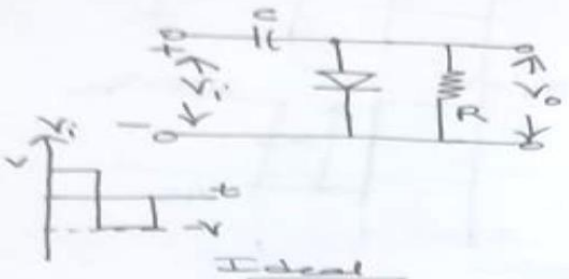
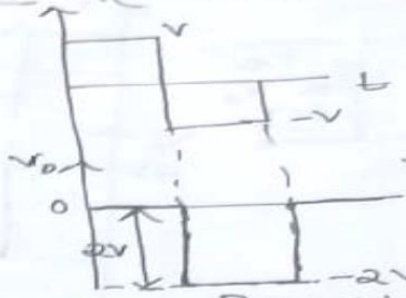
(1)

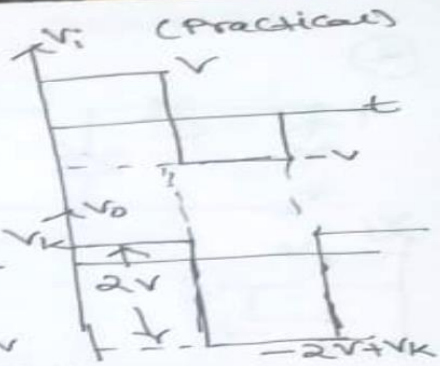


Ideal

Clamper V_i (Ideal)

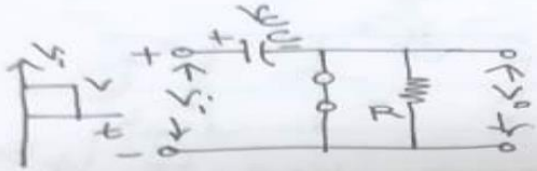


V_i (Practical)



Practical

During +ve half of applied i/p

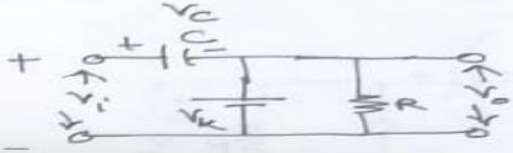


Apply KVL to i/p loop,

$V_i - V_C = 0$

$V_C = V_i = V$

$V_o = 0V$.



Apply KVL to i/p loop

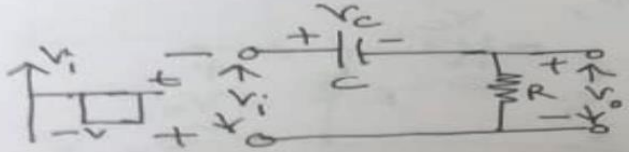
$V_i - V_C - V_K = 0$

$V_C = V_i - V_K$

$V_C = V - V_K$

$V_o = V_K$

During -ve half of i/p



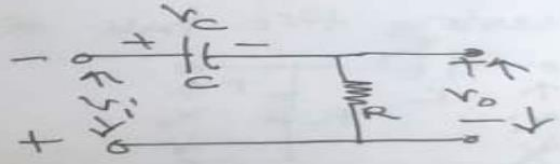
Apply KVL to ckt,

$-V_i - V_C - V_o = 0$.

$V_o = -V_i - V_C$

$V_o = -V - V$

$= -2V$

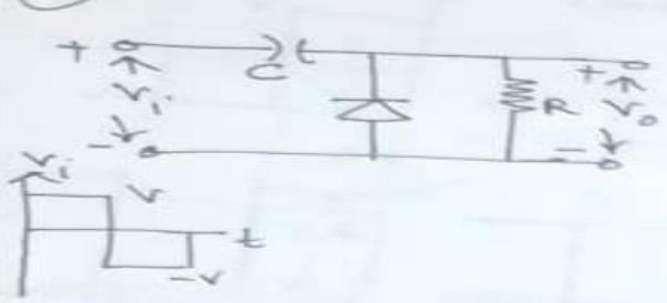


$-V_i - V_C - V_o = 0$

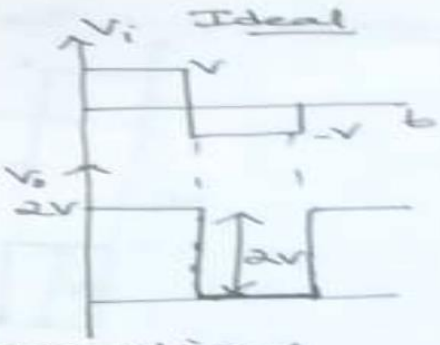
$V_o = -V - (V - V_K)$

$V_o = -2V + V_K$.

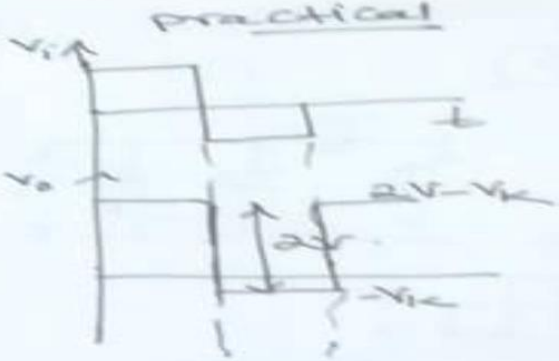
(2)



Ideal

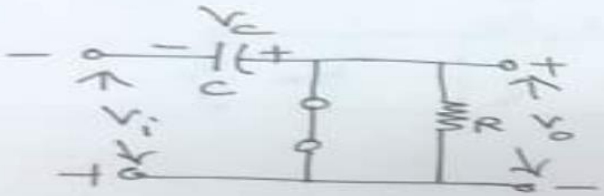


practical



Ideal

During +ve half of applied i/p



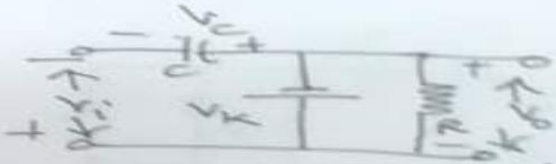
apply KVL to i/p loop,

$-V_i + V_C = 0$

$V_C = V_i = V$

$V_o = 0$.

practical



apply KVL to i/p loop

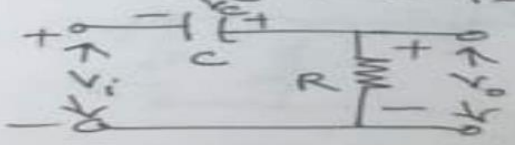
$-V_i + V_C + V_K = 0$

$V_C = V_i - V_K$

$V_C = V - V_K$

$V_o = V_R = -V_K$.

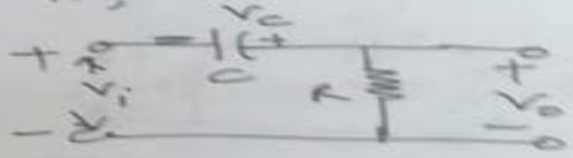
During +ve half of applied i/p,



$V_i + V_C = V_o$

$V + V = V_o$

$2V = V_o$

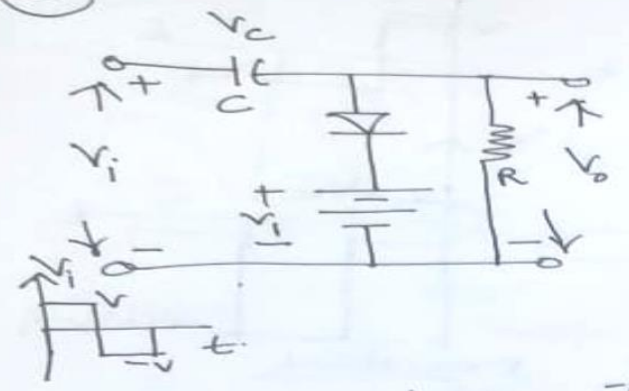


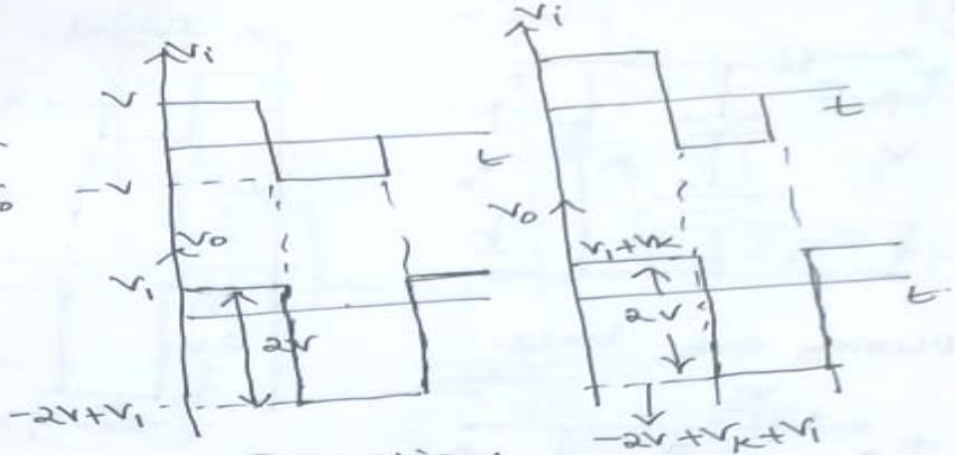
$V_i + V_C = V_o$.

$V_o = V_i + V - V_K$

$= V + V - V_K = 2V - V_K$.

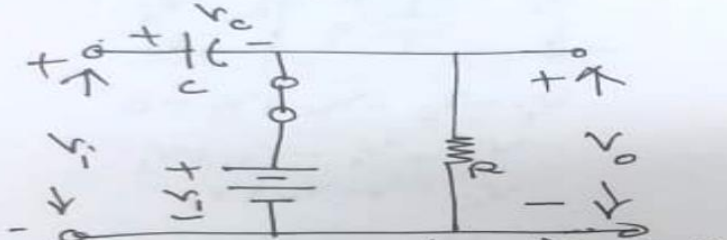
(3)





During +ve half.

Ideal



apply KVL to i/p loop

$V_i - V_c - V_1 = 0$

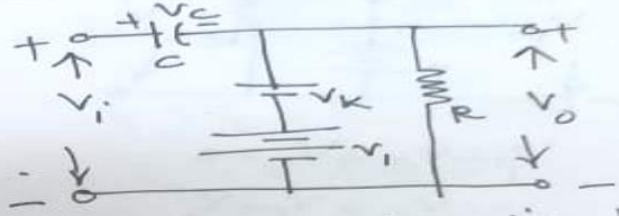
$V_c = V_i - V_1$

$V_c = V - V_1$

apply KVL to o/p loop

$V_i - V_o = 0$, $V_o = V_i$

Practical



apply KVL to i/p loop

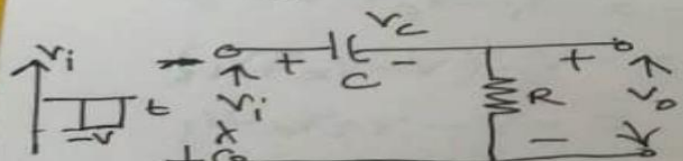
$V_i - V_c - V_K - V_1 = 0$

$V_c = V_i - V_K - V_1$

$V_c = V - V_K - V_1$

$V_o = V_1 + V_K$

During −ve half.

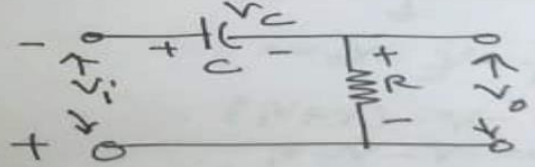


$-V_i - V_c - V_o = 0$

$V_o = -V_i - V_c = -V - V + V_1$

$= -2V + V_1$

During −ve half.



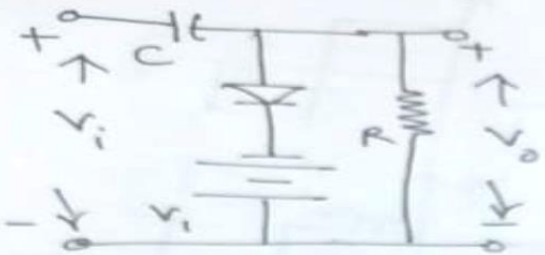
$-V_i - V_c - V_o = 0$

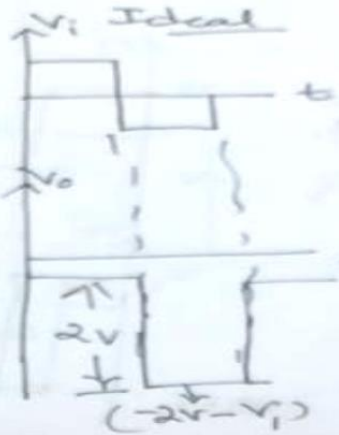
$V_o = -V - (V - V_K - V_1)$

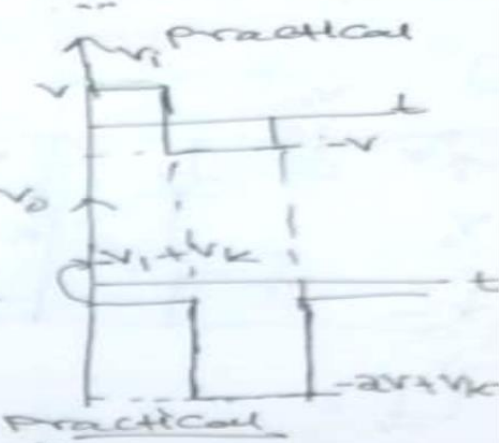
$= -V - V + V_K + V_1$

$= -2V + V_K + V_1$

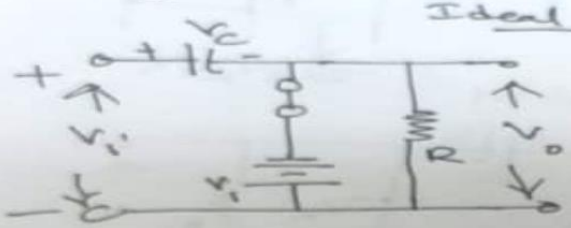
(4)







During +ve half

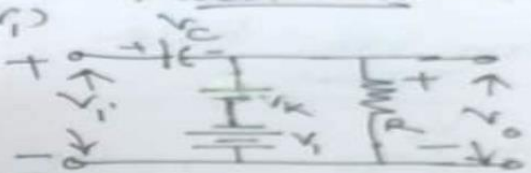


$V_i - V_C + V_1 = 0$

$V_C = V_i + V_1$

$V_C = V + V_1$

$V_o = -V_1$



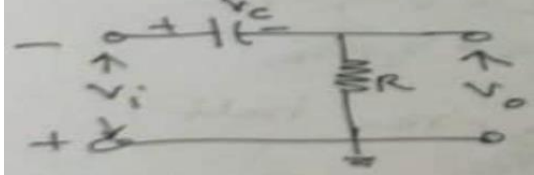
$V_i - V_C - V_K + V_1 = 0$

$V_C = V_i - V_K + V_1$

$V_C = V - V_K + V_1$

$V_o = -V_1 + V_K$

During -ve half,



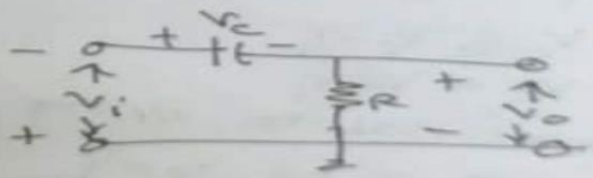
$-V_i - V_C - V_o = 0$

$V_o = -V - (V + V_1)$

$= -V - V - V_1$

$= -2V - V_1$

During -ve half



$-V_i - V_C - V_o = 0$

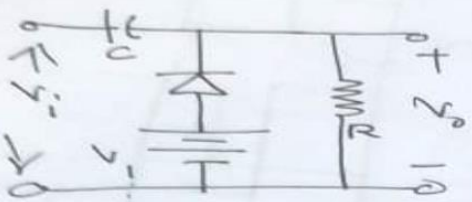
$V_o = -V_i - V_C$

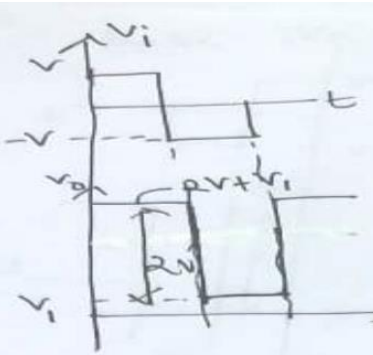
$= -V - (V - V_K + V_1)$

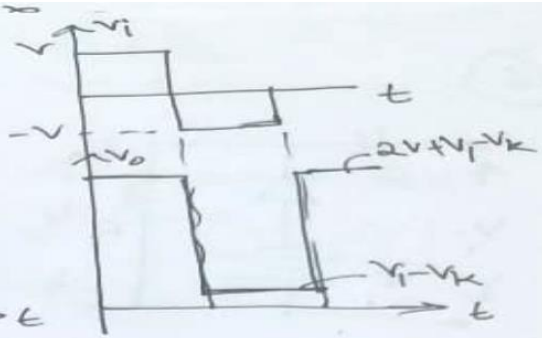
$= -V - V + V_K - V_1$

$= -2V + V_K - V_1$

(5)

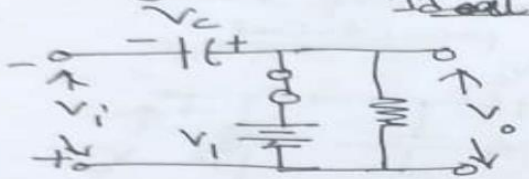






During -ve half

Ideal



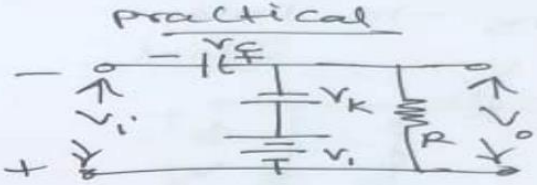
$-V_i + V_C - V_1 = 0$

$V_C = V_i + V_1$

$V_C = V + V_1$

$V_o = V_1$

Practical



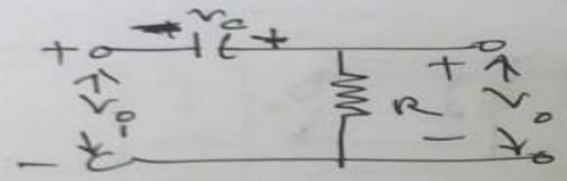
$-V_i + V_C + V_K - V_1 = 0$

$V_C = V_i - V_K + V_1$

$V_C = V - V_K + V_1$

$V_o = V_1 - V_K$.

During +ve half

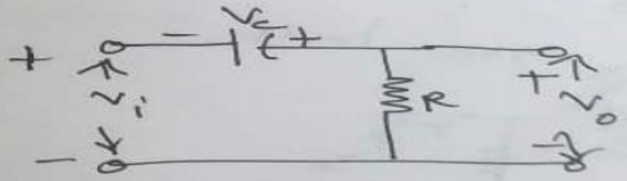


$V_o = V_i + V_C$

$V_o = V + (V + V_1)$

$= 2V + V_1$

During +ve half



$V_i + V_C - V_o = 0$

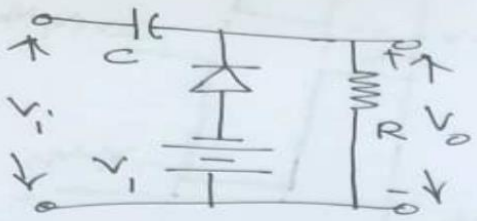
$V_o = V_i + V_C$

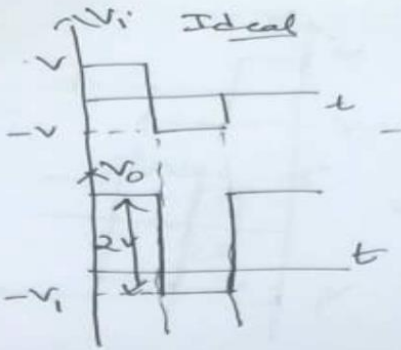
$V_o = V + ((V - V_K + V_1)$

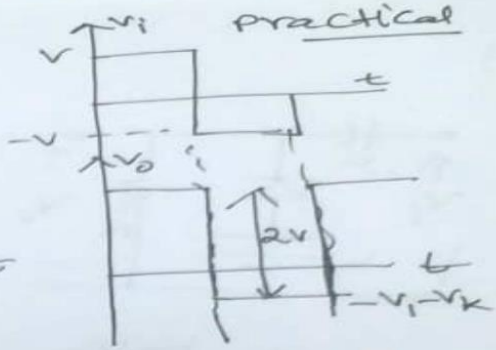
$V_o = V + V - V_K + V_1$

$V_o = 2V + V_1 - V_K$

(6)

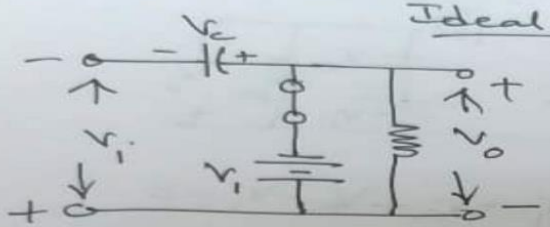






During -ve half

Ideal



$-V_i + V_c + V_1 = 0$

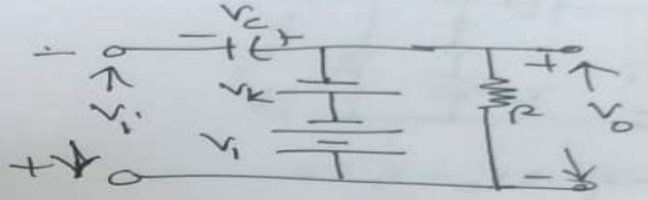
$V_c = V_i - V_1$

$V_c = V - V_1$

$V_o = -V_1$

During -ve half

practical



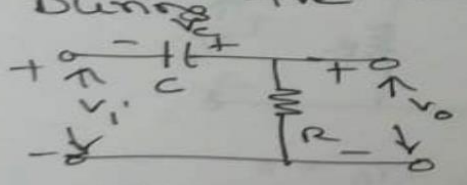
$-V_i + V_c + V_K + V_1 = 0$

$V_c = V_i - V_K - V_1$

$V_c = V - V_K - V_1$

$V_o = -V_1 - V_K$

During +ve half.



$V_i + V_c - V_o = 0$

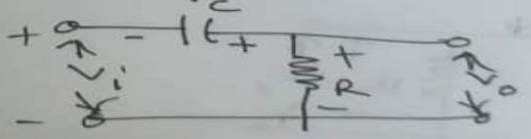
$V_o = V_i + V_c$

$= V + (V - V_1)$

$= V + V - V_1$

$= 2V + V_1$

During +ve half.



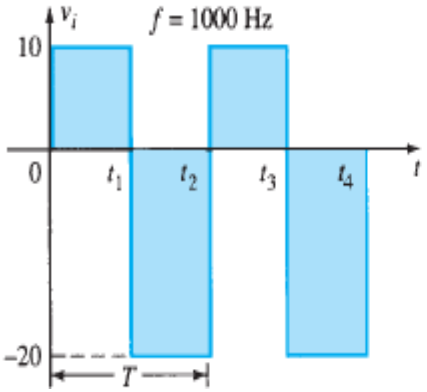
$V_i + V_c - V_o = 0$

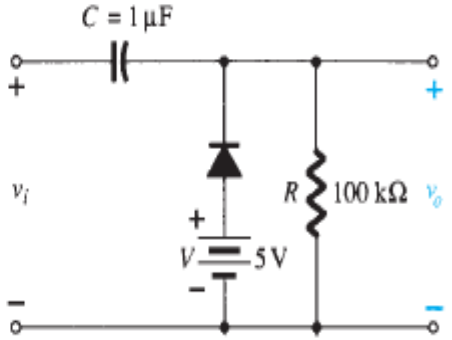
$V_o = V_i + V_c$

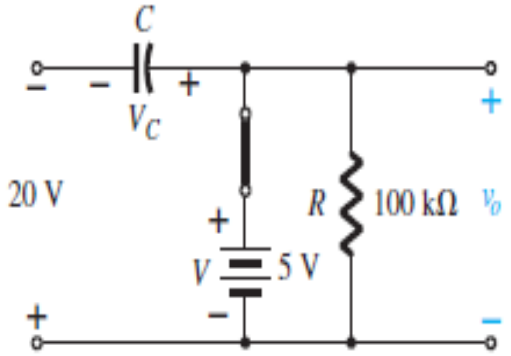
$= V + (V - V_K - V_1)$

$= 2V - V_K - V_1$

Determine v_o for the network of Fig.



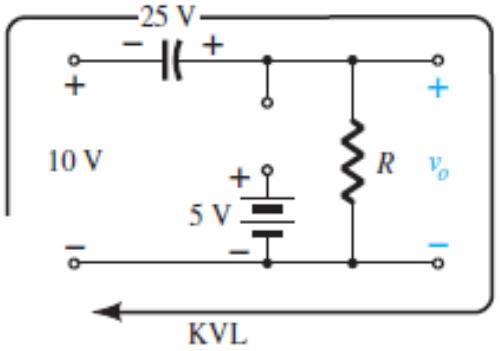




$$-20\,\text{V} + V_C - 5\,\text{V} = 0$$

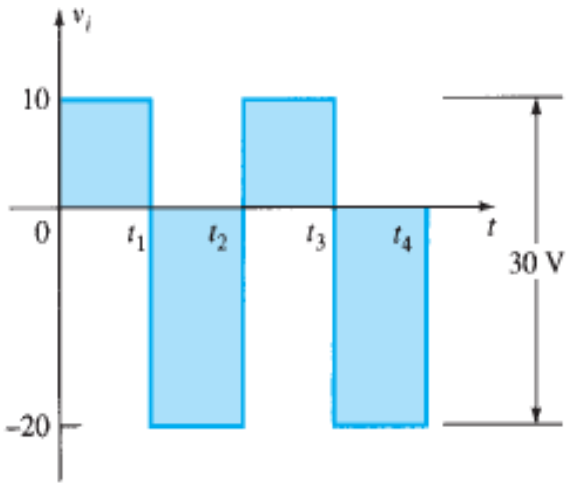
$$V_C = 25\,\text{V}$$

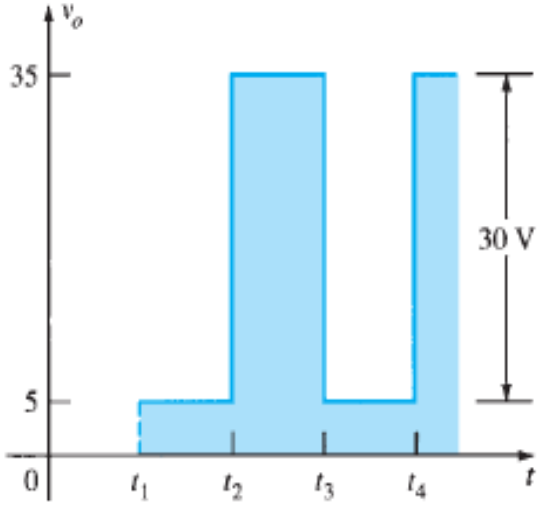
$$v_o = 5\,\text{V}$$



$$+10\text{ V} + 25\text{ V} - v_o = 0$$

$$v_o = 35\text{ V}$$

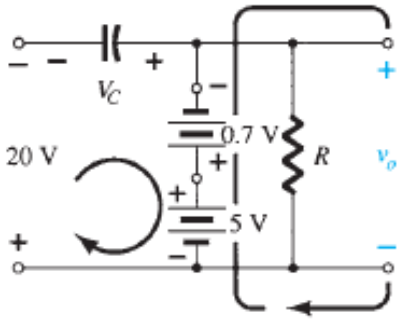




using a silicon diode with $V_K = 0.7\ \text{V}$.

$$+5\ \text{V} - 0.7\ \text{V} - v_0 = 0$$

$$v_0 = 5\ \text{V} - 0.7\ \text{V} = 4.3\ \text{V}$$



Kirchhoff's voltage law results in

$$-20\ \text{V} + V_C + 0.7\ \text{V} - 5\ \text{V} = 0$$

$$V_C = 25\ \text{V} - 0.7\ \text{V} = 24.3\ \text{V}$$

$$+10\ \text{V} + 24.3\ \text{V} - v_0 = 0$$

$$v_0 = 34.3\ \text{V}$$