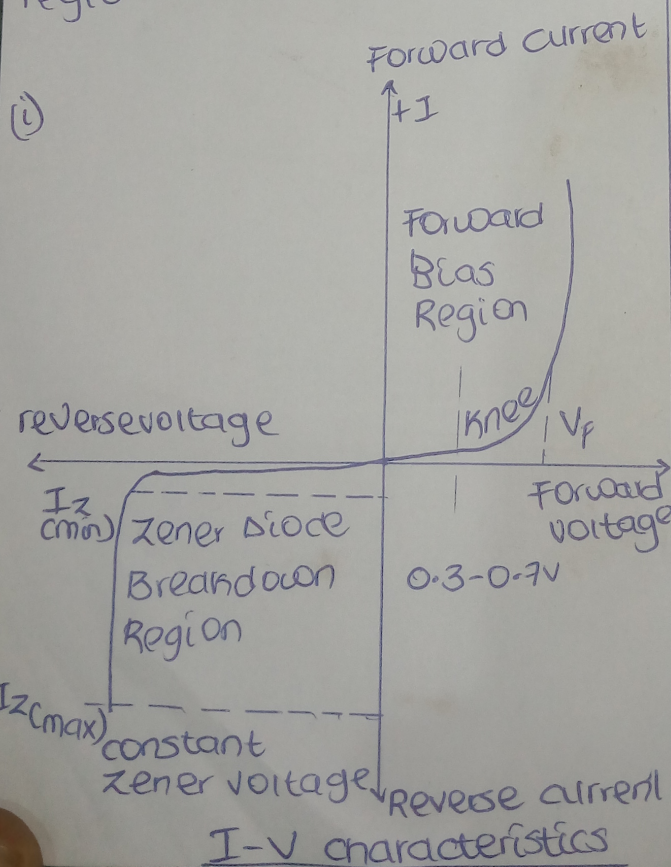


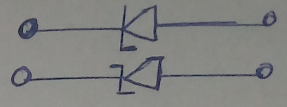
INAMING BASSETT EYO  
 18/05/2022  
 MECHATRONICS ENGINEERING  
 ENG 222

ZENER DIODE REGULATOR

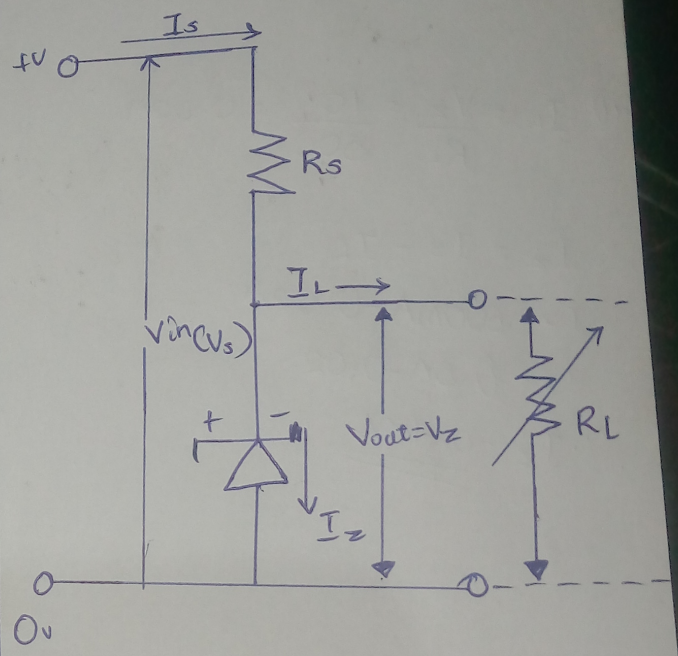
The main function of a zener diode regulator is to provide a constant output voltage to a load connected in parallel with it in spite of the ripples in the supply voltage or the variation in the load current and the zener diode will continue to regulate the voltage until the diode current falls below the minimum  $I_z$  value in the reverse breakdown region.



Cathode or Anode (+)  
 (-)



(ii)



(2)  $P = 5W$   
 $I_{max} = 500mA$   
 $20V_{max}$

$R_s$  for bridge rectifier circuit is  $R_s = \frac{2V_{max}}{\pi}$

$R_s = \frac{2 \times 20}{\pi} = 12.7V$



$$P = IV$$

$$5 = 0.5V$$

$$V_z = 10V_z$$

$$R_s = \frac{12.7 - 10}{500\text{mA}} = 5.4\Omega$$

$\therefore$  Maximum value of series Resistor is  $5.4\Omega$

$$(ii) I_L = \frac{V_z}{R_L} = \frac{10}{500} = 0.02A$$

$$I_z = I_s - I_L$$

$$I_z = 500\text{mA} - 0.02A$$

$$I_z = 0.5A - 0.02$$

$$\therefore I_z = \underline{\underline{0.48A}}$$