

LABORATORY WORK SHEET

Name of the Student : Abdul Basith Khan
 Class : 1st Year (CSM-A) Semester : 1st
 Course Code : AEE001 Course Name : EE Laboratory
 Name of the Course Faculty : Dr. L. Rajashekar Goud Faculty ID : IARE11067
 Exercise Number : 10 Week Number : 10 Date : 21/01/2024

Roll Number									
2	3	9	5	1	A	6	6	0	1

DAY TO DAY EVALUATION:

Marks	Aim / Preparation	Algorithm / Procedure	Source Code	Program Execution	Viva - Voce	Total
		Performance in the Lab	Calculations and Graphs	Results and Error Analysis		
Max. Marks	4	4	4	4	4	20
Obtained	4	4	4	4	4	20

[Signature]
Signature of Faculty

START WRITING FROM HERE : VOLT AMPERE Characteristics of P-N

Aim:-

JUNCTION DIODE

To plot the V-I Characteristics of a P-N Junction diode in both forward and reverse directions, determine cut in voltage (Knee Voltage), static & dynamic resistance in forward direction at forward current of 2mA & 8mA respectively and find static and dynamic resistance at 10V in reverse bias condition

Apparatus Required:-

S.No	Device	Range/Rating	Quantity (in Nos)
1.	Semiconductor diode trainer Board containing DC Power Supply, Diode (Silicon) Diode (Germanium) Carbon Film Resistor	(0-30)V 1N4007 OA-79 1K Ω , 1/2W	1 1 1 1

2.	DC Voltmeter	(0-1) V	1
	DC Voltmeter	(0-20) V	1
3.	DC Ammeter	(0-200) mA	1
	DC Ammeter	(0-200) mA	1
4.	Connecting Wires	5A	10

Circuit Diagrams:-

Forward Bias:-

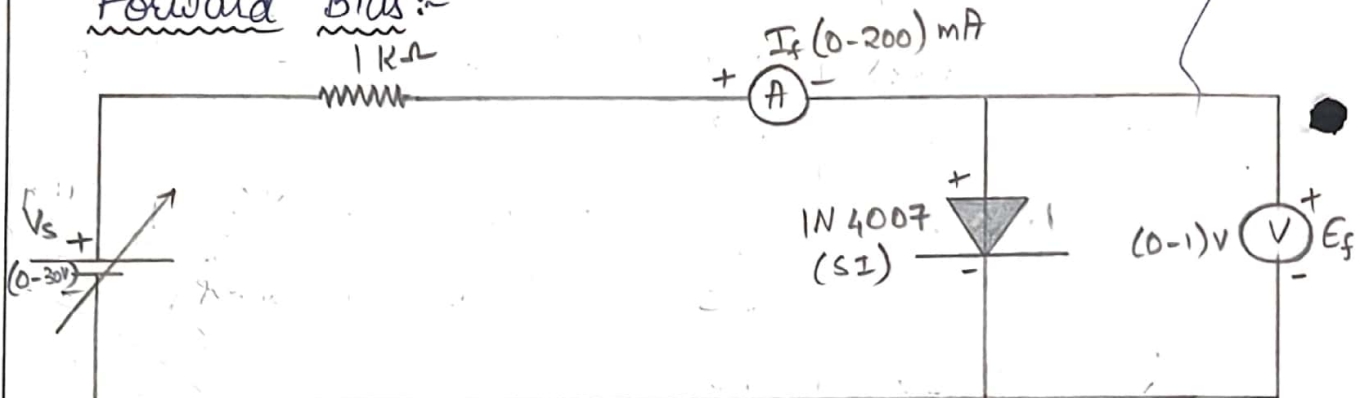


Fig-8.3 Forward Bias Circuit

Reverse Bias:-

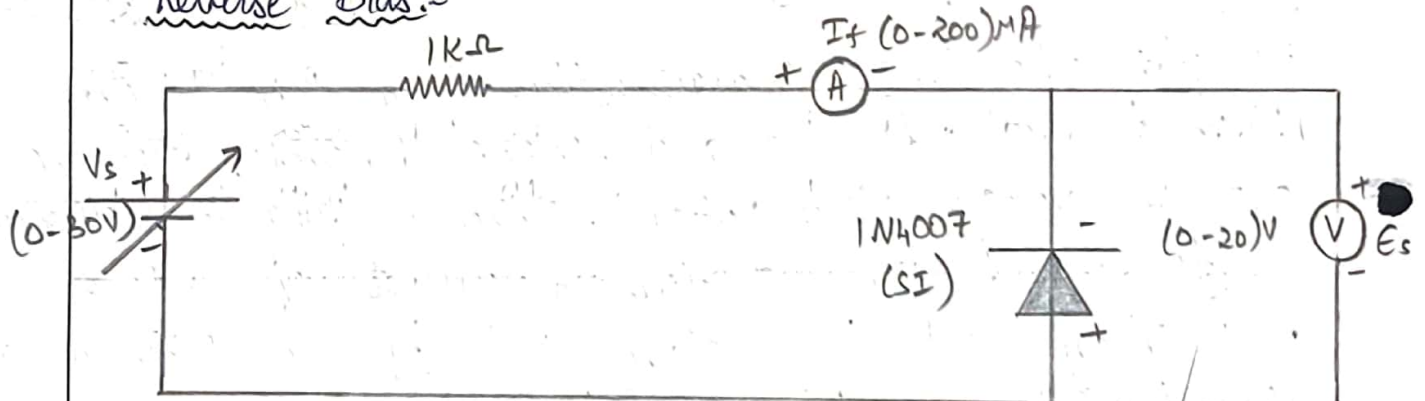


Fig-8.4 Reverse Bias Circuit

Expected graphs:-

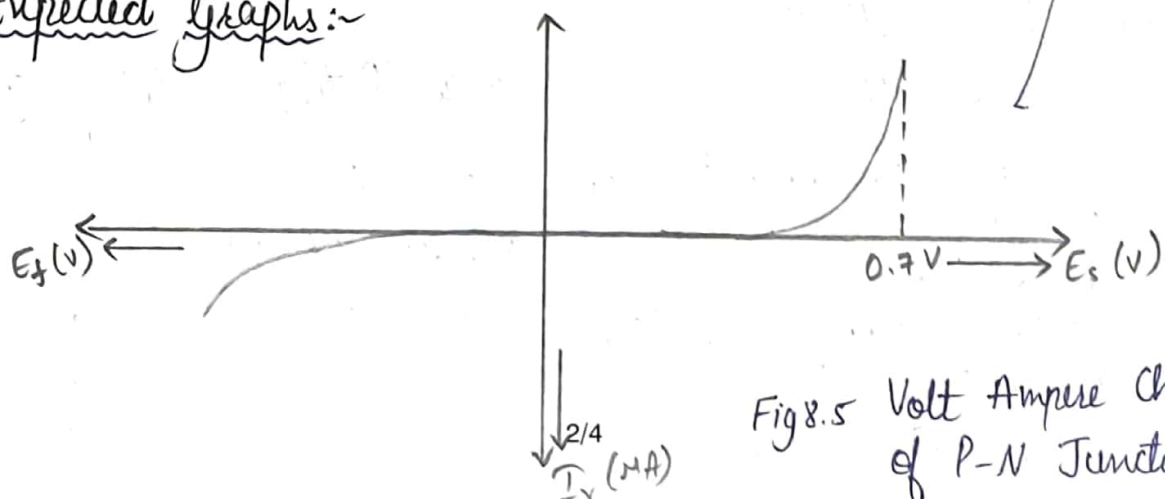


Fig 8.5 Volt Ampere Characteristics of P-N Junction Diode

Tabular Column:-

Forward Bias

Reverse Bias

E_s (Volts)	E_f (Volts)	I_f (mA)
0.1	0.23	0
0.2	0.38	0
0.3	0.42	0
0.4	0.46	0
0.5	0.48	0.1
0.6	0.51	0.2
0.7	0.53	0.3
0.8	0.54	0.4
0.9	0.55	0.5
1	0.60	0.6
2	0.60	1.5
4	0.75	3.5
6	1.95	5.5
8	1.11	7.6
10	1.75	9.7
12	2.32	11.7
14	2.71	13.2

E_s (Volts)	E_r (Volts)	I_r (mA)
0.1	0.25	0
0.2	0.32	0
0.3	0.39	0
0.4	0.4	0.1
0.5	0.45	0.2
0.6	0.46	0.3
0.7	0.48	0.4
0.8	0.52	0.5
0.9	0.56	0.6
1	0.59	0.7
2	0.01	1.6
4	0.64	3.5
6	0.67	5.5
8	0.69	7.6
10	0.70	9.7
12	0.71	11.7
14	0.73	13.2

Precautions:-

1. Ensure that the polarities of the power supply and the meters as per the circuit Diagram.
2. Keep the input voltage Knobs of the regulated power supply in minimum position.
3. No loose can tacts at the junction

4. Ensure that the ratings of the meters are as per the circuit design for precision.

Calculations:-

Forward Bias:-

$$\begin{aligned}\text{Static Resistance at } 8 \text{ mA} &= E_f / I_f \\ &= \text{Static resistance at } 2 \text{ mA}\end{aligned}$$

$$\begin{aligned}\text{Dynamic Resistance at } 8 \text{ mA} &= \Delta E_f / \Delta I_f \\ &= \text{Dynamic Resistance.}\end{aligned}$$

Reverse Bias:-

$$\begin{aligned}\text{Static Resistance at } (10 \text{ V}) &= E_r / I_r \\ &= \text{Dynamic resistance at } (10 \text{ V}) \\ &= \Delta E_r / \Delta I_r.\end{aligned}$$

Result:-

- In forward Bias as we increase current the value of Voltmeter & ammeter increases.
- In reverse Bias as we increase current, the values of Voltmeter and Ammeter decreases.

Scale:-

X-axis = 1 unit = 2 cm

Y-axis = 1 unit = 2 cm

X'-axis = 1 unit = 2 cm

Y'-axis = 1 unit = 2 cm

