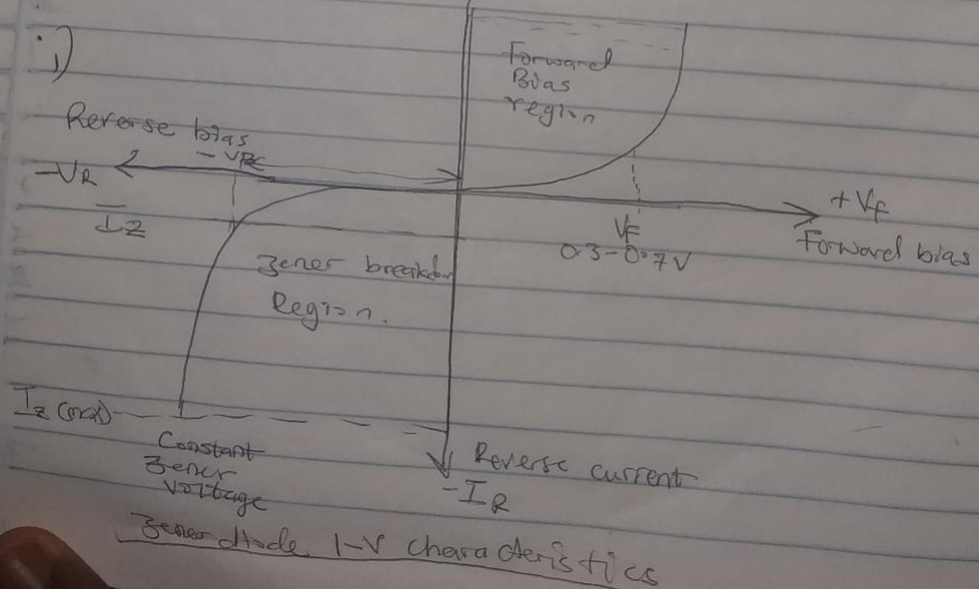
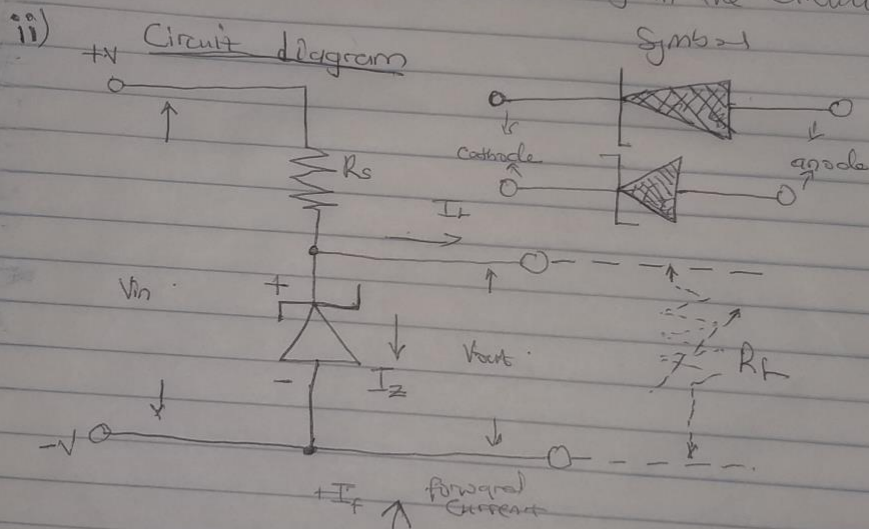


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①

Zener diode Regulator is when a Resistor  $R_s$  is connected to a zener diode in series to limit the current flow through the diode with the voltage source  $V_s$  being connected across the combination.

The Voltage Output  $V_{out}$  across the zener diode is connected with its Cathode terminal which is connected to the positive rail of the DC supply so it is reverse biased. The Resistor  $R_s$  is selected to limit the maximum current flowing in the circuit.



Q2

$$P_z = 5W$$

$$I_z = 500mA = 0.5A$$

$$\text{Max. Current} = \frac{\text{max. Power}}{V}$$

$$0.5A = \frac{5W}{V}$$

$$0.5AV = 5W$$

$$V = \frac{5W}{0.5A}$$

$$V = 10V$$

$$\text{But } V_{dc} = 0.637 V_{max} \quad (\text{full wave})$$

$$V_{dc} = 0.637 \times 20$$

$$= 12.74 \text{ V}_{dc}$$

$$\therefore \text{min. resistance} = \frac{V_s - V_z}{I_z} = \frac{12.74 - 10}{0.5}$$

$$= \frac{2.74}{0.5} = 5.48 \Omega$$

ii) Current across the diode (a) full load of  $500\Omega$

$$I_L = \frac{V_z}{R_L} = \frac{10}{500} = \frac{1}{50} = 0.02A$$

$\therefore$  Current across the diode at  $500\Omega$  full load =  $20mA$  or  $0.02A$