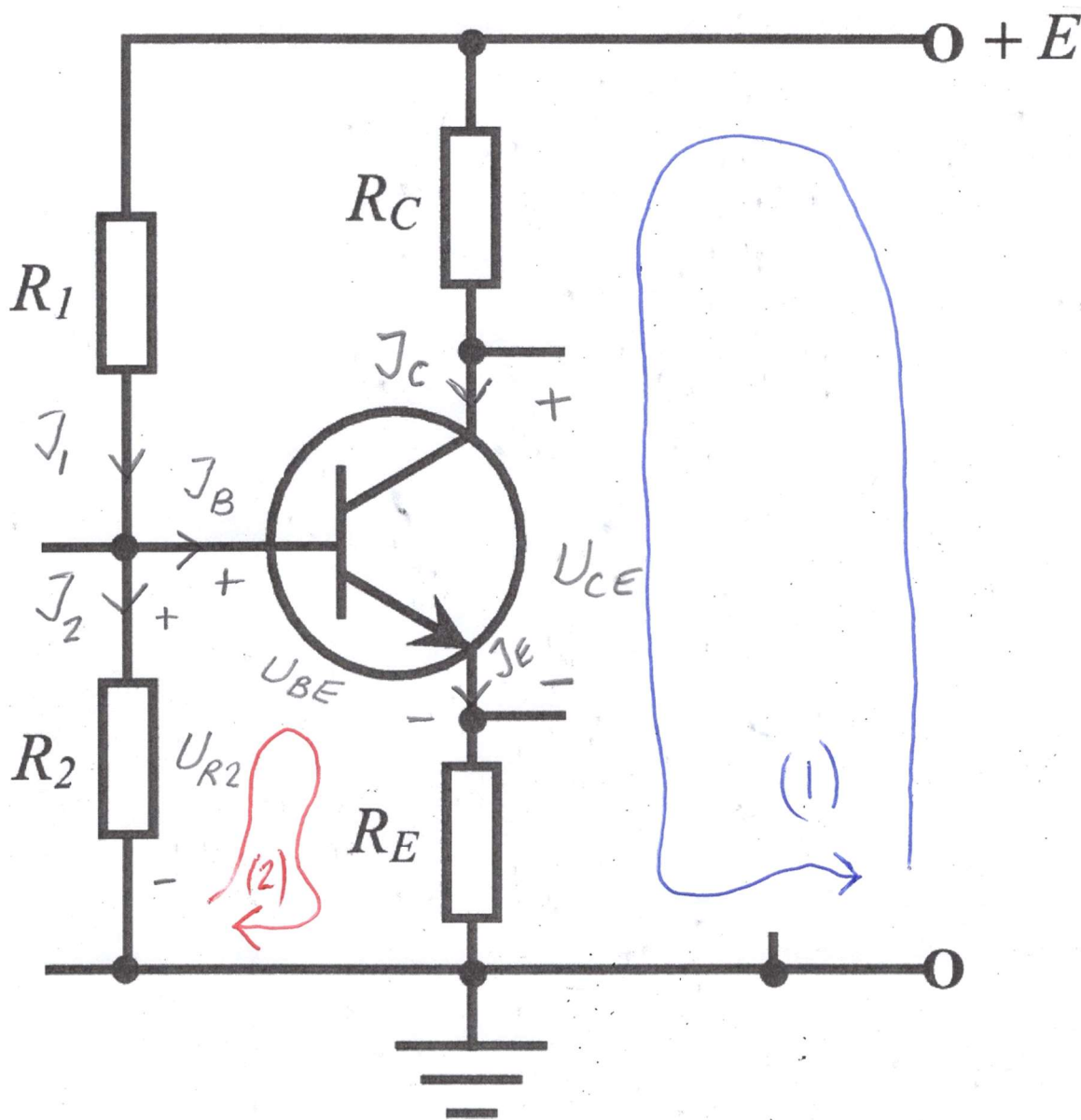


Ex1 a) Likströmsschema

Betrakta alla kondensatorer som avbrott ty $X_C = \frac{1}{\omega C} \rightarrow \infty$ då $\omega \rightarrow 0$ (likström).



a) LKSTROMSCHEMA \rightarrow

$$+E - R_3 J_C - U_{CE} - R_4 J_E = 0 \dots (1)$$

$$+U_{R_2} - U_{BE} - R_4 J_E = 0 \dots (2)$$

$$U_{R_2} = R_2 J_2$$

$$J_2 = J_1 - J_B \rightarrow$$

$$U_{R_2} = R_2 (J_1 - J_B) =$$

$$= \left| J_1 = \frac{U_{R_2}}{R_2} = \frac{E - U_{R_2}}{R_1} \right| =$$

$$= R_2 \left(\frac{E - U_{R_2}}{R_1} - J_B \right) \rightarrow$$

$$\frac{U_{R_2}}{R_2} = \frac{E}{R_1} - \frac{U_{R_2}}{R_1} - J_B$$

$$U_{R_2} \left(\frac{1}{R_1} + \frac{1}{R_2} \right) = \frac{E}{R_1} - J_B$$

$$U_{R_2} \left(\frac{R_1 + R_2}{R_1 R_2} \right) = \frac{E}{R_1} - J_B \rightarrow$$

$$U_{R_2} = E \cdot \frac{R_2}{R_1 + R_2} - J_B \cdot \frac{R_1 R_2}{R_1 + R_2}$$

$$\text{INS 1 (2)} \Rightarrow$$

$$E \cdot \frac{R_2}{R_1 + R_2} - J_B \cdot \frac{R_1 R_2}{R_1 + R_2} - U_{BE} - R_E \underbrace{(1 + h_{FE}) J_B}_{J_E} = 0$$

$$\Rightarrow J_B = 14,3 \mu A$$

$$J_C = h_{FE} J_B \Rightarrow J_C = 8,58 \text{ mA}$$

$$J_E = (1 + h_{FE}) J_B \Rightarrow J_E = 8,59 \text{ mA}$$

$$(J_E \approx J_C)$$

$$\text{INS 1 (1)} \Rightarrow \underline{U_{CE} = 3,6 \text{ V}}$$