Tutorial-9
Winter 2024
Basic Electronics (ECE113)

Q1: In Figure-1, If $V_i(t) = 4 \sin wt$ volt then draw $V_o(t)$ & transfer characteristic, also define the nature of circuit. **[Ans: Half Wave Rectifiers]**

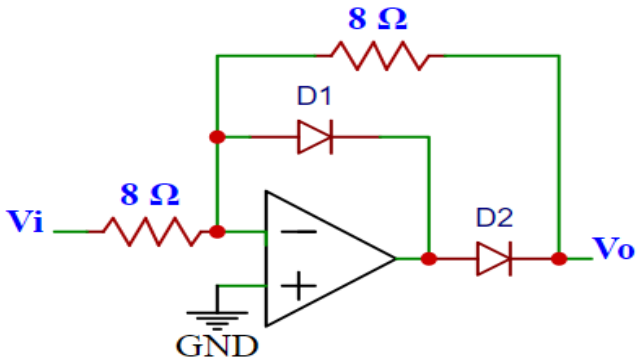


Figure 1

Q2: In Figure-2, If $V_i(t) = 2 \sin wt$ volt then draw $V_o(t)$ & transfer characteristic, also define the nature of circuit. **[Ans: Half Wave Rectifier]**

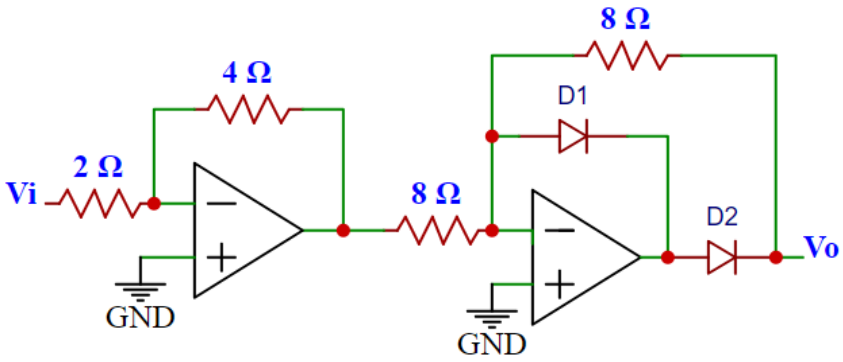


Figure 2

Q3: In Figure-3, if $V_i(t) = 5 \sin wt$ then draw the curve for capacitor voltage $V_c(t)$ & output voltage $V_o(t)$ with explanation. Define the nature of circuit. **[Ans: Clamper Circuit]**

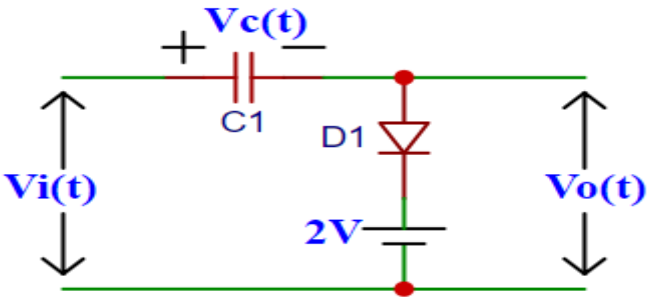


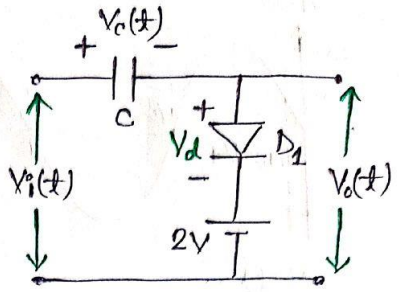
Figure 3

Solution:

5):

Here $V_i(t) = 5\sin(\omega t)$

$V_i(t) = V_c(t) + V_d + 2$

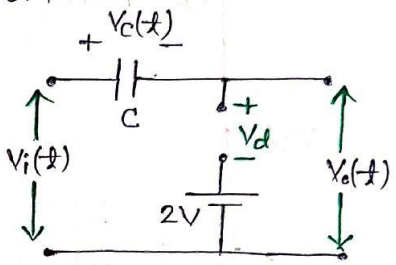


Part(I)

Case(I): For $0 \leq V_i \leq (2\blacktriangle)$, Diode is OFF.

$\therefore V_c(t) = 0\,V$

$\therefore V_o(t) = V_d = V_i(t)$



Case(II): For $(2\blacktriangle) \leq V_i < (5\blacktriangle)$, Diode is ON.

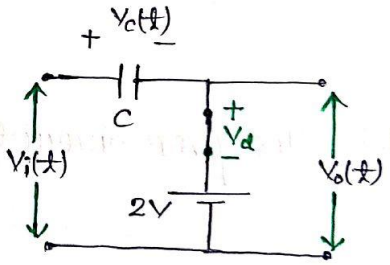
$\therefore V_c(t) = V_i(t) - V_d - 2$

$= V_i(t) - 0 - 2$

$= [V_i(t) - 2]$

at $t = (T/4)$, $V_c(t) = (5-2) = 3V$

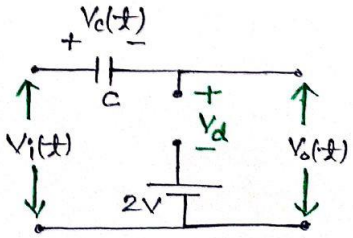
$\therefore V_o(t) = 2\,V$



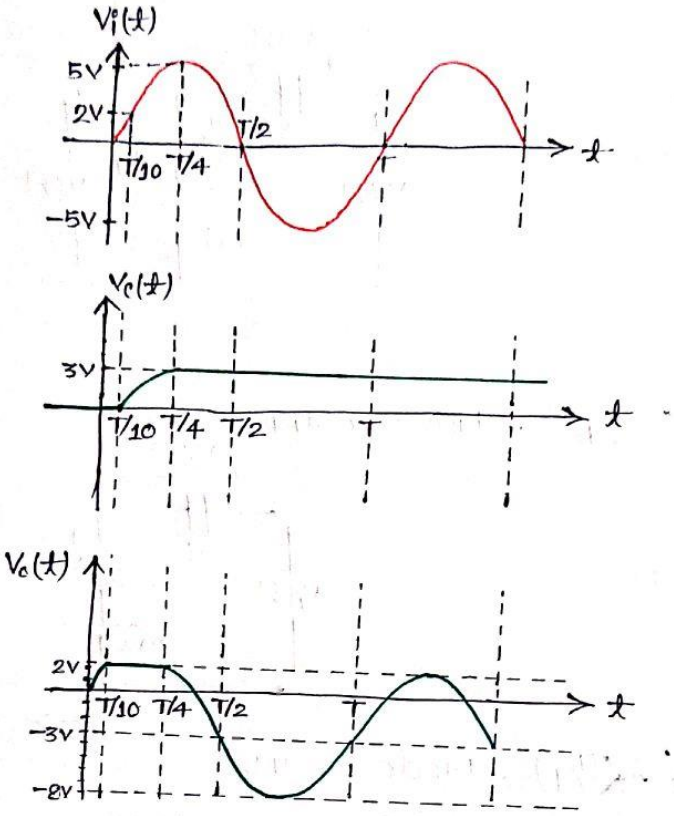
Case(III): For $V_i > (5\blacktriangle)$, Diode is OFF.

$V_o(t) = V_d = V_i(t) - V_c(t)$

$= [V_i(t) - 3]$



Part (II):



Part (III): The given circuit is working as a clamper circuit.