Procedure to find the region of operation in BJT

① Find $I_C(sat)$ from the output loop { by making $V_{CE} = V_{CE}(sat)$ }

② Find $I_{B(min)} = \frac{I_C(sat)}{\beta}$

③ This is the minimum required current to drive the BJT into Saturation.

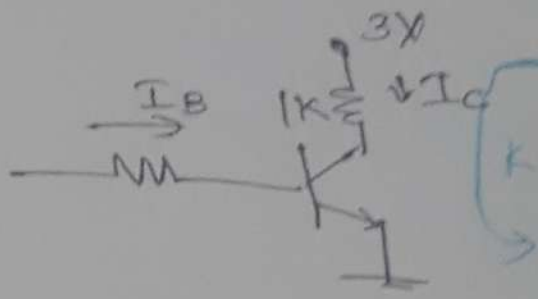
④ From the input loop find the I_B

(a) If $I_B \leq 0 \rightarrow$ cut off region

(b) If $I_B \leq I_{B(min)} \rightarrow$ active region

(c) If $I_B \geq I_{B(min)} \rightarrow$ Saturation region.

(9) Assuming $V_{CE(sat)} = 0.2V$ and $\beta = 50$, the minimum base current (I_B) required to drive the tx^r in the given figure to saturation is



$$I_{B(min)} = \frac{I_{C(sat)}}{\beta}$$

Step:1

KVL →

$$3 - I_{C(sat)} \times 1K - 0.2 = 0$$

$$I_{C(sat)} = \frac{3 - 0.2}{1K}$$

$$= 2.8mA$$

$$\therefore I_{B(min)} = \frac{2.8mA}{50} = 56\mu A$$