3.9. (1) 因为只接 R_L,

$V_{O(AV)} = 0.9 \times 20 = 18V$

(2) 只有C. $V_{O(AV)} = \sqrt{2} \times 20 = 28.28V$

(3) ~~只有半波~~ 只有C. 开路一个二极管. $V_{O(AV)} = \sqrt{2} \times 20 = 28.28V$

(4) $V_{O(AV)} = 1.2 \times 20 = 24V$

3.11 (1) $I_Z = \frac{20-8}{1} = 12mA$

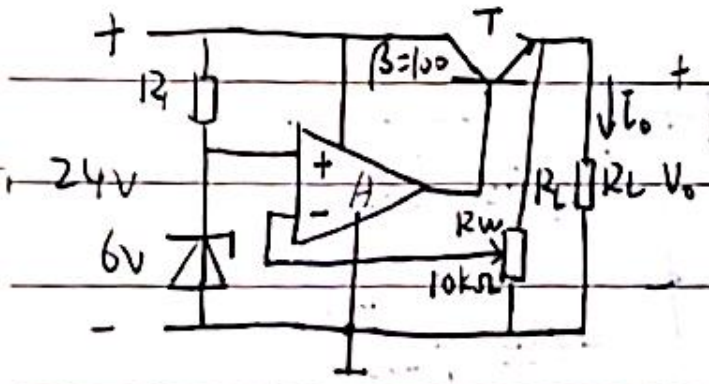
(2) $V_O = (1 + \frac{1}{1}) \times 8 = 16V$

(3) $V_{O\min} = (1 + \frac{0}{1}) \times 8 = 8V$

$V_{O\max} = (1 + \frac{3}{1}) \times 8 = 32V > 20V$ 超过范围

最大可处于输出电压 $V_{O\max} = V_I - V_{CES} \approx V_I = 20V$

3.12,



(2) 最大负载电流1mA

$i_{B大} = 1mA$ $i_{C大} = 100mA$

$i_{O\max} = i_{E大} \approx i_{C大} = 100mA$

$V_{O\max} = 20V - V_{BE} = 19.3V$

当 V_O 最小时, V_{CE} 达最大

此时 R_W 在最上端为

$V_O = 6 \times (1 + \frac{0}{10}) = 6V$ $V_{CE大} = 24 - 6 = 18V$

$P_{CM} = I_{C大} \cdot V_{CE大} = 1.8W$

3.13 (1) $V_{o大}=(6.3+0.7)\times(1+\frac{R_1+R_W}{R_2})=20$

$V_{o小}=(6.3+0.7)\times(1+\frac{R_1}{R_2+R_W})=10$

解出 $R_1=300\Omega$; $R_W=350\Omega$

(2) $V_{CE2}=V_I-V_o\geq 4V$

~~V_I~~ V_I取最小，V_o取最大

$V_I\geq 24V$

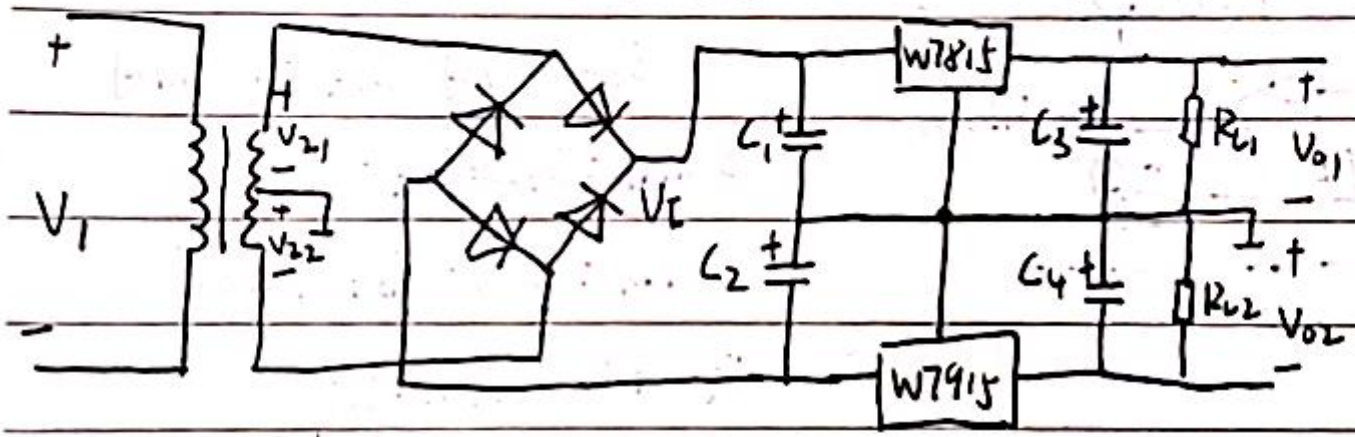
$V_I=1.2V_2$ $V_2\geq 20V$

3.14 ~~$V_o=\frac{R_{22}}{R_1+R_2}(1+\frac{R_3}{R_4})V_{o1}'$~~

$V_o=V_{o1}+V_o'$

$=V_o'+(\frac{R_2}{R_1+R_2})(1+\frac{R_3}{R_4})V_o$

3.15



(2) 由其型号名称知15V稳压，故 $V_{o1}=15V$ $V_{o2}=-15V$

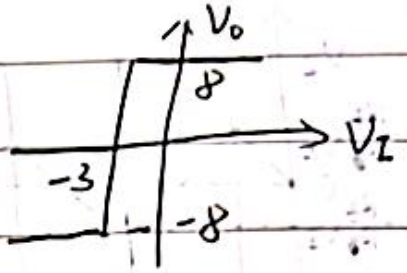
(3) $V_I=20\times1.2=24V$

$V_{CE}=V_I-V_{o1}=9V$

$P=V_{CE}\times I_{L1}=9W$

4.8.1 (a) $V_+ = V_I \times \frac{R_1}{2R_1} + 3 \times \frac{R_1}{2R_1}$

当 $V_+ = 0$ $V_I = -3$

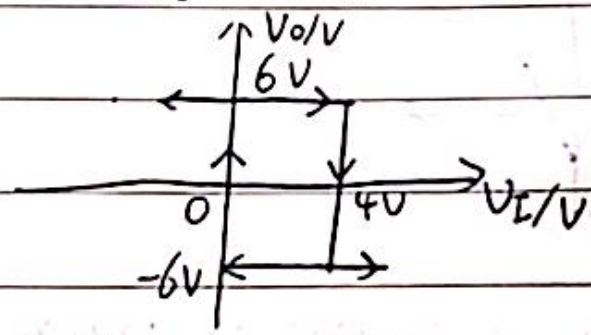


(c) ~~$V_+ = 3 \times \frac{20}{30} + V_o \times \frac{10}{30} = 2 + \frac{1}{3}V_o$~~

$V_+ = 3 \times \frac{20}{30} + V_o \times \frac{10}{30} = 2 + \frac{1}{3}V_o$

当 $V_o = 6V$ 时 $V_{TH} = 4V$

当 $V_o = -6V$ 时 $V_{TL} = 0V$

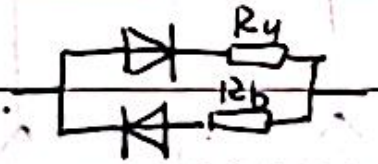


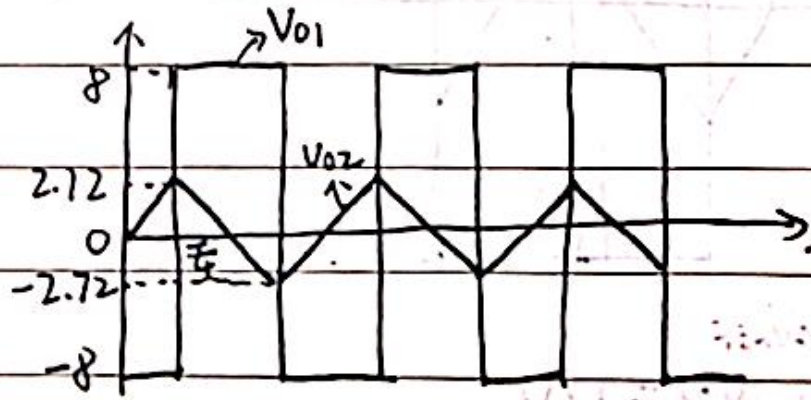
4.12 (1)

$T = 4RC \times \frac{R_1}{R_2} = 0.326 \times 10^{-3} s$

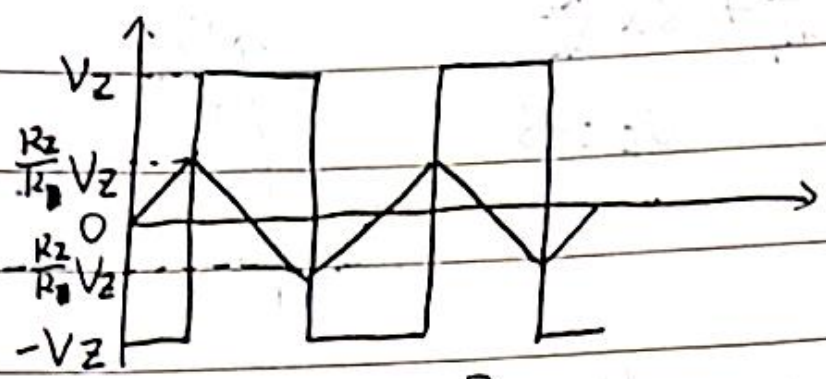
$f = \frac{1}{T} = 3067Hz$

(2) 把R替换为





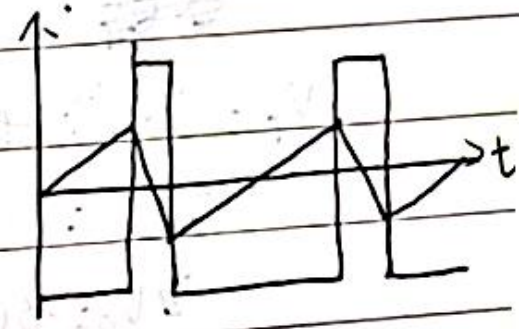
4.13.(1)



$$\frac{V_{01m}}{V_{02m}} = \frac{R_1}{R_2}$$

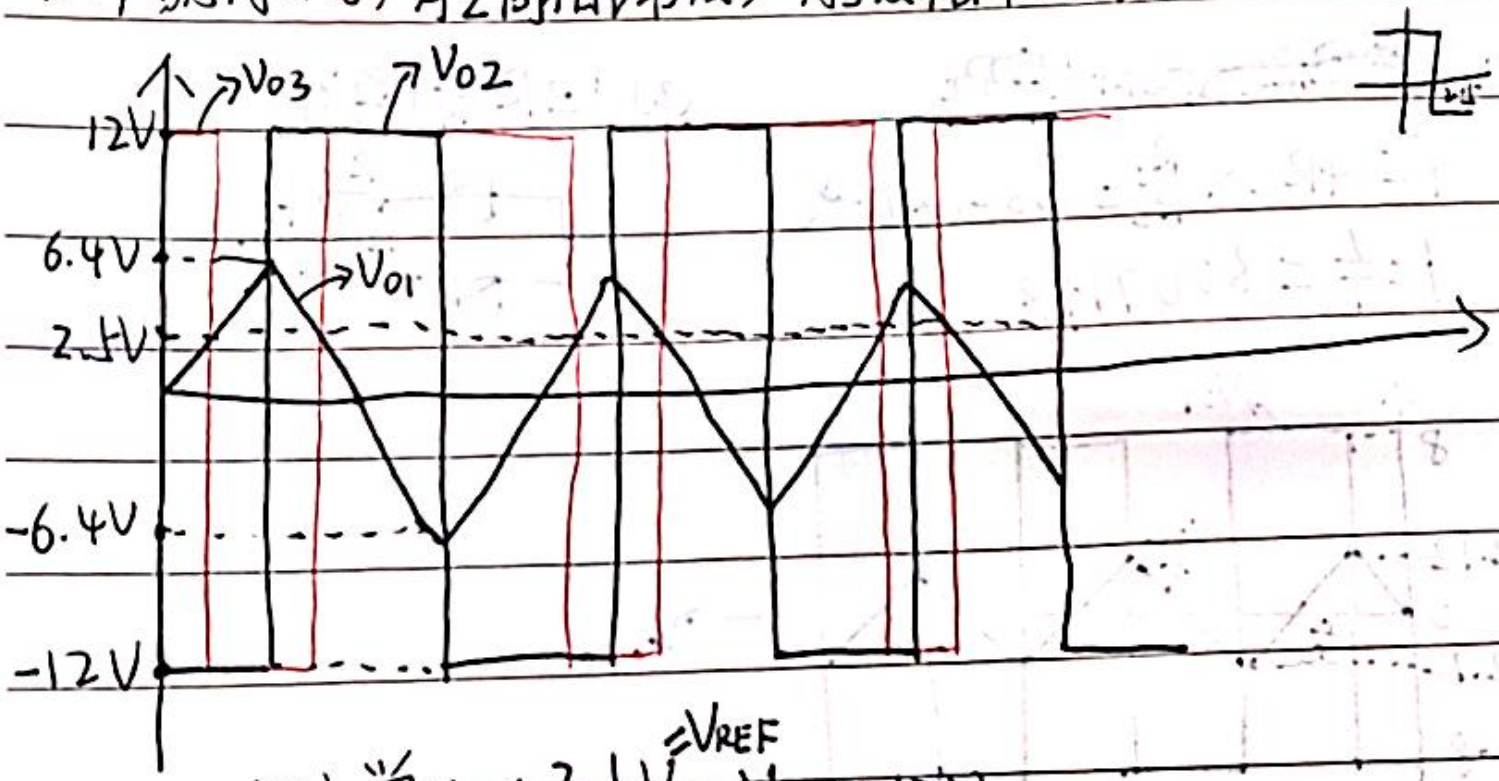
(2) $T = 4(R_3+R_4)C\cdot\frac{R_2}{R_1}$

$$f = \frac{1}{T} = \frac{1}{4(R_3+R_4)C}\cdot\frac{R_1}{R_2}$$



(3) 使积分充电电流变小，
放分充电电流变大 $T_1 > T_2$

4.14 A_1积分，A_2同相滞回，A_3反相单门限，门限为2.5V



(2) 当$V_{O1}<2.5V$，$V_{O3}=12V$

当$V_{O1}>2.5V$ $V_{O3}=-12V$

$=V_{REF}$

$=V_{REF}$