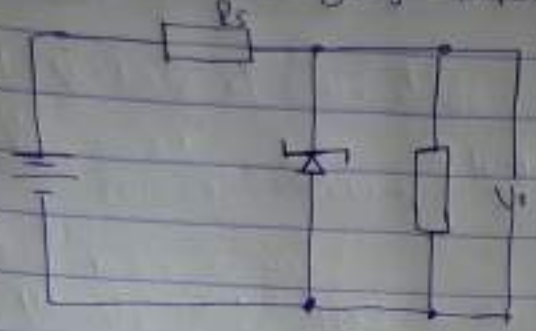
AFABOR - AABOR
18/ENG02/001
PETROLEUM - ENGINEERING
ENG 227

Zener Diode Regulator

This can be described under the following

1, Regulation with varying input voltage Vin
2) Regulation with varying load Resistance RL
1, Regulation with varying Input Voltage Vin

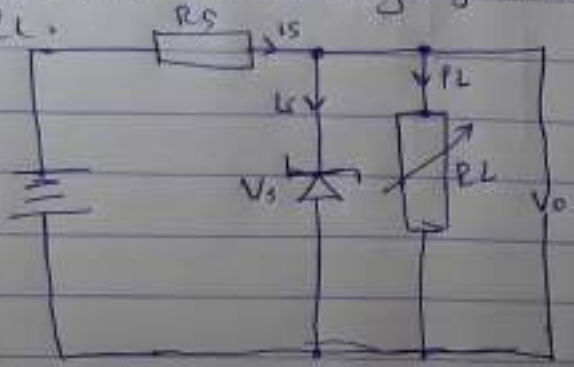


When Vin Increases, Input Current Is also Increases. This Increases the Current through zener diode I_z without affecting the load Current I_L with the increase in Input Current the voltage drop across resistor Rs will also increase, thereby keeping the load voltage Vo Constant.

When Vin decreases, the input Current also decreases. This decreases the Current through zener diode I_z without affecting the load Current I_L with the decrease in input Current the voltage drop across resistor Rs will also decrease thereby by keeping the load Vo Constant

2 ~~R~~.

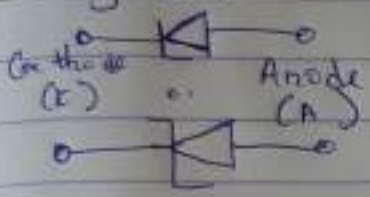
2) Regulation with varying load resistance



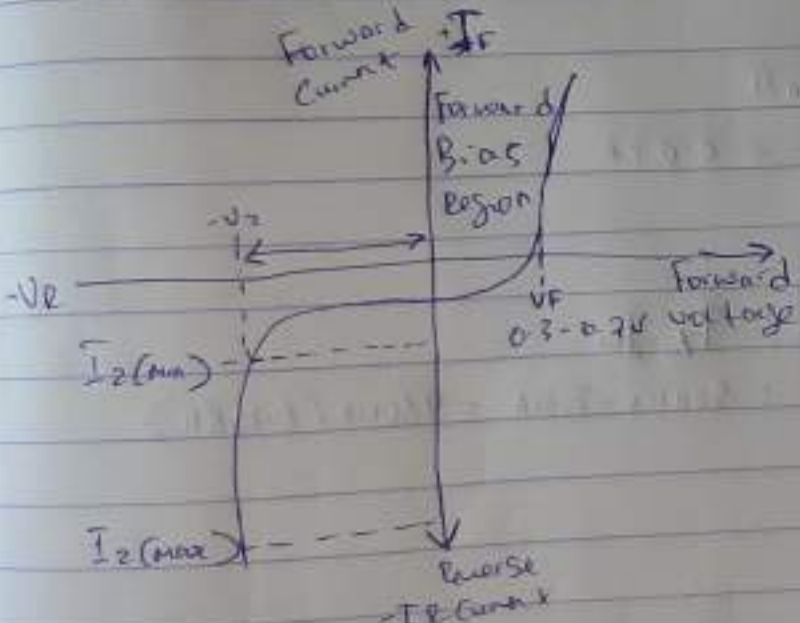
When RL Increases, the load Current I_L decreases. This Increases the Current through zener diode I_z. As a result of this

the Input Current I_s and voltage drop across R_s remains Constant thereby keeping the load voltage V_o Constant. when R_L decreases, the load Current I_L increases. This decreases the Load Current through zener diode I_z and voltage drop across R_s remains Constant thereby keeping the Load voltage V_o Constand.

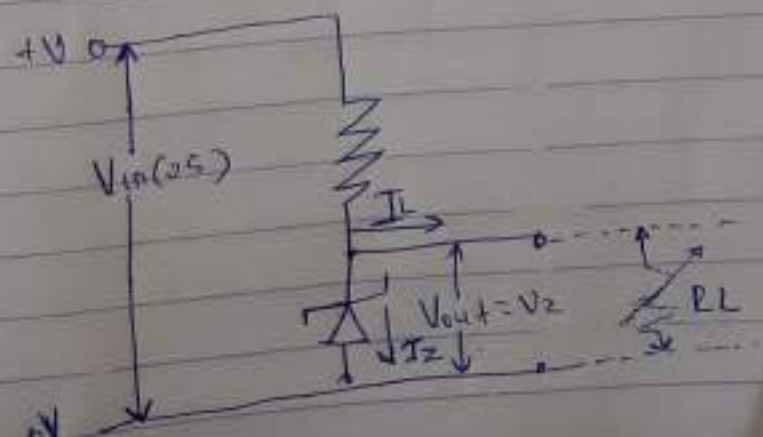
1(i) Symbols



I-V Characteristic Curves



Circuit Diagram



2a) First voltage of zener diode

$$V_z = \frac{\text{volt}}{\text{Current}} = \frac{5}{500\text{MA}} = 10\text{V}$$

This minimum value

$$R_S = \frac{V_S - V_z}{I_z} = \frac{20-10}{500\text{MA}}$$

$$R_S = 20\Omega$$

2b) Current at 500Ω

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

$$I_L = 0.02\text{A}$$

∴ Zener Current: $I_z = I_{FL} - I_L$

$= 500\text{MA} - 20\text{MA} = 480\text{MA}\ (0.48\text{A})$