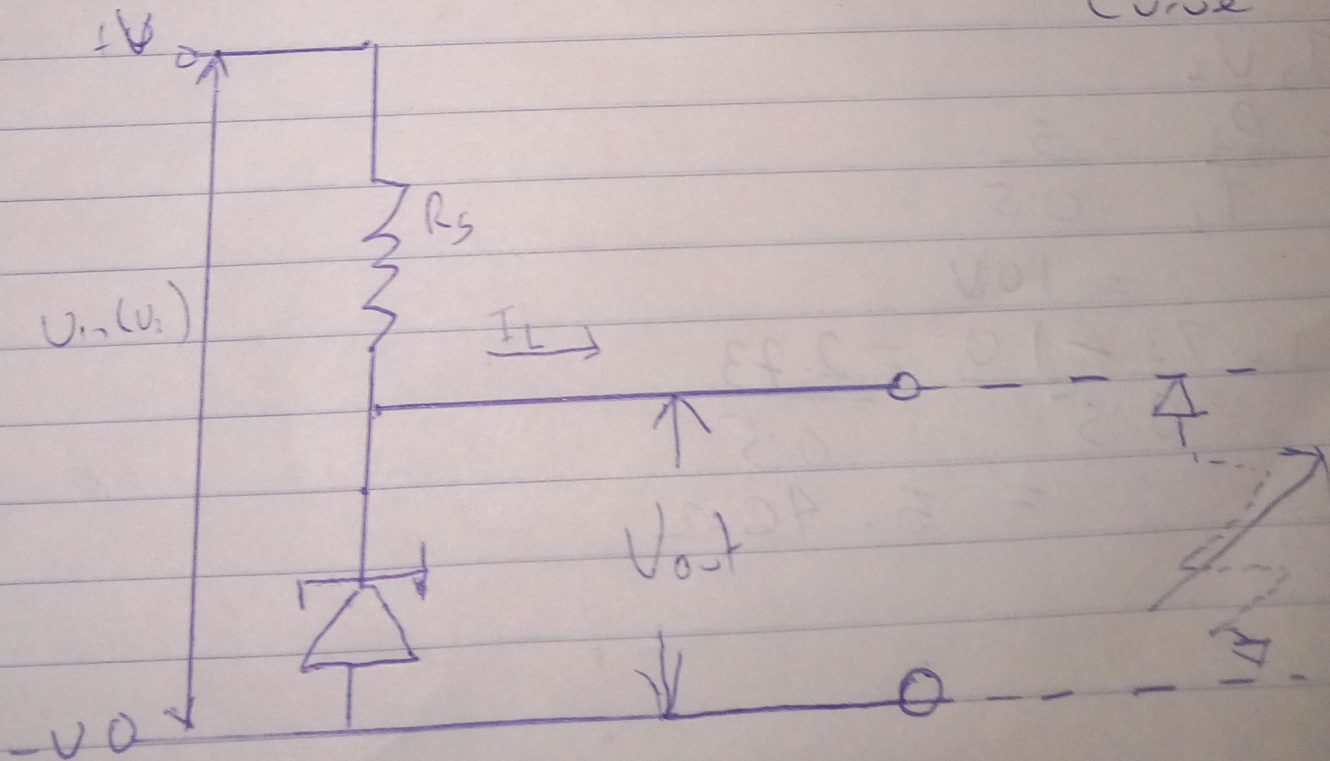
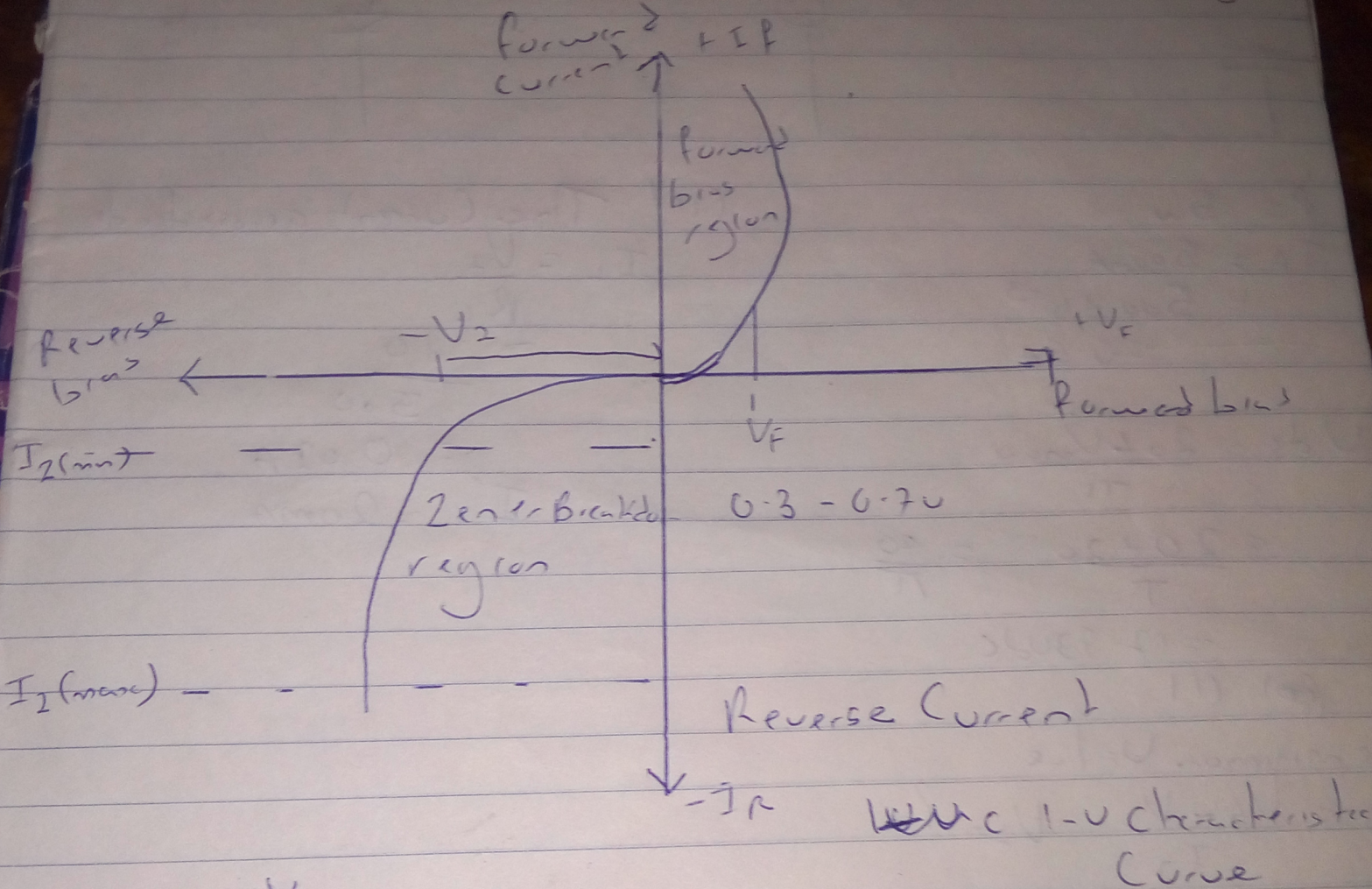
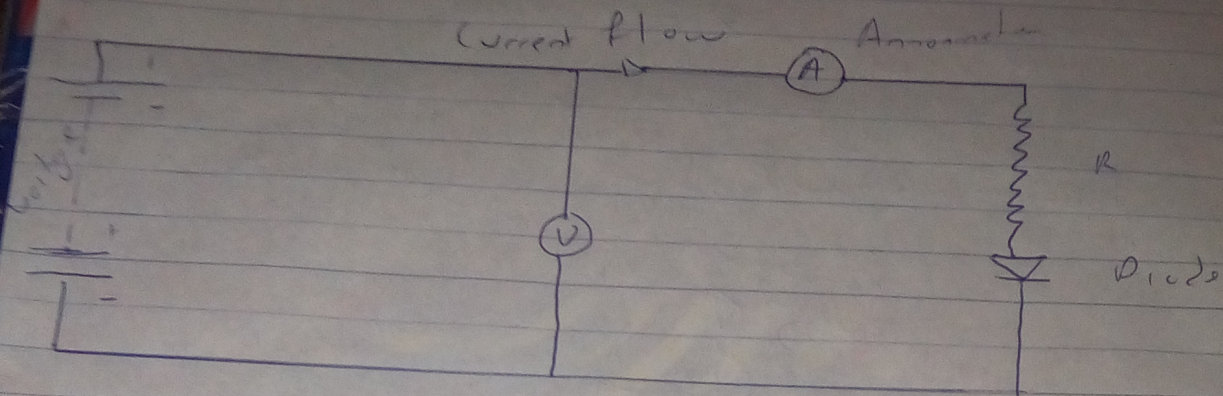


A Zener diode is a diode similar to the standard PN junction diode but they are specifically designed to have a low and specified reverse breakdown voltage.



2)



$$P = 5W$$

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

$$V_{dc} = \frac{20 + V_{max}}{\pi}$$

$$= \frac{20 + 20}{\pi} = \frac{40}{\pi}$$

$$= 12.73V_{dc}$$

(*) (ii)

The minimum value

$$R_s = \frac{V_s - V_2}{I_2} \quad V_2 = ?$$

$$P_2 = I_2 V_2$$

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

$$= 10V$$

$$R_s = \frac{12.73 - 10}{0.5} = \frac{2.73}{0.5}$$

$$= 5.46 \Omega$$

(iii) The current across diode

$$I_L = \frac{V_2}{R_c} \\ = \frac{10}{500}$$

$$= 0.02A$$

$$I_L = 20mA$$