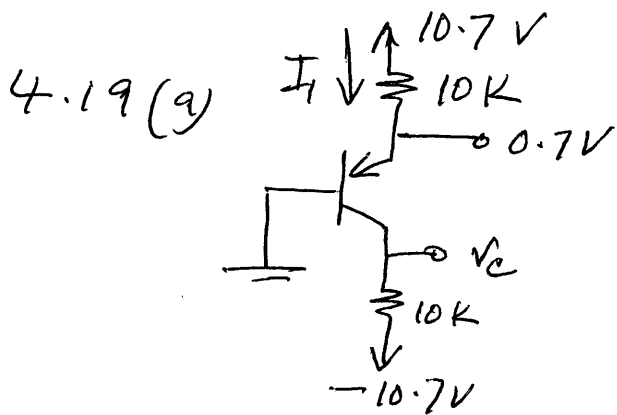


# Assignment #4

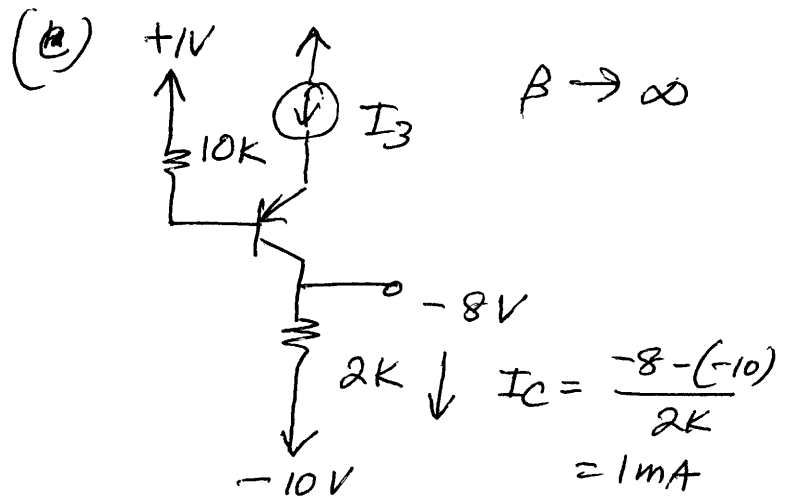
EE341



$$I_1 = \frac{10.7 - 0.7}{10K} = 1mA$$

$$V_c = -10.7 + 1 \times 10 = -0.7$$

$\therefore V_{bc} > 0$  active mode.



$\beta \rightarrow \infty$

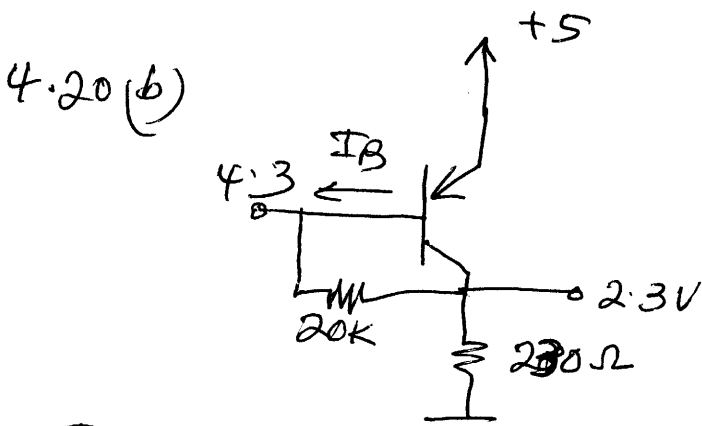
$$I_c = \frac{-8 - (-10)}{2K} = 1mA$$

$$\therefore I_3 = 1mA$$

$I_B \approx 0$  since  $\beta \rightarrow \infty$

$$\therefore V_4 = 1V$$

$V_{bc} > 1$  Active mode



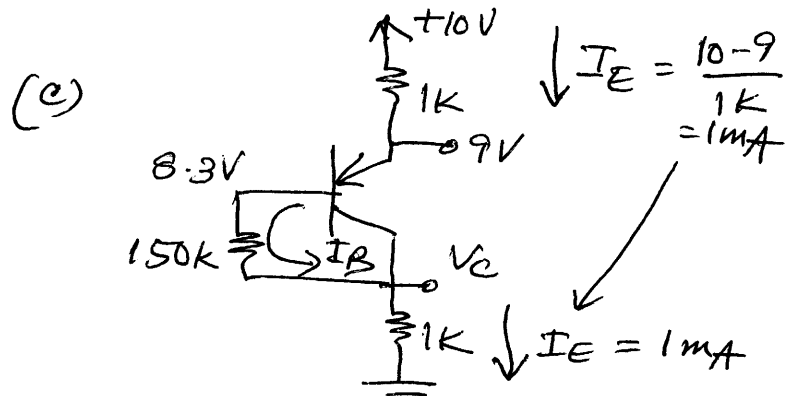
$$I_B = \frac{4.3 - 2.3}{20K}$$

$$= 0.1mA$$

$$I_{230} = I_E = \frac{2.3V}{0.23K} = 10mA$$

$$\therefore (1+\beta) = \frac{I_E}{I_B} = 100$$

$$\beta = 99$$



$$I_E = \frac{10 - 9}{1K} = 1mA$$

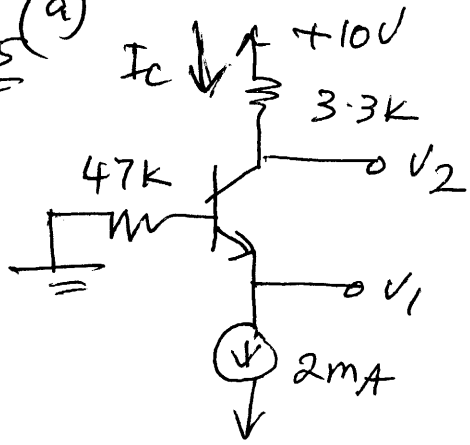
$$\therefore V_c = 1mA \times 1K = 1V$$

$$I_B = \frac{8.3 - 1}{150K} = 48.66\mu A$$

$$\therefore 1+\beta = \frac{1mA}{48.66\mu A} = 20.55$$

$$\beta = 19.5$$

4.35 (a)



$$\beta \rightarrow \infty \Rightarrow I_B \rightarrow 0$$

$$I_E = 2 \text{ mA}$$

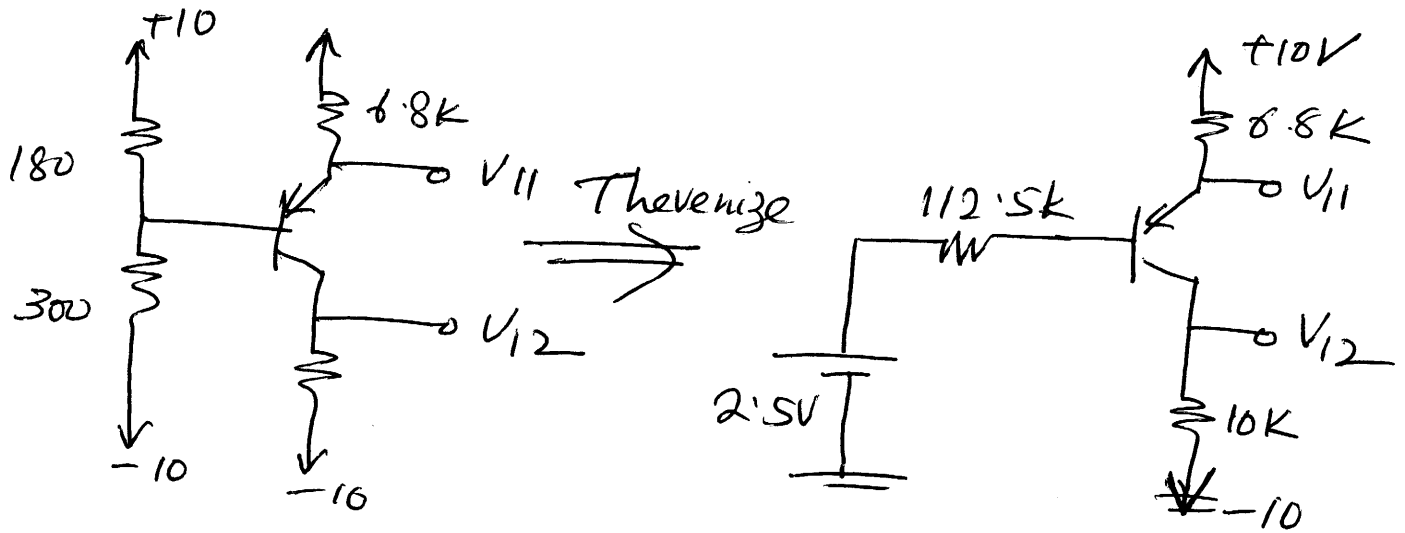
$$\therefore I_C = 2 \text{ mA}$$

$$V_2 = 10 - 3.3 \times 2 = 3.4 \text{ V}$$

$$V_B = 0 \text{ since } I_B \rightarrow 0$$

$$\therefore V_1 = V_B - 0.7 = -0.7 \text{ V}$$

(e)



$$V_{11} = V_B + 0.7 = 3.2 \text{ V} \text{ since } I_B \rightarrow 0$$

$$I_E = \frac{10 - 3.2}{6.8} = 1 \text{ mA}$$

$$\therefore V_{12} = -10 + 10 \times 1 = 0 \text{ V}$$