0.6	1
5	0.8	2
6	1.0	3
7	1.2	5
8	1.4	7.5
9	1.6	10
10	1.8	15
11	2.0	20
12	2.2	25

6b. Characteristic of PN junction diode under reverse bias

AIM:

To plot the characteristics curve of PN junction diode in reverse bias

Apparatus

A diode, DC voltage supplier, Bread board, 100Ω resistor, 2 multimeter for measuring current and voltage and connecting wires.

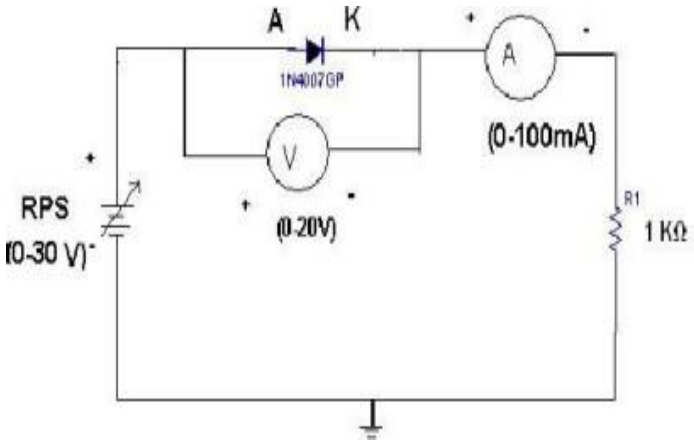


Fig. 6.3 PN Junction Reverse Bias

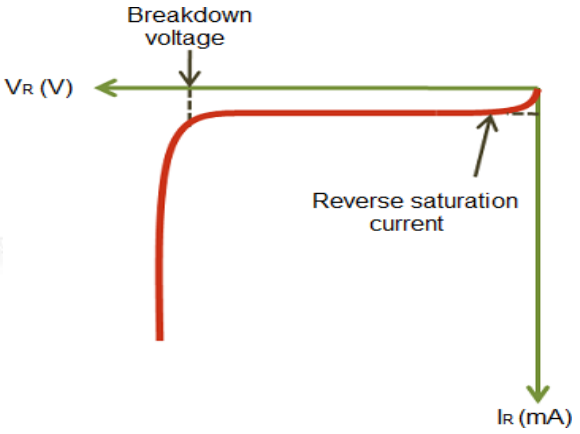


Fig. 6.4 Model graph for I-V Characteristics

Procedure

For the reverse bias of p-n junction, P-type is connected to the negative terminal while N-type is connected to the positive terminal of a battery. Under normal reverse voltage, a very little reverse current flows through a P-N junction. But when the reverse voltage is increased, a point is reached when the junction break down with sudden rise in reverse current. The critical value of the voltage is known as break down (VBR). The break down voltage is defined as the reverse voltage at which P-N junction breakdown with sudden rise in reverse current.

Table 6.2 I-V Characteristics of PN junction diode under reverse bias

S. No	Reverse Voltage V_R (Volt)	Reverse Current I_R (μ A)
1	0	0
2	3	0
3	5	0
4	7	0
5	9	1.5
6	11	3.5
7	13	5
8	15	7
9	17	9
10	19	11
11	21	13

Assignment Question:

1. By using the readings in the tabular coloum (V and I), to draw the Forward Biased and Reverse Biased I-V characteristic curve.

2. Write the result in the following order

The forward biased and reverse biased I-V characteristics of PN Junction diode are studied and curves are drawn.

Finally, submit the scanned copy of your observation note book in GCR on (or) before THREE working days from the date of experiment.