

EXPERIMENT NUMBER: 2.5

STUDENT'S NAME –
 STUDENT' UID –
 CLASS AND GROUP –
 SEMESTER – 1st BRANCH: CSE
 SUBJECT – PHYSICS FOR ENGINEERS

- **AIM OF THE EXPERIMENT –**

To draw the static current- voltage characteristics of a zener diode.

- **APPARATUS –**

Sr.No	Equipments	Range	Quantity
1	Regulated Power Supply	0-30V	1
2	Zener diode	5V/7V/10V	3
3	Voltmeter	0-30V	2
4	Ammeter	100mA	1
5	Connecting wires	NA	13
6	Resistance	1Kohm	2
7	Rheostat	1Kohm	1

- **THEORY –**

A Zener diode is a heavily doped p-n junction diode, specially made to operate in the breakdown region. A p-n junction diode normally does not conduct when reverse biased. But if the reverse bias is increased, at a particular voltage it starts conducting heavily. This voltage is called Break down Voltage. High current through the diode can permanently damage the device. To avoid high current, we connect a resistor in series with a zener diode. Once the diode starts conducting it maintains almost constant voltage across the terminals whatever may be the current through it, i.e., it has very low dynamic resistance. It is used in voltage regulators.

• **CIRCUIT DIAGRAM:-**

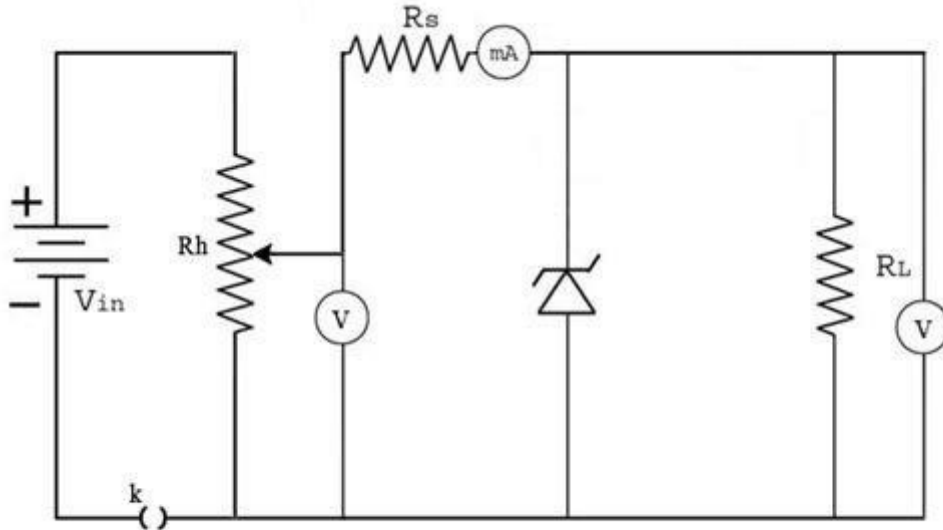


Figure 1: Circuit Diagram

• **OBSERVATIONS -**

Load resistance: 20000 ohm

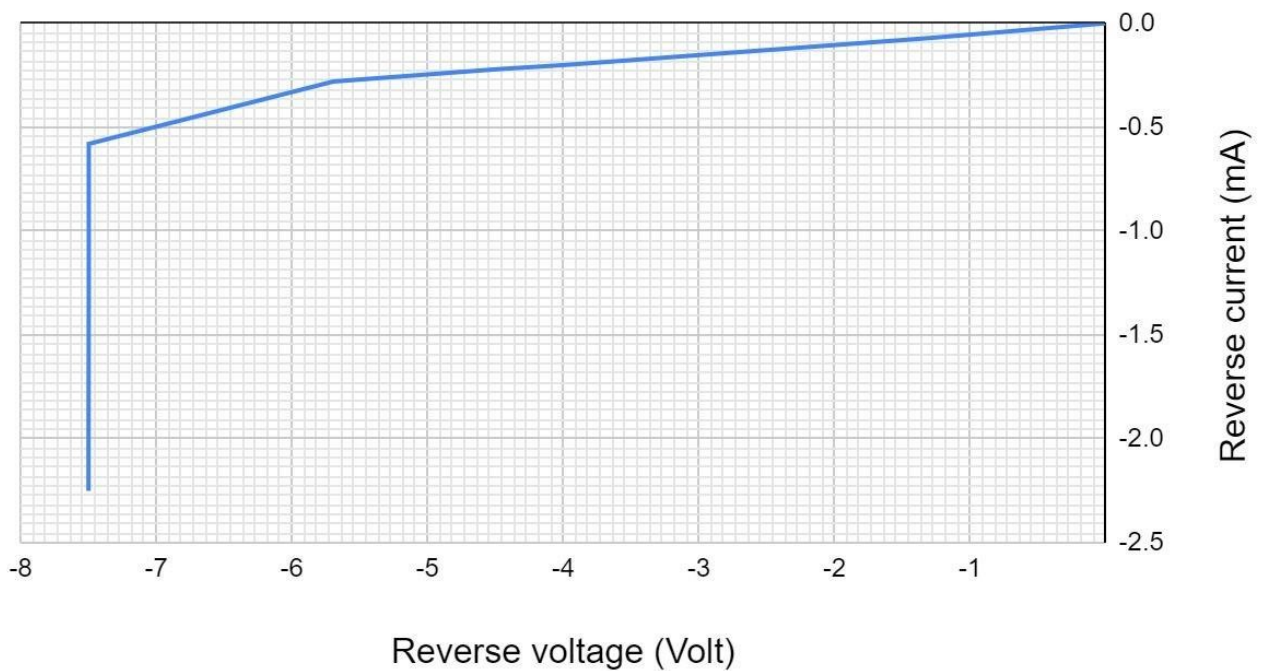
Series Resistance: 2000 ohm

<u>SR NO.</u>	<u>Reverse voltage across the Diode (V_{ZR}) (Volt)</u>	<u>Reverse current through the diode (I_{ZR}) (mA)</u>
1	1.302	0.070
2	3.972	0.200
3	4.488	0.220

4	5.695	0.280
5	7.497	0.580
6	7.497	0.720
7	7.497	0.970
8	7.498	1.260
9	7.499	2.000
10	7.500	2.250

• **GRAPH:-**

Zener Voltage



• **RESULTS -**

The value of breakdown voltage is **7.497 V**

- **CONCLUSION –**

The Zener diode, with its accurate and specific reverse breakdown voltage, allows for a simple, inexpensive voltage regulator. Combined with the right resistor, fine control over both the voltage and the supply current can be attained. However, the low power ratings of standard Zener diodes and resistors make this solution impractical for high power devices.

- **LEARNING OUTCOMES-**

- On completion students will be able to understand
- Zener diode constructed for the operation in reverse biasing.
- To build a circuit which provides a constant voltage.
- To know different applications of zener diodes.

- **EVALUATION COLUMN (TO BE FILLED BY CONCERNED FACULTY ONLY)**

Sr. No.	Parameters	Maximum Marks	Marks Obtained
1.	Post Lab Quiz Result.	5	
2.	Worksheet completion including writing learning objectives/Outcomes.(To be submitted at the end of the day)	10	
3.	Student Engagement in Simulation/Demonstration/Performance and Controls/Pre-Lab Questions.	5	
4.	Total Marks	20	