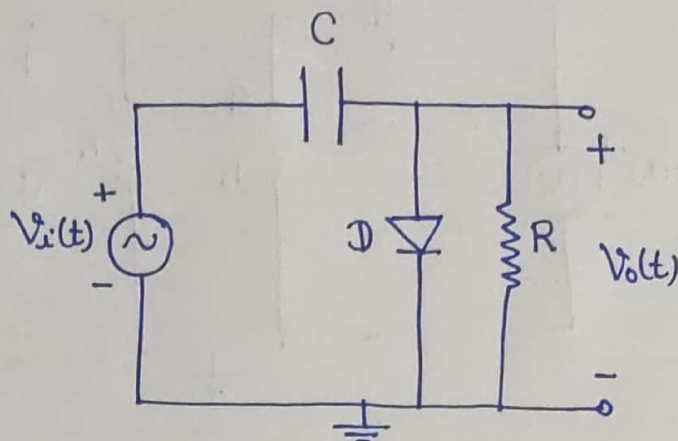
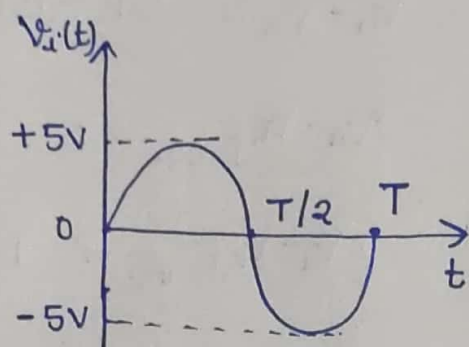


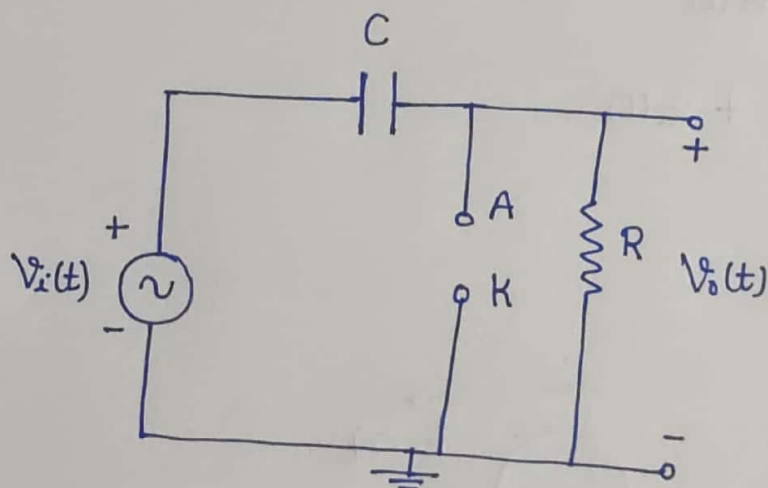
Q.1:

Determine  $V_o$  in the given circuit?

Given that  $RC \gg T$ .



Sol: Step 1: Condition for F.B. and R.B. of diode

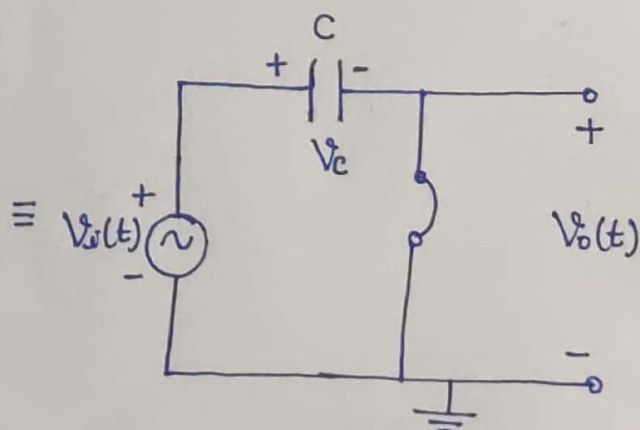
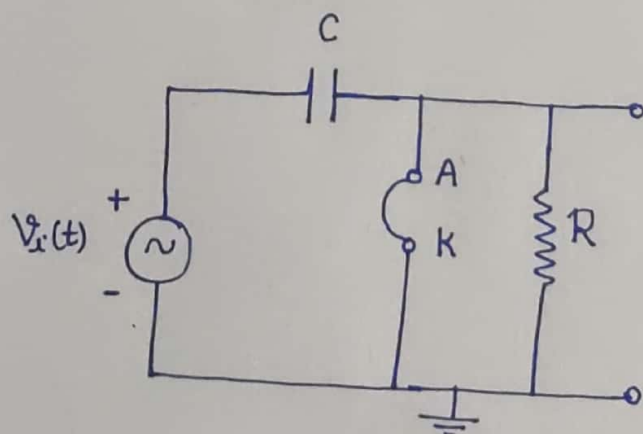


$$V_A - V_K > 0$$

$$V_i(t) > 0 \Rightarrow \text{F.B.}$$

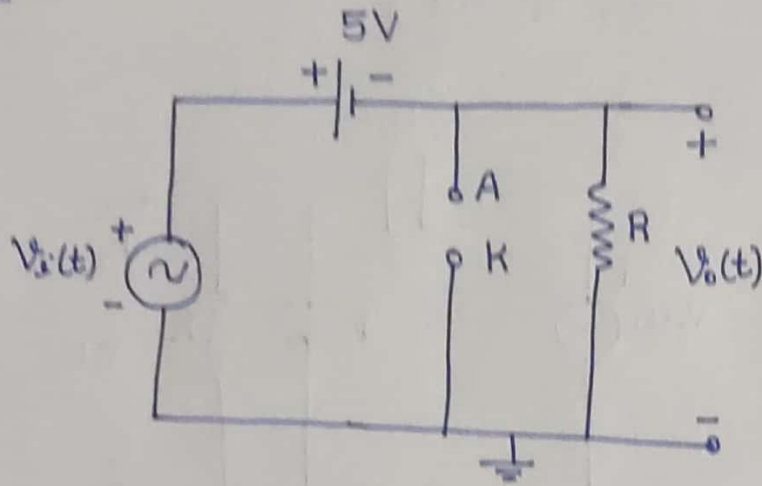
$$V_i(t) \leq 0 \Rightarrow \text{R.B.}$$

Step 2: Charging of Diode



$$V_c = V_i(t) = 5V$$

Step 3:



$$V_A - V_K = -5 + V_i(t)$$

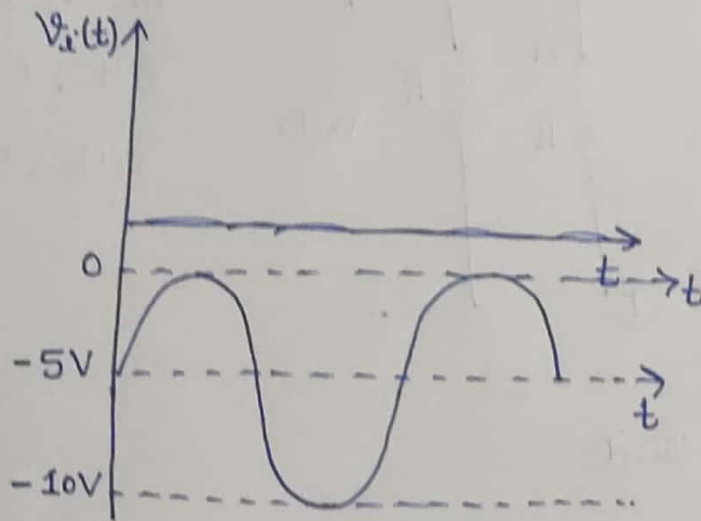
$$\{V_A - V_K\}_{\max} = 0$$

$$\{V_A - V_K\}_{\min} = -10V$$

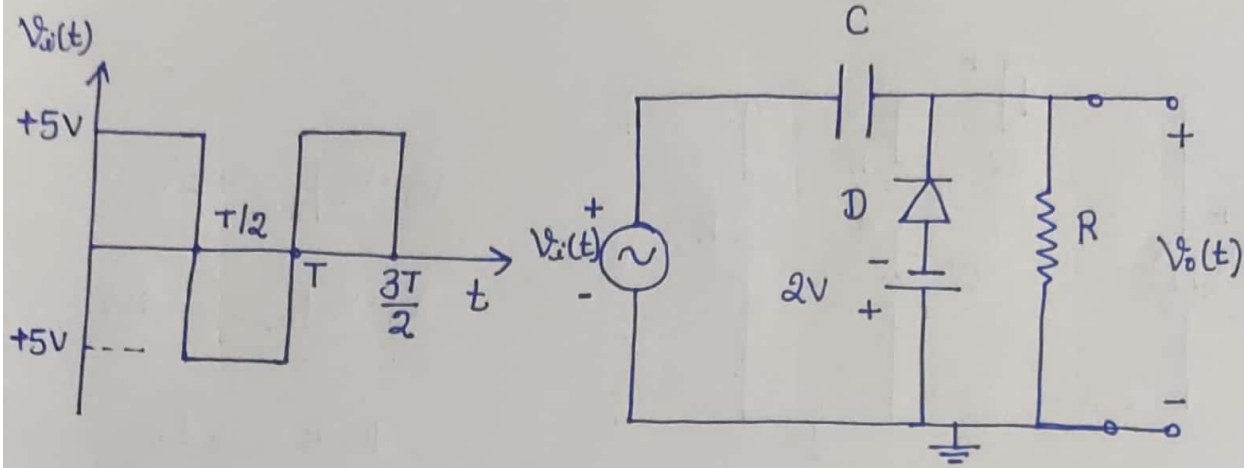
Diode is in R.B.  
(reverse bias).

Step 4: Output Voltage  $V_o(t)$

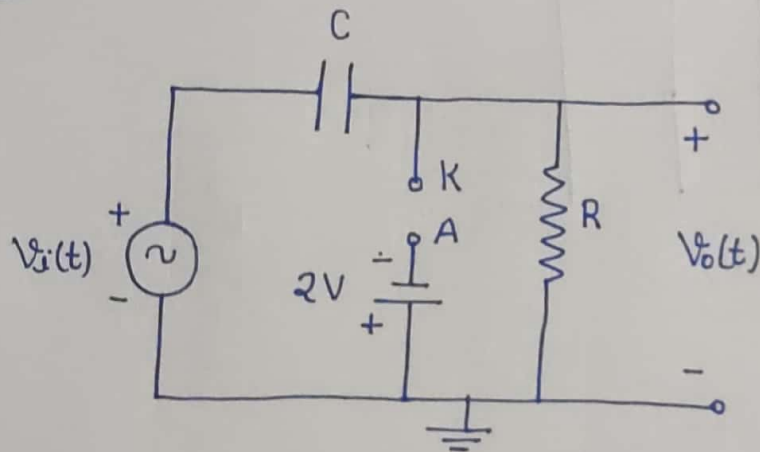
$$V_o(t) = -5 + V_i(t)$$



Q.2:- Determine the  $V_o$  in the given circuit? Given that  $RC \gg T$ .  
Q.2:-



Sol: Step 1:



$$V_A - V_K > 0$$

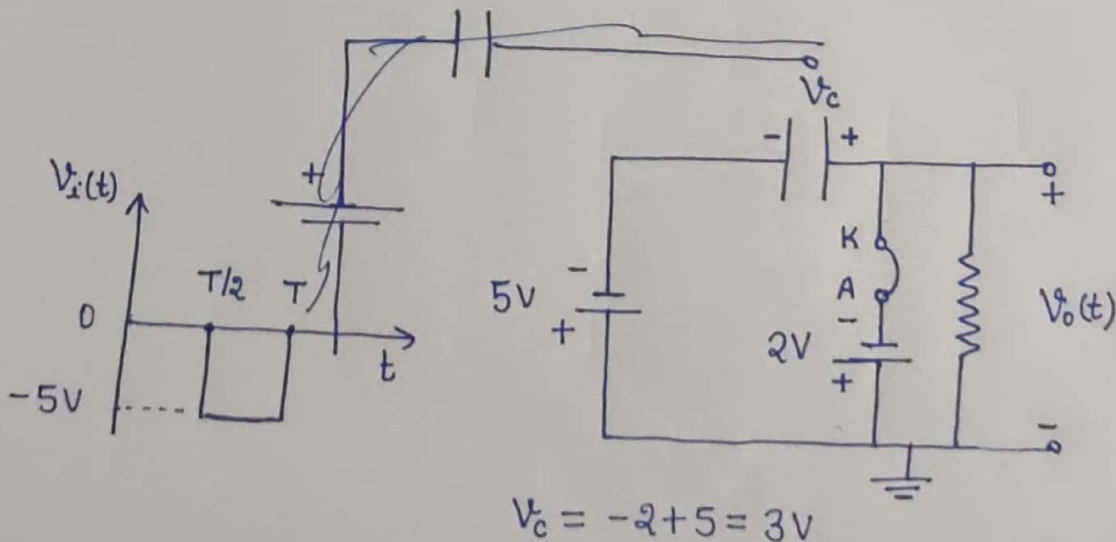
$$-2 - V_i(t) > 0$$

$$V_i(t) < -2 \Rightarrow \text{F.B.}$$

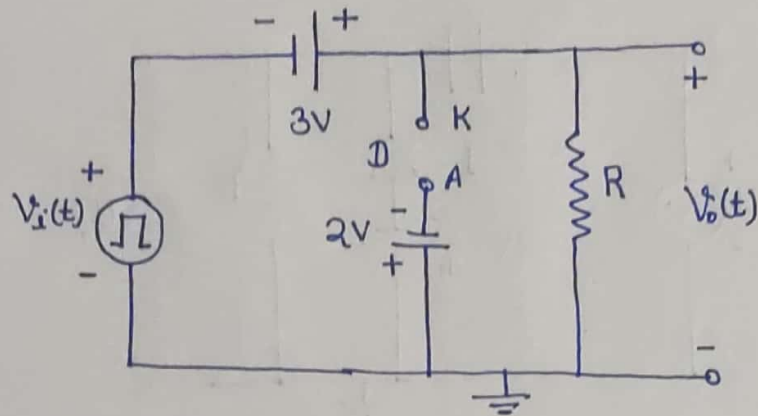
$$V_i(t) \geq -2 \Rightarrow \text{R.B.}$$

Step 2:-

Charging of Capacitor



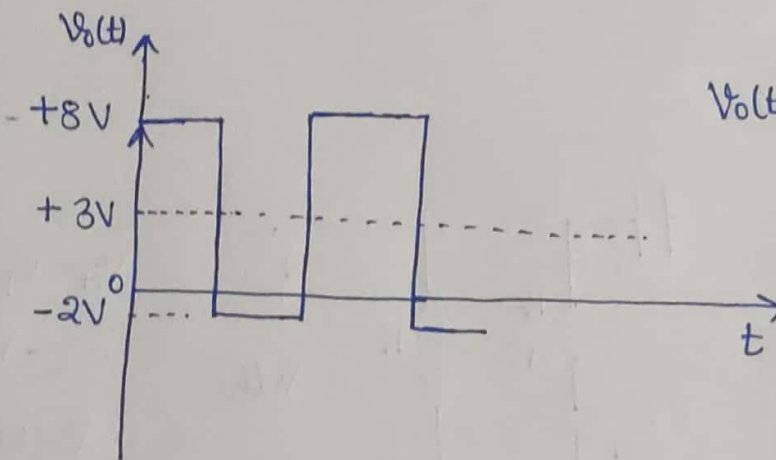
Step 3: After charging of capacitor



$$V_A - V_K|_{\text{max.}} = 8V$$

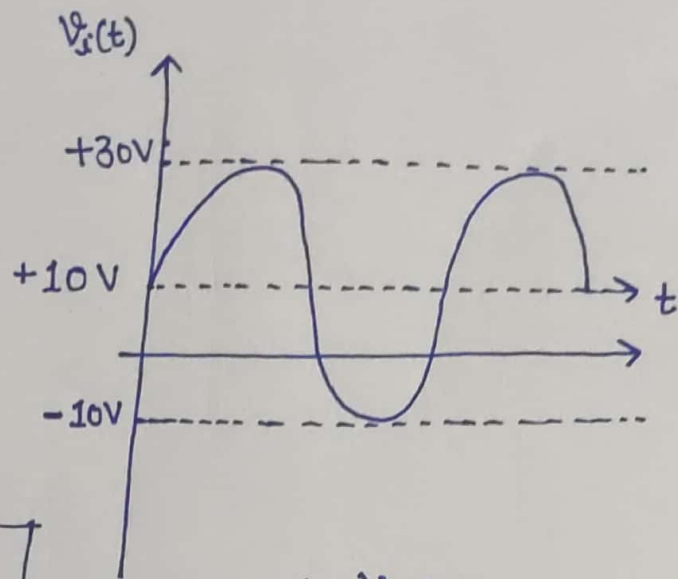
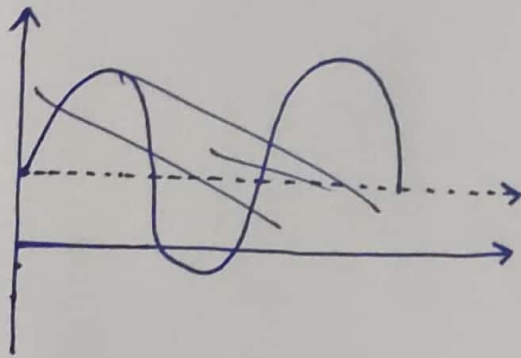
$$V_A - V_K|_{\text{min.}} = \cancel{4V} - 2V$$

Diode will be in reverse bias

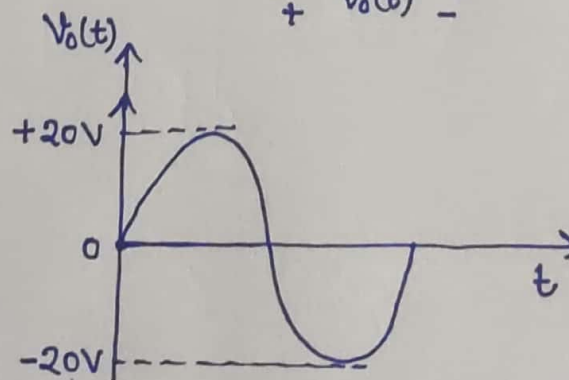
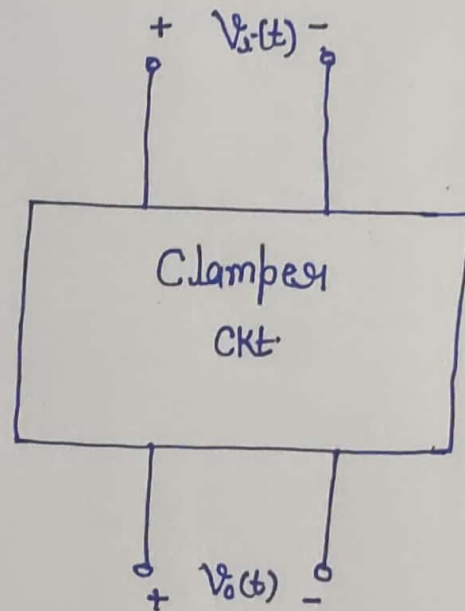
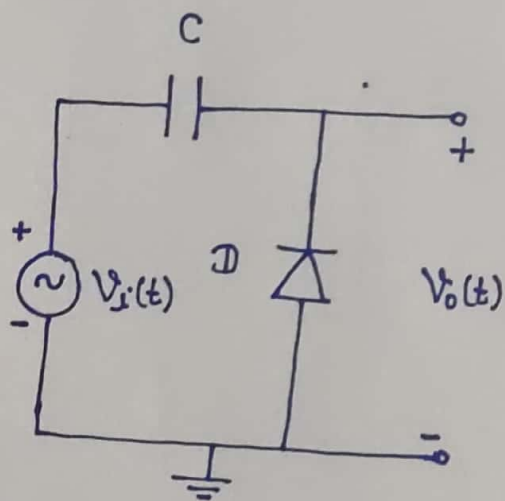


$$V_o(t) = 3 + V_i(t)$$

Q.3: Design a clamper to perform the function indicated in the figure.

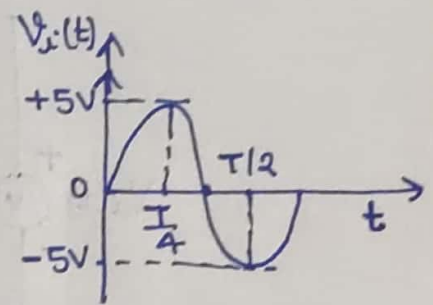
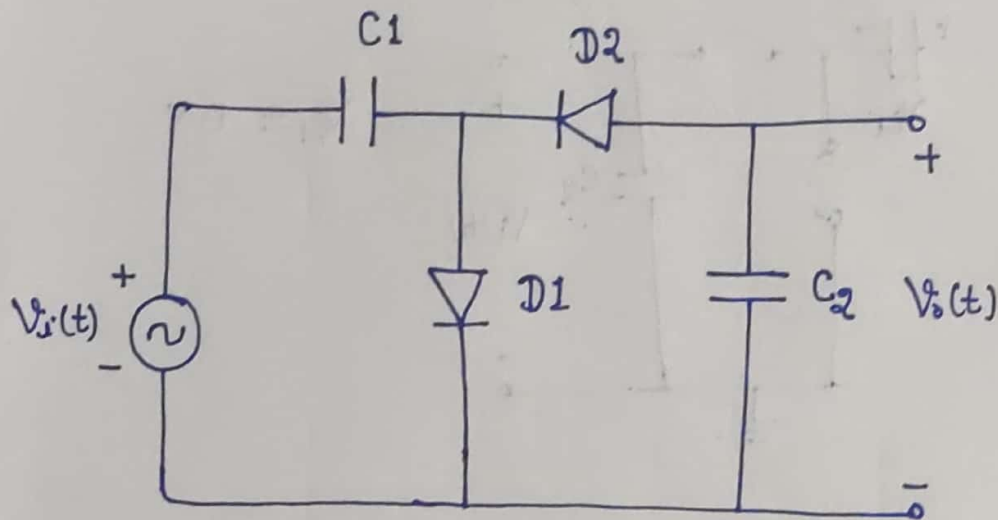


Ans:

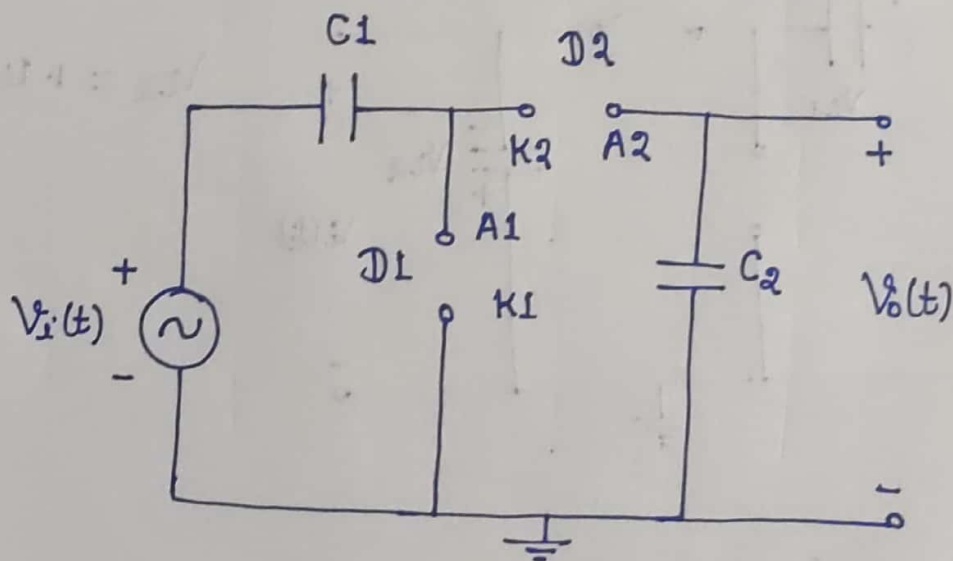




Q.4: Find  $V_o(t)$  in the given circuit?



Sol: Step 1: Condition for F.B. and R.B. for  $D1$  and  $D2$ .



For  $D1$  at  $t=0^+$

$$V_i(t) > 0 \Rightarrow \text{F.B.}$$

$$V_i(t) \leq 0 \Rightarrow \text{R.B.}$$

For  $D2$  at  $t=0^+$

$$V_{A2} - V_{K2} > 0$$

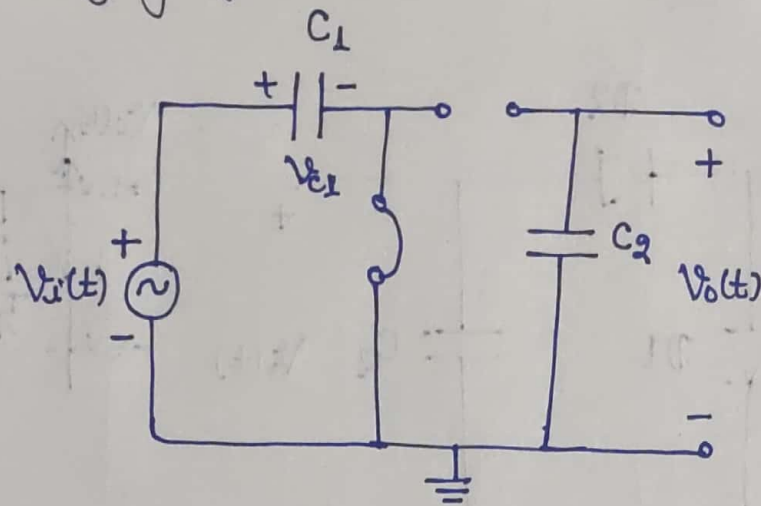
$$0 - V_i(t) > 0$$

$$\text{or } V_i(t) < 0 \Rightarrow \text{F.B.}$$

$$V_i(t) \geq 0 \Rightarrow \text{R.B.}$$

Step 2:

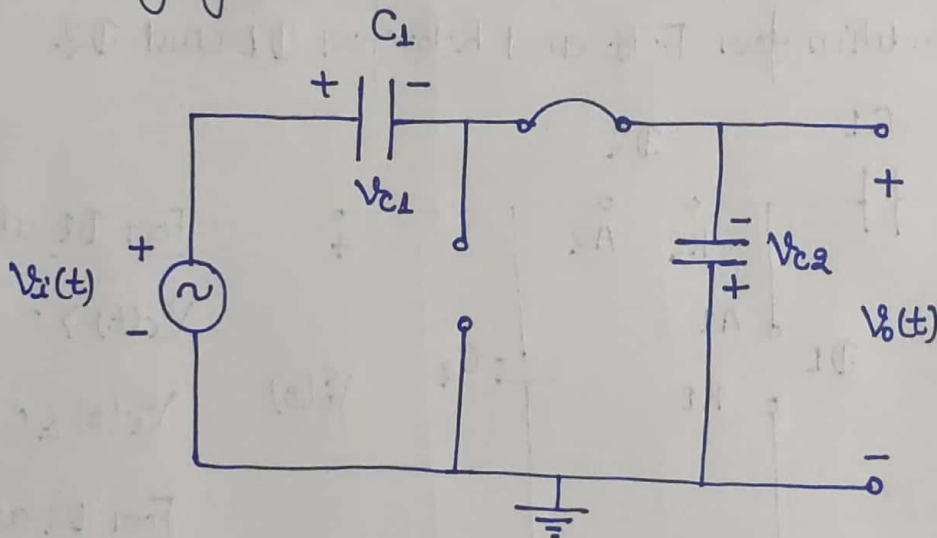
Charging of  $C_1$   $\{0 < t \leq \frac{T}{4}\}$



$$V_{c1} = 5V$$

Step 3:

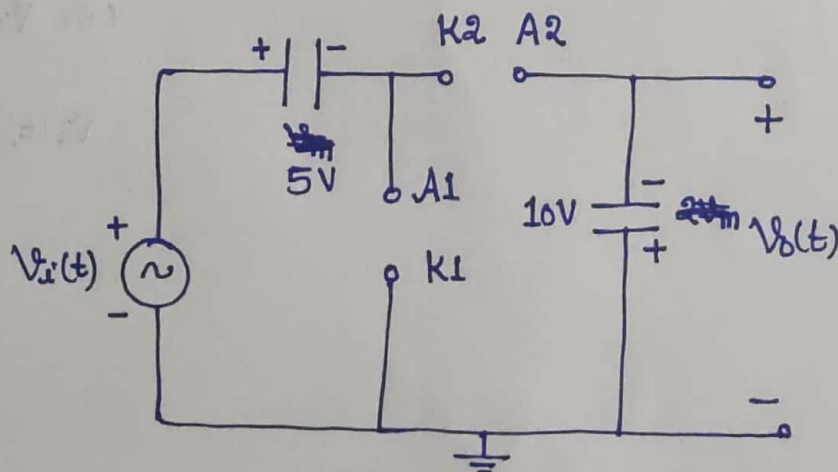
Charging of  $C_2$   $\{\frac{T}{4} < t \leq \frac{3T}{4}\}$



$$V_{c2} = +10V$$

Step 4:

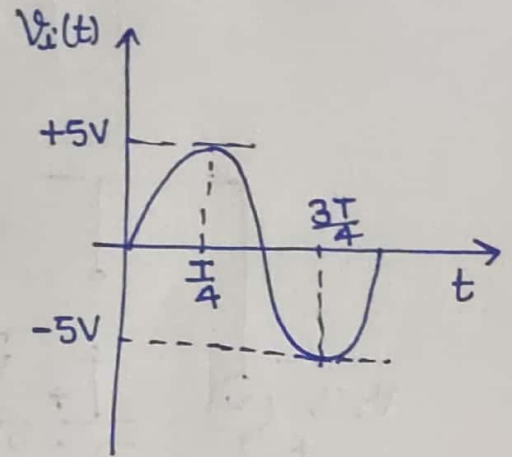
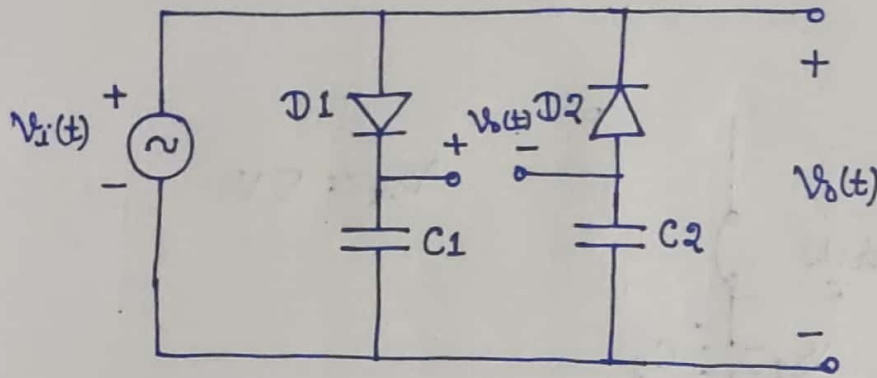
For  $t > \frac{3T}{4}$  { Steady State }



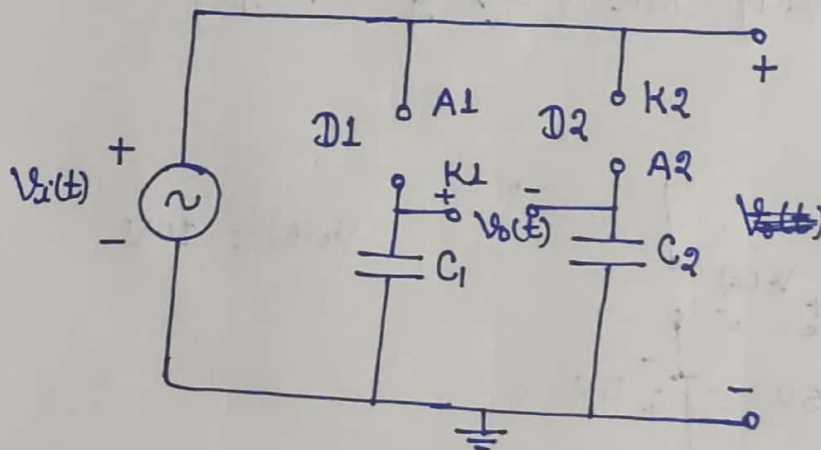
$$V_o(t) = 2V_m$$

$$V_o(t) = -10V$$

Q.5: Find  $V_o(t)$  ?



Sol: Step 1: Condition for F.B. and R.B. of D1 and D2. ~~at t = 0~~



For D1

$$V_i(t) > 0 \Rightarrow \text{F.B.}$$

$$V_i(t) \leq 0 \Rightarrow \text{R.B.}$$

For D2

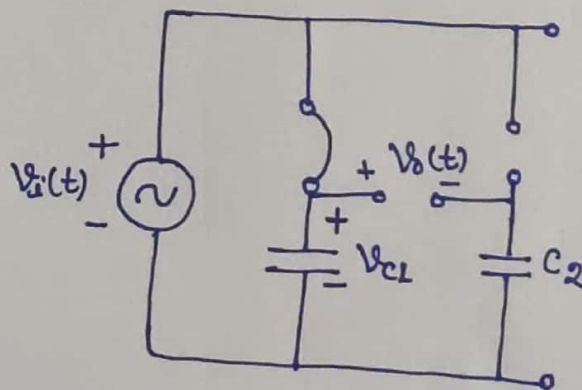
$$V_{A2} - V_{K2} > 0$$

$$-V_i(t) > 0$$

$$V_i(t) < 0 \Rightarrow \text{F.B.}$$

$$V_i(t) \geq 0 \Rightarrow \text{R.B.}$$

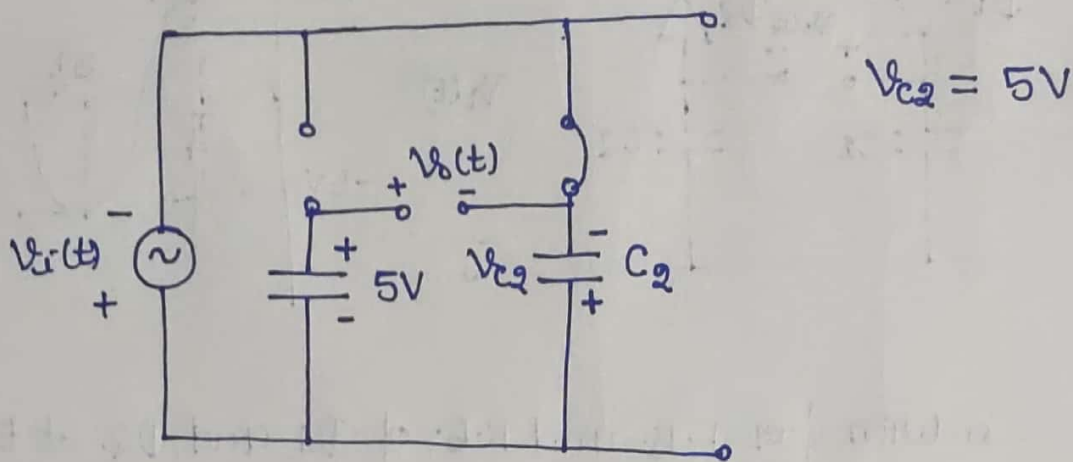
Step 2: Charging of  $C_1$   $\{0 \leq t \leq \frac{T}{4}\}$



$$V_{C1} = 5V$$



Step 3: Charging of  $C_2$   $\left\{ \frac{T}{2} < t \leq \frac{3T}{4} \right\}$   $\left\{ \frac{T}{2} < t \leq \frac{3T}{4} \right\}$



Step 4: At Steady State  $\left\{ t > \frac{3T}{4} \right\}$

