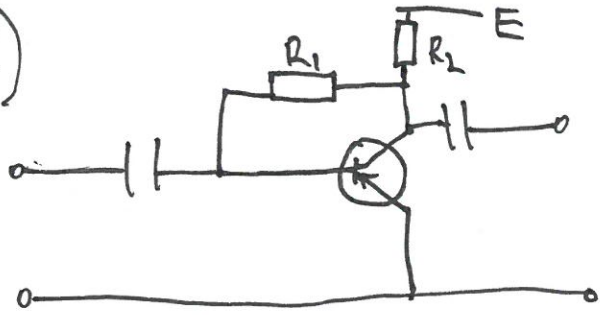
4-4)



$E = -1,3\ V$

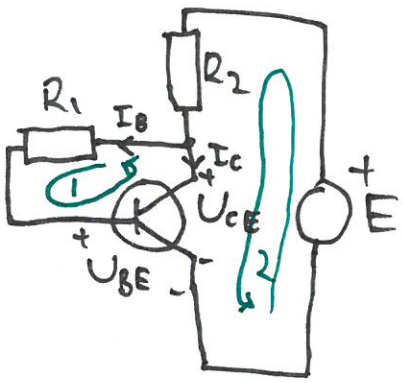
$B = 50$

$R_1 = 1,2\ M\Omega$

$R_2 = 3,3\ k\Omega$

$U_{BE} = -0,1\ V$

Likströmsschema:



1: $-U_{BE} + U_{CE} - I_B \cdot R_1 = 0$ (1)

2: $E - (I_C + I_B) \cdot R_2 - U_{CE} = 0$ (2)

$I_C = B \cdot I_B$ (3)

(2) o (3) insatt i (1) ger:

$$-U_{BE} + E - (B \cdot I_B + I_B) \cdot R_2 - I_B \cdot R_1 = 0 \iff$$

$$E - U_{BE} = ((B+1) \cdot R_2 + R_1) \cdot I_B \iff$$

$$I_B = \frac{E - U_{BE}}{R_1 + (B+1) \cdot R_2} = \frac{-1.3 - -0.1}{1,2M + 51 \cdot 3,3k} \approx -0,877\ \mu A$$

(3) $\Rightarrow$ $I_C \approx -43,9\ \mu A$

(2) $\Rightarrow$ $U_{CE} = E - R_2(I_C + I_B) \approx -1,15\ V$

$I_{BQ} = -0,877\ \mu A$

$I_{CQ} = -43,9\ \mu A$

$U_{CEQ} = -1,15\ V$