knee voltage votage,
voltage at which
current increases sharply

THE DIODE CHARECTERISTICS

AIM

    1. To draw the V-I characteristics of a pn junction diode in forward bias.

    2. To determine static resistance.

    3. To determine dynamic resistance.

    4. Knee voltage.

APPARATUS

Diode IN 4007 , milliammeter , voltmeter , battery , rheostat , key

THEORY

Forward bias: in forward bias, P side of diode is connected to positive terminal of battery and N side is connected to negative terminal.

Forward characteristic is obtained by plotting voltage along X axis and current along Y axis.

$$\text{Dynamic resistance (ac resistance)} = \frac{\text{change in small forward bias voltage}}{\text{change in forward current}}$$

$$\text{Static resistance (dc resistance)} = \frac{\text{forward bias voltage}}{\text{forward current}}$$

Knee voltage: The forward voltage at which forward current raises sharply is called knee voltage.

Observations and Calculation

Trial No.	Voltmeter reading V in volt	Ammeter reading I in mA	I in A	Static Resistance R=$\frac{V}{I}$ in ohm
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

YouTube: HARI CVM

From graph

Static resistance = $\frac{OP}{OQ}$ = ………….. ohm

Dynamic resistance = $\frac{\Delta V}{\Delta I}$ = $\frac{AB}{BC}$ =…………. ohm

Knee voltage =..................... volt

PROCEDURE

The connections are made as shown in figure. Using rheostat the voltage across diode is made at 0.1V and corresponding current is noted. The voltage is increased as 0.2 , 0.3 , 0.4 , 0.5...... and in each time milliammeter reading is taken. A graph is plotted with voltage along X axis and current along Y axis. From the graph static resistance and dynamic resistance is calculated.

RESULT

1. The V-I characteristics of the diode is drawn
2. The static resistance = ... ohm
3. The Dynamic resistance = ... ohm
4. Knee voltage =.................... volt