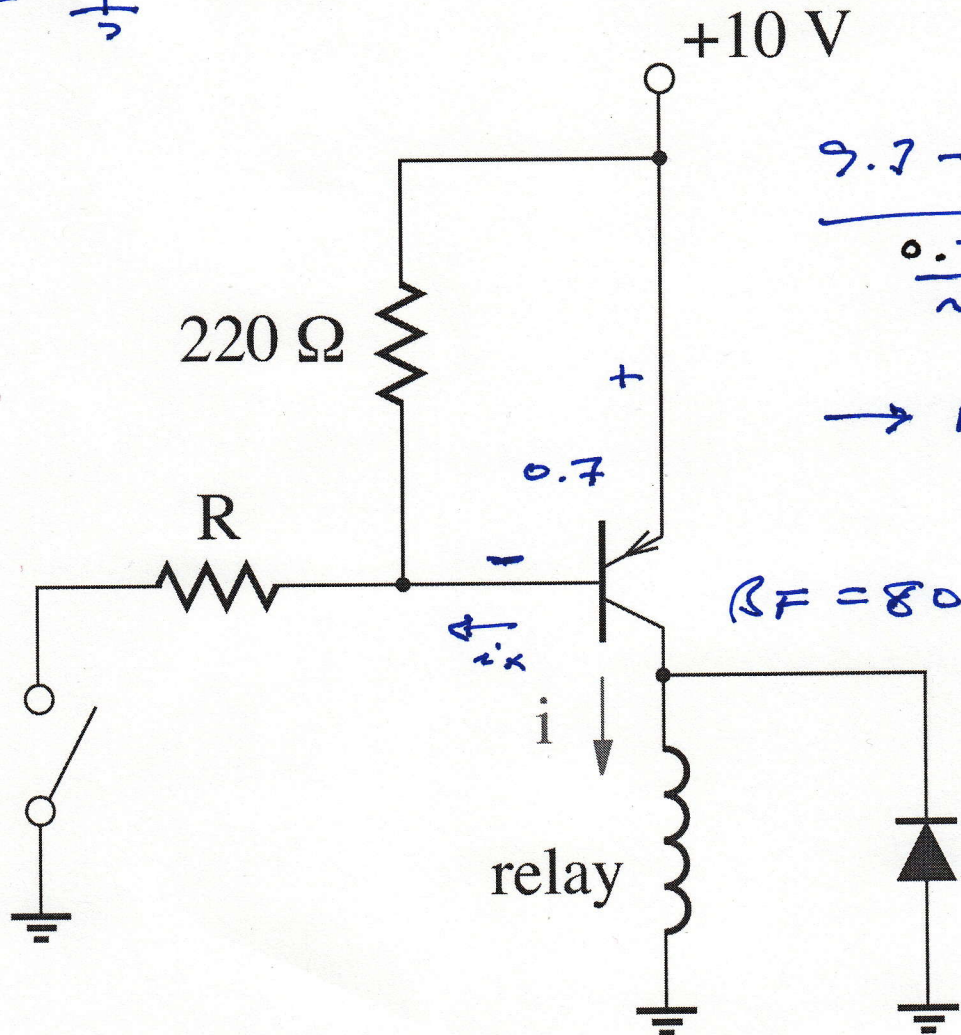
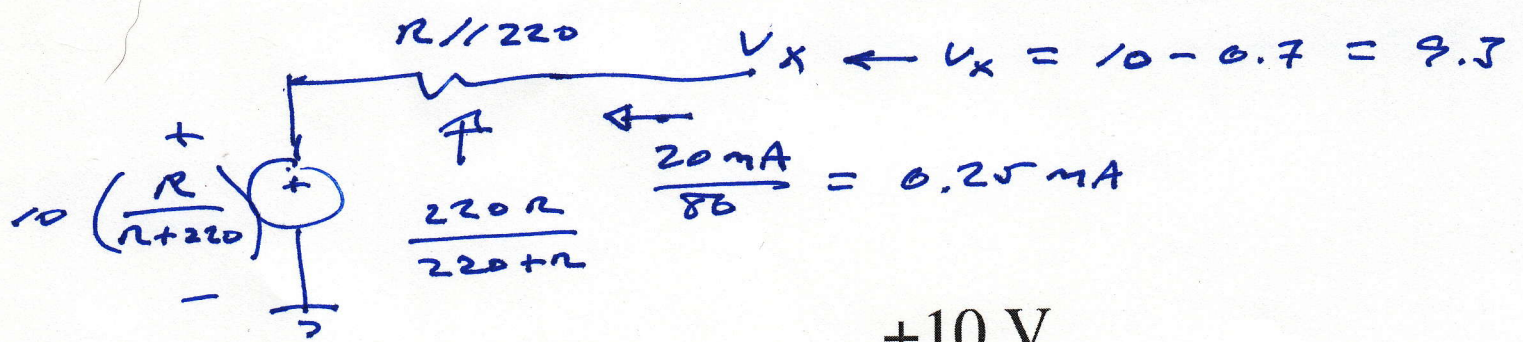


6.32 a) Thevenin circuit at base:



$$\frac{9.3 - \frac{10R}{R+220} \cdot 0.22}{\frac{0.22R}{R+220}} = \frac{1}{4}$$

$$\rightarrow R = \frac{26.7}{2.7} \text{K}$$

b) switch open $V_{be} \rightarrow 0$

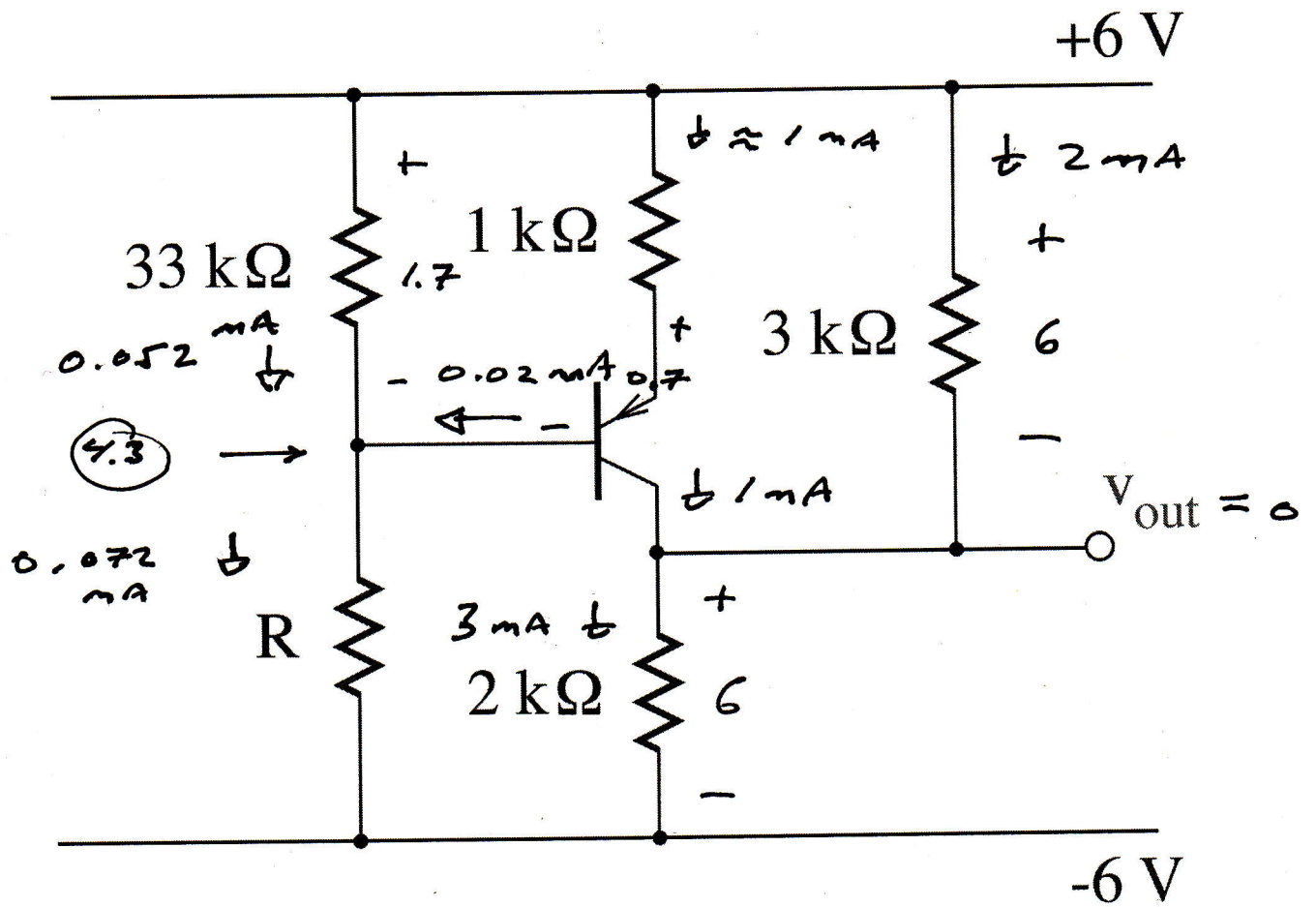
i_x can't be negative

$$\rightarrow i = 0$$

c) The diode absorbs relay current when the transistor switches off.

6.33

a)



$$R = \frac{4.3 - (-6)}{0.072 \text{ mA}} = 147 \text{ k}$$

6.33

$$\beta_F = 50$$

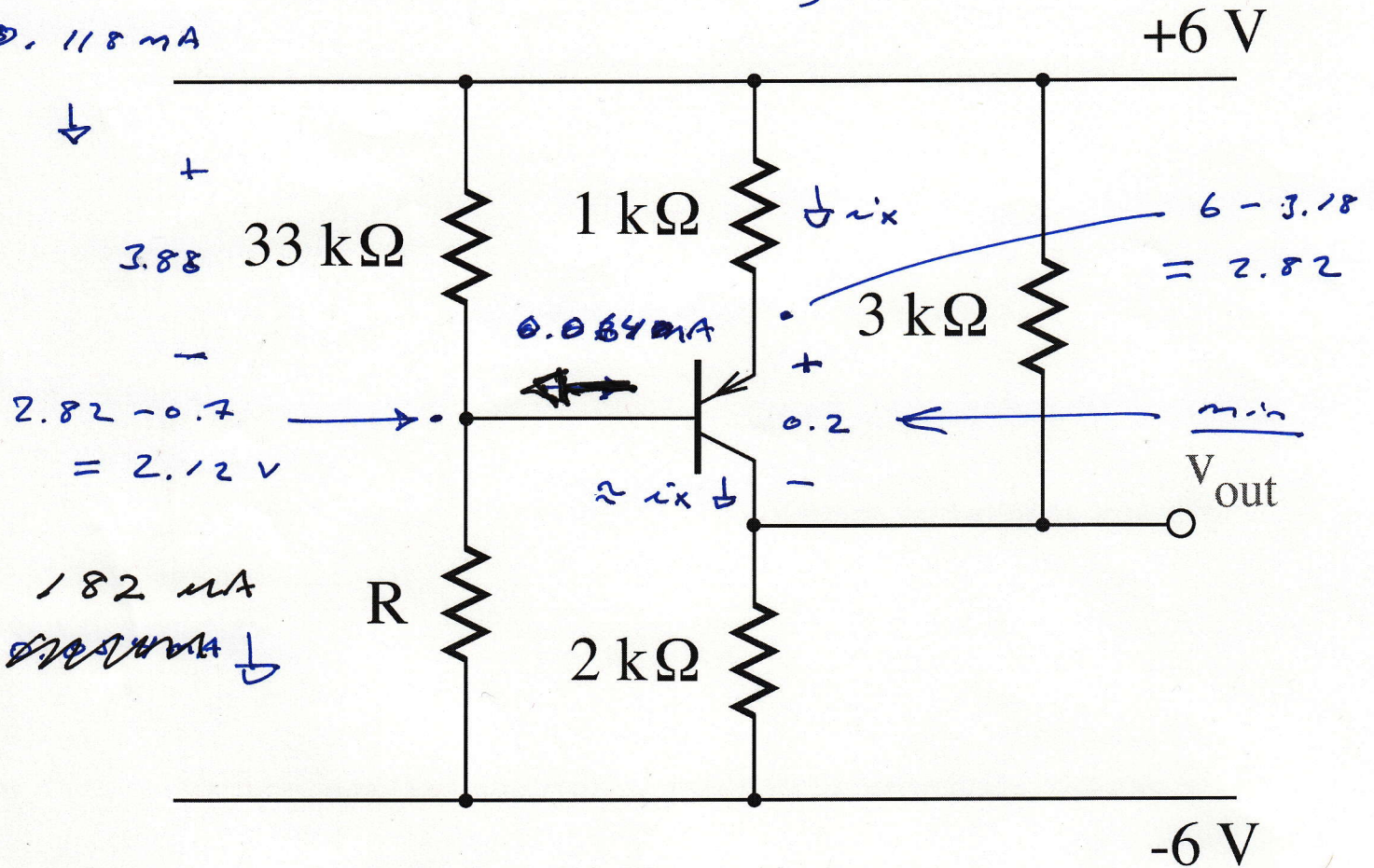
b)

$$i_x = \frac{6 - (v_{out} + 0.2)}{1}$$

$$i_x + \frac{6 - v_{out}}{3} = \frac{v_{out} - (-6)}{2}$$

$$\rightarrow v_{out} = 2.62 \text{ V}, \quad i_x = 3.18 \text{ mA}$$

0.118 mA



$$R = \frac{8.12 \text{ V}}{0.182 \text{ mA}} = \underline{\underline{44.6 \text{ k}\Omega}}$$

6.34

$$\beta = 100$$

$$V_Z = 5V$$

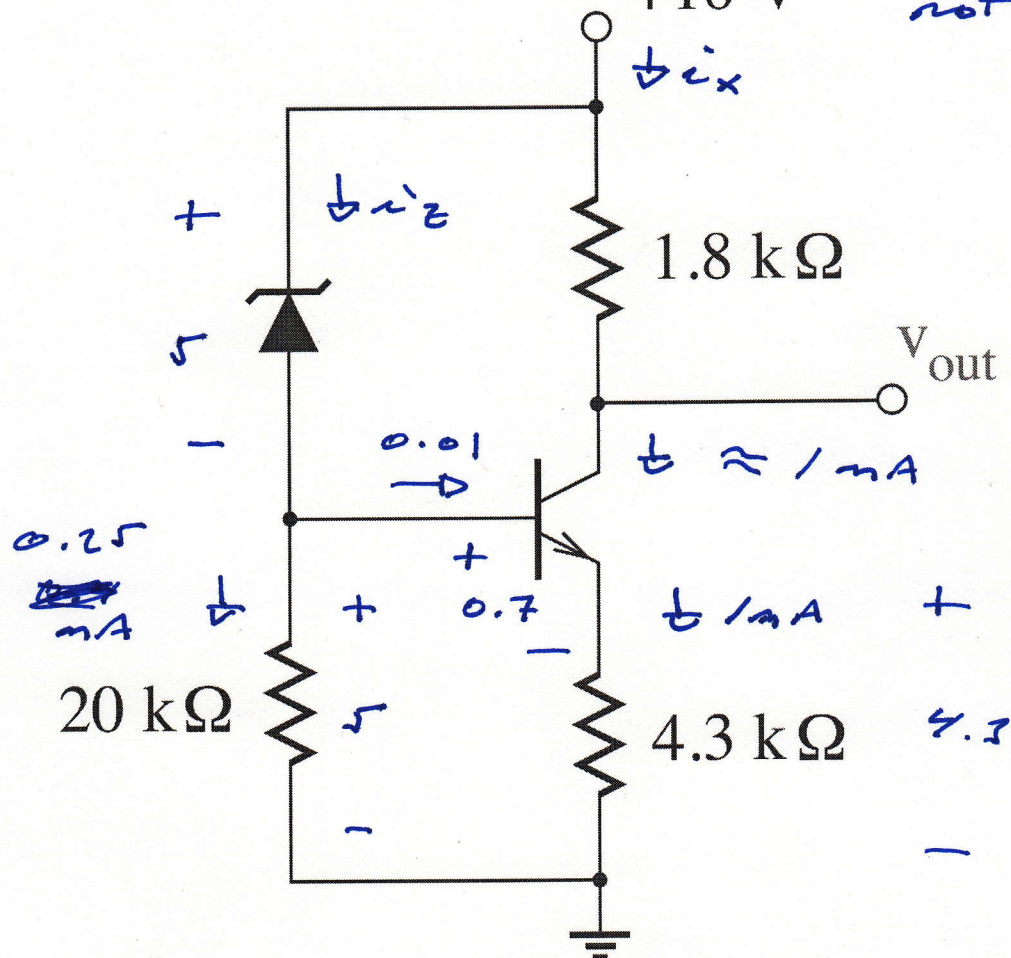
a) Mark up diagram

$$V_{out} \approx 10 - 1(1.8) = 8.2V$$

$$V_{CE} = 8.2 - 4.3 = 3.9V > 0.2V \quad \checkmark$$

+10 V

not sat.

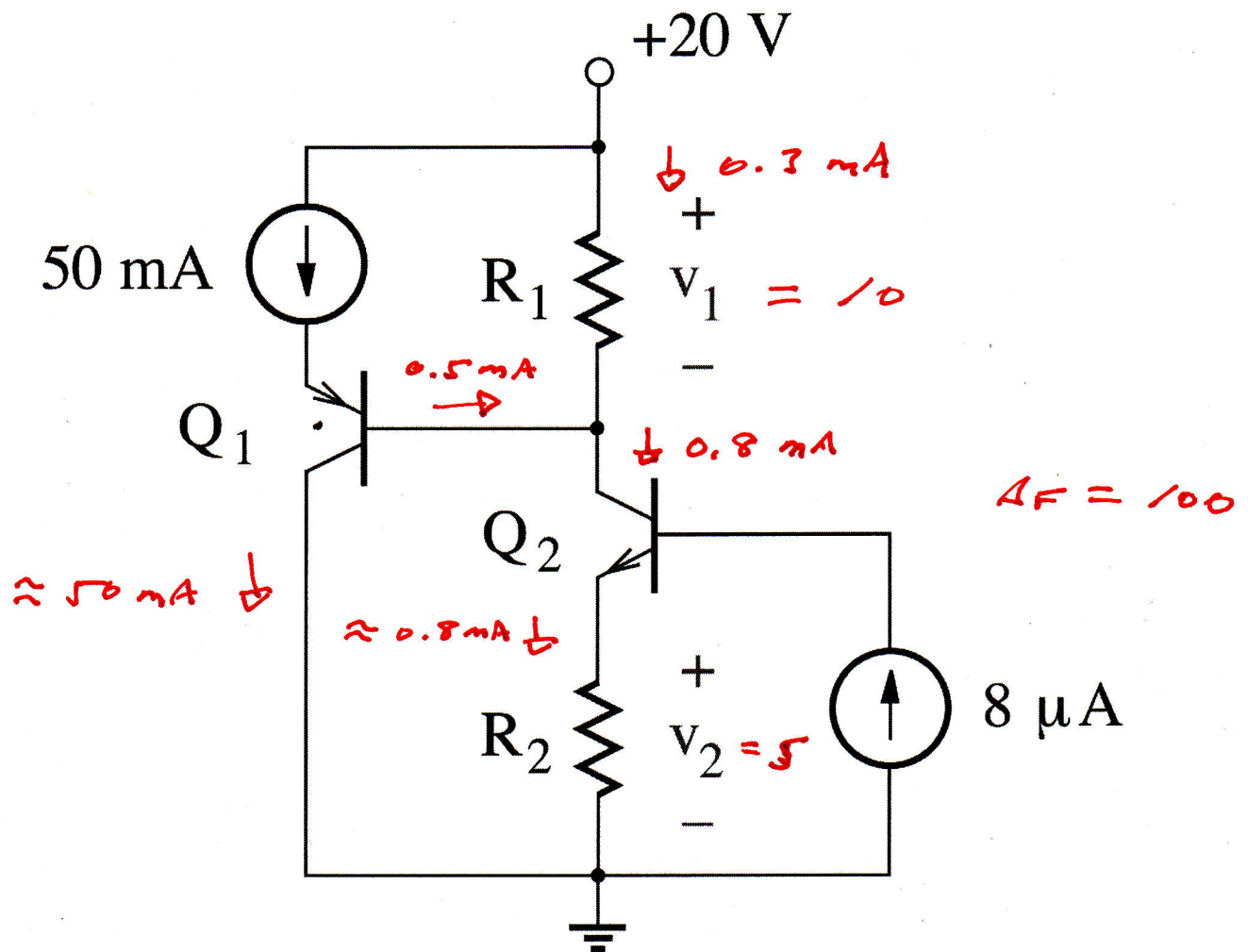


$$b) \quad i_z = 0.25 \text{ mA} + 0.01 \text{ mA} = 0.26 \text{ mA}$$

$$i_x = 0.26 \text{ mA} + 1 \text{ mA} = 1.26 \text{ mA}$$

$$P_D = 10V \times 1.26 \text{ mA} = 12.6 \text{ mW}$$

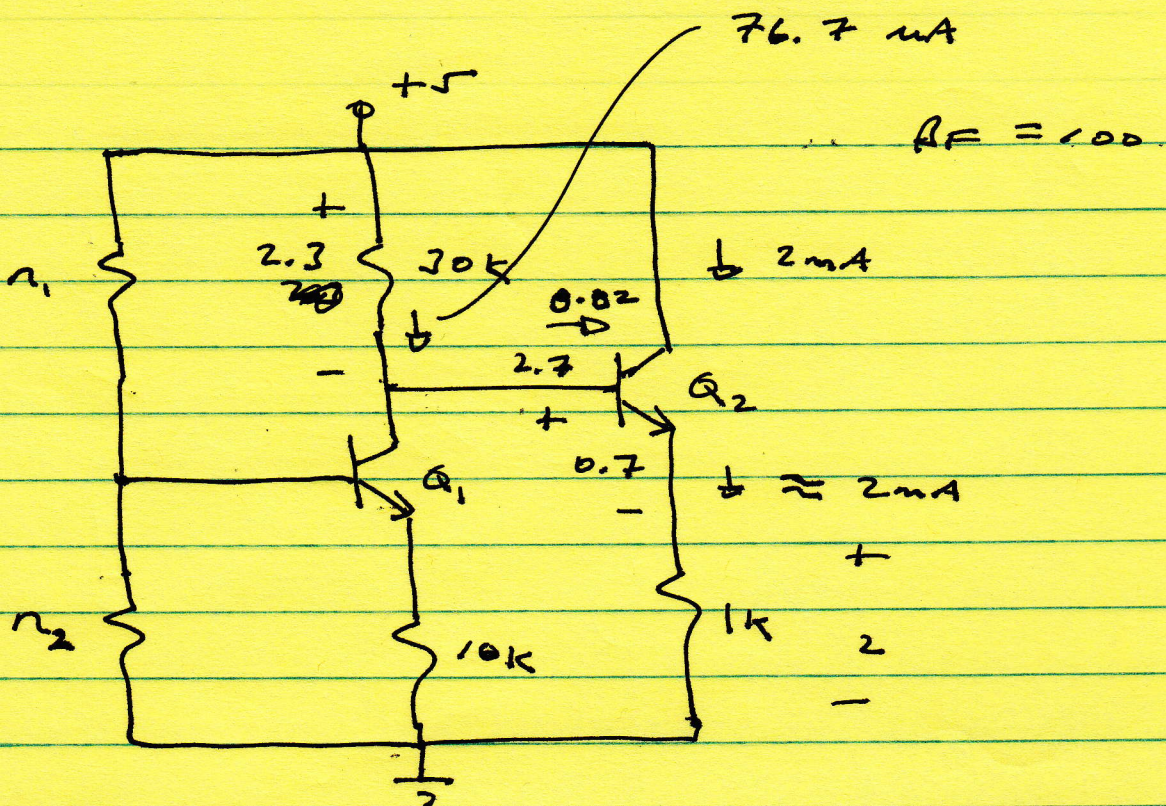
6.36



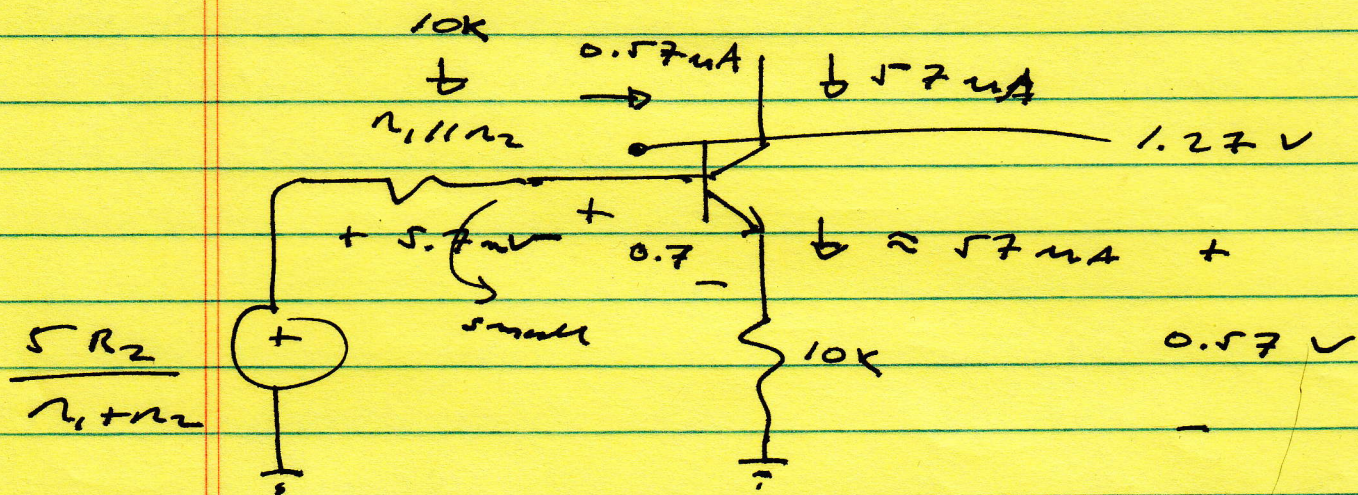
$$R_1 = \frac{10}{0.3} = 33.3\text{ k}$$

$$R_2 = \frac{5}{0.8} = 6.25\text{ k}$$

6.37



Mark up diagram $\rightarrow v_{e1} = 56.7 \mu A$



$$\frac{5R_2}{R_1 + R_2} \approx 1.27 V$$

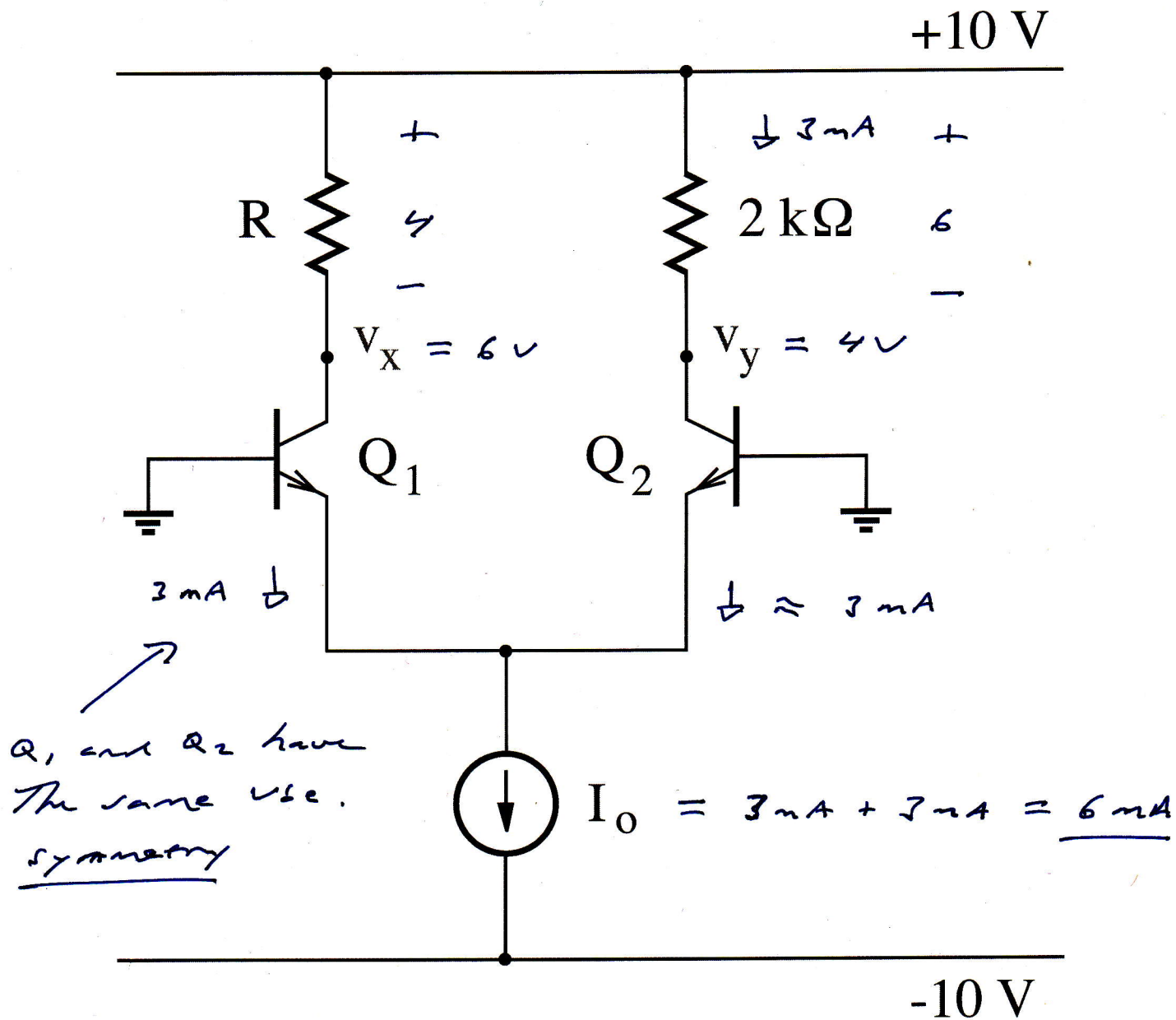
$$\frac{R_1 R_2}{R_1 + R_2} = 10k$$

$$R_1 = \frac{50k}{1.27} = 39k$$

$$R_2 = \frac{(1.27)(39)}{2.77} = 13k$$

6.38

$$\beta_F = 100$$



$$R = \frac{4\text{ V}}{3\text{ mA}} = 1.33\text{ k}$$