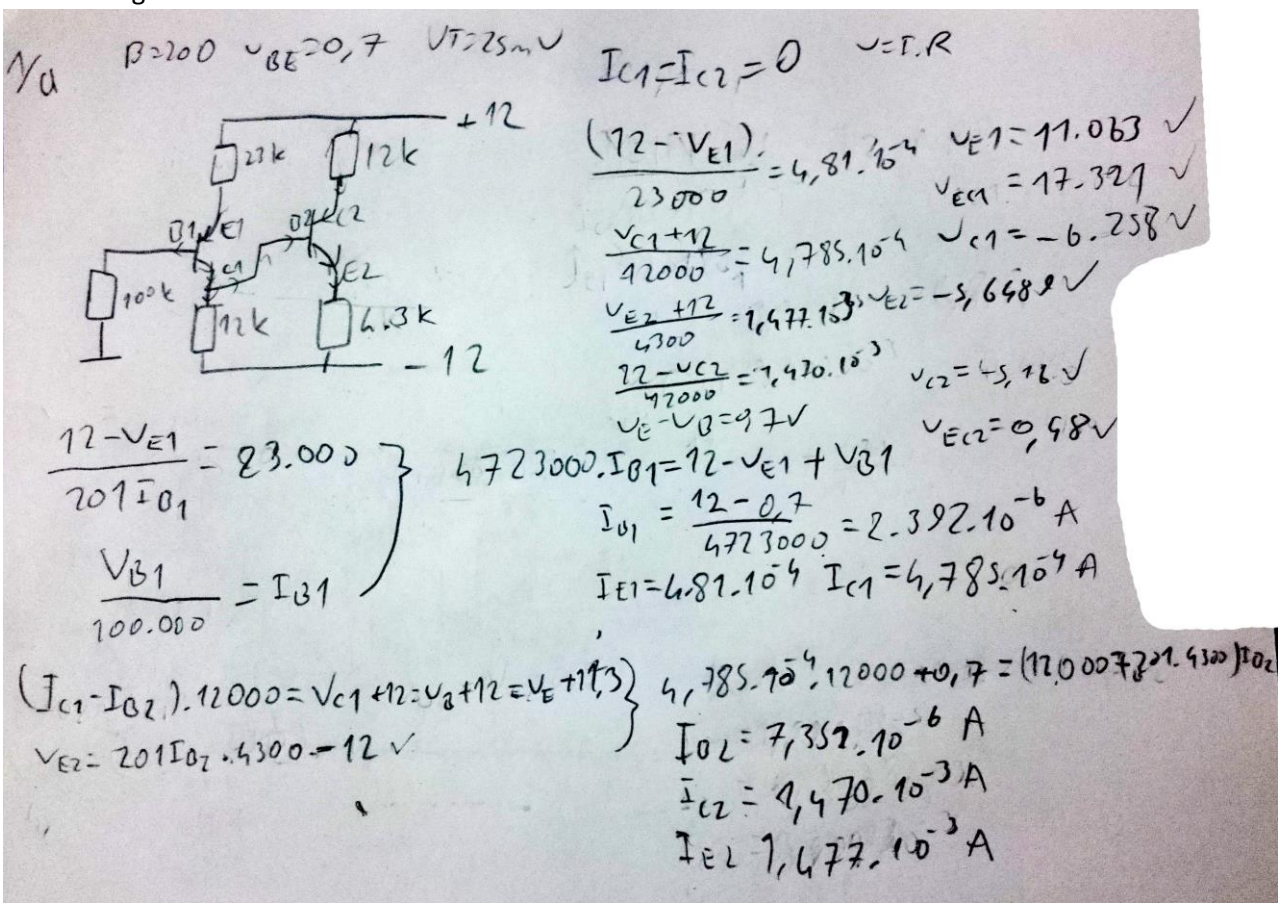
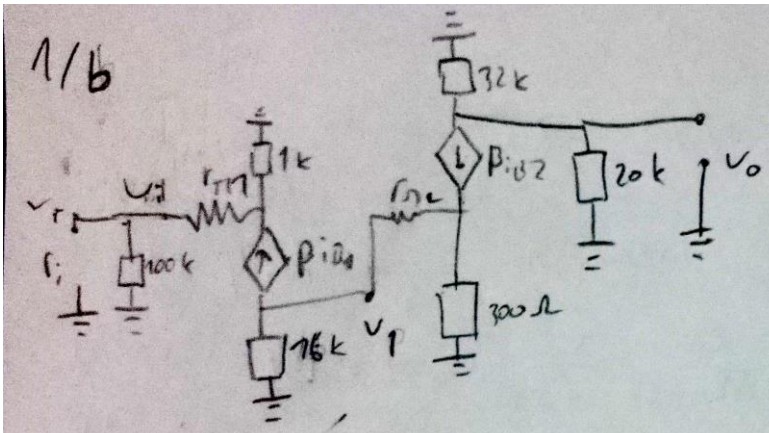
EHB222E-Introductions to Electornics-CRN:10821-Homework

Yunus Güngör No:150150701



1/b



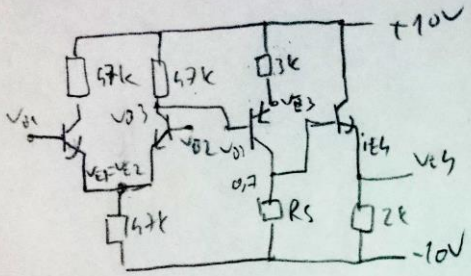
$$\frac{v_1}{v_i} = -\frac{R_c \beta}{r_{\pi 1}} = -\frac{16.000 \cdot 200}{27 \cdot 10^{-3} / 2,392 \cdot 10^{-2}} = -\frac{16.000 \cdot 200}{1,1287 \cdot 10^{-4}} = -283,512$$

r_i : 100k } $r_{\pi 1}$ $\quad r_1 \Rightarrow \frac{1}{100.000} + \frac{1}{1,1287 \cdot 10^{-4}} \cong 1,2287 \cdot 10^{-4}\ \Omega$

$$\frac{v_1}{v_0} = -\frac{R_c \beta}{r_{\pi 1}} = \frac{32000 \cdot 200}{27 \cdot 10^{-3} / 7,352 \cdot 10^{-6}} = -1742,696$$

$$\frac{v_0}{v_i} = \frac{v_1}{v_i} \cdot \frac{v_o}{v_1} = -283,512 \cdot -\frac{1}{1742,696} = 0,162$$

2)



$V_{E1}=V_{E2}=0,7\,V$

$i_{E1}=i_{E2}=\frac{10,7}{47000}\cdot\frac{1}{2}=7,138.10^{-4}$

$i_{C2}=7,132.10^{-4}\,A$

$i_{B3}+\frac{10-V_{B1}}{4700}=i_{C2}$ $\qquad \frac{10-V_{E3}}{3000}=i_{E3}=201i_{B_3}A$

$i_{E3}=\frac{10-V_{B3}+0,7}{3000}=201i_{B_3}=3,83.10^{-4}A$

$i_{E3}=3,8142.10^{-4}A$

$V_{E4}=0 \Rightarrow V_{B4}=V_{E3}=0,7\,V$

$R_s=9,3.3,8142.10^{-4}=3,5472.10^{3}\Omega$

$\frac{10,7-V_{B3}}{3000}+\frac{10-V_{B3}}{4700}=1,132.10^{-4}$

$V_{B3}=9,55V$

$V_{CE4}=10V$

$V_{CE3}=8.151V$

$V_{CE2}=8.85V$

$V_{CE1}=4.6204\,V$