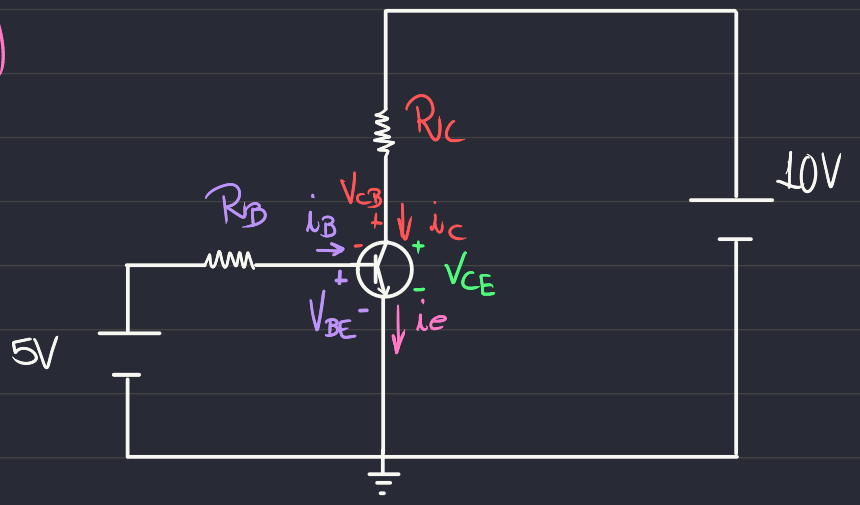
Lista de Exercícios =>

Nome: Victor Henrique de Moura Netto
RA: 2090910

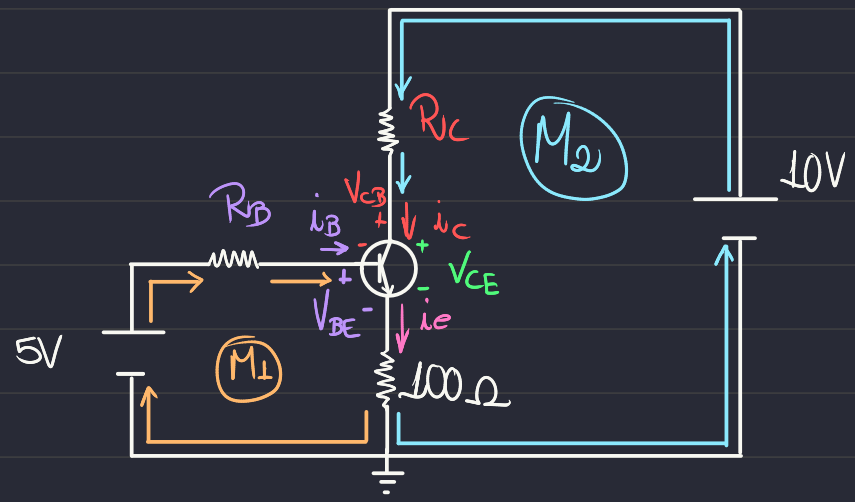
1)



$i_C = 10mA$
$V_{CE} = 5V$
$\beta = 100$
$V_{BE} = 0,7V$

$$i_c = \beta \cdot i_b \rightarrow i_b = \frac{10 \cdot 10^{-3}}{100} = 1 \cdot 10^{-4} A$$

$$R_B = \frac{5 - 0,7}{1 \cdot 10^{-4}} = 43k\Omega \qquad R_C = \frac{10 - 5}{10m} = 500\Omega$$



- Malha (1)

$$-5 + R_B i_B - V_{BE} + 100 \cdot i_E = 0 \rightarrow$$

$$R_B = \frac{-V_{BE} - 100\, i_E + 5}{i_B} \Rightarrow$$

$$R_B = \frac{-0,7 - 100 \cdot (i_b + i_c) + 5}{1 \cdot 10^{-4}} \Rightarrow$$

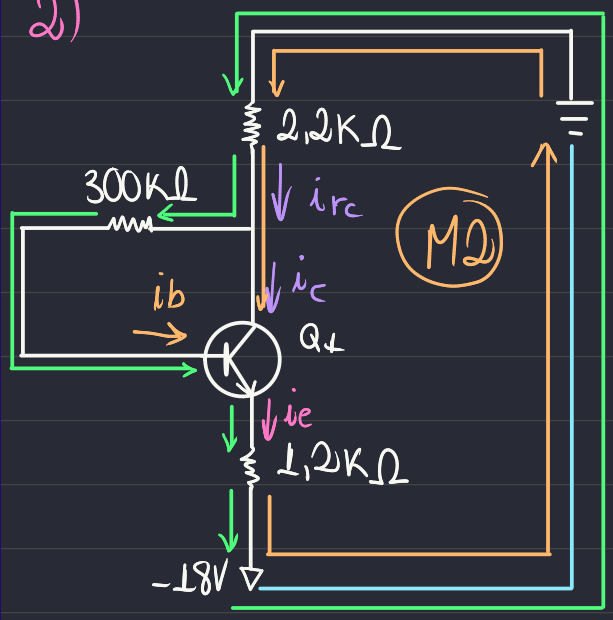
$$R_B = \frac{-0,7 - 1,01 + 5}{1 \cdot 10^{-4}} = 32,9\,k\Omega$$

- Malha ②

$$-10 + R_C \cdot i_c + V_{CE} + 100(i_c + i_b) = 0 \Rightarrow$$

$$R_C = \frac{5 - 10m - 1}{10 \cdot 10^{-3}} = \frac{3,99}{10 \cdot 10^{-3}} = 399\,\Omega$$

2)



$V_{BE} = 0,7V$

$\beta = 100$

Como ib é considerado como 0: $i_c = ie$

Considerando: $i_c >> ib$, $i_{rc} \cong i_c$

$i_c = \beta \cdot ic$

- Malha ①

$2,2K\,i_c + 300K\,ib + 0,7 + 1,2K\,ie - 18 = 0 \rightarrow$

$2,2K\,ic + 300K \cdot 100 \cdot ic + 1,2K\,ie - 17,3 = 0 \rightarrow$

$5,2K\,ic + 1,2K\,ie = 17,3 \rightarrow$

$6,4\,ie = 17,3 \rightarrow$ $ie = 2,703\,mA$

$\therefore i_B = \frac{i_c}{\beta} = 27,03\,mA$

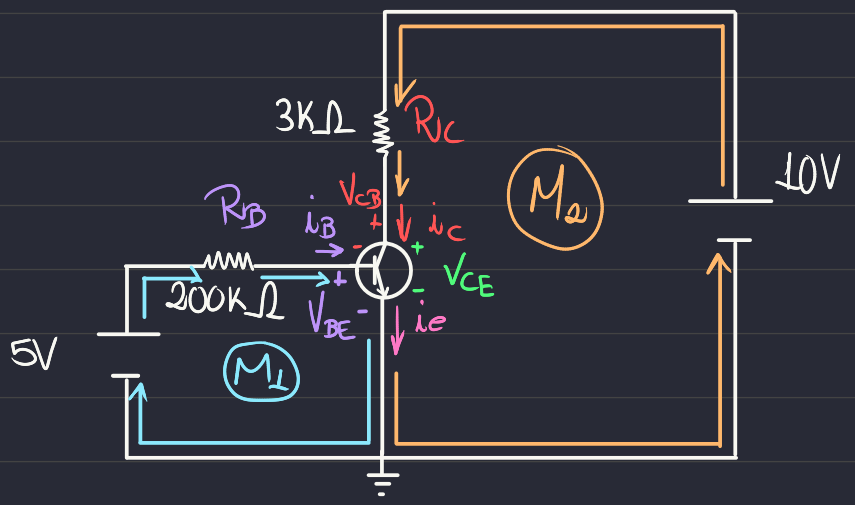
- Malha ②

$2,2K\,ic + V_{CE} + 1,2K\,ic - 18 = 0 \rightarrow$

$V_{CE} = 18 - 3,4K\,ic = 8,81V$

∴ Região de corte, V_{CE} existe e I_B é mínimo.

3)



$h_{FE} = 100$
$V_{CE} = 0,2V$
$V_{BE} = 0,8V$

- Malha (1):

$$-5 + 200k\, i_b + 0,8 = 0 \rightarrow$$

$$200k\, i_b = 4,2 \rightarrow i_b = 21\,\mu A$$

- Malha (2):

$$3k \cdot i_c + 0,2 - 10 = 0 \rightarrow$$

$$3k\, i_c = 9,8 \rightarrow i_c = 3,267mA$$

∴ Sabendo que $i_{B\,min} = \frac{i_c}{\beta}$ e $h_{FE} = \beta = 100$,

$$i_{B\,min} = \frac{3,267 \cdot 10^{-3}}{100} \Rightarrow i_{B\,min} = 32,67\,\mu A$$

Como o $i_{B\,min}$ $(32,67\,\mu A) > i_B\,(21\,\mu A)$, então está no modo ativo.