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Matric: 19/ENG-06/069

Dept: Mechanical Engineering

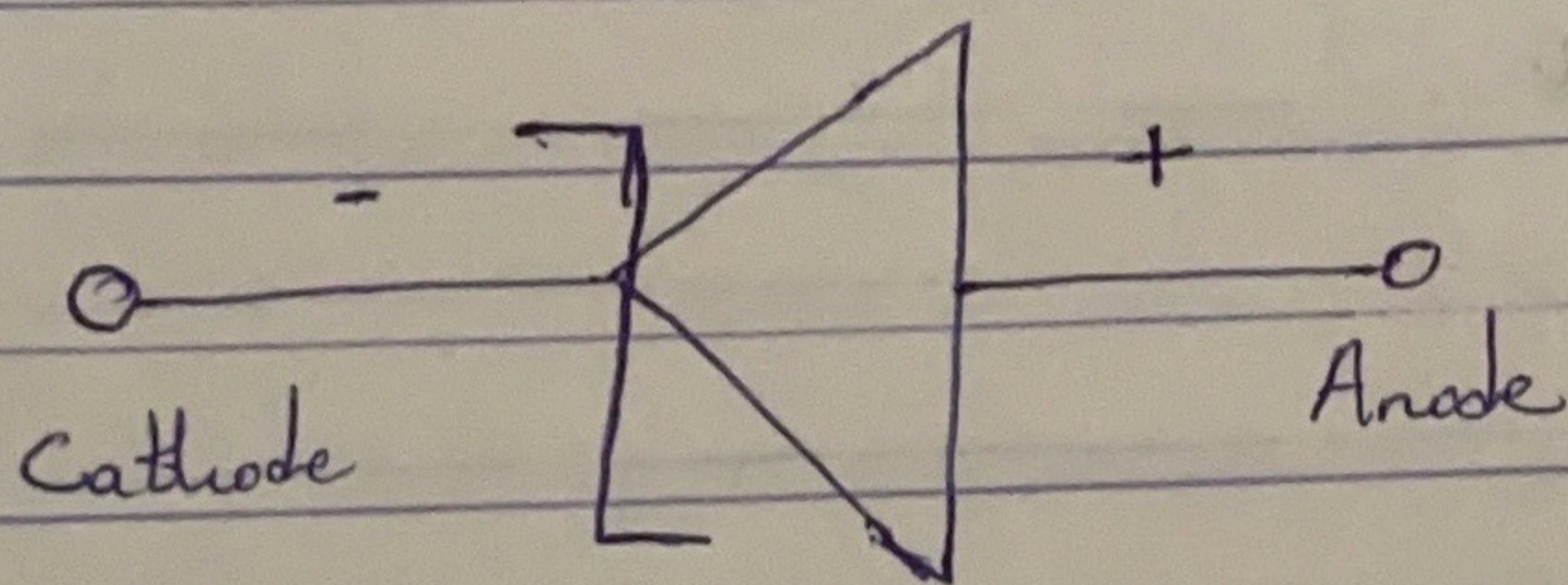
Course: ENG 222

Date: 01/05/2020

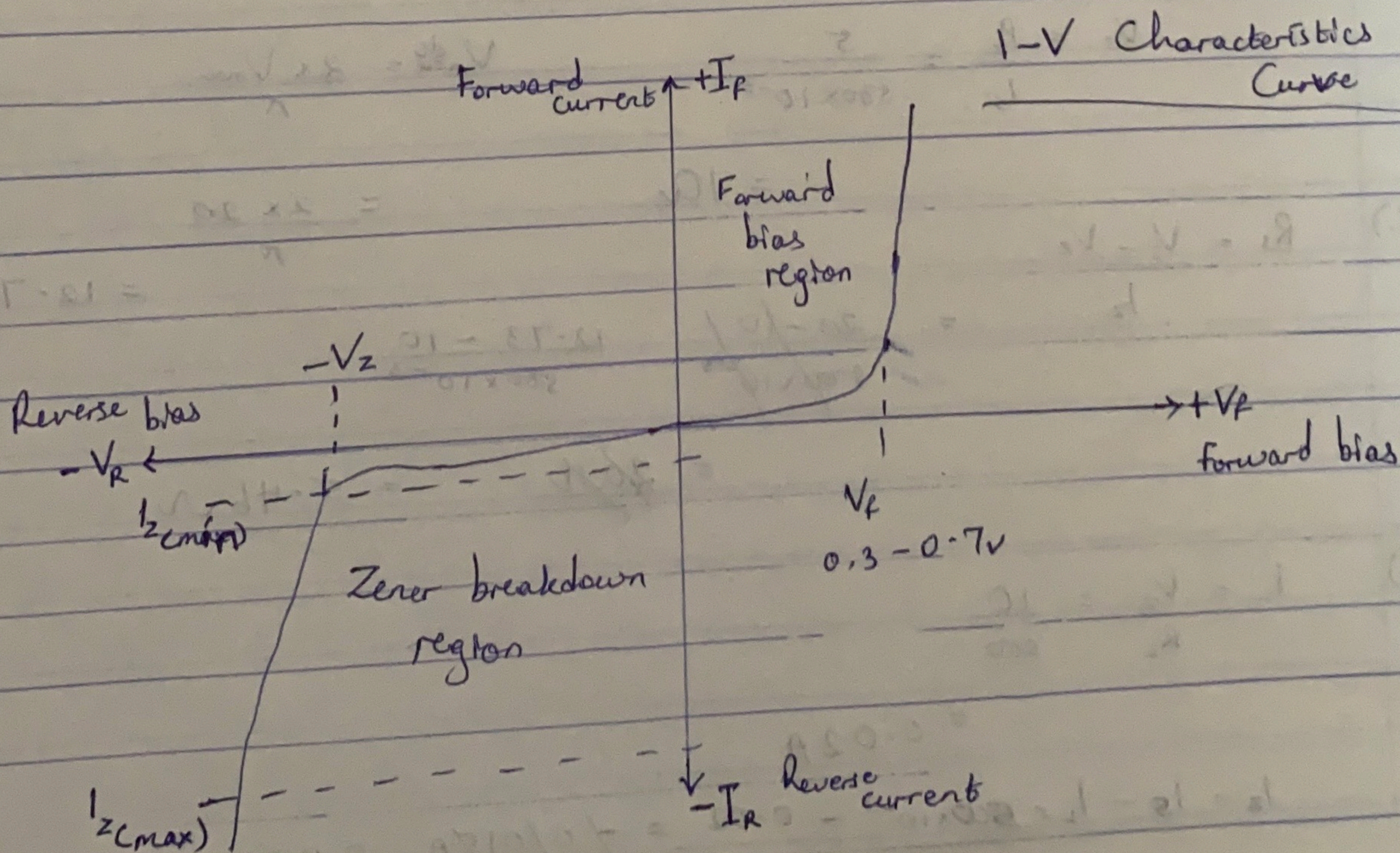
Online Assignment:

1. A zener diode is a general-purpose signal diode consisting of a silicon PN junction. When biased in the forward direction, it behaves like a normal signal diode, passing ^{the rated} current. When the reverse voltage applied across the zener diode exceeds the rated voltage of the device, the diode breakdown voltage is reached. The breakdown occurs in the semiconductor depletion layer and a current starts to flow through the diode to limit the increase in voltage.

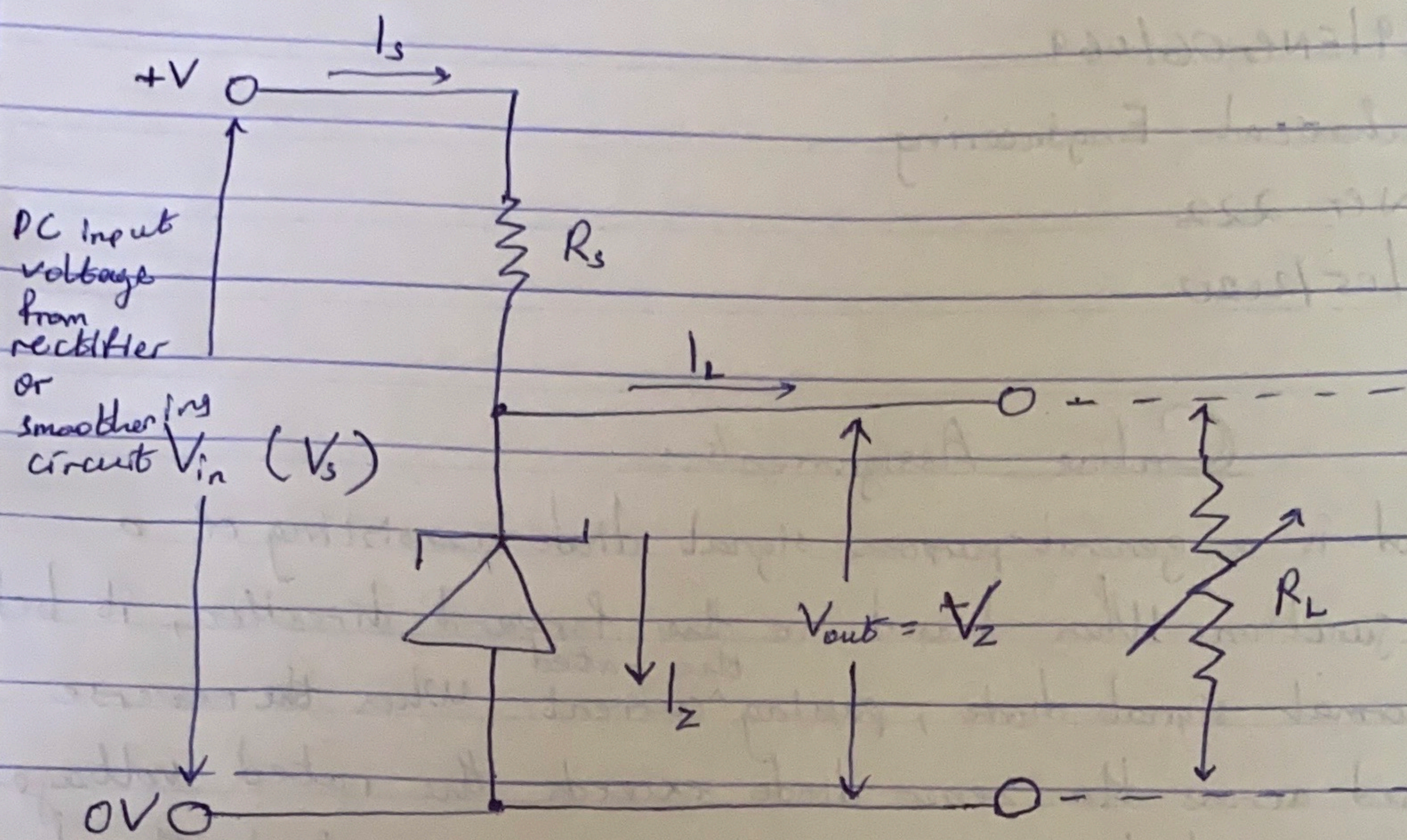
(i)



Zener diode symbol



ii.) Zener Diode Circuit:



2. $P_z = 5W$

$I_{s, max} = 500mA$

$V_s = 20V_{dc}$

$R_L = 500\Omega$

$V_z = ?$

$R_s = ?$

$I_z = ?$

$V_z = \frac{P_z}{I_s} = \frac{5}{500 \times 10^{-3}}$

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

$= 10V$

$= \frac{2 \times 20}{\pi}$

i-) $R_s = \frac{V_s - V_z}{I_z}$

$= 12.73V_{dc}$

$= \frac{20 - 10}{500 \times 10^{-3}}$

$\frac{12.73 - 10}{500 \times 10^{-3}}$

$= 20\Omega$

$= 5.46\Omega$

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

$= 0.02A$

$I_z = I_s - I_L = 500 \times 10^{-3} - 0.02 = 0.48A$