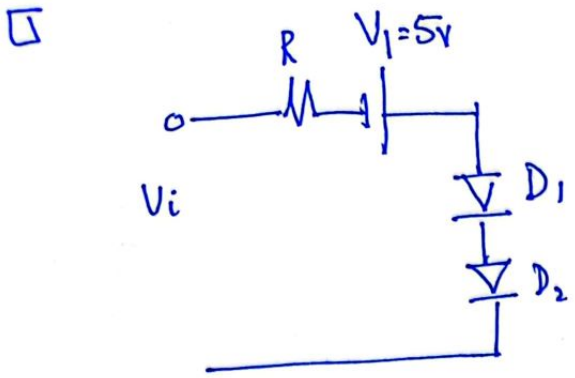
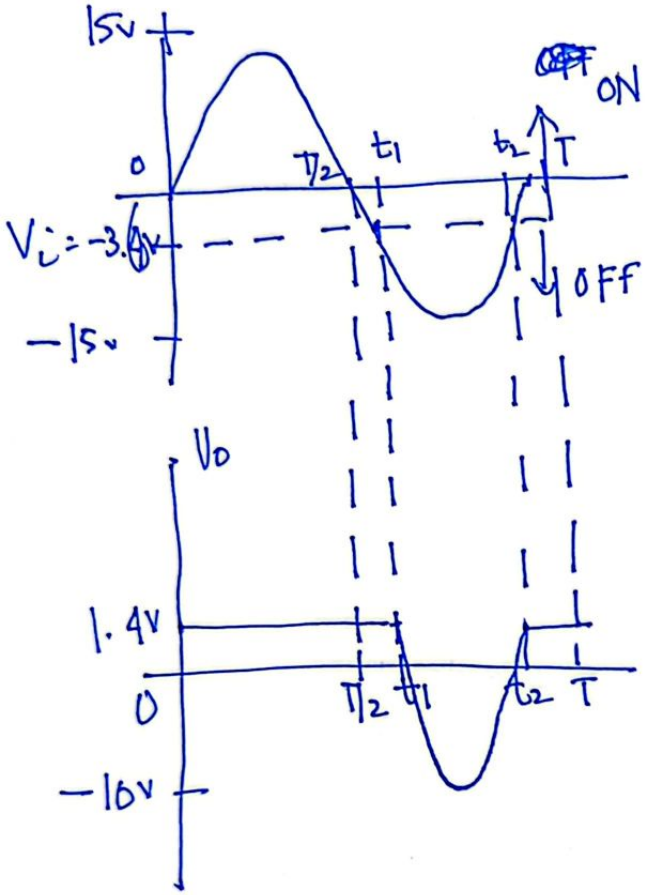
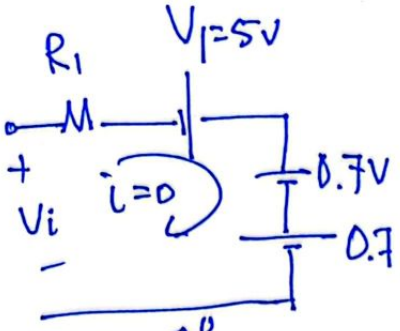






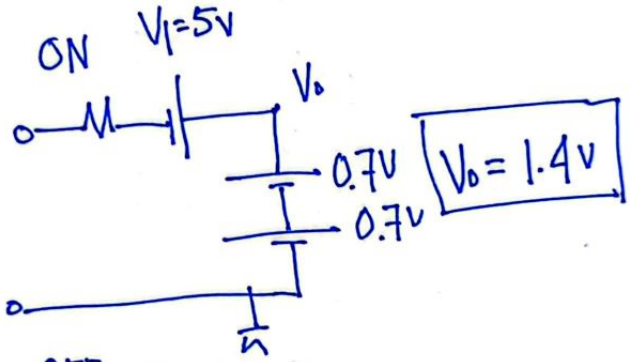
$V_i - iR_1 + 0.5 - 0.7 - 0.7 = 0$

$V_i = -3.6V$

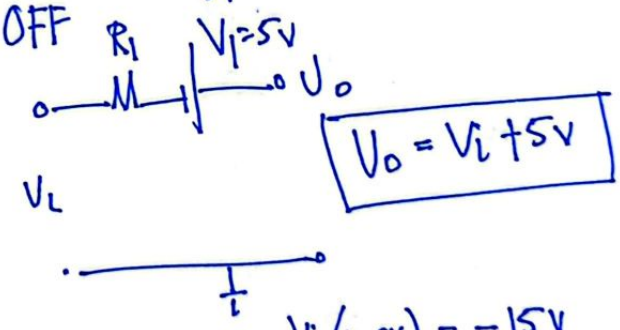
$0 < t < t_1, V_i > -3.6$, ON

$t_1 < t < t_2, V_i < -3.6V$, OFF

$t_2 < t < T, V_i > -3.6V$, ON



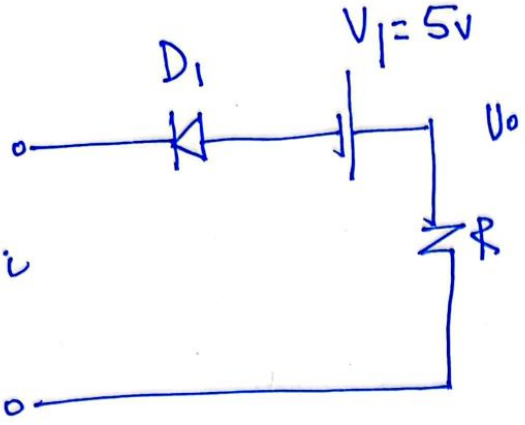
$V_o = 1.4V$

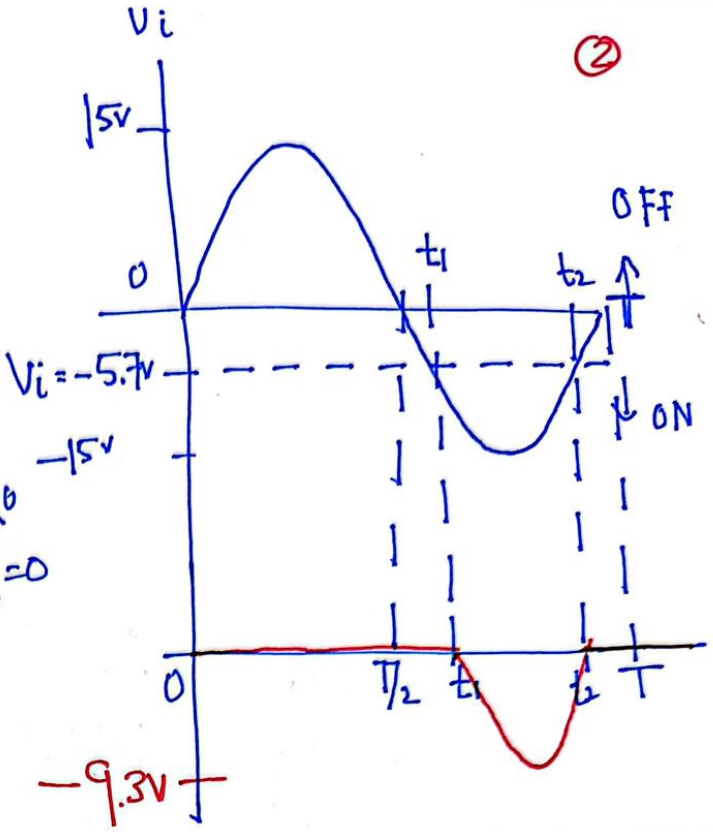


$V_o = V_i + 5V$

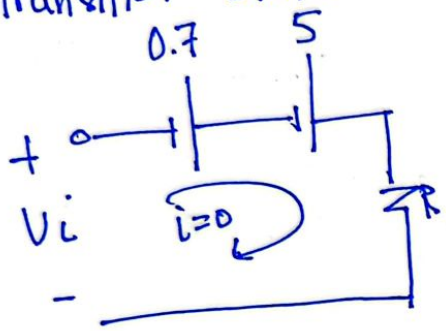
$V_i(max) = -15V$

$V_o(max) = -15+5 = -10$





Transition State



$V_i + 0.7 + 5 = iR = 0$

$V_i = -5.7V$

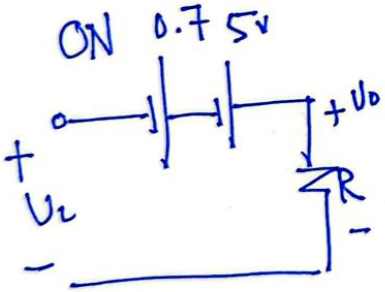
$0 < t < t_1, V_i > -5.7V$, OFF.

$t_1 < t < t_2, V_i < -5.7V$, ON

$t_2 < t < T, V_i > -5.7V$ OFF

$V_i(max) = -5, \quad V_o(max) = -5 + 5.7 = -9.3V$

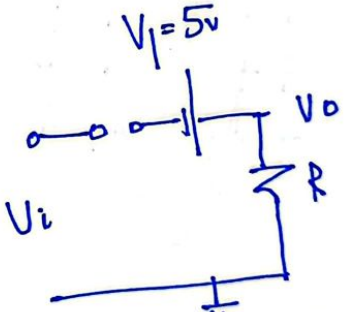
i/o: ON



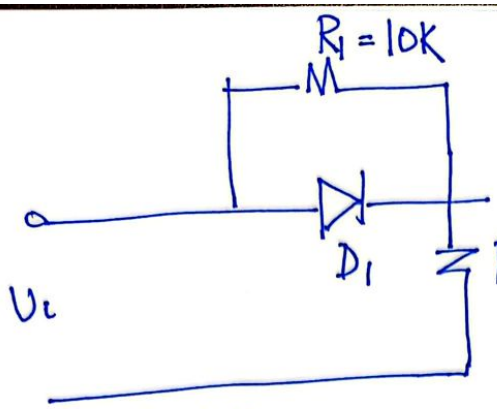
$V_i + 0.7 + 5 = V_o$

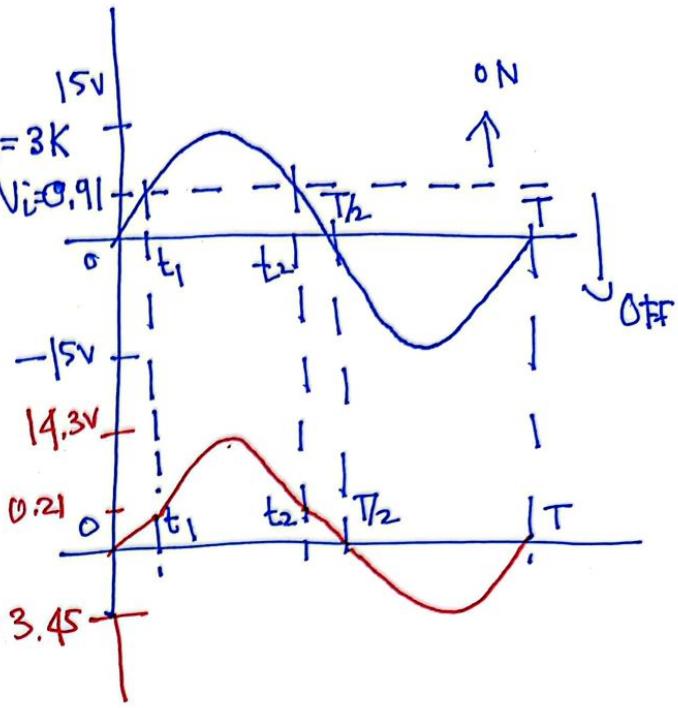
$\Rightarrow \boxed{V_o = V_i + 5.7}$

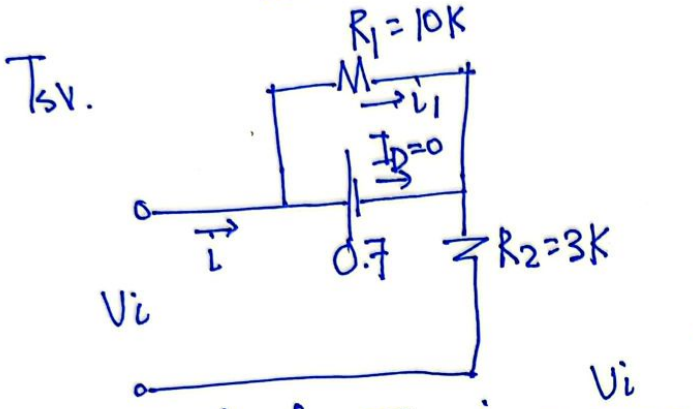
OFF



$\boxed{V_o = iR = 0} \quad [i = 0]$







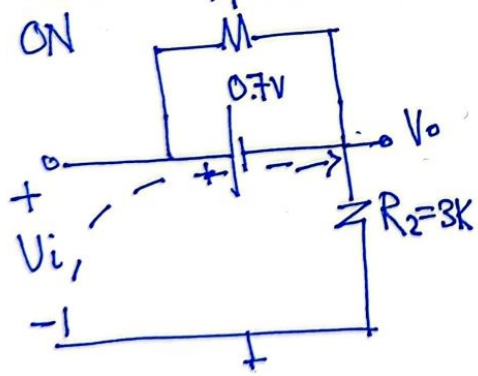
T5V.

$$i = i_1 + I_D = i_1 = \frac{V_i}{13}$$

at transition $V_{R_1} = 0.7V$ [R_1 & Diode are parallel]

$$\Rightarrow i R_1 = 0.7V \Rightarrow \frac{V_i}{13} \times 10 = 0.7V \Rightarrow \boxed{V_i = 0.91\,V}$$ T5V

i/o: Relation:



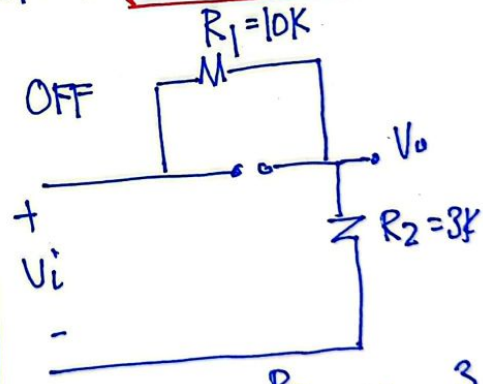
$$V_i - 0.7 = V_o$$

$$\boxed{V_o = V_i - 0.7}$$

~~$t=0$, $V_o = -0.7V$~~

~~$t = t_1$, $V_i = 0.91$, $V_o = 0.91 - 0.7 = 0.21$~~

$V_i(max) = 15V$, $V_o = 15 - 0.7 = 14.3$



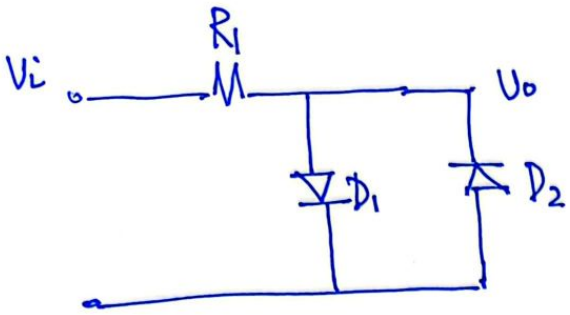
$$V_o = \frac{R_2}{R_1 + R_2} V_i = \frac{3}{13} V_i$$

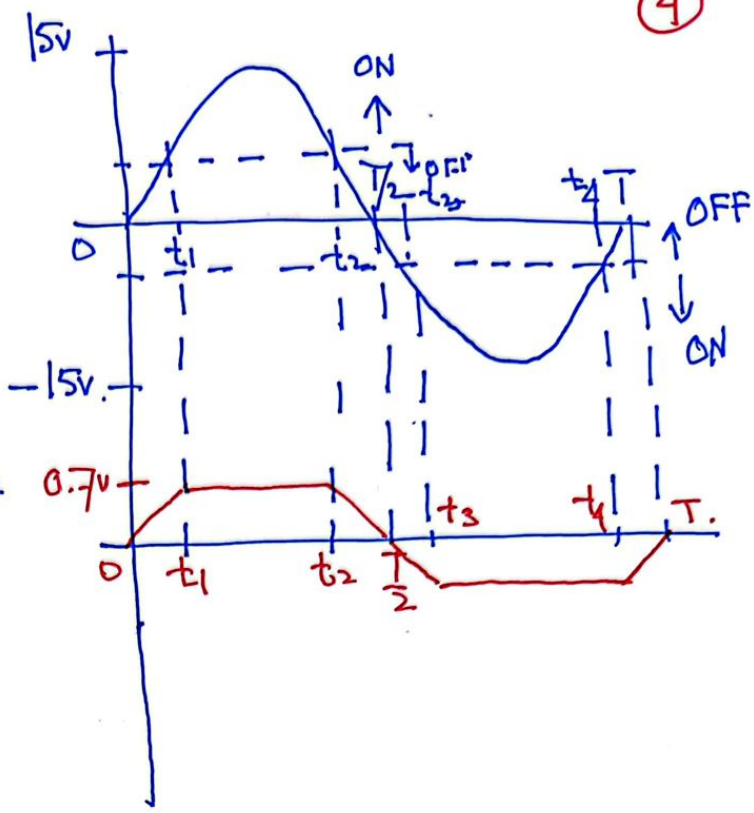
$$\boxed{V_o = 0.23\,V_i}$$

If $t=0$, $V_i = 0$, $V_o = 0$

$t = t_1$, $V_i = 0.91$, $V_o = 0.21$

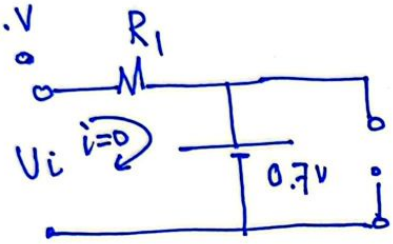
$V_i(max) = -15V$, $V_o(max) = 0.23 \times (-15) = -3.45V$





$0 < t < T/2$, $V_i > 0$. $D_2 \rightarrow$ R.B. $\rightarrow$ OFF

T.S.V



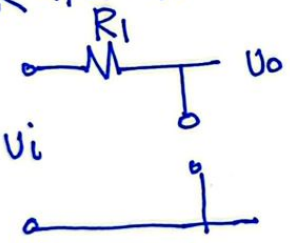
$V_i = 0.7V$

$0 < t < t_1$: $V_i < 0.7V$, OFF.

$t_1 < t < t_2$: $V_i > 0.7V$, ON

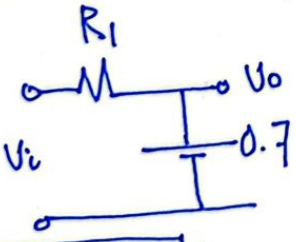
$t_2 < t < T/2$, $V_i < 0.7V$, OFF

i/o : OFF



$\boxed{V_o = V_i}$

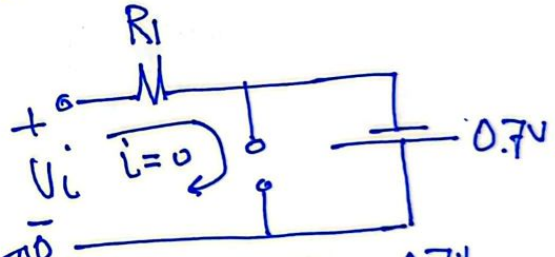
ON



$\boxed{V_o = 0.7V}$

$T/2 < t < T$, $D_1 \rightarrow$ RB $\rightarrow$ OFF

T.S.V



$V_i - iR_1 + 0.7V = 0 \Rightarrow V_i = -0.7V$

[Diode Anti clockwise]

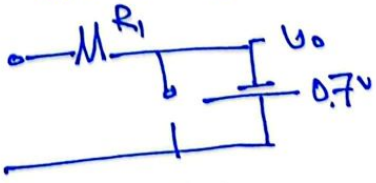
$\frac{T}{2} < t < t_3$, $V_i > -0.7V$, OFF

$t_3 < t < t_4$, $V_i < -0.7V$, ON

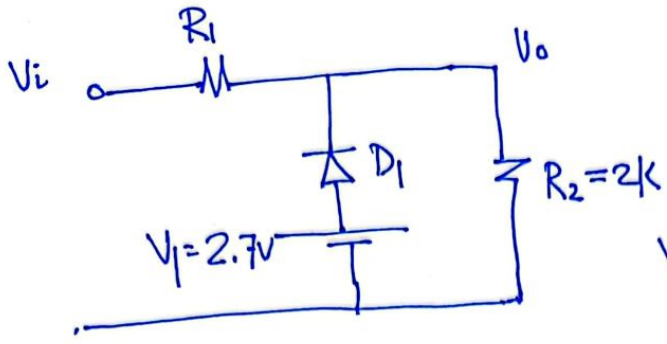
$t_4 < t < T$, $V_i > -0.7V$, OFF

i/o : OFF, $V_o = V_i$

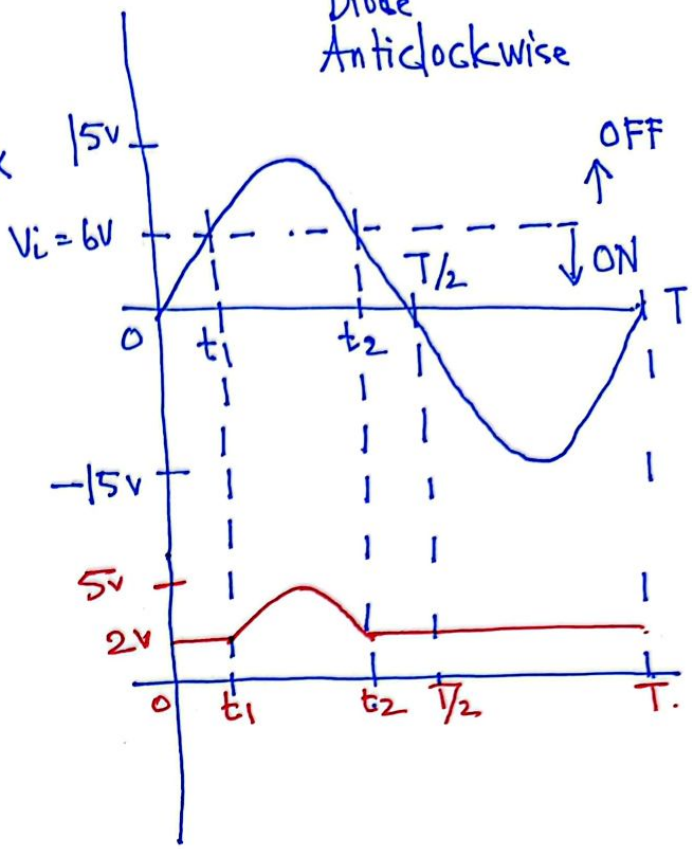
ON



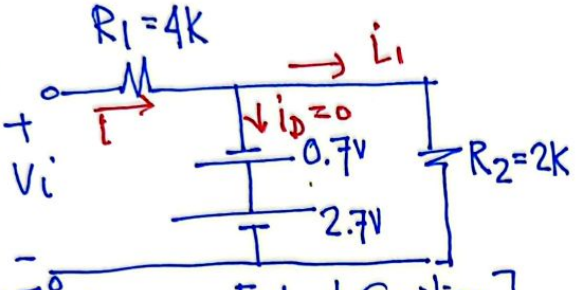
$V_o = -0.7V$.



Diode Anticlockwise



T.S.V:



$i = i_D + i_1$ [at transition]

$i = i_1 = \frac{V_i}{R_1+R_2} = \frac{V_i}{6}$

$V_{R_2} = 2.7 - 0.7 = 2V$

$\Rightarrow i_{R_2} = 2 \Rightarrow \frac{V_i}{6} \times 2 = 2$

$\Rightarrow V_i = 6V$

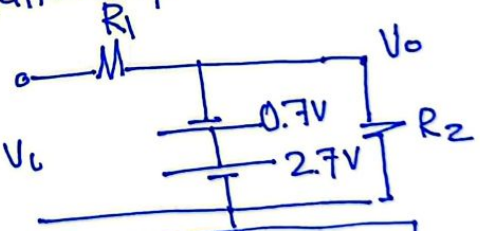
$0 < t < t_1$, $V_i < 6V$, ON

$t_1 < t < t_2$. $V_i > 6V$, OFF.

$t_2 < t < T$. $V_i < 6V$, ON

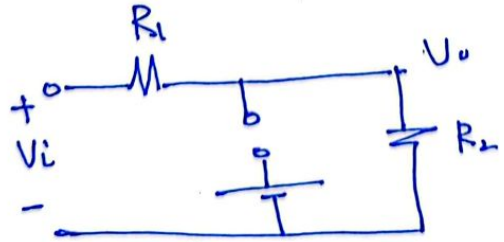
i/o. Relationship.

ON



$V_o = 2.7 - 0.7 = 2V$

OFF



$V_o = \frac{R_2}{R_1+R_2} V_i$

$= \frac{2}{6} V_i = 0.33 V_i$

$V_o = 0.33 V_i$

@ $V_i(max) = 15V$, $V_o(max) = 0.33 \times 15 = 5V$.