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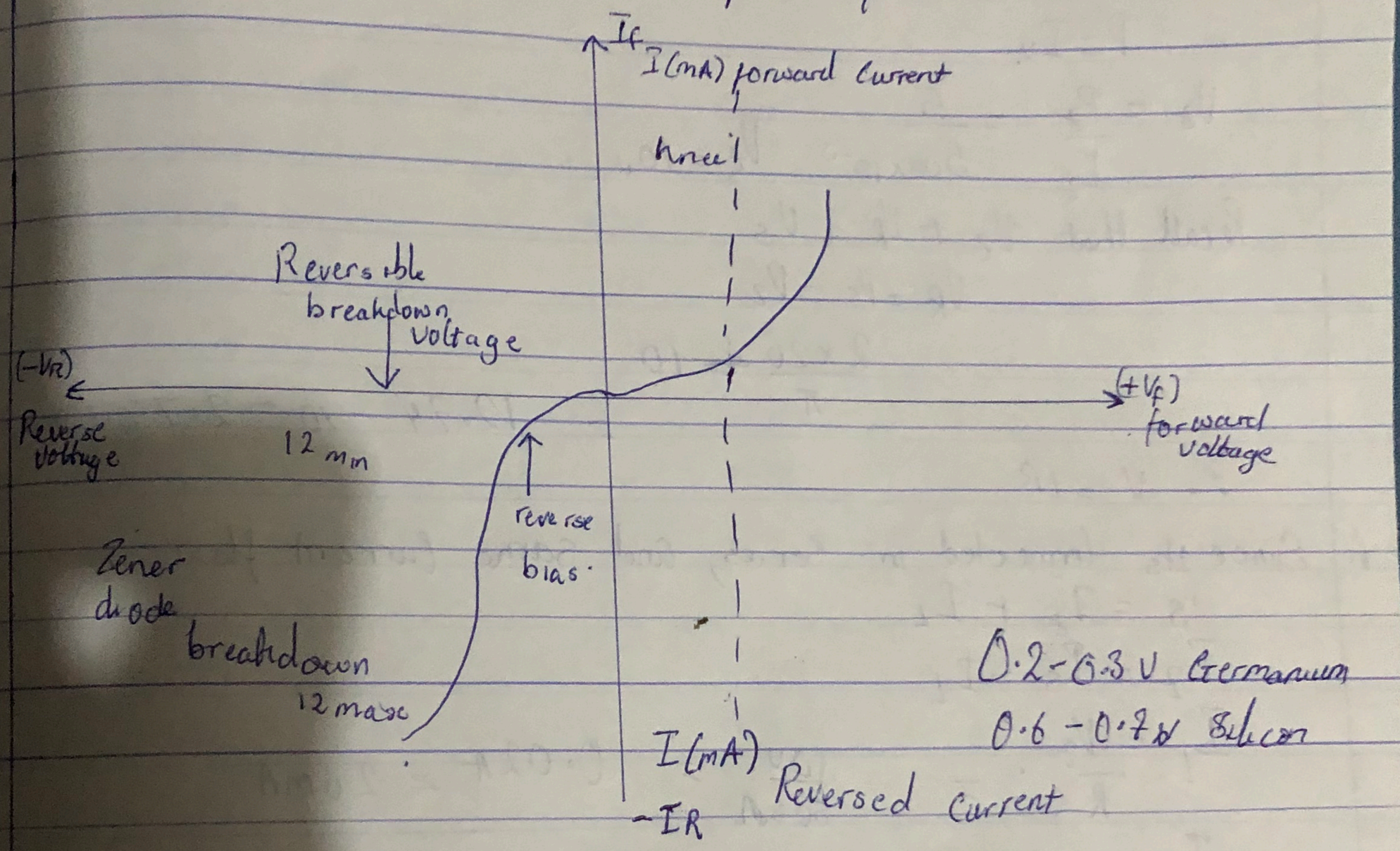
Course code: ENG 222
Mechanical Engineering

Assignment

1. A Zened diode is a type of diode that allows current to flow in the conventional manner - from its anode to its cathode. i.e. when the anode is postive with repect respect to the cathode.

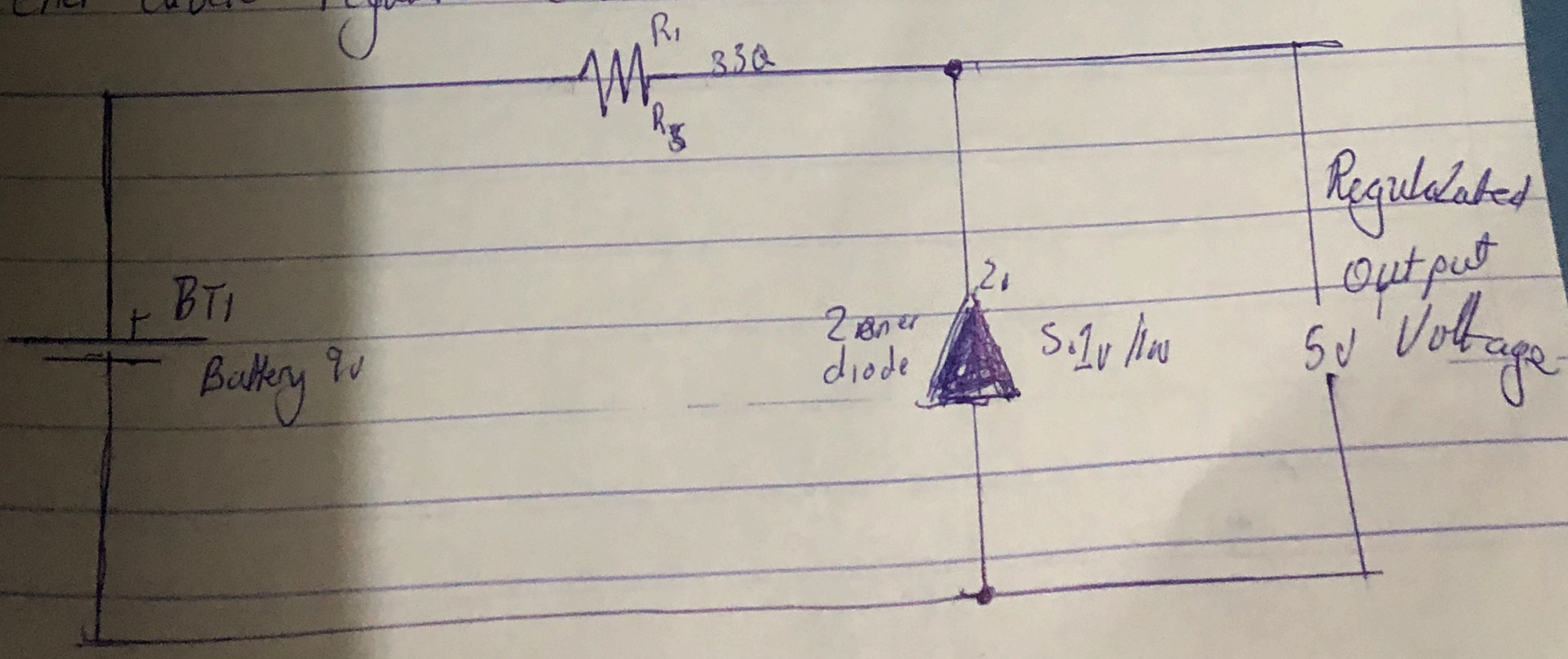
i



ii

I-V Characteristic Curve

iii Zener diode regulator Circuit



Solution

2i A 5w ~~Maximum~~ Zener = 5w = P_z

Current = 500mA I_z

20 V_{max}

To Convert V_{max} to V_{DC},

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

$$V_s = \frac{2 \times 20}{\pi} = 12.74\,V_{DC}$$

$$P = IV$$

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

Recall that $V_z + V_R = V_s$

$$V_R = V_s - V_z$$

$$\frac{2 \times 20}{\pi} - 10 = 12.74 - 10 = 2.74V$$

$\therefore V = IR$

ii Since Its connected in Series, and same current flow

$$I_S = I_z + I_L$$

$$I_z = I_S - I_L$$

$$I_L = \frac{V_z}{R} = \frac{10V}{500\Omega} = 0.02A = 20mA$$

$$I_z = 500mA - 20mA$$

$$= 480MA = 0.48A$$