期末复习测试题答案

一、

先看P108 公式（4-25） 和 图4-43，P156 图5-47

答案： （1） $0-(-V_{SS})=U_{GS}+2I_DR_{SS}$

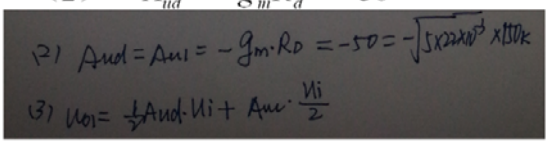
$I_D=5(U_{GS}-0.6)^2$

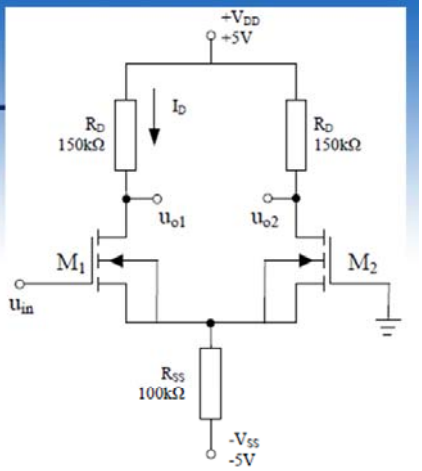
$U_{GS1}=0.602V, U_{GS2}=0.533V$

由于$U_T=0.6V$ 所以舍去$U_{GS2}=0.533V$

$I_D=5(U_{GS}-0.6)^2=20\mu A$

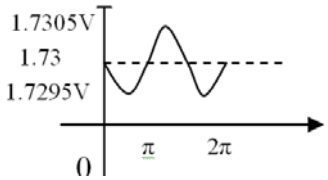
（2） $A_{ud}=-g_mR_d=-50$

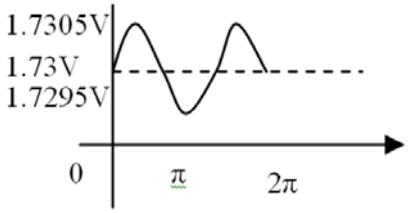




uo2

（3） uo1





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二、

答案：（1）A1（左一）：上+ 下— A2（右一）：上— 下+

A3（下方）：上+ 下—

(2) A1： $V_+=V_-=0.1V=V_I$

$$\frac{Vo1}{R2+R1}=V_-=V_I$$

所以， $$Vo1=\frac{V_I(R2+R1)}{R1}=(1+\frac{R2}{R1})V_I=(1+\frac{400}{20})\times 0.1=2.1(V)$$

所以， $Vo2=V_I=0.1(V)$

$$Vo=-(\frac{R5}{R3}Vo1+\frac{R5}{R4}Vo2)=-\frac{100}{50}\times 2.1-\frac{100}{10}\times 0.1$$

$$=-4.2-1=-5.2(V)$$

三、

(1) $I_{C3} \doteq \left[\frac{12-(-12)}{68+22} \times 22 - 0.7\right] / 5.1 = 1.01\ mA$

$I_{C1} = I_{C3}/2 = 0.5\ mA$

$U_{CE1} = 12 - 10 \times 0.5 - (-0.7) = 7.7V$

$U_{CE3} = -0.7 - 1 \times 5.1 - (-12) = 6.2V$

$r_{be1} = 300 + \frac{26}{0.5} \times 5k\Omega = 3k$

(2) $A_{ud} = -\frac{\beta R_{C1}}{R_{S1} + r_{be1}} = -\frac{50 \times 10}{2+3} = -100$

(3) $R_{id} = 2(R_{S1} + r_{be1}) = 10k$

$R_{od} = 2R_{C1} = 20k$

四、

(1) 电压串联负反馈

(2) $F = \frac{U_F}{U_O} = \frac{R_b I_F}{(R_f + R_b) I_F} = \frac{1}{21}$

$\dot{A}_{uf} = \frac{\dot{U}_o}{\dot{U}_i} \approx \frac{1}{F} = 21$

五、

$$\frac{U_{01}}{R_1}=-\frac{X_1}{1} \qquad U_{01}=-X_1R_1$$

$$\frac{U_{02}-X_2}{10}=\frac{X_2}{R_2} \qquad U_{02}=(1+\frac{10}{R_2})X_2$$

$$\frac{U_{01}}{10}+\frac{U_{02}}{10}+\frac{X_3}{R_3}=\frac{-Y}{10}$$

$$Y=-(U_{01}+U_{02}+\frac{10}{R_3}X_3)$$

$$=X_1R_1-(1+\frac{10}{R_2})X_2-\frac{10}{R_3}X_3$$

$R_1=3K$ $\qquad 1+\frac{10}{R_2}=2$ $\qquad R_2=10K$

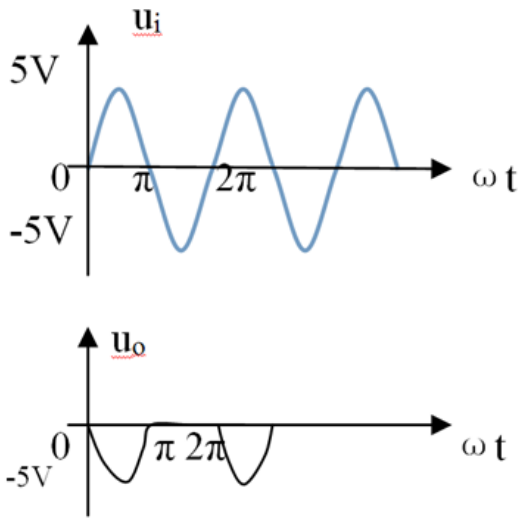
$\frac{10}{R_3}=1$ $\qquad R_3=10K$

$R_b=10K/\!/10K/\!/R_3/\!/10K=2.5K$

六、

（1）半波整流

（2）

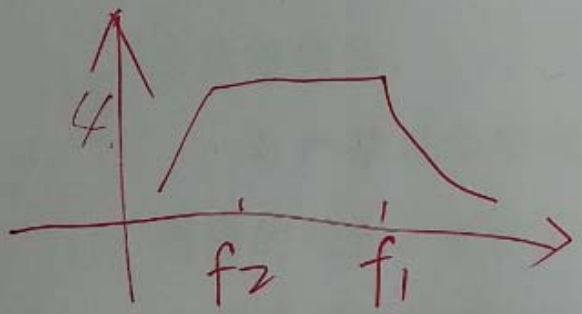


七、

$f_H = \frac{1}{2\pi R_{C_1}} = 2000$

$f_L = \frac{1}{2\pi R_{C_2}} = 200$.

$A_{um} = A_{u1} \cdot A_{u2} = (1 + \frac{R_2}{R_1})(1 + \frac{R_2}{R_1}) = 4$



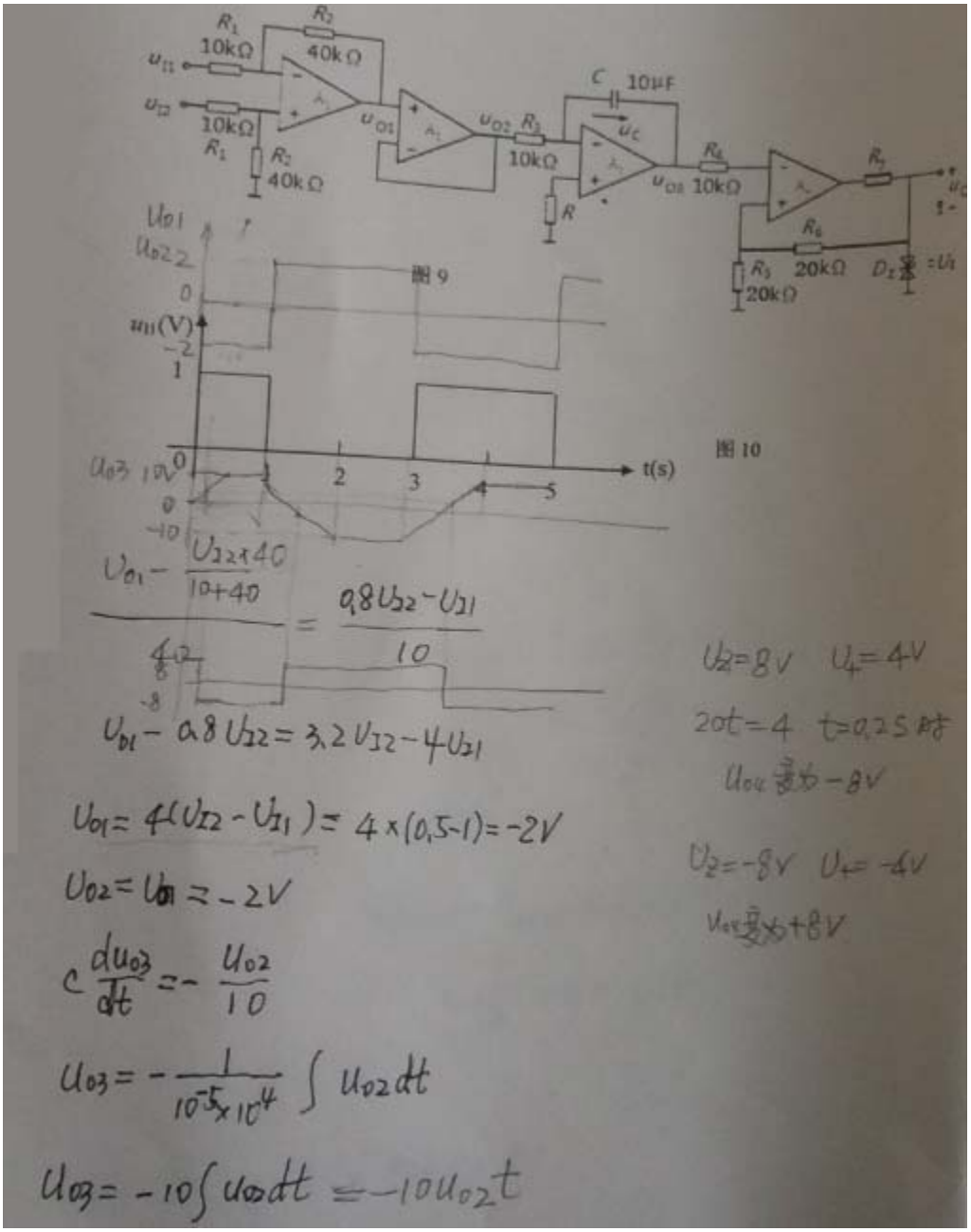
八、

图中为镜像电流源.

$V_{CC} + V_{be} = I_R \cdot R$, $I_R = 43mA$.

$I_o \approx I_R = 43mA$

九、



$$u_{O1}-\frac{u_{22}+40}{10+40}=\frac{0.8u_{22}-u_{21}}{10}$$

$$u_{O1}-0.8u_{22}=3.2u_{12}-4u_{21}$$

$$u_{O1}=4(u_{12}-u_{11})=4\times(0.5-1)=-2V$$

$$u_{O2}=u_{O1}=-2V$$

$$C\frac{du_{O3}}{dt}=-\frac{u_{O2}}{10}$$

$$u_{O3}=-\frac{1}{10^{-5}\times10^{4}}\int u_{O2}dt$$

$$u_{O3}=-10\int u_{O2}dt=-10u_{O2}t$$

$u_2=8V$ $u_+=4V$

$20t=4$ $t=0.25$ 时

u_{O2} 变为 $-8V$

$u_2=-8V$ $u_+=-4V$

u_{O2} 变为 $+8V$

十、

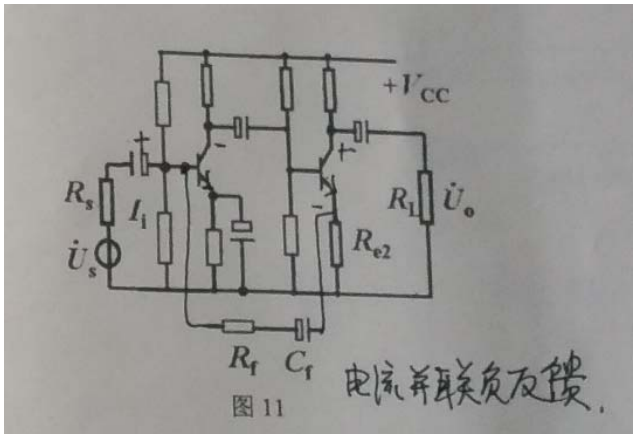


图 11