

$$R_G = 1M\Omega \quad R_C = 4,7k$$

$$R_D = 5,6k \quad R_E = 2,2k$$

$$R_S = 820\Omega \quad R_L = 10k$$

$$R_1 = 10k \quad Y_{21s} = 2,5 \mu A/V$$

$$R_2 = 3,3k \quad Y_{22s} = 20 \mu S$$

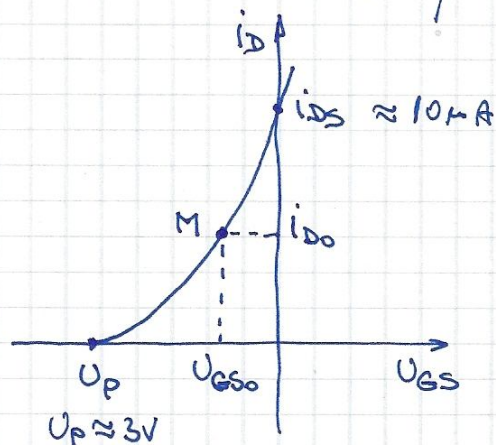
$$h_{11e} = 2k \quad h_{21e} = 80 \quad h_{22e} = 40 \mu S$$

$$a.) \begin{cases} U_{GS0} = U_p \left(1 - \sqrt{\frac{i_{D0}}{i_{DS}}} \right) \\ U_T = U_{DS0} + i_{D0} (R_D + R_S) \\ U_{GS0} = R_S \cdot i_{D0} \end{cases}$$

$$U_{GS0} = f_1(U_T, U_p, i_{DS}, R_S, R_D)$$

$$U_{DS0} = f_2(\quad)$$

$$i_{D0} = f_3(\quad)$$



$$\frac{U_T}{R_1 + R_2} \cdot R_2 \approx U_{BE0} + i_D \cdot R_E \Rightarrow i_D = \frac{U_T}{R_1 + R_2} \cdot \frac{R_2}{R_E} - \frac{0,6V}{R_E} \Rightarrow$$

$$i_D = U_T \cdot \frac{0,11}{10^3} - \frac{0,27}{10^3} \quad [A]$$

$$U_{CE} = U_T - i_D (R_C + R_E)$$

$$U_{CE} = U_T - i_D \cdot 6,9k = U_T - 0,78 U_T + 1,86 = 0,24 U_T + 1,86 \quad [V]$$

$$b.) r_{be} = R_G = 1M\Omega$$

$$r_{ki} = r_{ki2} = \frac{1}{h_{22e}} \times R_C = \frac{1}{0,04 \mu S} \times 4,7k = 25k \times 4,7k \approx 3,9k\Omega$$

$$c.) A_u = A_{u1} \cdot A_{u2}$$

$$r_{be2} = R_1 \times R_2 \times h_{11e} = 10k \times 3,3k \times 2k \approx 1,1k\Omega$$

$$A_{u1} = -Y_{21s} \cdot \left(\frac{1}{Y_{22s}} \times R_D \times r_{be2} \right) \stackrel{\downarrow}{=} -2,5 \frac{\mu A}{V} \left(50k \times 5,6k \times 1,1k \right) \approx$$

$$\approx -2,5 \frac{\mu A}{V} \cdot 0,92k \approx \underline{\underline{-2,3}}$$

$$A_{u2} = -\frac{h_{21e}}{h_{11e}} \cdot \left(\frac{1}{h_{22e}} \times R_C \times R_L \right) = -\frac{80}{2k} \left(25k \times 4,7k \times 10k \right) \approx$$

$$\approx -40 \frac{\mu A}{V} \cdot 2,8k = \underline{\underline{-112}}$$

$$A_u = -2,3 \cdot (-112) = \underline{\underline{258}}$$

$$f_c = 20 \text{ Hz}$$

d.)

$$C_1 = \frac{1}{2\pi \cdot f_c \cdot R_{be1}} = \frac{1}{2\pi \cdot 20 \text{ Hz} \cdot 1 \text{ M}} \approx 7,96 \cdot 10^{-9} \approx \underline{\underline{8 \mu\text{F}}}$$

$$C_2 = \frac{1}{2\pi \cdot f_c \cdot (R_{ei} + R_{be2})} = \frac{1}{2\pi \cdot 20 \text{ Hz} \cdot (6,1 \text{ k})} \approx 1,3 \cdot 10^{-6} = \underline{\underline{1,3 \mu\text{F}}}$$

$$\text{we: } R_{ei} = \frac{1}{Y_{us}} \times R_D = 50 \text{ k} \times 5,6 \text{ k} \approx \underline{\underline{5 \text{ k}\Omega}}$$

$$R_{be2} = R_1 \times R_2 \times h_{ie} = 10 \text{ k} \times 3,3 \text{ k} \times 22 \approx \underline{\underline{1,1 \text{ k}\Omega}}$$

$$C_3 = \frac{1}{2\pi \cdot f_c \cdot (R_{ei2} + R_t)} = \frac{1}{2\pi \cdot 20 \text{ Hz} \cdot (3,9 \text{ k} + 10 \text{ k})} \approx 5,7 \cdot 10^{-7} = \underline{\underline{570 \text{ nF}}}$$

$$C_E = \frac{10}{2\pi \cdot f_c \cdot R_E} = \frac{10}{2\pi \cdot 20 \text{ Hz} \cdot 22 \text{ k}} \approx 3,6 \cdot 10^{-5} = \underline{\underline{36 \mu\text{F}}}$$