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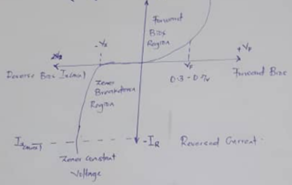
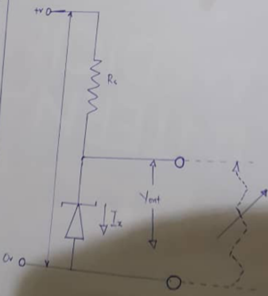
18/ENG02/089
Computer Engineering

1\. A Zener diode is a diode similar to the standard pn junction diode but they are specially designed to have a low and specified Breakdown Voltage.

i. 



I-V Characteristic Curve.

ii. 

While
Rs - Resistor
Vs - Voltage source
Vout - Stabilised voltage source
RL - Load Resistance
Iz - load current Across Zener Diode

2\. Max Power = 5W
I_z = 500mA = 0.5A
V_s = 20Vrms

(i) Maximum current = $\frac{\text{Max Power}}{\text{Voltage}} = \frac{5W}{V} = 0.5A$

V_z = 10volts

Minimum Resistance = $\frac{V_s - V_z}{I_z}$

V_{dc} = 0.637Vmax
= 0.637 × 20
= 12.74Vdc

∴ minimum Resistance = $\frac{12.74 - 10}{0.5}$
= 5.48Ω

(ii) load current $I_L = \frac{V_z}{R_L}$
= $\frac{10}{500}$ = 0.02A or 20mA