Image

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1.) The Zener diode is like a general-purpose signal diode consisting of a silicon PN junction. When biased in the forward direction it behaves just like a normal signal diode passing the rated current, but as soon as a reverse voltage is applied across the zener diode exceeds the rated voltage of the device, the diodes breakdown voltage is reached at which point a process called Avalanche Breakdown occurs in the semiconductor depletion layer and a current starts to flow through the diode to limit this increase in voltage.

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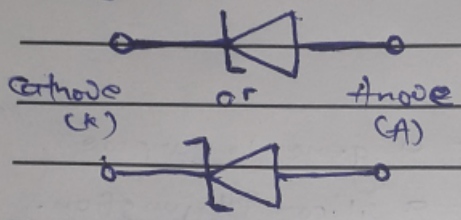
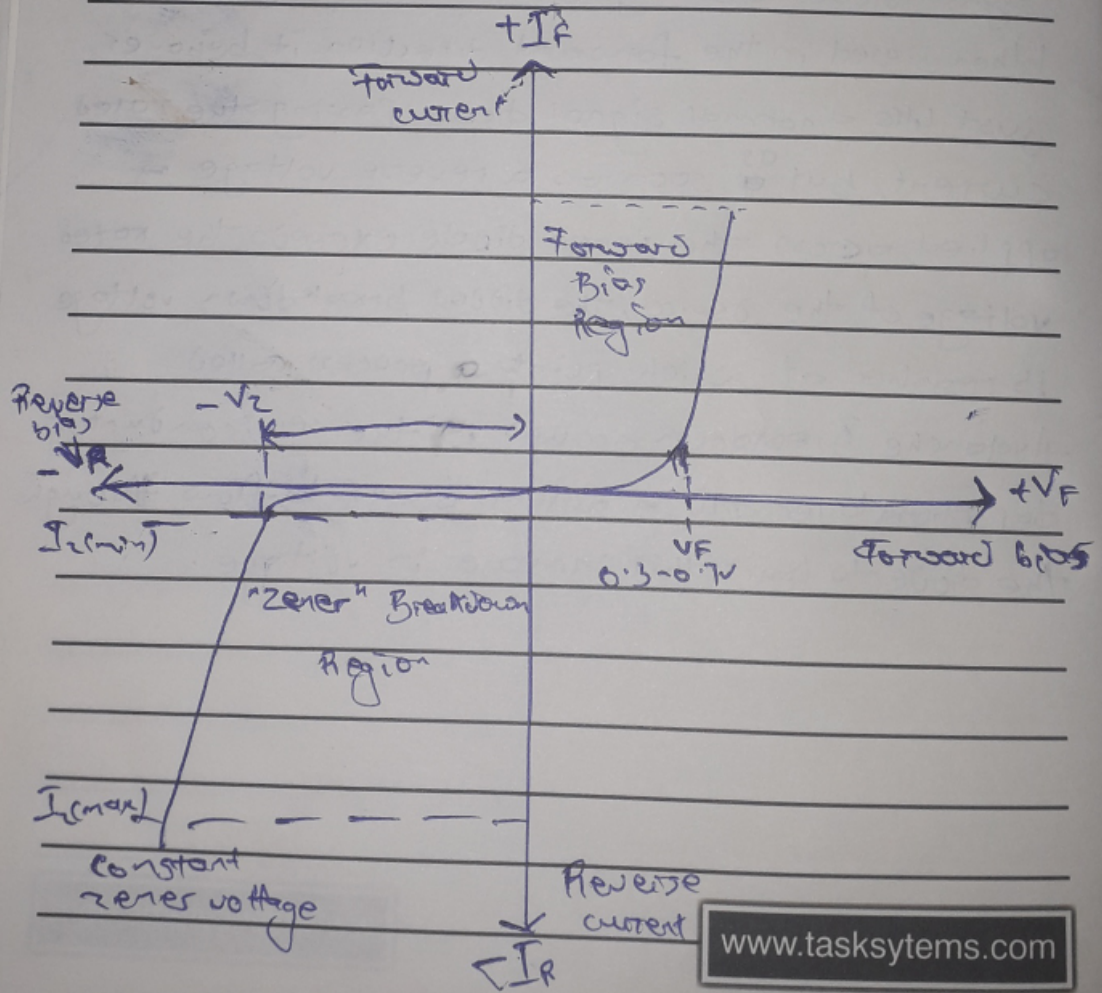
Zener Diode I-V Characteristics

Symbol:





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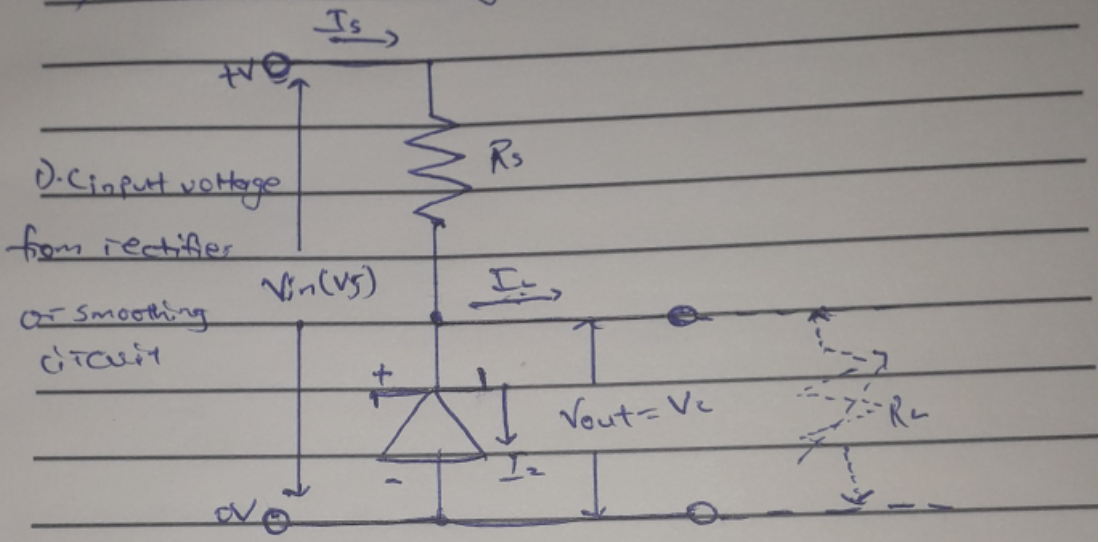
ii) Zener Diode Regulator



2.)

i) $V_z = \frac{V_{diff}}{I} = \frac{5}{500mA} = 10V$

∴ Minimum value, $R_s = \frac{V_s - V_L}{I_L} = \frac{20-10}{500mA}$

$R_s = 20\Omega$

ii) Current across full load.

$I_L = \frac{V_L}{R_L} = \frac{10}{500\Omega} = 0.02A$