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MATRIC NO: 19/ENG01020

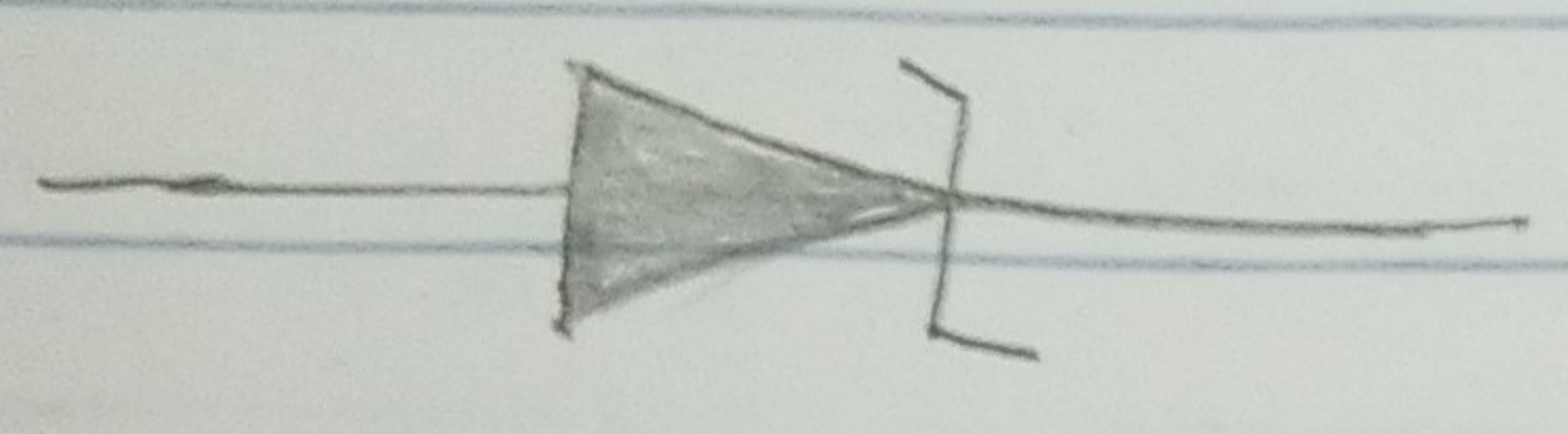
DEPT: CHEMICAL

COURSE CODE: ENG 222

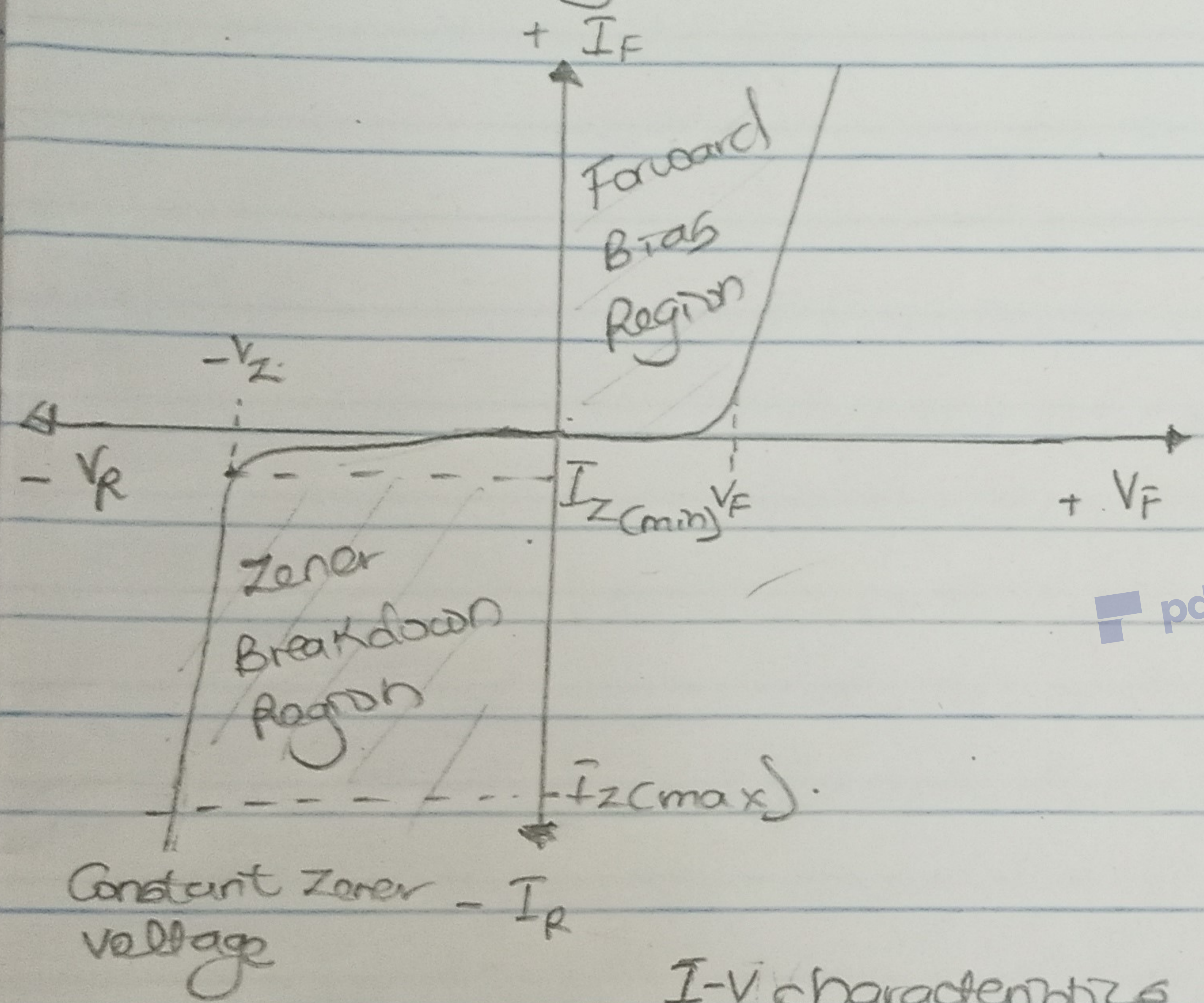
Assignment

Question 1

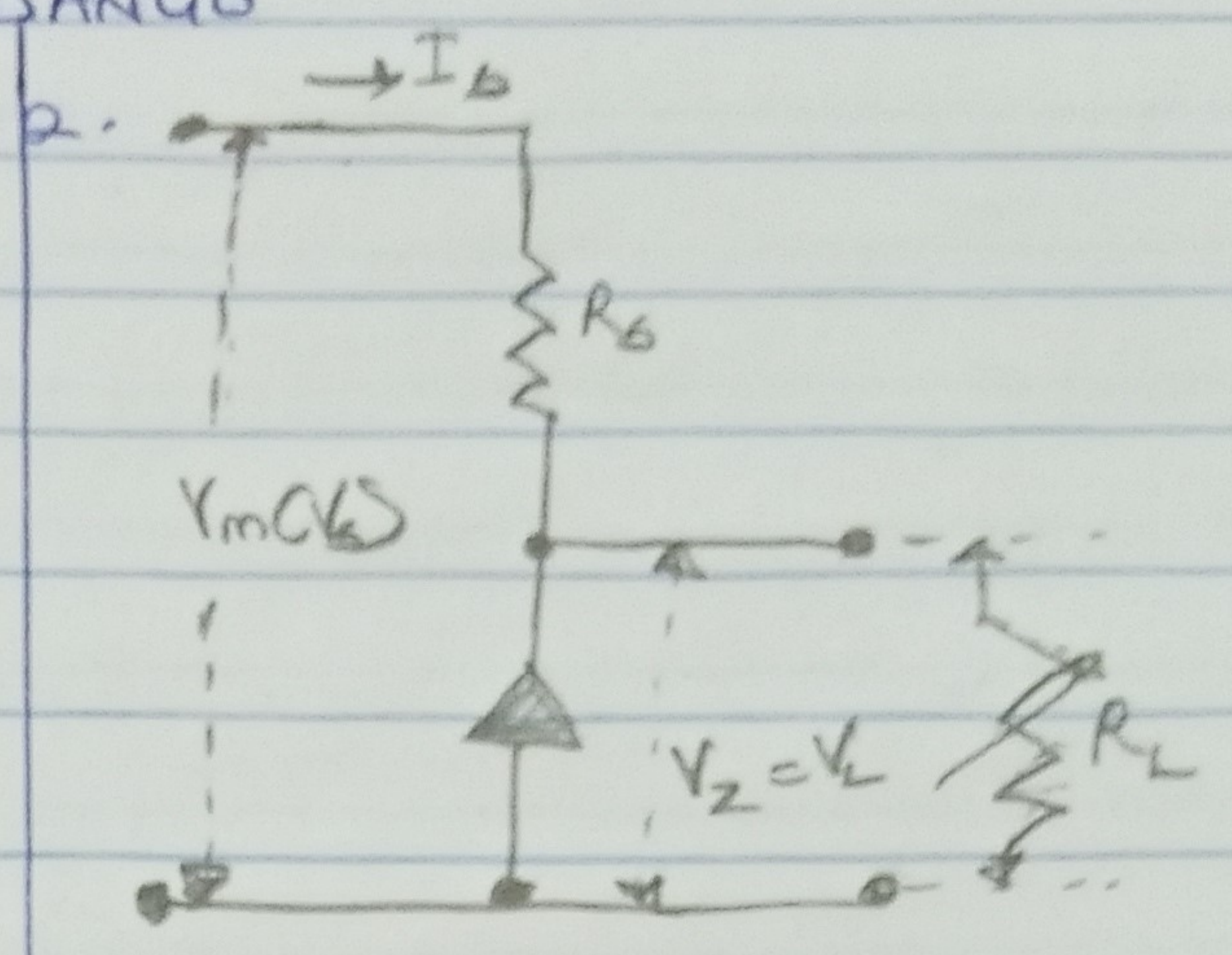
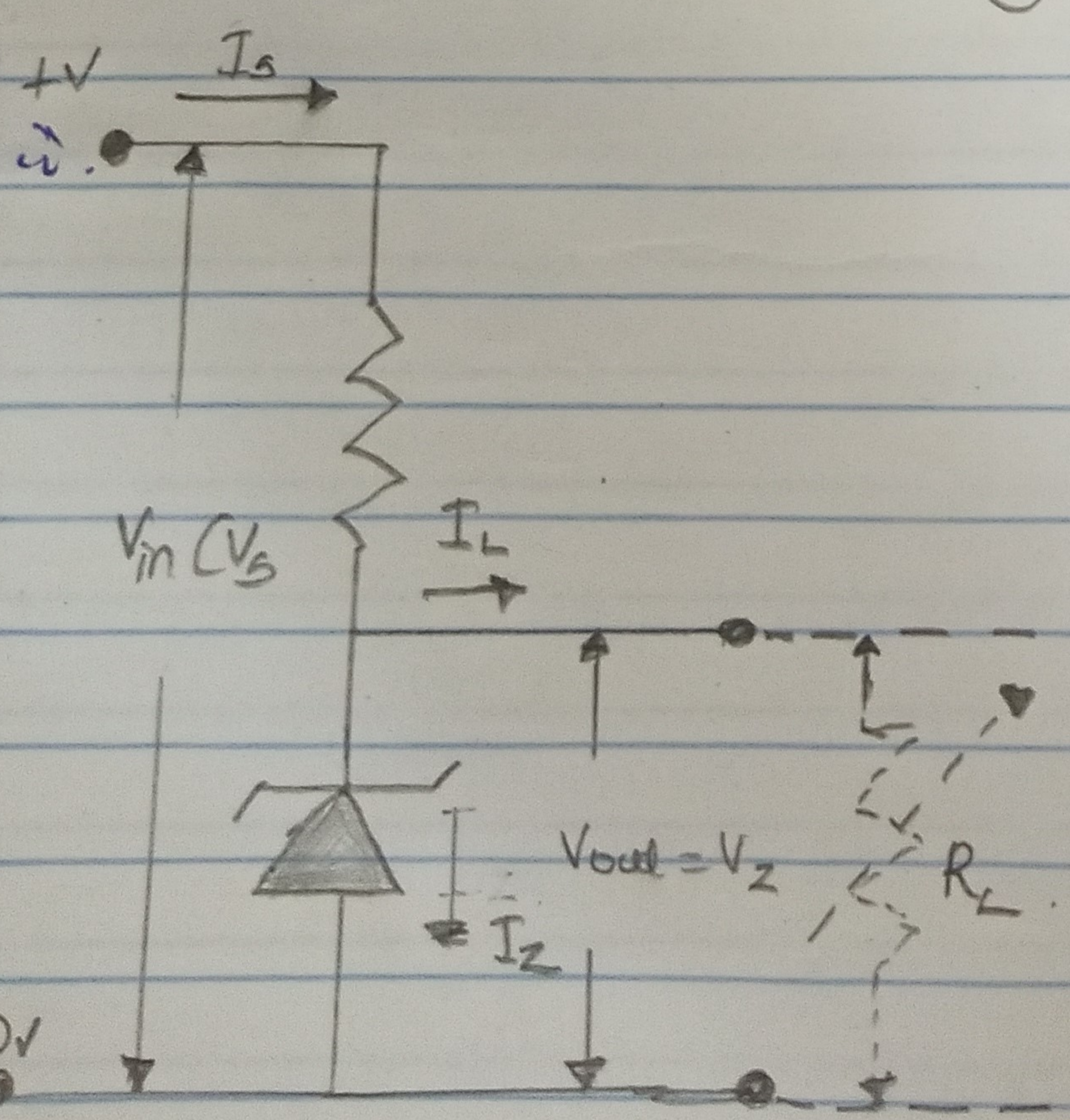
2.



Symbol for Zener diode



I-V characteristics curve for Zener Diode Regulator.



$$P_Z = 5W$$

$$I_S = I_{Z \max} = 500mA$$

$$V_S = 20V_{\max}$$

$$V_{oc} = \frac{2 \times V_{\max}}{\alpha} = \frac{2 \times 20}{\alpha} = 12.73V$$

Hence $V_S = 12.73V$

$$P_Z = I_{Z \max} V_Z$$

$$V_Z = \frac{P_Z}{I_{Z \max}} = \frac{5}{500 \times 10^{-3}} = 10V$$

But

$$V_S = V_Z + V_{R_S}$$

$$V_{R_S} = V_S - V_Z$$

$$= 12.73 - 10 = 2.73V$$

$$V_{R_S} = I_S R_S$$

$$R_S = \frac{V_{R_S}}{I_S} = \frac{2.73}{500 \times 10^{-3}} = 5.46 \Omega$$

$$V_Z = V_L ; V_L = I_L R_L ; I_L = \frac{V_L}{R_L}$$

$$I_L = \frac{V_Z}{R_L} = \frac{10}{500} = 0.02A = 20mA$$

$$I_S = I_Z + I_L ; I_Z = I_S - I_L = 500mA - 20 = 480mA //$$