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181ENG06100 4

Mechanical Engineering

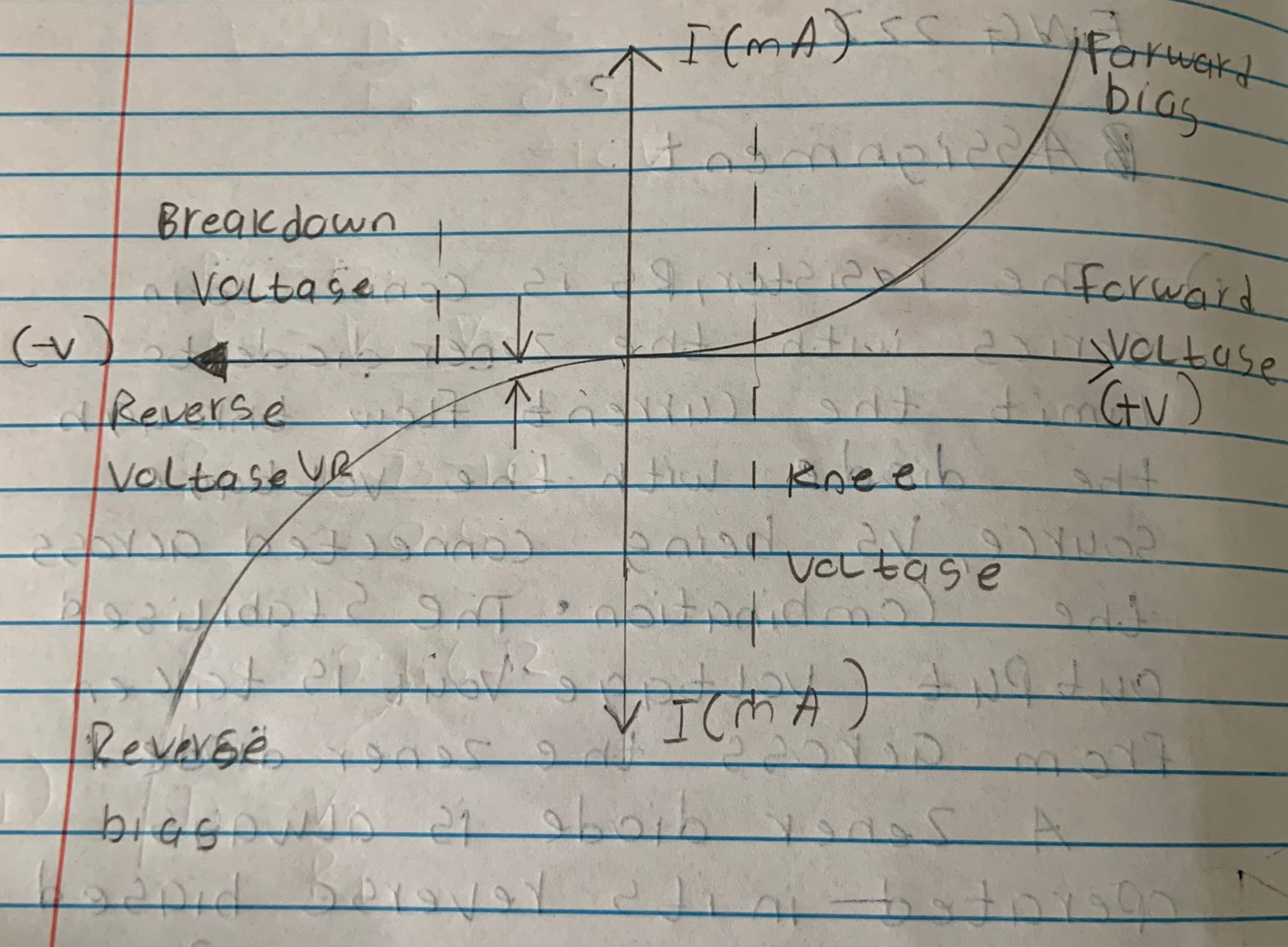
ENG 222

B Assignment

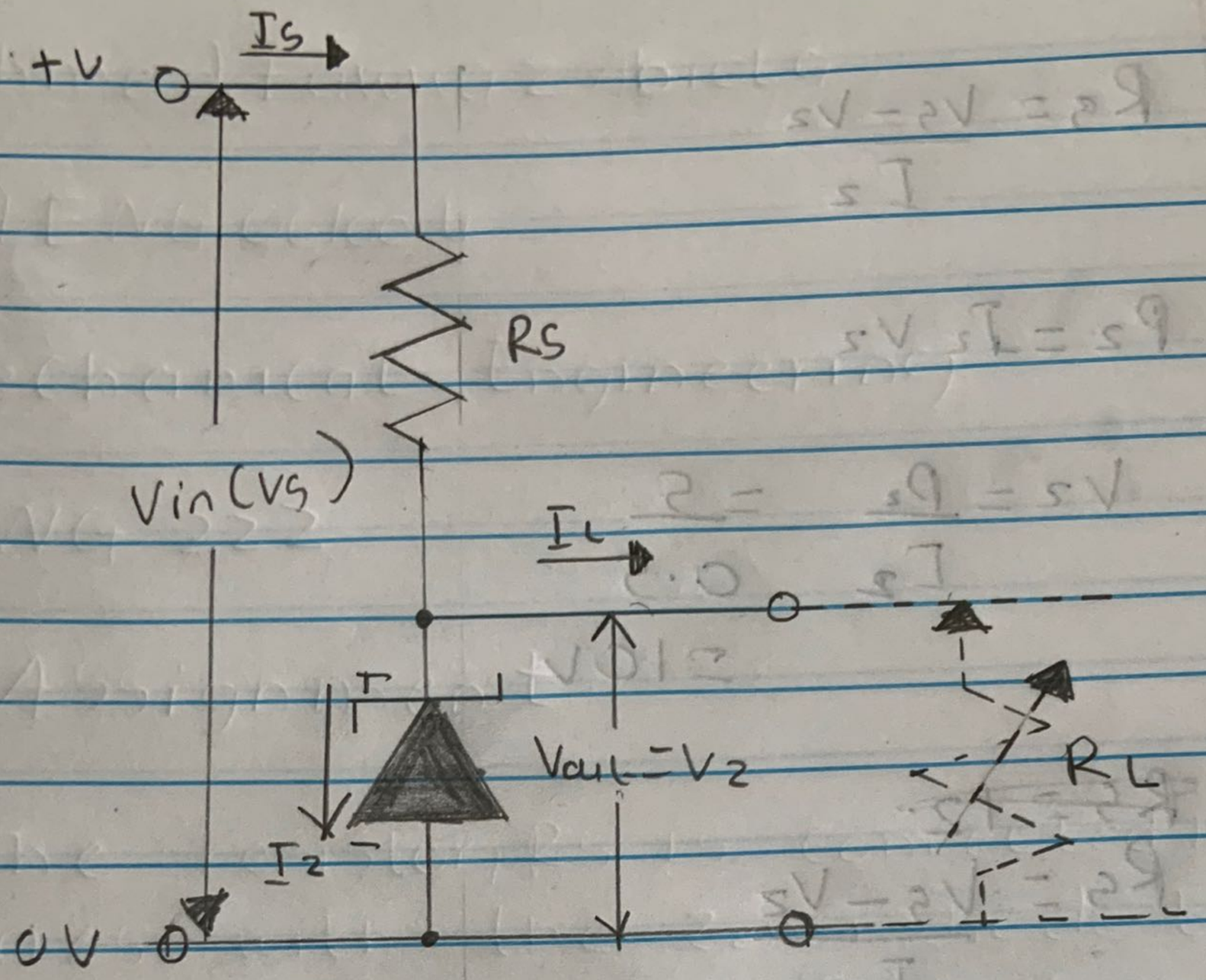
1) The resistor, RS is connected in series with the zener diode to limit the current flow through the diode with the voltage source, Vs being connected across the combination. The stabilised output voltage Vout is taken from across the zener diode.

A zener diode is always operated in its reverse biased condition. As such a simple voltage regulator circuit can be designed using a zener diode to maintain a constant Pcoutpu

voltage across the Load inspite of variations in the input voltage or changes in the load current.



I-V characteristic curve



2) $P = 5w$

$I_R = 500mA$

$I_R = 500 \times 10^{-3} A = 0.5A$

$V_{max} = 20V_{max}$

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

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

$V_{dc} = 12.73 V_{dc}$

direction perpendicular to both I and B.

i) $R_S = \frac{V_S - V_2}{I_2}$

$P_2 = I_2 V_2$

$V_2 = \frac{P_2}{I_2} = \frac{5}{0.5}$

$= 10V$

~~$R_S = I_2$~~

$R_S = \frac{V_S - V_2}{I_2}$

$R_S = \frac{12.73 - 10}{0.5}$

$R_S = 5.46 \Omega$

ii) $I_L = \frac{V_2}{R_L}$

$= \frac{10}{500}$

$I_L = 0.02A$ or $20mA$