0601190 张雨航

2-1. 1. a, b, a, a

2. b. 3. a. b

4. a, a. b

5. B

2-4 A: x-e, y-b, z-c, PNP型

B: x-b, y-c, z-e, NPN型

2-7 a) 不能, 将三极管改为PNP型

b) 不能, 将R_B为接到b与V_{CC}之间

c) 不能, 在b与V_{cc}间加上R_B

d) 不能, 将R_B接到b与V_C之间

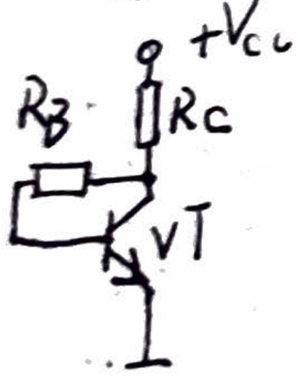
e) 能

f) 能

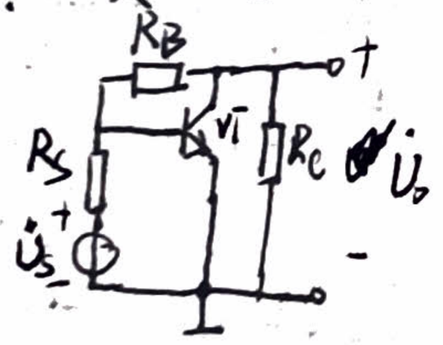
g) 不能, 在V_{CC}与C之间加R_C

h) 不能, 去除C_B

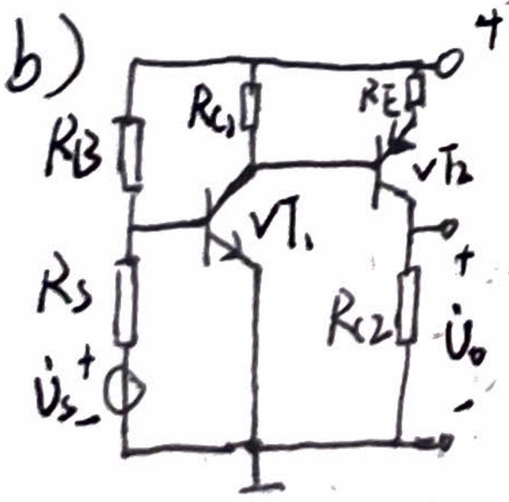
2-8 a) 直流通路:

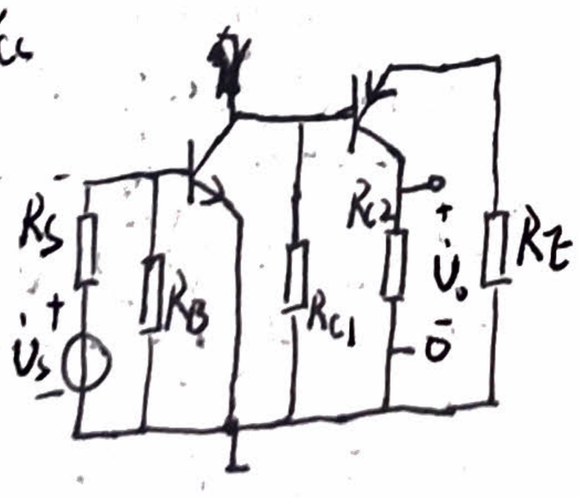


交流通路



b)





2-14. 1、$I_{BQ} \approx \frac{V_{CC}-U_{on}}{R_B} \quad I_{CQ} \approx \beta I_{BQ} = 0.5mA$

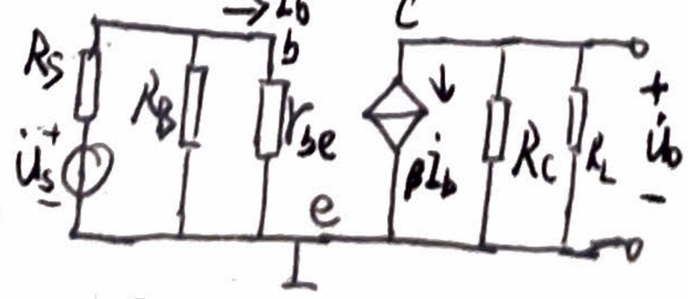
$\Rightarrow R_B = 1.13M\Omega$

2、$A_u = -\frac{\beta R_L'}{r_{be}} = -112$

$A_{us} = \frac{R_B // r_{be}}{R_B // r_{be} + R_S} \cdot A_u = -82$

其中, $r_{be} = r_{bb'} + (1+\beta)\frac{26mV}{I_{EQ}} = 2752\Omega$

$R_L' = R_C // R_L$

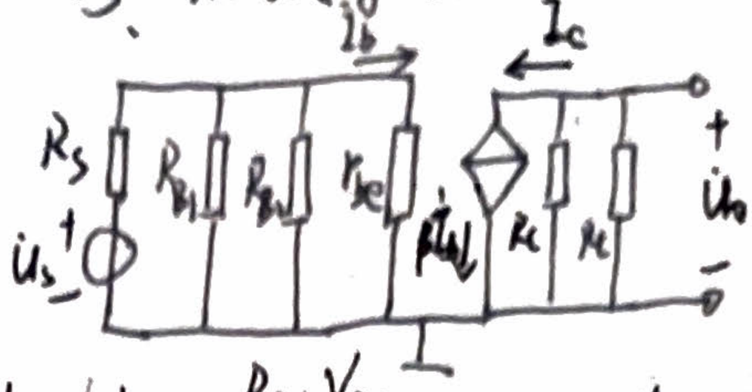


1120193148 模电 第2章

3. $R_i = R_{B3} // r_{be} = 2.7k\Omega$

$R_o = R_C = 16k\Omega$

2-15. 微变等效电路图



1、$U_B \approx \frac{R_{B2}V_{CC}}{R_{B1}+R_{B2}} = -4V$

$I_{CQ} \approx I_{EQ} = \frac{U_B}{R_E} = 2mA$

$I_{BQ} = \frac{I_{CQ}}{\beta} = 33\mu A$

$U_{CEQ} = V_{CC} - I_{CQ}(R_C+R_E) = -6V$

2、$I_{CQ} = -2.4mA$

$I_{BQ} = \frac{1}{\beta} I_{CQ} = -40\mu A$

$U_B = R_E(1+\beta) \cdot I_{BQ} = -4.8V$

$R_{B1} = 47k\Omega$

3、$r_{be} = (1+\beta)\frac{26mV}{I_{EQ}} = 0.8k\Omega$

$R_i = R_{B1} // R_{B2} // r_{be} = 0.75k\Omega$

$A_{us} = \frac{R_i}{R_i+R_S} \cdot A_u = \frac{R_i}{R_i+R_S} \cdot \frac{\beta R_L'}{r_{be}} = -64$

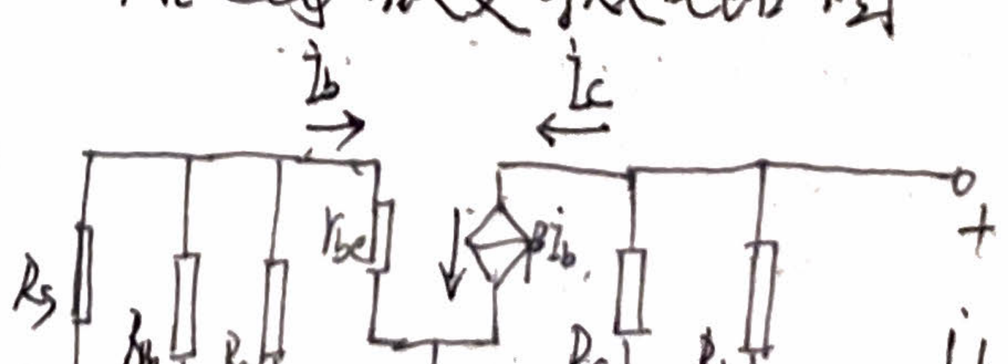
$R_o = R_C = 3k\Omega$

2-16. 1、电压放大倍数基本不变, 输入电阻增大

2、电压放大倍数减小, 输入电阻增大

2-17.

R_L微变等效电路图



06.11张雨航

$R_E=0$ 时 $U_B=\frac{R_{B2}V_{CC}}{R_{B1}+R_{B2}}=2.1V$

$I_{EQ}=\frac{U_B-U_{BE}}{r_{bb'}+R_E+R_{E1}}=1.27mA$

$r_{be}=1k\Omega+101\times\frac{26}{1.27}\Omega=2.17k\Omega$

$A_u=\frac{-\beta R_L'}{r_{be}}=-162.9$

$R_i=R_{B1}//R_{B2}//r_{be}=1.74k\Omega$

$R_o=R_C=8.2k\Omega$

$R=200\Omega$. $I_{EQ}=\frac{U_B-U_{BE}}{r_{bb'}+R_E+R_{E1}}=1.08mA$

$r_{be}=100\Omega+101\times\frac{26}{1.08}\Omega=2.53k\Omega$

$A_u=\frac{-\beta R_L'}{r_{be}+(1+\beta)R_E}=-15.5$

$R_i=6.36k\Omega$

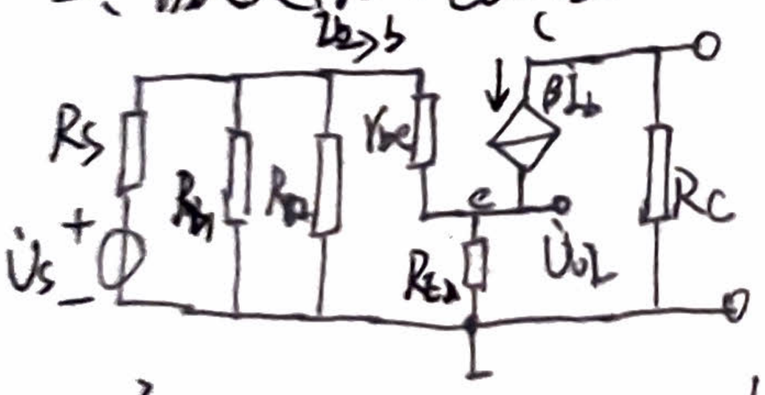
$R_o=R_C=8.2k\Omega$ ／ R_E变小时 A_u减小 R_i变小. R_o不变

2-18. 1、$U_B=\frac{R_{B2}V_{CC}}{R_{B1}+R_{B2}}=4.3V$

$I_{CQ}\approx I_{EQ}=\frac{U_B-U_{BE}}{R_E}=1.8mA$

$U_{CEQ}=V_{CC}-I_{CQ}(R_C+R_E)=2.8V$

2、微变等效电路图



123kΩ

$R_i'=r_{be}+(1+\beta)R_E=$

$R_i=R_{B1}//R_{B2}//R_i'=8k\Omega$

$A_{u1}=\frac{R_i}{R_i+R_S}\cdot\frac{-\beta\cdot R_C}{R_i'}=-0.78$

$A_{u2}=\frac{R_i}{R_i+R_S}\cdot\frac{(\beta+1)\cdot R_E}{R_i'}=0.79$

3、$R_{o1}=R_C=2k\Omega$

11.20 19:18 模电

若U_{o2}处加入电阻R_{o2}

则 $I_{o2}=\frac{(\beta+1)U_{o2}}{r_{be}+R_{B1}//R_{B2}//R_S}+\frac{U_{o2}}{R_E}$

$\therefore\frac{1}{R_{o2}}=\frac{\beta+1}{r_{be}+R_{B1}//R_{B2}//R_S}+\frac{1}{R_E}$

$R_{o2}=27\Omega$

2-19. 1、微变等效电路图

$U_B=\frac{R_{B2}V_{CC}}{R_{B1}+R_{B2}}=4.9V$

$I_{CQ}\approx I_{EQ}=\frac{U_B-U_{BE}}{R_E}=2.1mA$

$U_{EQ}=V_{CC}-I_{CQ}R_E\cdot I_{CQ}=7.8V$

2、$r_{be}=r_{bb'}+(1+\beta)\frac{26mV}{I_{CQ}}=1.35k\Omega$

$A_u=\frac{(1+\beta)R_L'}{r_{be}+(1+\beta)R_L'}=0.987$

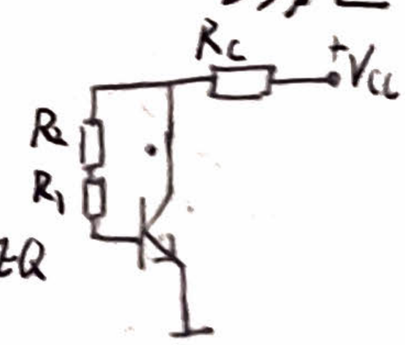
$R_i=R_{B1}//R_{B2}//(r_{be}+(1+\beta)R_L')=21.9k\Omega$

$R_o=R_E//\frac{r_{be}+R_{B1}//R_{B2}//R_S}{1+\beta}=23\Omega$

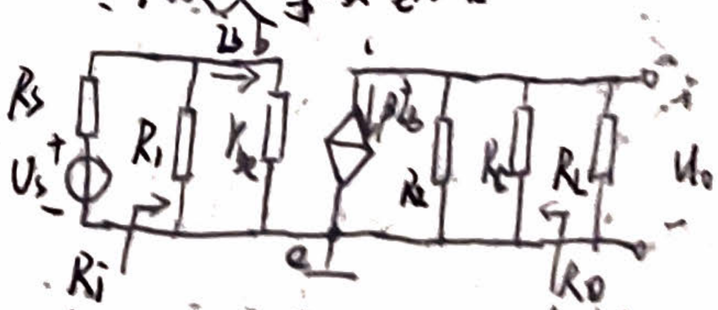
2-24. 1、$I_{CQ}=\frac{V_{CC}-U_{CEQ}}{R_C}=1.34mA$

$U_{CEQ}=(R_1+R_2)\cdot\frac{I_{CQ}}{\beta}+U_{BEQ}$

$\therefore R_1=R_2=61.6k\Omega$



2、微变等效电路



$r_{be}=r_{bb'}+(1+\beta)\frac{26mV}{I_{CQ}}=1.29k\Omega$

$A_u=\frac{-\beta(R_2//R_C//R_L)}{r_{be}}=-149$

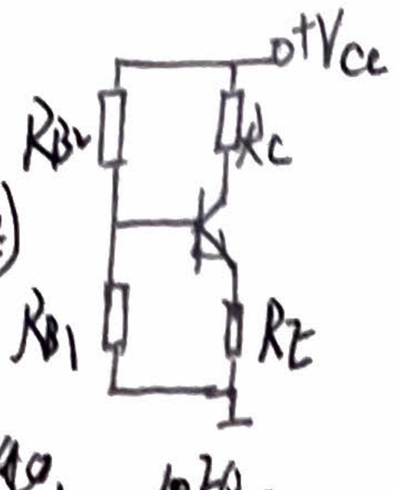
$A_{us}=\frac{R_i//r_{be}}{R_i//r_{be}+R_S}\cdot A_u=-83$

3、$R_i=R_1//r_{be}=1.26k\Omega$

$R_o=R_C//R_2=7.2k\Omega$

0601197 张雨舟 1120193148 换电

2-25 1、



$V_{CC} - V_{CEQ} = I_{CQ}(R_1+R_E)$

I_1

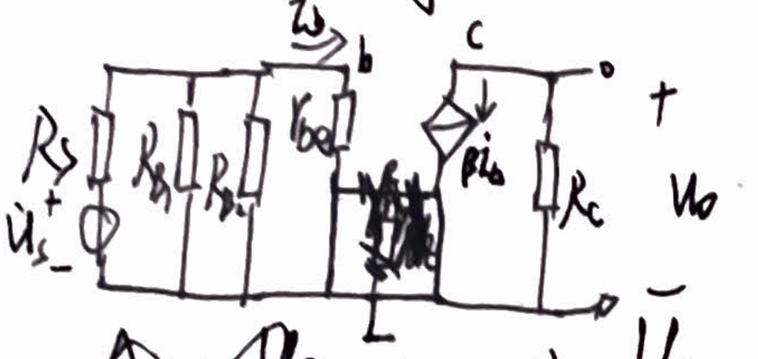
$V_{BQ} \approx V_{BEQ} = I_1 \cdot R_{B1} = \frac{V_{BQ}}{\beta} \cdot R_{B1}$

$I_{CQ} \approx I_{EQ} = \frac{V_{BQ}-V_{BEQ}}{R_E}$

$R_{B1} = \frac{V_{CC}-I_1 \cdot R_{B1}}{I_1 + I_{BQ}}$

$\therefore \begin{cases} R_{B1} = 35k\Omega \\ R_{B2} = 77k\Omega \\ R_E = 2.8k\Omega \\ R_C = 5.2k\Omega \end{cases}$

2、微变等效电路图



$A_u = \frac{U_o}{U_i} = \frac{-\beta R_C}{r_{be}} = -193$

$R_i = R_{B1} // R_{B2} // r_{be} = 2.4k\Omega$

$R_o = R_C = 5.2k\Omega$