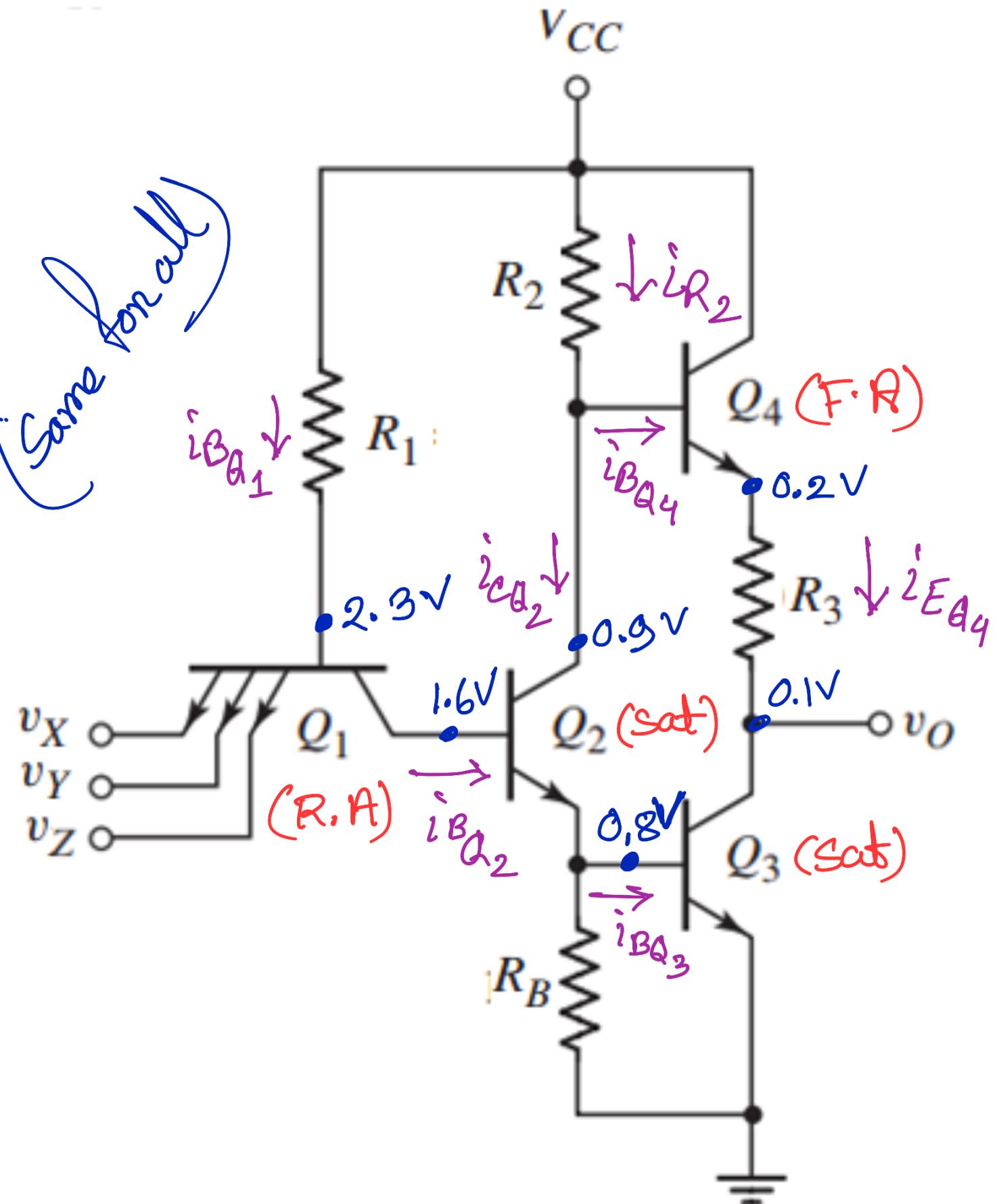


* So, Q_4 in Forward active mode

* Q_1 in Reverse active mode.



Resistors values (for me): $[V_{CC} = 3.2V]$

$$R_1 = 4.0\text{ k}\Omega, R_2 = 1.1\text{ k}\Omega, R_3 = 0.5\text{ k}\Omega,$$

$$R_B = 10\text{ k}\Omega$$

$$* i_{B_1} = \frac{V_{CC} - 2.3}{R_1} = \frac{32 - 2.3}{9} = \boxed{0.225 \text{ mA}}$$

$$\begin{aligned}
 * i_{B_2} &= i_{B_1} + i_{E_x} + i_{E_y} + i_{E_z} \\
 &= 0.225 + 3(i_{E_x}) \xrightarrow{i_{E_x} = 0.8} 0.8 \\
 &= 0.225 + 3(\beta_R \times i_{B_1}) \\
 &= 0.225 + (3 \times 0.8 \times 0.225) \\
 &= \boxed{0.765 \text{ mA}}
 \end{aligned}$$

* for i_{B_3} ,

$$i_{R_2} = \frac{V_{CC} - 0.9}{R_2} = \frac{3.2 - 0.9}{1.1} = 2.091 \text{ mA}$$

$$i_{E_{Q4}} = \frac{0.2 - 0.1}{R_3} = \frac{0.2 - 0.1}{0.5} = 0.2 \text{ mA}$$

$$i_{BQ4} = \frac{i_{EQ4}}{\beta_F + 1} = \frac{0.2}{15+1} = 0.0125mA$$

15 ←

$$i_{CQ2} = i_{R2} - i_{BQ4} = 2.091 - 0.0125 \\ = 2.0785mA$$

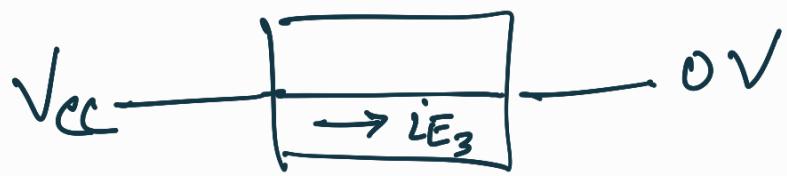
$$i_{B3} = i_{BQ3} = i_{CQ2} + i_{BQ2} = 2.0785 + 0.765 \\ = 2.8435mA$$

* $i_{B4} = i_{BQ4} = 0.0125mA$
 $= 12.5 \mu A$

* for i_{E3} ,

$$i_{E3} = i_{B3} + i_{EQ4} = 2.8435 + 0.2 \\ = 3.0435mA$$

* power dissipation,



\therefore power dissipation, $(V_{ce} - 0) (\dot{i}_{E_3})$

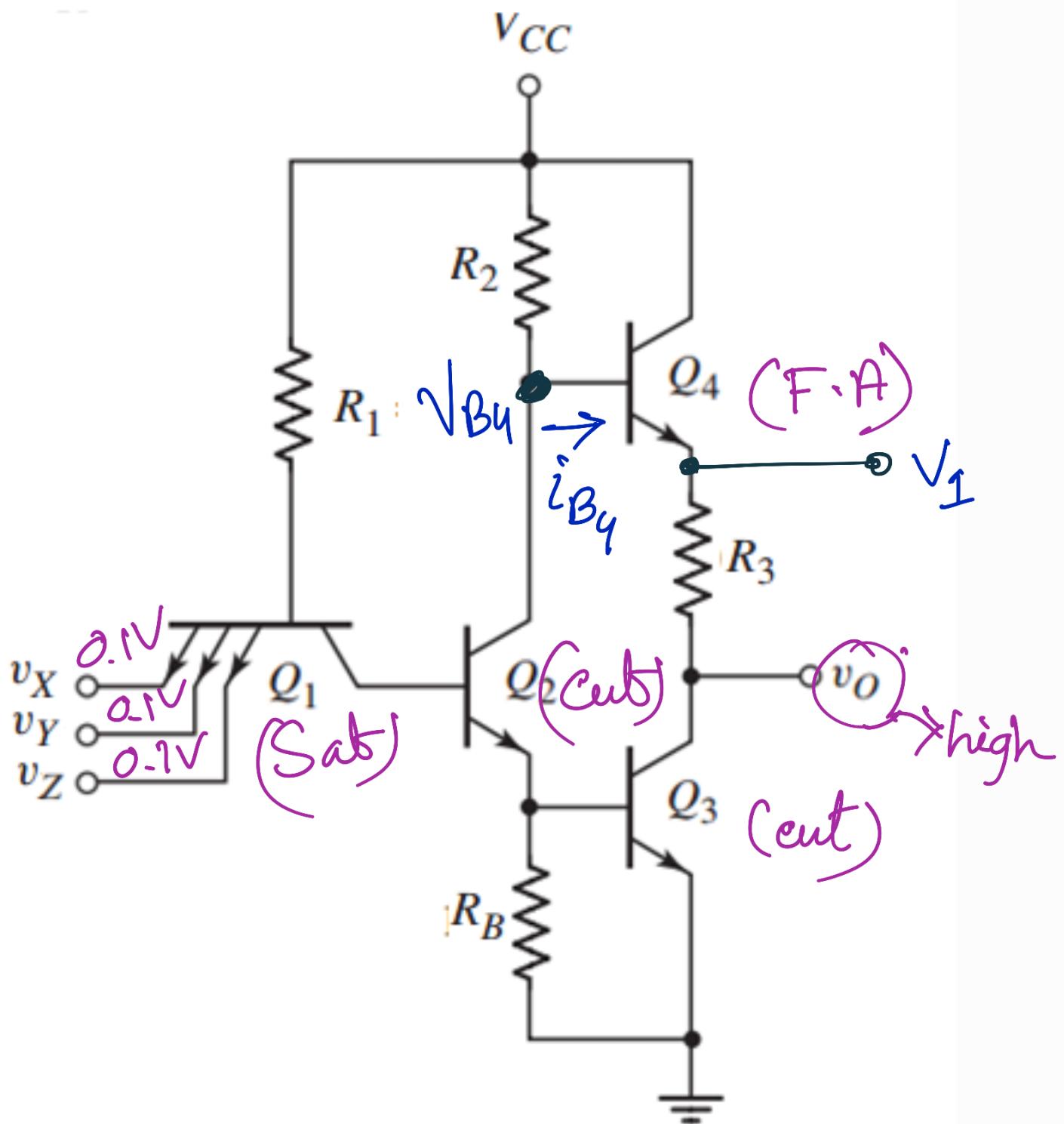
$$= (3.2 - 0) \times 3.0435$$

$$= \boxed{9.7392 \text{ mW}}$$

$$\cancel{*} \quad \dot{i}_{C_3(\max)} = \dot{i}_{B_3} \times \beta_F + \dot{i}_{C_3(\text{no load})} = N \times \dot{i}_L$$

$$\Rightarrow \dot{i}_{BQ_3} \times \beta_F + \dot{i}_{CQ_3} = N \times \dot{i}_L$$

$$\frac{V_{cc} - 0.9}{R_L}$$



$$i_E X = \beta_R \times i_{B1} = 0.8 \times 0.225 = 0.18 \text{ mA}$$

\rightarrow fanout

$$i_L = 12 \times 0.18 = 2.16 \text{ mA}$$

$$V_1 - V_0 = 2.16 \times R_3$$

$$\Rightarrow V_1 = V_0 + 2.16 \times 0.5$$

$$\Rightarrow V_1 = V_0 + 1.08 \quad \text{--- } i$$

$$i_{B4} = \frac{i_{E4}}{\beta_F + 1} = \frac{2.16}{15+1} = 0.135 \text{ mA}$$

$$\begin{aligned} \text{So, } V_{B4} &= V_{ce} - (i_{B4} \times R_2) \\ &= 3.2 - (0.135 \times 1.1) \\ &= 3.0515 \text{ V} \end{aligned}$$

$$\therefore V_1 = V_{B4} - 0.7 = 3.0515 - 0.7 = 2.3515 \text{ V}$$

$$i \Rightarrow V_1 = V_0 + 1.08$$

$$\therefore 2.3515 = V_0 + 1.08 \Rightarrow V_0 = 1.2715 \text{ V}$$