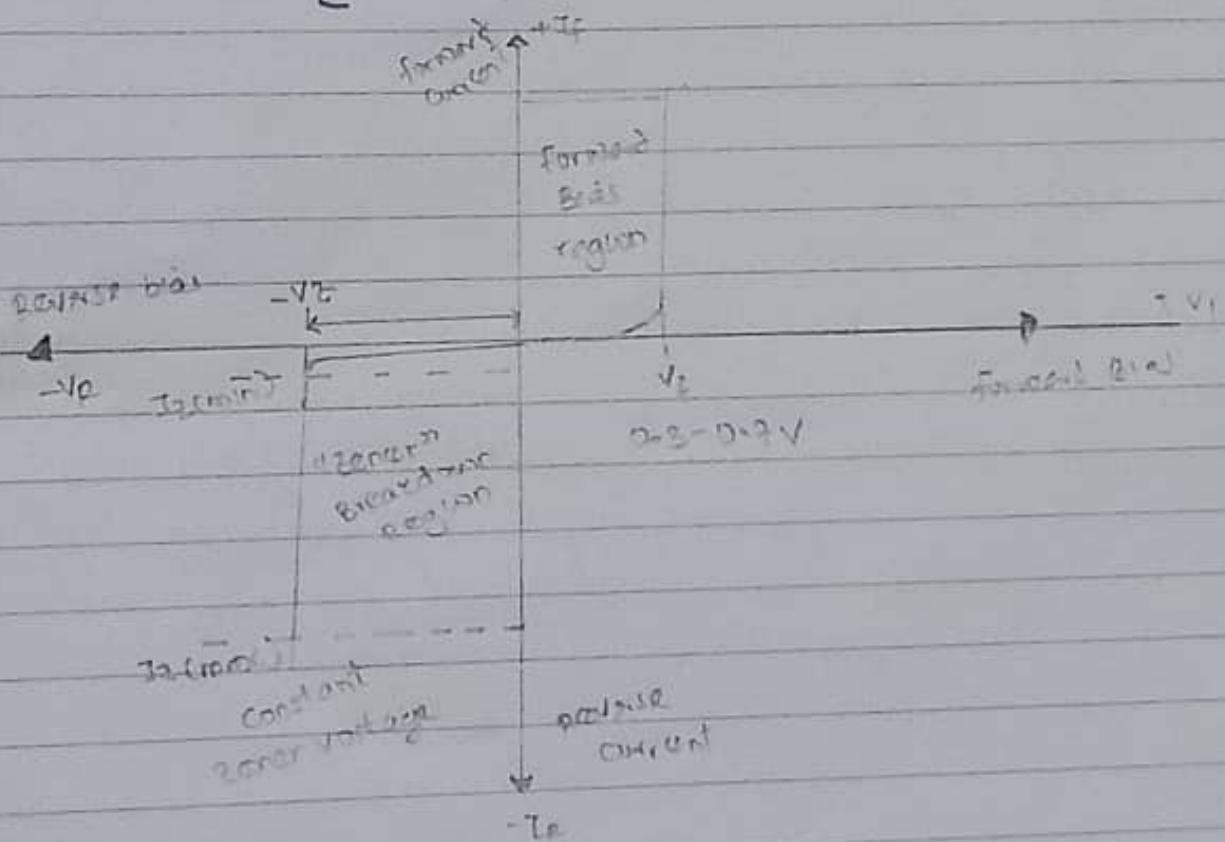
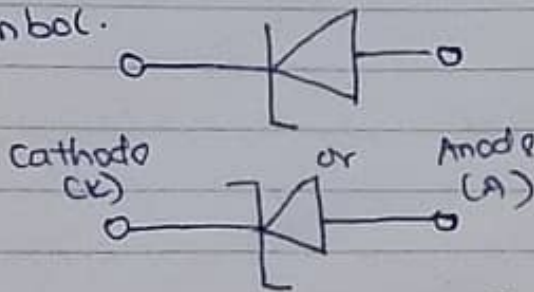
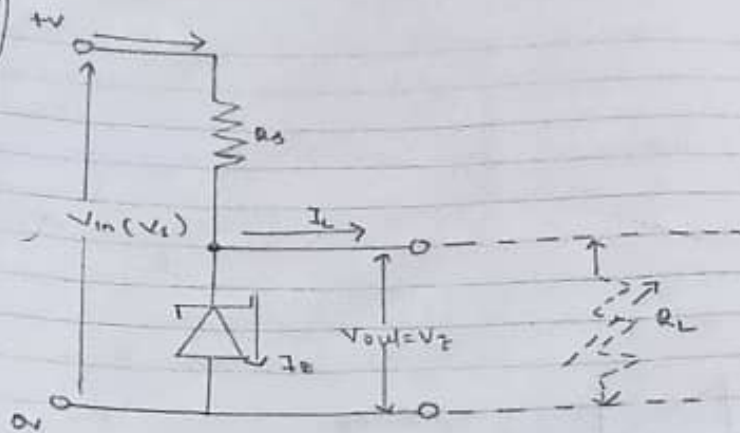


1. A Zener diode is one of the specially designed diodes that predominately work in reverse biased conditions. They are heavily doped than ordinary diodes due to which they have narrow depletion region. While regular diodes get damaged when voltage across them exceeds the reverse break down voltage, Zener diodes work exclusively in this region. The depletion region in Zener diode goes back to its normal state when the reverse voltage get removed. This particular property of Zener diodes make it useful as a voltage regulator.

Symbol.



I-V characteristics Curve



Zener Diode Voltage Regulator

2

$$V = 20V$$

$$V_z = ?$$

$$I_{max} = 500mA = 500 \times 10^{-3}$$

$$P = 5W \quad R_L = 500\Omega$$

$$I_z = \frac{P_z}{V_z} \quad V_z = \frac{P_z}{I_z}$$

$$= \frac{5}{500 \times 10^{-3}}$$

$$V_z = 10V$$

$$R_s = \frac{V_s - V_z}{I_z}$$

$$= \frac{20 - 10}{500 \times 10^{-3}}$$

$$R_s = 20\Omega$$

$$(ii) \quad I_z = I_s - I_L$$

$$I_L = \frac{V_z}{R_L}$$

$$= \frac{10}{500} = 0.02A = 20mA$$

$$I_z = 500 - 20 = 480mA$$