(3) $r_i = R_E // \frac{r_{be}}{1+\beta} = 2.9k\Omega // \frac{1.4k\Omega}{101} = 14\Omega$

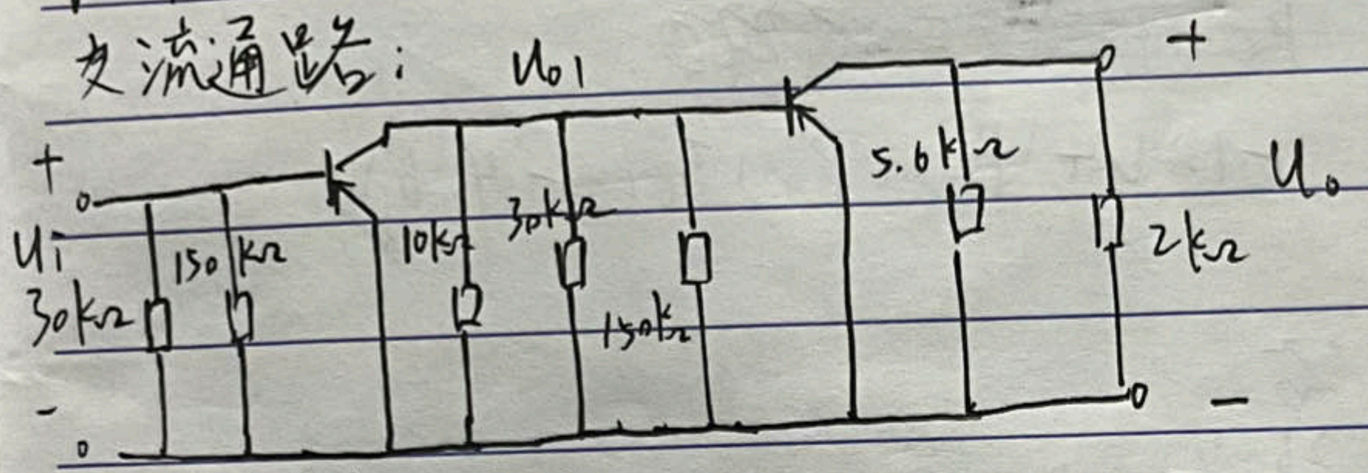
(4) $r_o = R_C = 2.1k\Omega$

(5) $R_S = 50\Omega$ 时

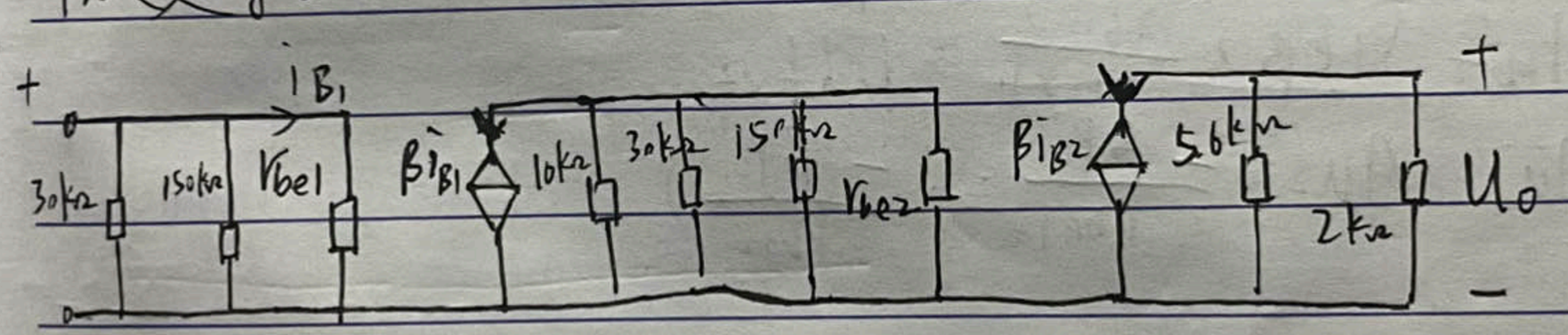
有 $A_{US} = A_U \frac{r_i}{r_i + R_S} = 10.6$

1.24

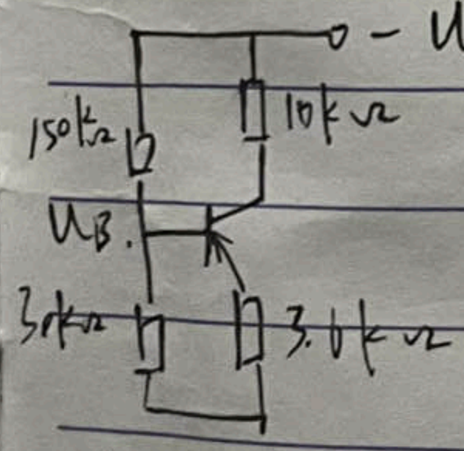
交流通路：



微变等效：



(1) 对第一级电路：



有 $U_{B1} = -U_{CC} \times \frac{30k\Omega}{30k\Omega + 150k\Omega} = -2V$

~~而 $U_{BE} = -0.7V \Rightarrow I_{E1} = \frac{2 - 0.7V}{R_E} = 0.5mA$~~

~~从而 $I_{B1} = \frac{I_E}{\beta+1} = 7.05\mu A$, $I_{C1} \approx I_E$, $U_{CE1} = -12V + I_C R_C + I_E R_E$~~

~~$= -7V$~~

又 $U_{BE}=-0.2V$

从而 $U_{E1}=U_{BE}-U_{B1}=1.8V$, $I_{E1}=\frac{U_{E1}}{R_E}=0.5mA$

$I_E\approx I_C$, $I_{B1}=\frac{I_E}{1+\beta}=9.8\mu A$, $U_{CE}=-12V+I_{E1}R_E+I_{C2}$

$=-5.2V$

同理有 $U_{B2}=-2V$, 而 $R_{E2}=1.8k\Omega$

则 $I_{E2}=1mA\approx I_C$, $I_{B2}=19.6\mu A$,

~~$U_{CE2}=-12+I_C(R_C+R_E)$~~,

~~I_C~~ $U_{CE2}=-12V+(R_{E2}+R_{C2})I_{E2}=-4.6V$

(2) 由微变等效电路,

$r_{be1}=r_{bb'}+(1+\beta)\frac{26mV}{|I_{E1}|}\approx 3k\Omega$

$r_{be2}=r_{bb'}+(1+\beta)\frac{26mV}{|I_{E2}|}\approx 1.6k\Omega$

$A_u=A_{u1}\cdot A_{u2}=\frac{-\beta R_{L1}'}{r_{be1}}\cdot\left(-\frac{\beta R_{L2}'}{r_{be2}}\right)$

其中 $R_{L1}'=R_{C1}//150k\Omega//30k\Omega//1.6k\Omega=1.3k\Omega$

$R_{L2}'=5.6k\Omega//2k\Omega=1.5k\Omega$

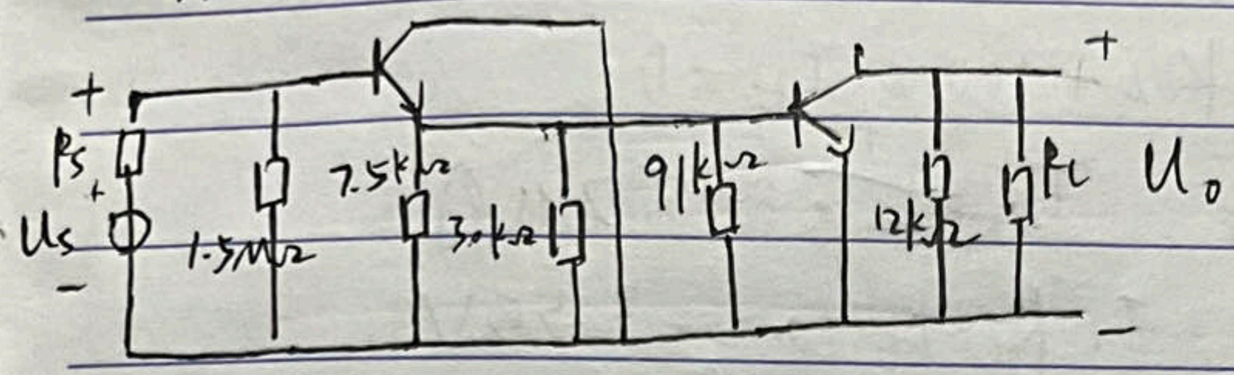
则 $A_u=1016$

(3) $r_i=150k\Omega//30k\Omega//r_{be1}=2.68k\Omega$

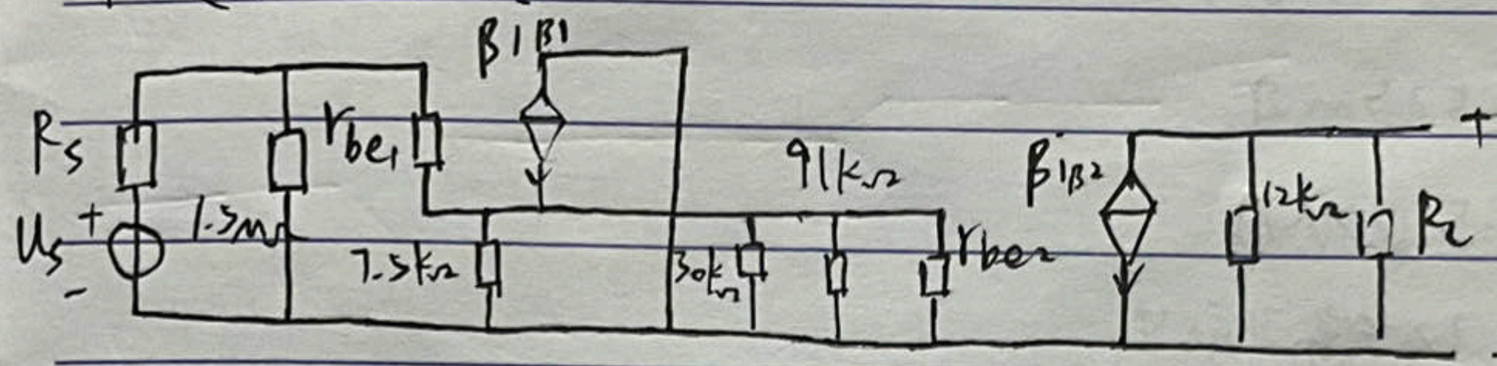
(4) $r_o=5.6k\Omega$

6.25

交流通路：



微变等效：



(1) $r_i = 1.5M\Omega // r_{be1} + (1+\beta)(7.5k\Omega // 30k\Omega // 91k\Omega // r_{be2})$

$= 1.5M\Omega // 298.63k\Omega \approx 249k\Omega$

(2) $r_o = 12k\Omega$

(3) $A_u = A_{u1} \cdot A_{u2}$, $A_{u1} \approx 1$. $A_u \approx A_{u2} = -\frac{\beta R_{L2}'}{r_{be2}}$

$R_L = \infty$ 时，$R_{L2}' = 12k\Omega$,

$A_{u2} = -200$.

$R_L = 3.6k\Omega$ 时，$R_{L2}' = 2.8k\Omega$

$A_{u2} = -46.7$

1.28

(1) $A_u = 100 \Rightarrow$ 电压增益为 $20\lg|A_u| = 40\,dB$

(2) $20\lg|A_u| = 80\,dB \Rightarrow A_u = 10^4$

6.37

(1) 直流通路：

有 $-6V + U_{BE} + 2I_E \cdot 5k\Omega + 100\Omega \cdot I_E = 0$

得 $I_E = 0.525mA \approx I_C$，$I_B = \frac{I_E}{1+\beta} \approx 5.2\mu A$

此时有 $U_{CE} = 12V - 2I_E R_E - I_C R_C = I_E \cdot 100\Omega = 3.55V$

从而 $U_{CE1} = U_{CE2} = 3.55V$

$I_{E1} = I_{E2} = 0.525mA$

$I_{B1} = I_{B2} = 5.2\mu A$

(2) 双端输入，双端输出

$A_{ud} = -\frac{\beta(R_C // \infty)}{0 + r_{be}} = -38.8$

$r_{id} = 2r_{be} + (1+\beta) \cdot 200\Omega = 2r_{be} + (1+\beta) \cdot 200\Omega = 5|.12k\Omega$

(3) $A_{uc} = \frac{-\beta R_C}{r_{be} + (1+\beta)(2R_E // 100\Omega)} = -0.58$

$r_{ic} = \frac{1}{2}[r_{be} + (1+\beta) \cdot 2r_E] // // // // // // // // \Rightarrow r_{ic} = 517.78k\Omega$

(4) $K_{CMR} = \left|\frac{A_{ud}}{A_{uc}}\right| = 37.9$