5.14.

解：先求两级放大电路的静态工作点

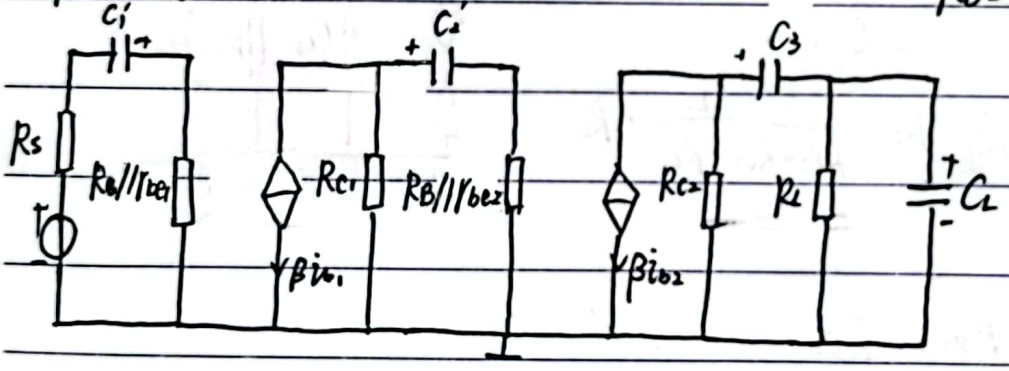
$$U_{BQ1}=U_{BQ2}=\frac{R_{B12}}{R_{B11}+R_{B12}}\cdot V_{CC}=4.06V \qquad U_{BQ2}=4.06V$$

$$I_{EQ1}=\frac{U_{BQ1}-U_{BEQ}}{R_{E1}}=1.87mA=I_{E2} \qquad I_{EQ2}=1.87mA$$

$$r_{be1}=r_{bb'}+(1+\beta)\frac{U_T}{I_{EQ}}=1.7k\Omega \qquad r_{be2}=1.7k\Omega$$

作微变等效电路为

$$R_B=R_{B11}//R_{B21}=14.5k\Omega$$



低频特性：主要由旁路电容、耦合电容影响

$$C_1'=C_1//\frac{C_E}{1+\beta}=\frac{C_1\frac{C_{E1}}{1+\beta}}{C_1+\frac{C_{E1}}{1+\beta}}=0.9\mu F$$

$$C_2'=C_2//\frac{C_{E2}}{1+\beta}=\frac{C_2\cdot\frac{C_{E2}}{1+\beta}}{C_2+\frac{C_{E2}}{1+\beta}}=0.9\mu F$$

$$\tau_1=C_1'(R_S+R_B//r_{be1})\approx C_1'(R_S+r_{be1}) \qquad f_{L1}=\frac{1}{2\pi C_1'(R_S+r_{be1})}=98.29Hz$$

$$\tau_2=C_2'(R_{E1}+R_B//r_{be2})\approx C_2'(R_{c1}+r_{be2}) \qquad f_{L2}=\frac{1}{2\pi C_2'(R_{E1}+r_{be2})}=53.61Hz$$

$$\tau_3=C_3(R_{c2}+R_L) \Rightarrow \qquad f_{L3}=\frac{1}{2\pi C_3(R_L+R_{c2})}=0.23Hz$$

$\therefore f_L = 1.1\sqrt{f_{L1}^2 + f_{L2}^2 + f_{L3}^2} = 123.18Hz$

高频特性：忽略结电容主要由负载电容影响

$T_H = C_L \cdot (R_{C3} // R_L)$　　$f_H = \frac{1}{2\pi C_L (R_L // R_{L2})} \approx 191.94kHz$

6.5 (a)

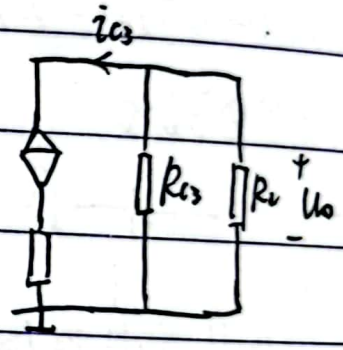
解：反馈网络为 R_{E1}、R_F、R_{E3}

反馈为电流、串联、负反馈

$$F = \frac{\dot{U}_f}{\dot{I}_{C3}} = \frac{\dot{I}_1 \cdot R_{E1}}{\dot{I}_{C3}} = \frac{\frac{R_{E3}}{R_{E1}+R_F+R_{E3}} \cdot \dot{I}_{C3} \cdot R_{E1}}{\dot{I}_{C3}} = \frac{R_{E3} \cdot R_{E1}}{R_{E1}+R_{E3}+R_F}$$

$AF \gg 1$ 对于深反馈下 $U_i \approx U_f$

$$A_f = \frac{1}{F} = \frac{R_{E1}+R_{E3}+R_F}{R_{E3} \cdot R_{E1}} = \frac{\dot{I}_{C3}}{\dot{U}_f}$$



$$A_{uf} = \frac{\dot{U}_o}{\dot{U}_i} = \frac{\dot{I}_{C3} \cdot R_L'}{\dot{U}_i} = A_f \cdot R_L' = \frac{R_{E3} \cdot R_{E1}}{R_{E3}+R_{E1}+R_F} \cdot R_L'$$

其中 $R_L' = R_{C3} // R_L$

$R_{if} = \infty$　　$R_{if}' = R_{if} // R_{B1} = R_{B1}$

$R_{of} = \infty$　　$R_{of}' = R_{of} // R_{C3} = R_{C3}$

6.9

解：反馈网络为 400kΩ 电阻

反馈类型为电压、并联、负反馈

$$F = \frac{\dot{I}_f}{\dot{U}_o} = \frac{-\frac{\dot{U}_o}{400k}}{\dot{U}_o} = -\frac{1}{400k}$$

深反馈下 $\dot{I}_i = \dot{I}_f$

$$A_f = \frac{1}{F} = -400k$$

$$\dot{A}_{uf} = \frac{\dot{U}_o}{\dot{U}_i} = \frac{\dot{U}_o}{\dot{I}_2 \cdot 10k\Omega} = \frac{\dot{A}_f}{10k} = -40$$

$$R_{if} = 0 \qquad R'_{if} = R_{if} + 10k\Omega = 10k\Omega$$

$$R_{of} = 0 \qquad R'_{of} = R_{of}$$