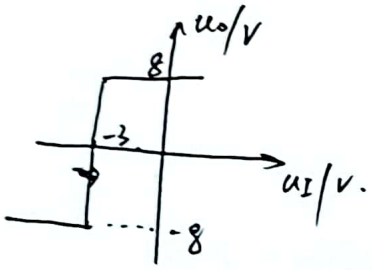
7.13.

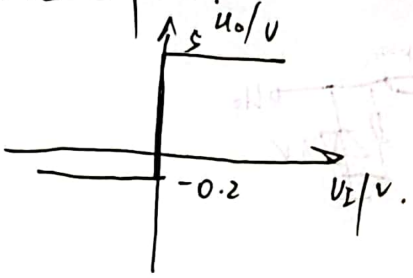
(a). $u_N = 0$

$\frac{u_I - u_P}{R_1} = \frac{3 + u_P}{R_1}$

$u_I = U_T = -3V$.



(b). $u_I = U_T = 0$.



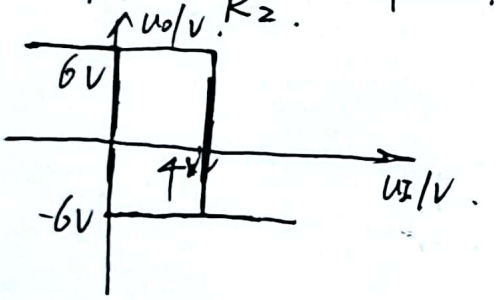
(c). $u_N = u_I$

1°. $u_I \geq 0$.

$\frac{3 - u_P}{R_1} = \frac{u_P + 6}{R_2} \rightarrow u_P = 0$.

2°. $u_I \leq 0$.

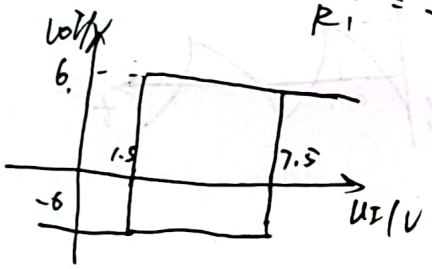
$\frac{u_P - 3}{R_1} = \frac{6 - u_P}{R_2} \rightarrow u_P = 4V$.



(d). $u_N = 3V$.

1°. $u_I < 0$. $\frac{u_I - u_P}{R_1} = \frac{u_P + 6}{R_2}$. $U_I = 7.5V$.

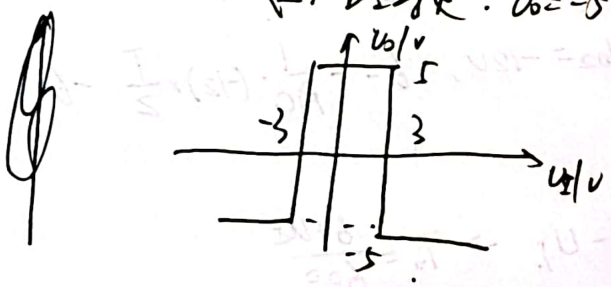
2°. $u_I > 0$. $\frac{u_I - u_P}{R_1} = \frac{u_P - 6}{R_2}$. $U_I = 1.5V$.



(e)1. $u_I > 3V$. D_2截止. D_1导通. $u_o = -5V$.

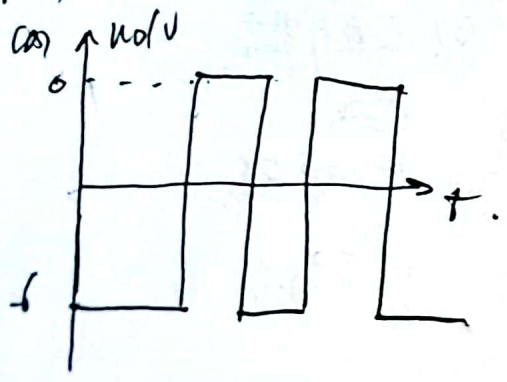
2°. $-3 < u_I < 3$. D_1, D_2截止. $u_o = 5V$.

3°. $u_I < -3$. D_1截止. D_2导通. $u_o = -5V$.

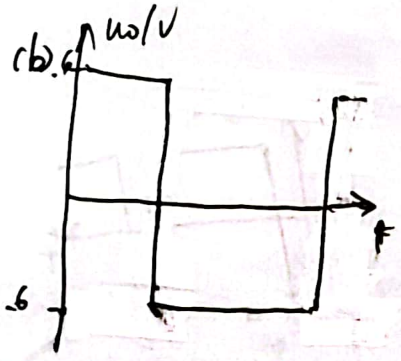


7.14.

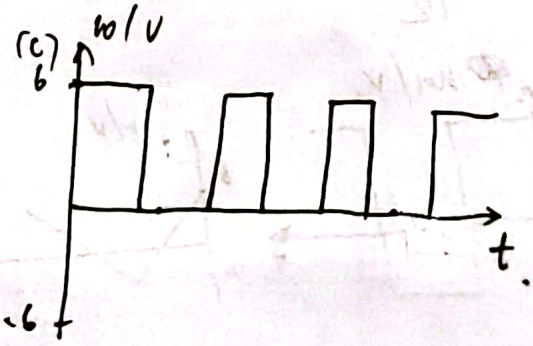
(a)



(b).



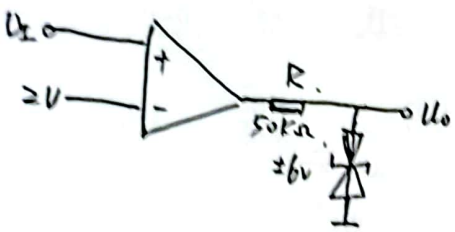
(c)



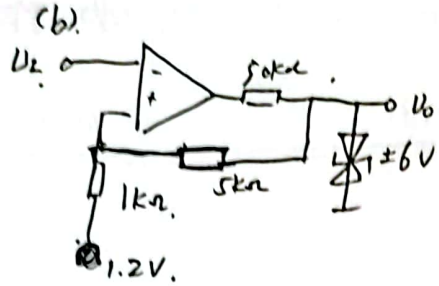
△

7.16

(a).



(b).



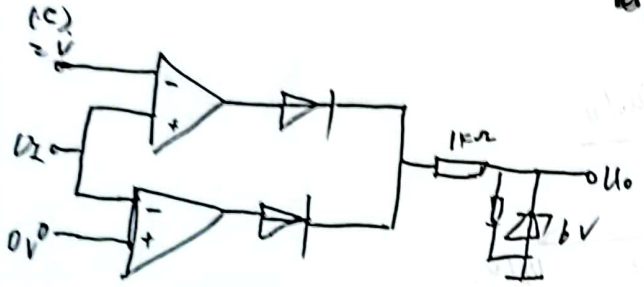
$\frac{U_{REF}-U_I}{R_1}=\frac{U_I-6}{R_2}$。

$U_I=2V$

$\frac{U_{REF}-U_I}{R_1}=\frac{U_I+6}{R_2}$

$U_I=0V$.

(c).

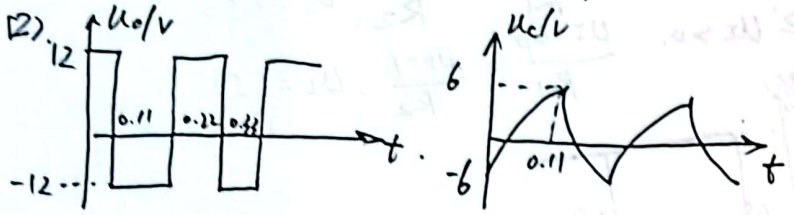


7.17 1)

$T_1=RC\ln 3$.

$T\approx(R_1+R_2)C\ln 3\approx 3.3ms$.

2).



7.20

1). $\frac{u_{o1}}{R_e}=\frac{-u_{o2}}{R_3}\rightarrow U_T=\pm\frac{R_2}{R_3}U_{OM}=\pm 6V$

$u_{o1}=\frac{-1}{R_1C}u_{o2}(t_2-t_1)+u_{o1}(t_1)$

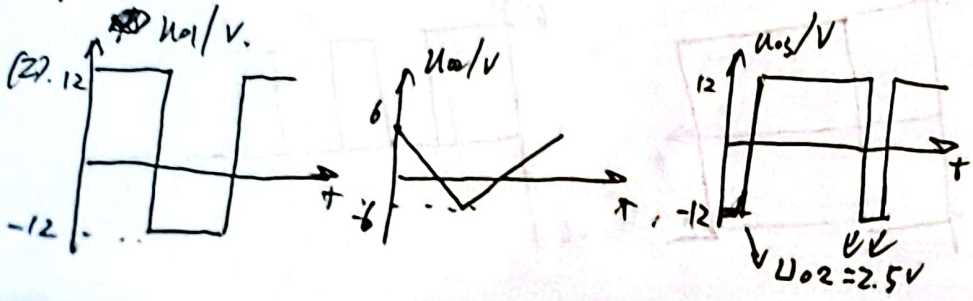
从 $-6V\rightarrow 6V$ 时，$u_{o2}=-12V$，$6=-\frac{1}{RC}\cdot(-12)\times\frac{T}{2}-6$.

$\rightarrow T=2\times10^{-2}s$.

$U_I=-\frac{1}{R_1C}\cdot(-12)\cdot\frac{T_0}{2}-U_T\rightarrow T_0=\frac{6+u_I}{600}$

$\frac{T_0}{T}=\frac{6+u_I}{12}$.

2).



3). C.断路.

R_1 短路.

C 短路.

7.22.

(a). $u_I>0$，D_1、D_4导通，D_2、D_3截止。$u_O=u_I$。

$u_I<0$，D_1、D_4截止，D_2、D_3导通。$u_O=-u_I$。

(b). $u_I>0$。D_1、D_4导通，D_2、D_3截止。$u_O=\frac{R_L}{R_1}u_I$。

$u_I<0$。D_1、D_4截止。D_2、D_3导通。$u_O=-\frac{R_L}{R_1}u_I$。