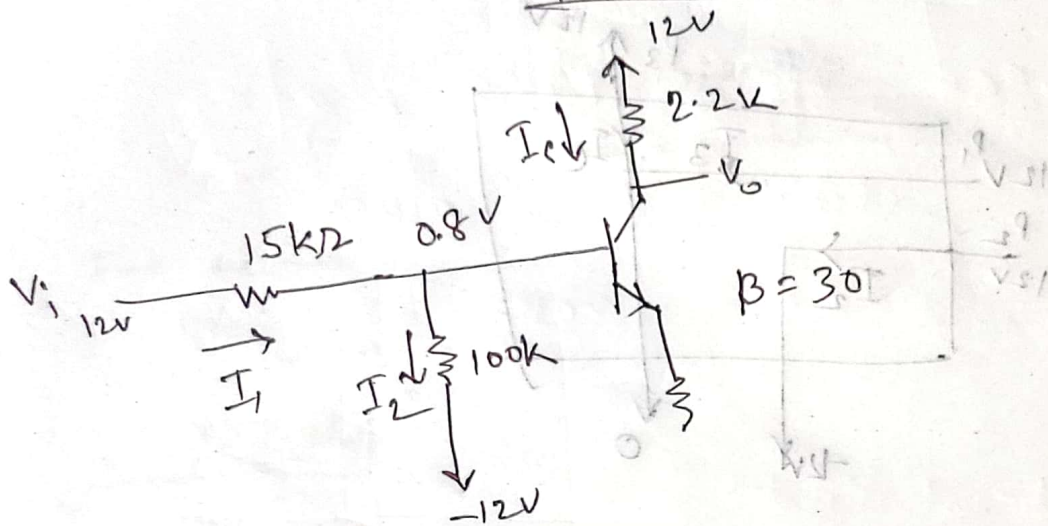


# Home work - 2



$V_i = \text{high}$  Assume saturation  $I_{C(sat)} = I_1 - I_2$

$$V_{BE} = 0.8V, V_{CE} = 0.2V$$

$$\therefore V_B = 0.8V, V_C = V_o = 0.2V$$

$$I_1 = \frac{12 - 0.8}{15} = 0.7466 \text{ mA}$$

$$I_2 = \frac{0.8 - (-12)}{100} = 0.128 \text{ mA}$$

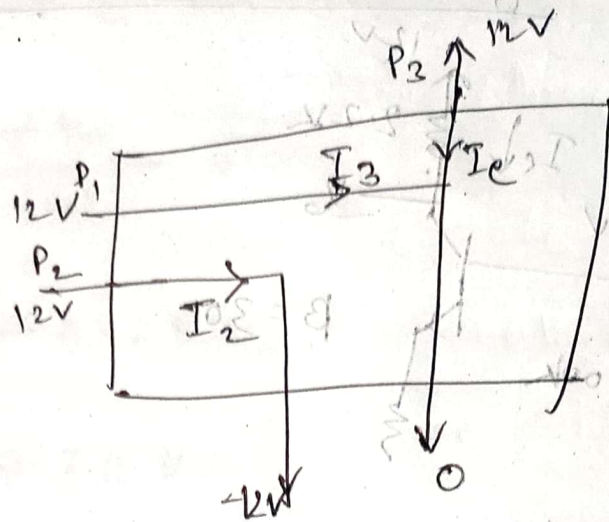
$$I_B = I_1 - I_2 = 0.619 \text{ mA}$$

$$I_C = \frac{12 - 0.2}{2.2} = 5.364 \text{ mA}$$

Condition Check,

$$\beta_{\text{forced}} = \frac{I_C}{I_B} = \frac{5.364}{0.619} = 8.666 < \beta_{\text{forced}}$$

$\therefore$  Assumption correct.



$$P_1 = (12 - 0) I_{B3} = 12 \times 0.619 = 7.428 \text{ mW}$$

$$P_2 = (12 - (-12)) I_{B2} = 24 \times 0.128 = 3.072 \text{ mW}$$

$$P_3 = (12 - 0) I_{C3} = 12 \times 5.364 = 64.368 \text{ mW}$$

total dissipation,

$$P = P_1 + P_2 + P_3$$

$$= 74.868 \text{ mW}$$

Assumption correct