

Experiment No. 15

ZENER DIODE

AIM:

To draw the characteristic curve of a Zener diode and to determine its reverse breakdown voltage.

APPARATUS:

A Zener diode, a power supply with potential divider, resistance of 125 ohm, A milliammeter, a voltmeter, connecting wires, one-way key etc.

THEORY:

Zener diode is a semiconductor diode, in which n-type and *p-type* sections are heavily doped, which results in a low value of the reverse breakdown voltage. This value can be controlled during the manufacturing. The reverse breakdown voltage of a Zener diode is called Zener voltage (V_z) and the reverse current that results after the breakdown is called Zener current (I_z)

PROCEDURE:

Draw a neat circuit diagram as shown in figure. Connect all the components by leads and ensure that the Zener diode is reverse biased. Also ensure that milliammeter is connected in series with Zener diode having protective resistance and voltmeter is connected in parallel with Zener diode. Now adjust the slider of rheostat so that the power supply shows minimum potential. Switch on the power supply and gradually increase the potential difference applied across the Zener diode and note the reading of potential difference from voltmeter also note corresponding value of reverse current in milliammeter.

Increase the value of applied potential difference in the steps of 0.5 V and read the corresponding current in milliammeter to each applied potential. Continue increasing the potential difference till you get a sudden increase in the reverse current in microammeter.

The reverse potential corresponding to this value of reverse current is the breakdown or Zener-voltage of the Zener diode. Take the observations near the breakdown voltage by varying applied potential difference in the steps of 0.1 V.

Record all the observations in the table given.

Plot the graph between V and I as shown.

Mark on the graph the value of Breakdown Voltage or Zener Voltage V_z as shown. Take the value of V, corresponding to I, where it suddenly increases. This value of V, is called Zener voltage or Breakdown voltage V_z .

RESULT:

The characteristic curve of the given Zener is plotted as shown in the graph.

The reverse breakdown voltage of the given Zener Diode is

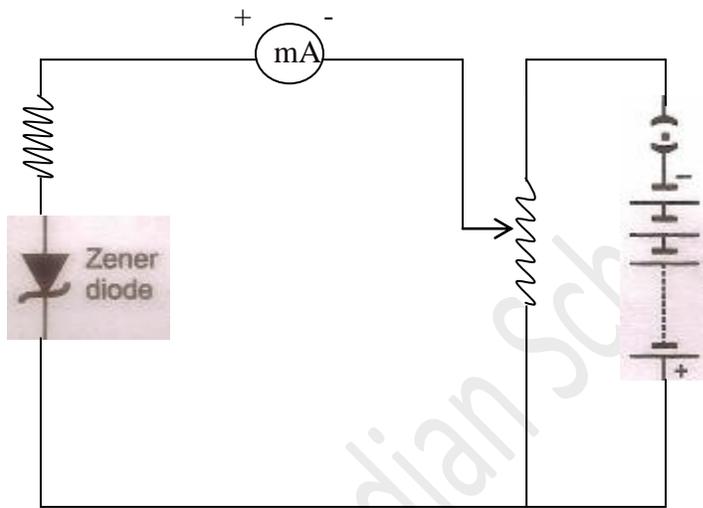
PRECAUTIONS AND SOURCES OF ERROR

1. All connections should be neat, clean and tight.
2. The Zener diode should be connected in reverse bias.
3. Voltmeter and microammeter of appropriate least count and ranges are to be chosen.
4. Zero error if any in the voltmeter or milliammeter should be kept nil.

[On L.H.S]

OBSERVATIONS

Circuit Diagram



Least count of milliammeter =

Least count of voltmeter =

V

Sl.No	Voltmeter reading (V)	Ammeter reading (I)