



DEPARTMENT OF PHYSICS
MAR THOMA COLLEGE FOR WOMEN, PERUMBAVOOR

ZENER DIODE CHARACTERISTICS

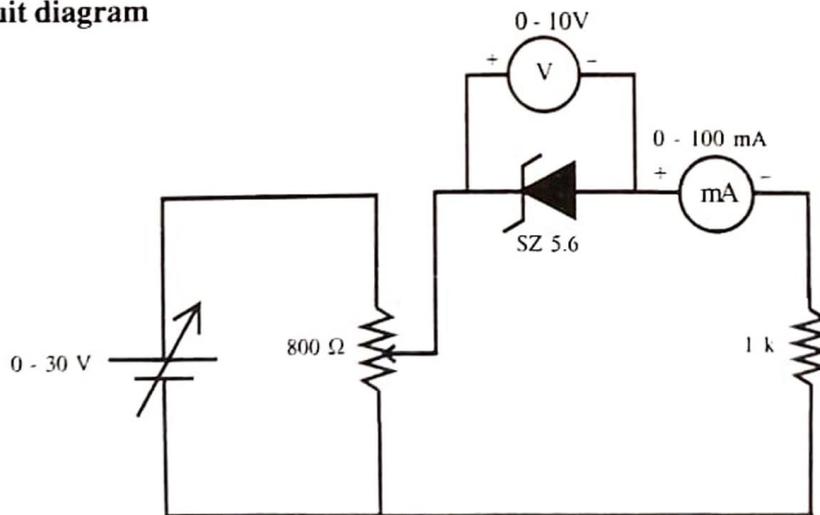
Aim To study and plot the zener diode characteristics.

Components and equipments required Zener, voltmeter, ammeter, resistor, rheostat, dc source, bread board and CRO.

Theory An ordinary diode will not permit current when it is reverse biased. If the reverse bias voltage exceeds the peak inverse voltage rating, diode may get destroyed due to avalanche breakdown. Zener diodes are special kinds of diodes designed to operate in the breakdown region without causing the damage to them. When a diode is heavily doped its depletion layer becomes very narrow. When the applied reverse bias voltage across the diode is increased, the electric field across the depletion layer becomes very intense and electrons get pulled out from covalent bonds, generating electron-hole pairs. Thus heavy reverse current flows. This phenomenon is called zener breakdown.

Zener diode behaves like an ordinary diode in the forward bias mode. In the VI characteristics of the zener diode it can be seen that the voltage across the diode remains constant and independent of the current through it. This property is utilised in voltage regulation.

Circuit diagram



Procedure

1. Wire the circuit as shown in figure after testing the components.
2. Vary the input voltage and note down the ammeter and voltmeter readings and enter it in the tabular column.
3. Plot the reverse characteristics on a graph sheet with voltage along x-axis and current along



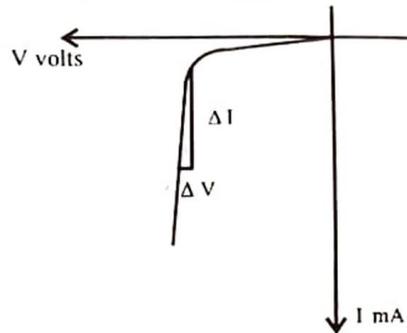
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- y-axis in third quadrant. Calculate the static resistance by taking the ratio of voltage to current at any particular voltage.
4. Calculate the dynamic zener resistance by taking the ratio of change in voltage to resulting change in current at a point on the graph after the break down point.

Observation

V volts	I mA

Graph V-I characteristics



Result

Static zener resistance at 10 mA = Ω

Dynamic zener resistance at 10 mA = Ω

Break down voltage of zener = Ω

Reference

Electronics Lab Manual Volume I, K.A. Navas, **Rajath Publishers**