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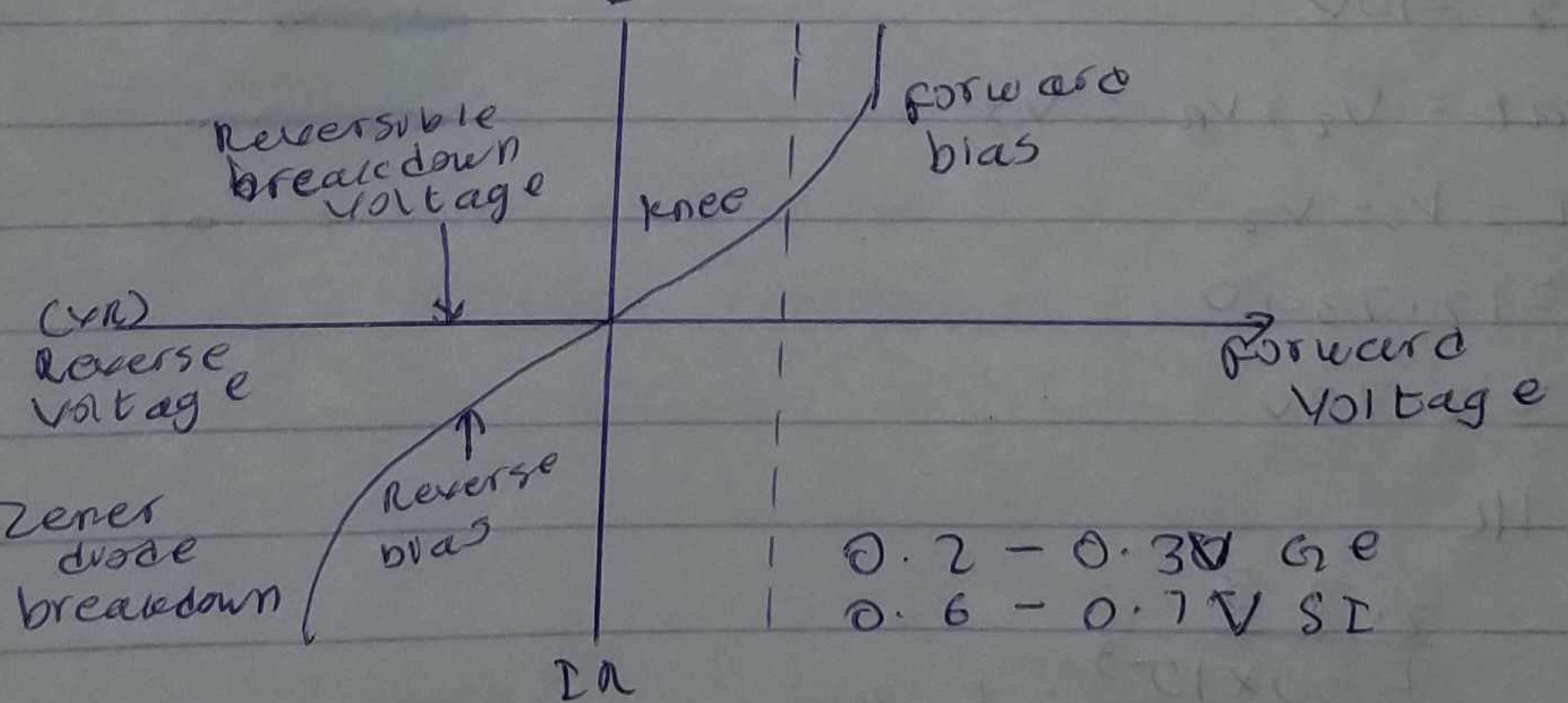
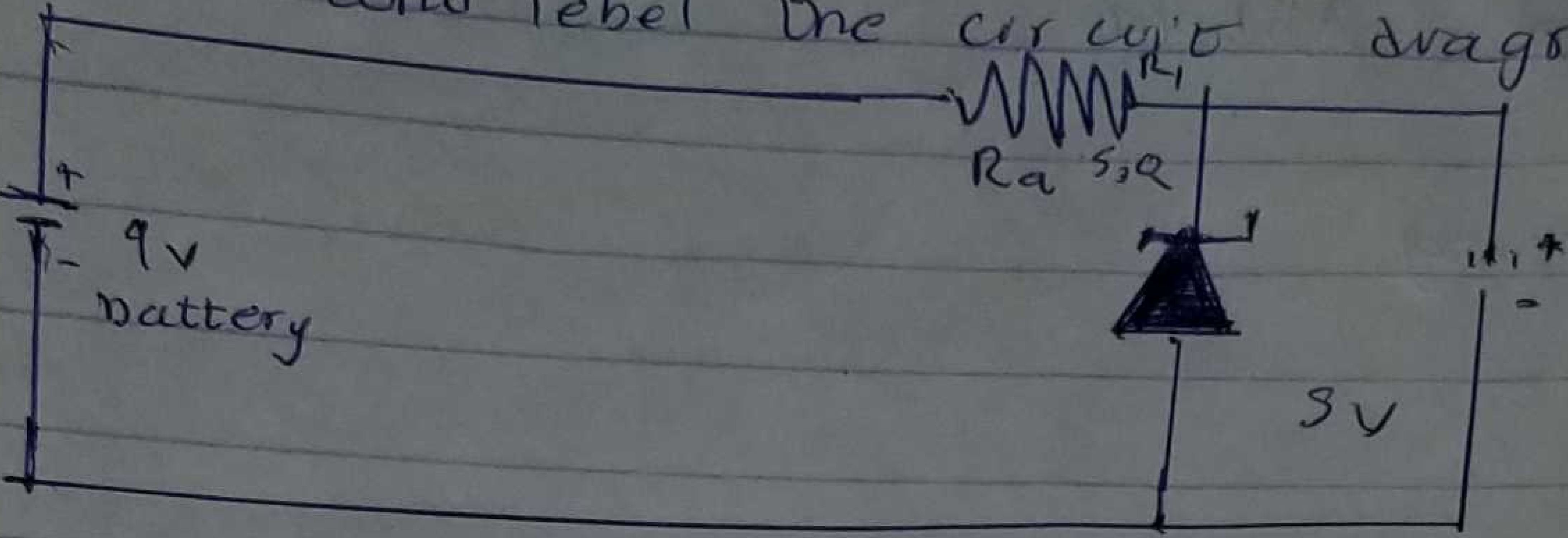
18/ENG03/010
Civil Engineering
ENG 222

1 Describe a Zener diode regulator
Zener diodes are widely used as shunt voltage Regulators to regulate voltage across Small Loads. zener diodes have a Sharp reverse breakdown Voltage and breakdown will be constant for a wide range of currents. Thus we will connect the zener diode parallel to the load such that the applied Voltage will reverse bias it. Thus if the reverse bias voltage across the zener diode exceeds the knee voltage, the Voltage across the load will be constant.

1) sketch the Symbol and I-V charecteristic curve



ii) Sketch and lebel the circuit diagram




2) $P_z = 5w$

$I = 500mA$

200 V max

To convert Vmax to voc

$V_{dc} = \frac{2V_{max}}{\pi}$

$V_s = \frac{2 \times 20}{\pi} = 12.73 VOC$

Recall that $P = IV$

$\therefore V_z = P_z / I_z = \frac{5}{500 \times 10^{-3}}$

$V_z = 10V$

Recall That $= V_z + V_R = V_S$

$V_R = V_S - V_Z$

$= 12.73 - 10$

$= 2.73V$

$\therefore V = IR$

$R = V/I = \frac{2.73}{500 \times 10^{-3}} = 5.46$

Since it's connected to series and same current flows

$I_S = I_Z + I_L$

$I_Z = I_S - I_L$

$I_L = V_Z / R$

$= 10/500 = 0.02A = 200A$

$I_Z = 500 mA$

$- 20 mA$

$= 480 mA \backslash 0.48 A$