作 业 纸

课程名称：_____

班级：　　教学班级：　　姓名：　　学号：　　第　　页

2-4

解：A：∵ $V_X > V_Y > V_Z$　$V_{YX} = -0.3V$

∴Y是b　X为e，Z是c　为PNP型

B：∵ $V_Y > V_Z > V_X$　$V_{XZ} = 0.3V$　∴X为b极 Z是e极 Y是C极

∴是NPN型

2-7

解：(a)不能放大

(b)不能放大。将 R_B 的 V_{CC} 对调连

(c)不能放大。在基极和 V_{CC} 中加电阻 R_B

(d)不能放大。

(e)可以放大

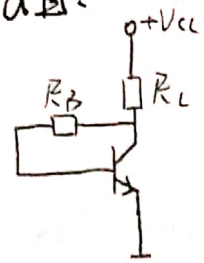
(f)可以放大

(g)~~不能放大~~不能放大。在集电极加电阻 R_C

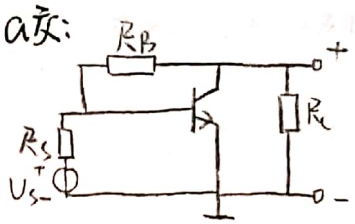
(h)不能放大。应去掉 C_B

2-8

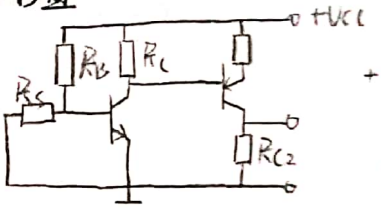
解：a直：



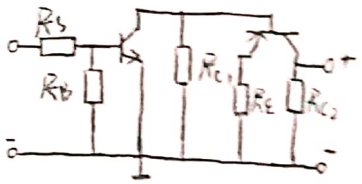
a交：



b直



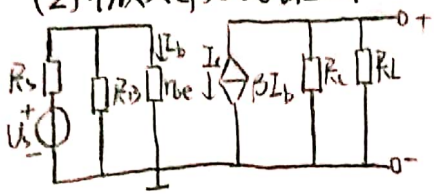
b交



2-14

解：(1) $I_{BQ} = \frac{I_{CQ}}{\beta} = 10\mu A$　$R_B = \frac{V_{CC} - V_{BEQ}}{I_{BQ}} = 1.13M\Omega$

(2)微变等效电路如下



$r_{be} = r_{bb'} + (1+\beta)\frac{26mV}{I_{EQ}} = 2700\Omega$

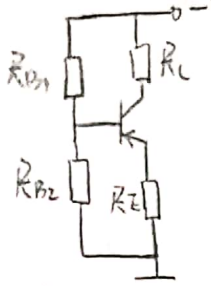
∴电压增益 $A_u = -112$

又 $R_i = \frac{V_i}{I_i} = 2.7K\Omega$　且 $R_e = R_C = 16K\Omega$

$A_{us} = \frac{R_i}{R_i + R_S} A_u = -83$　(3)由(2)得 $R_i = 2.7K\Omega$　$R_o = 16K\Omega$

联系方式：_____

解：直流电路 (1)



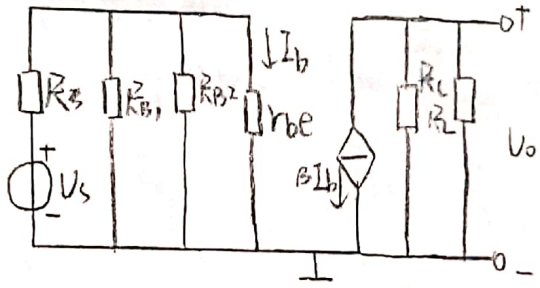
则 $V_B=\frac{R_{B2}}{R_{B1}+R_{B2}}(-V_{CC})=-4V$ $I_{CQ}=\frac{V_B+0.3}{R_E}=-1.85mA$

$V_{CEQ}=-V_{CC}+I_{CQ}(R_C+R_E)=-6.75V$

(2) 此时 $I_{CQ}=\frac{-V_{CC}-V_{CEQ}}{R_C+R_E}=-2.4mA$ $V_B=I_{CQ}R_E=-4.8V$

又 $\because V_B=\frac{R_{B2}}{R_{B1}+R_{B2}}(-V_{CC})$ $\therefore R_{B1}=47K\Omega$

(3) 微变等效电路如下



$r_{be}=r_{bb'}+(1+\beta)\frac{26mV}{I_{EQ}}=1.3K\Omega$

$R_i=R_{B1}//R_{B2}//r_{be}=1.2K\Omega$

$A_{us}=\frac{V_o}{V_s}=-\frac{R_i}{R_i+R_s}\frac{\beta(R_C//R_L)}{r_{be}}=-55$

$R_o=R_C=3K\Omega$

2-17

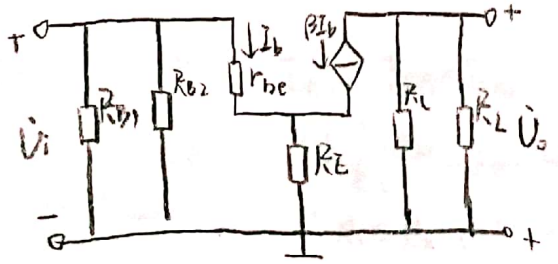
解：① $R_E=0$ 时

$I_E=\frac{V_B-0.7V}{R_B+R_{E1}}=1.42mA$ $r_{be}=r_{bb'}+(1+\beta)\frac{26mV}{I_E}=1.217K\Omega$

$R_i=\frac{\dot{V}_i}{\dot{I}_i}=R_{B1}//R_{B2}//[r_{be}+(1+\beta)R_E]=1.63K\Omega$

则 $A_u=\frac{\dot{V}_o}{\dot{V}_i}=-\frac{\beta(R_L//R_C)}{r_{be}+(1+\beta)R_E}=-174$ $\therefore R_o=R_C=8.2K\Omega$

② 微变等效电路 $R_E=200\Omega$ 时



此时 $I_E=\frac{V_B-0.7V}{R_B+R_{E1}}=1.18mA$

$r_{be}=r_{bb'}+(1+\beta)\frac{26mV}{I_E}=1.4K\Omega$

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

$R_i=\frac{\dot{V}_i}{\dot{I}_i}=R_{B1}//R_{B2}//[r_{be}+(1+\beta)R_E]=6.3K\Omega$

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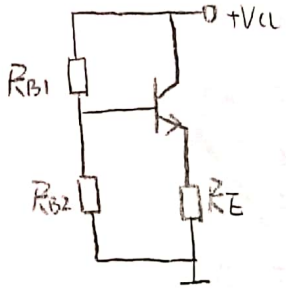
2-18

解：(1) $V_B=4.3V$　$I_{EQ}=\frac{V_B-0.7V}{R_E}=1.8mA$　$V_{CEQ}=V_{CC}-I_{CQ}(R_C+R_E)=2.8V$

(2)

2-19

解：(1) 直流通路如下

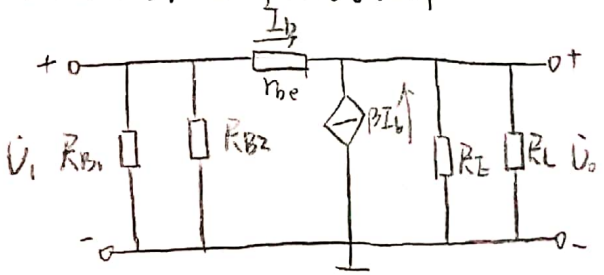


$V_{BQ}=\frac{R_{B2}V_{CC}}{R_{B1}+R_{B2}}=5V$

$I_{EQ}=\frac{V_{BQ}-0.7V}{R_E}=2.15mA$

$I_{CQ}=\frac{\beta}{1+\beta}I_{EQ}=2.1mA$　(取) $V_{CEQ}=V_{CC}-I_{EQ}R_E=7.7V$

(2) 此时微变等效电路如下



$r_{be}=r_{bb'}+(1+\beta)\frac{26mV}{I_{EQ}}=1.35K\Omega$

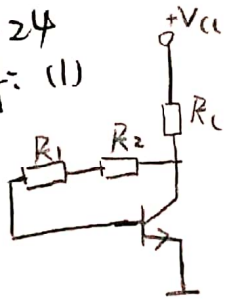
$A_V=\frac{\dot{V}_o}{\dot{V}_i}=\frac{(1+\beta)R_L'}{r_{be}+(1+\beta)R_L'}=0.987$

$R_i=R_{B1}//R_{B2}//[r_{be}+(1+\beta)R_L']=21.8K\Omega$

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

2-24

解：(1)



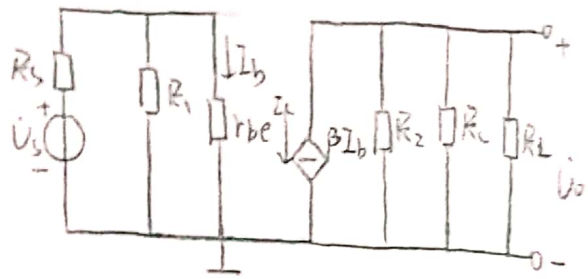
$I_{B1}=I_{BQ}+I_{CQ}$

$\frac{V_{CC}-V_{CEQ}}{R_C}=I_{BQ}+\beta I_{BQ}$

$\therefore R_1=R_2=62K\Omega$

联系方式：_____

(2) 微变等效电路



$r_{be}=r_{bb}+(1+\beta)\frac{26mV}{I_{CQ}}=1.3k\Omega$

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

(3) $R_i=r_{be}//R_1=1.3k\Omega$ $R_o=R_C//R_2=7.3k\Omega$

$\therefore A_{us}=\frac{R_i}{R_i+R_S}A_u=-83$

2-25

解：(1) $V_{BQ}=\frac{R_{B1}V_{CC}}{R_{B1}+R_{B2}}=3.5V=5\,V_{BEQ}$ $\therefore I_{EQ}=\frac{V_{BQ}-V_{BEQ}}{R_E}=1mA$

$\because R_E=2.8k\Omega$ $R_C=\frac{V_{CC}-(V_{BQ}-V_{BEQ})-V_{CEQ}}{I_{CQ}}=5.2k\Omega$ $\because I_1=0.1mA$, $I_{CQ}(\beta R_{B1}+R_{B2})=V_{CC}$

$I_1R_{B1}=V_{B1}$ $\therefore R_{B1}=35k\Omega$ $R_{B2}=85k\Omega$

(2)