



# Fundumantal of Electronic I

## Second Class

Chapter02: Diode Applications

Lec02\_p3

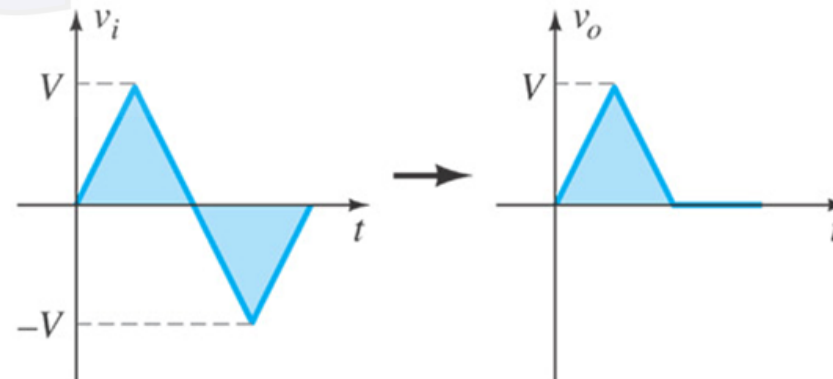
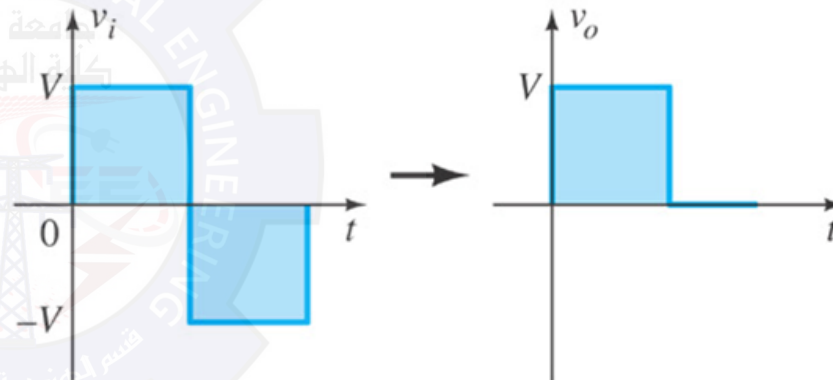
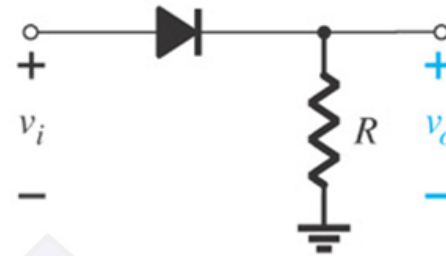
**Munther N. Thiyab**

**2019-2020**



# Diode Clippers

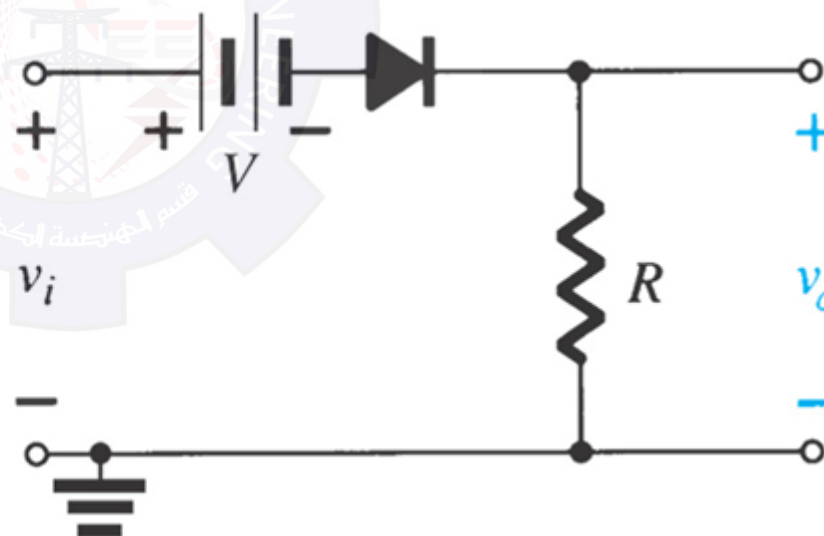
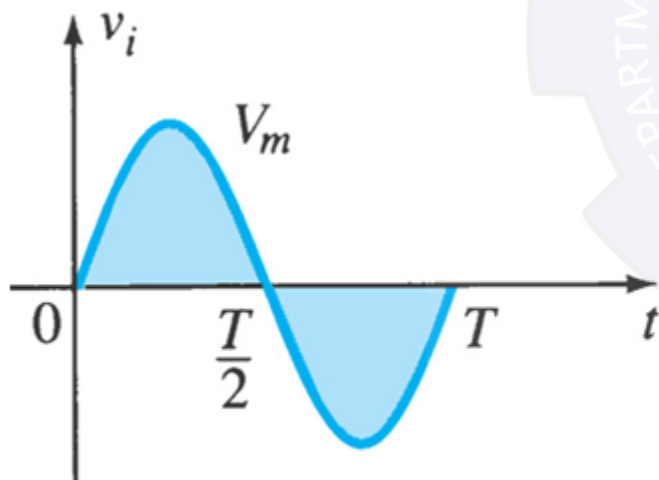
Clippers are networks that employ diodes to “clip” away a portion of an input signal without distorting the remaining part of the applied waveform.

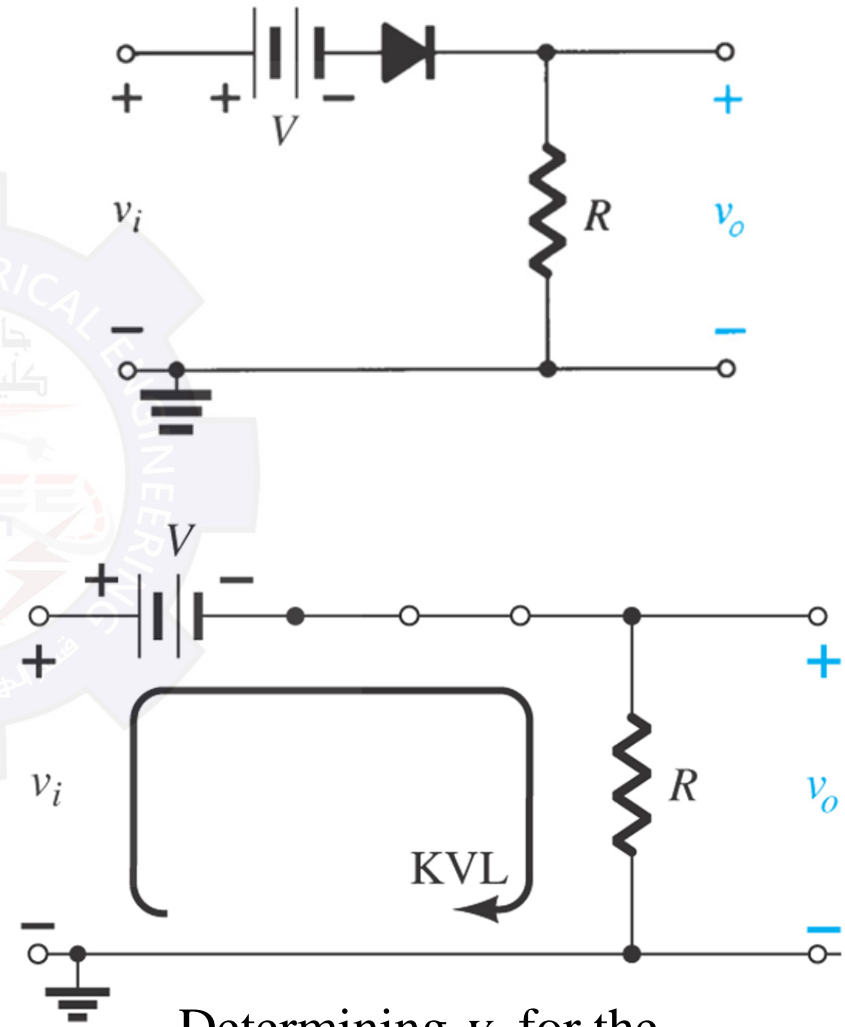
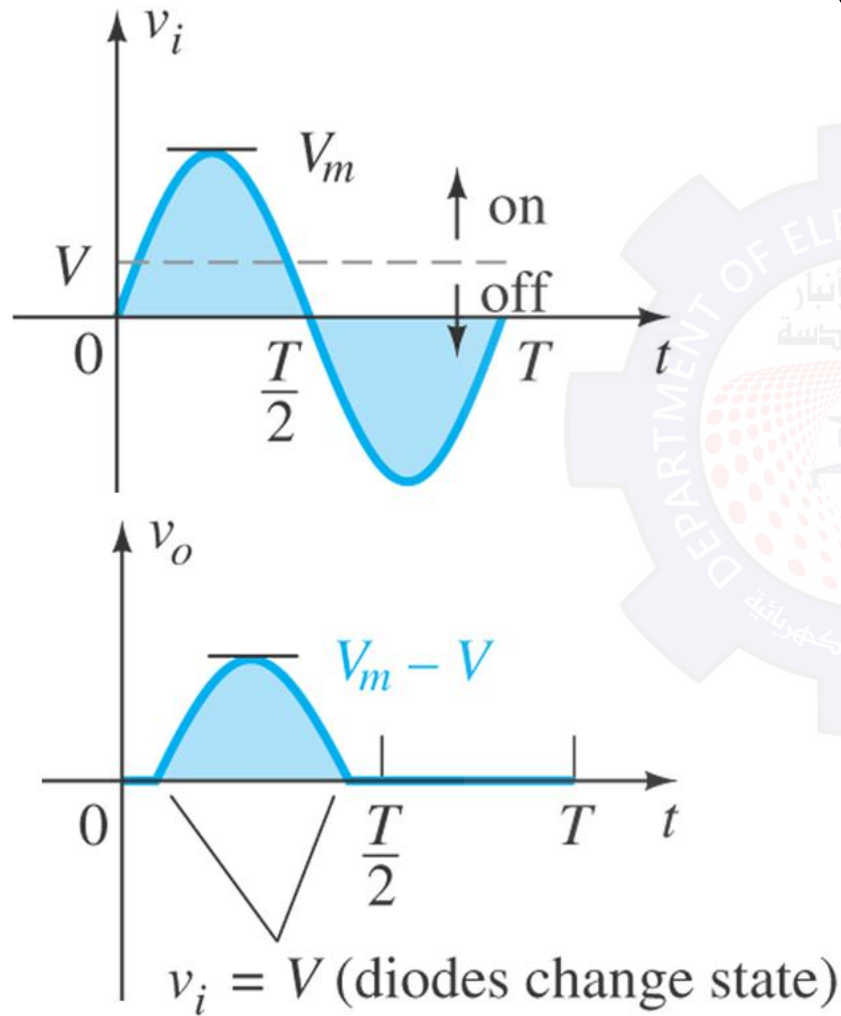




## Biased Clippers

**Adding a DC source in series with the clipping diode changes the effective forward bias of the diode.**

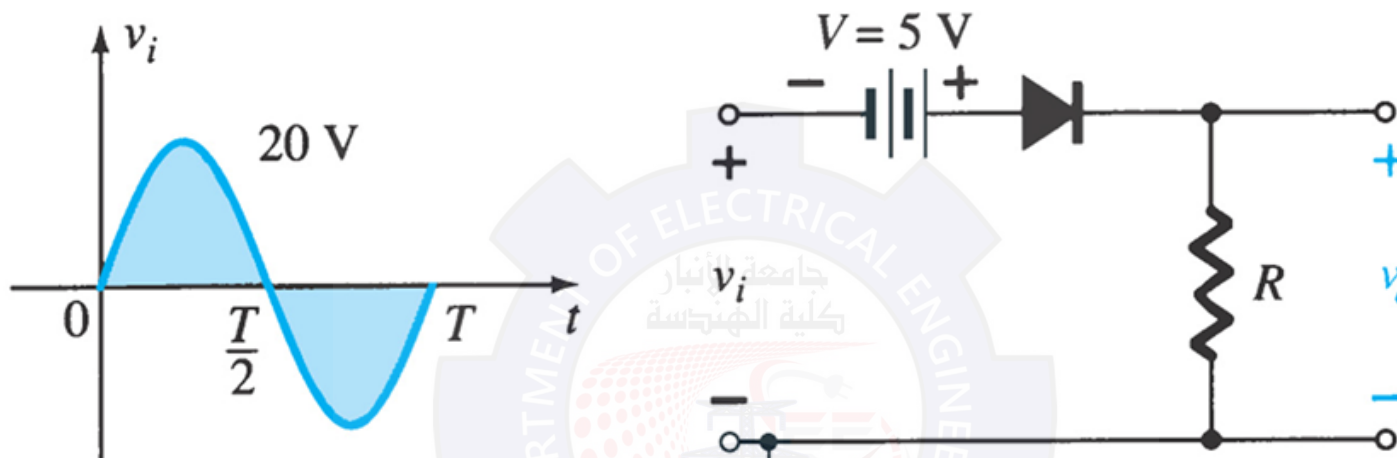




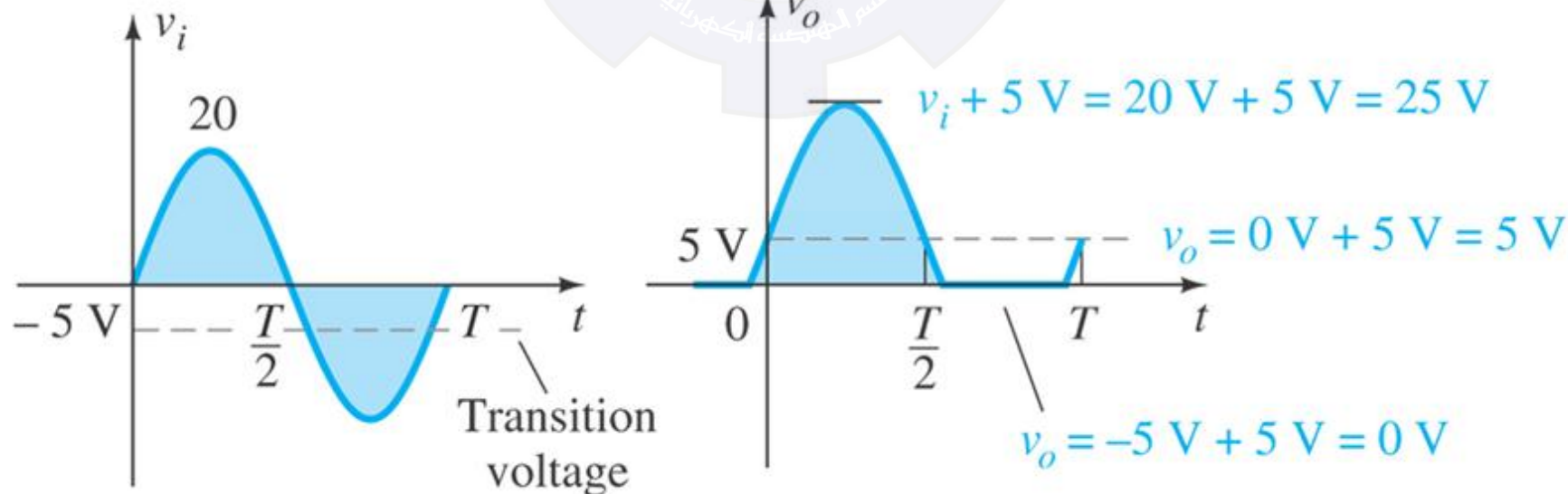
Determining  $v_o$  for the diode in the “on” state.



## Example 2.18 Determine the output waveform for the network.

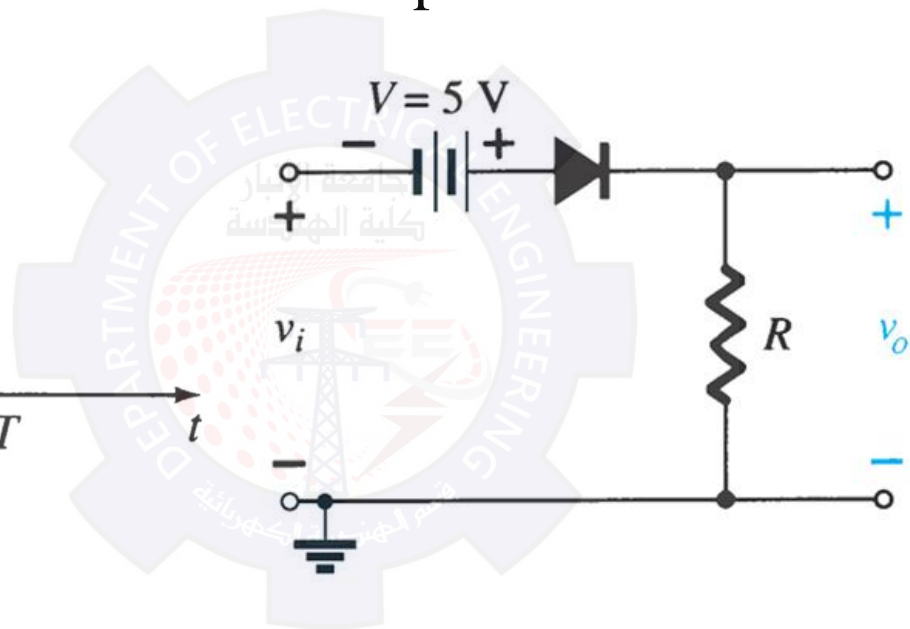
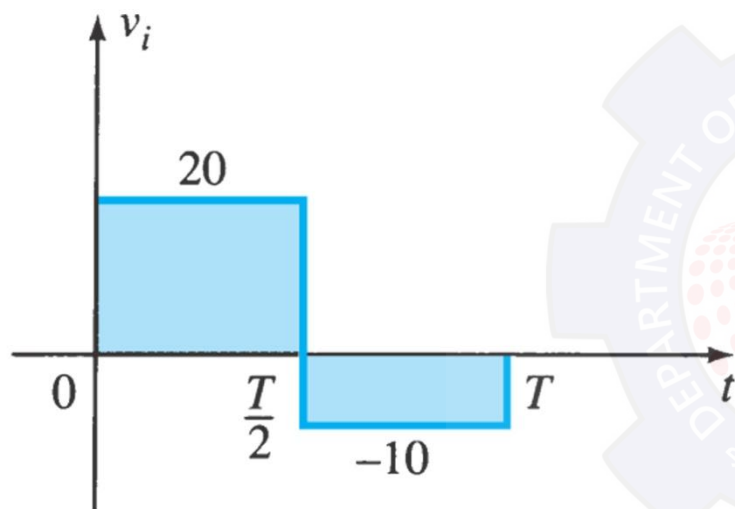


### Solution





**Example 2.19** Determine the output waveform for the network.



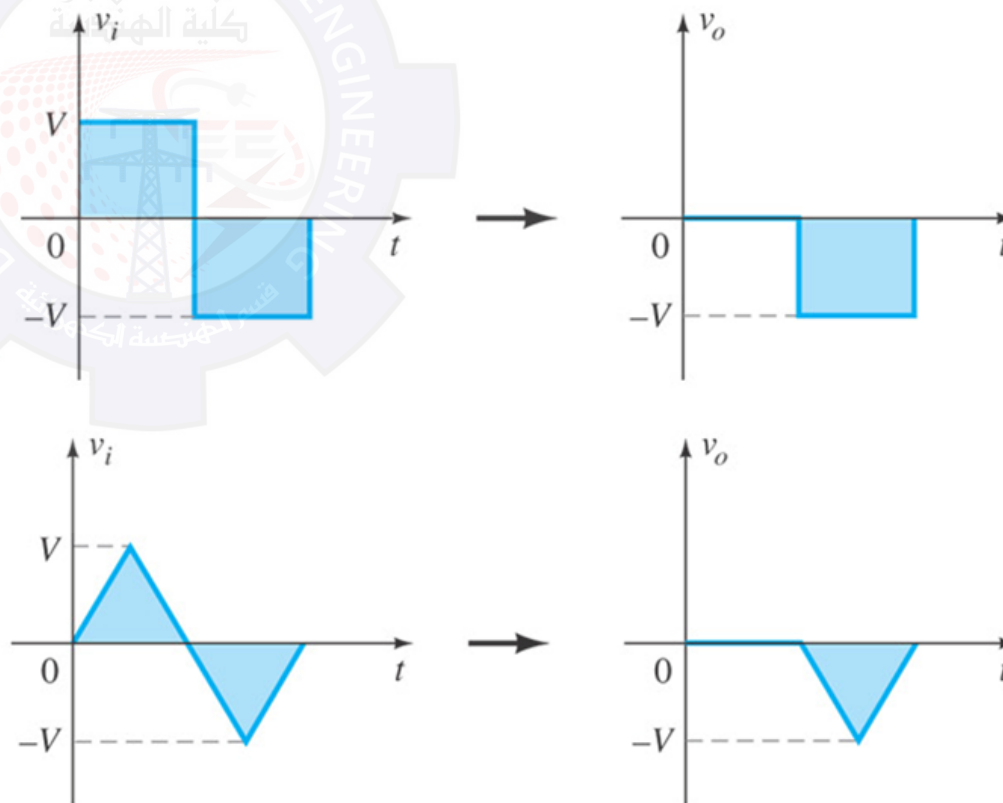
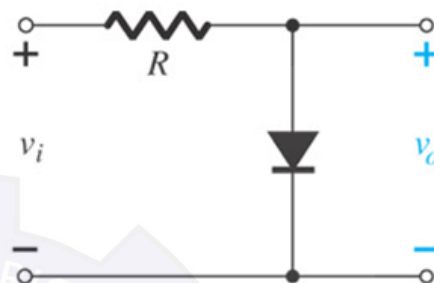
**Solution**



# Parallel Clippers

The diode in a **parallel clipper** circuit “clips” any voltage that forward bias it.

DC biasing can be added in series with the diode to change the clipping level.

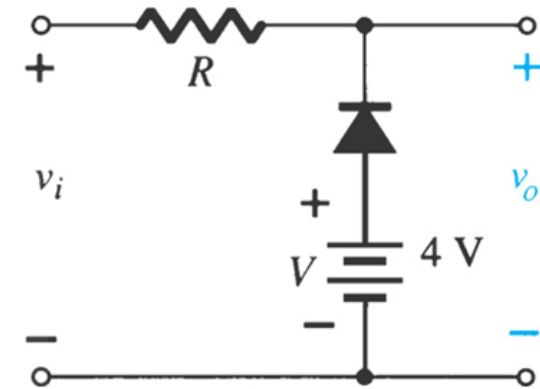
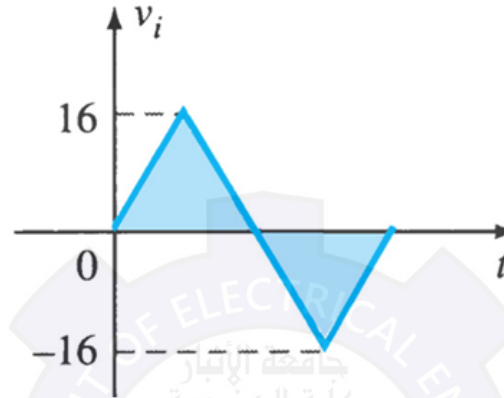
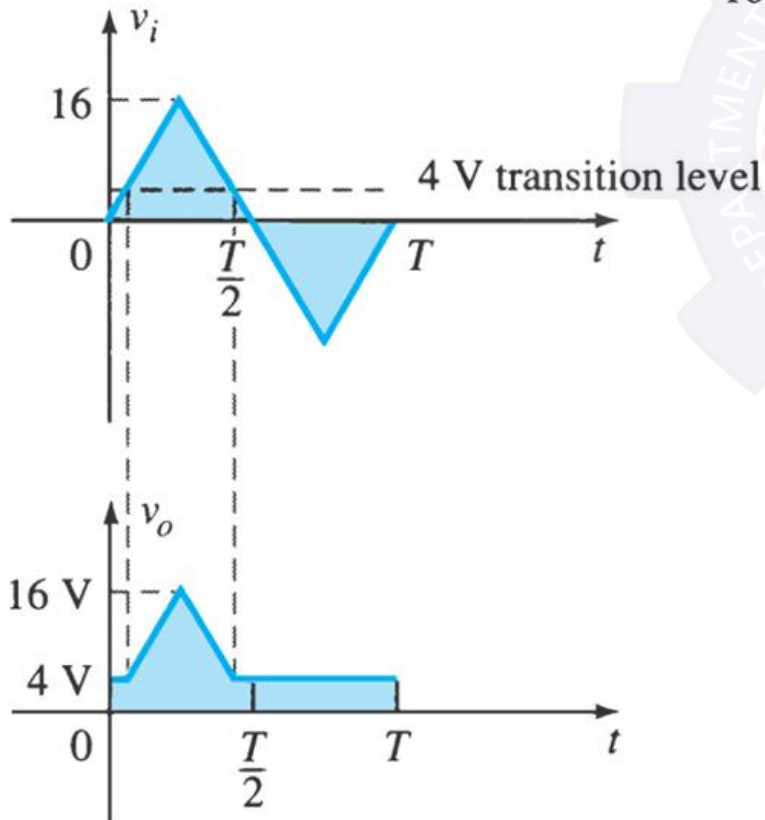




## Example 2.20

Determine  $v_o$  for the network shown.

**Solution**



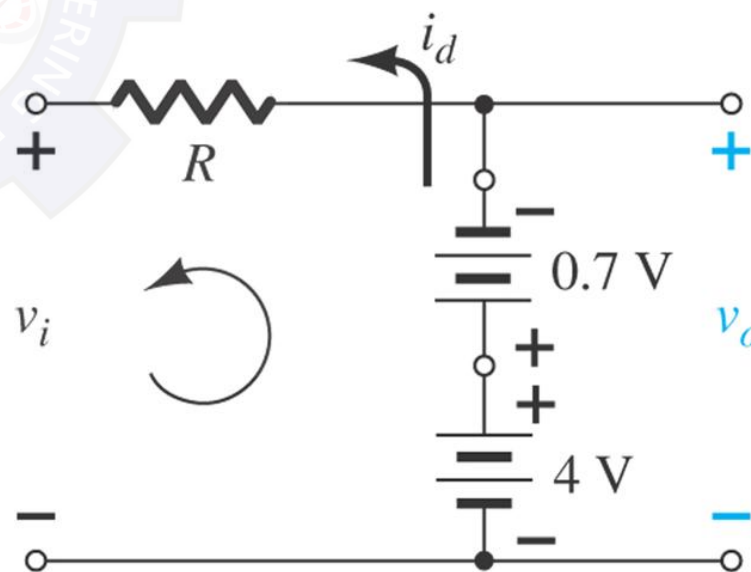
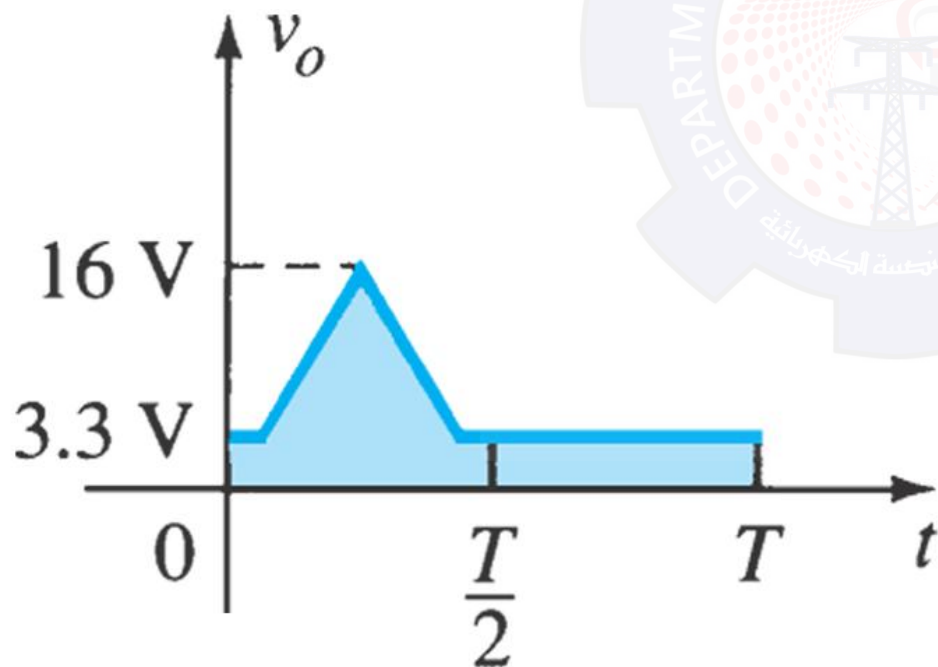
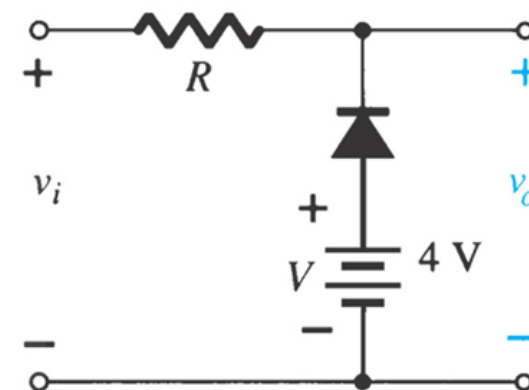
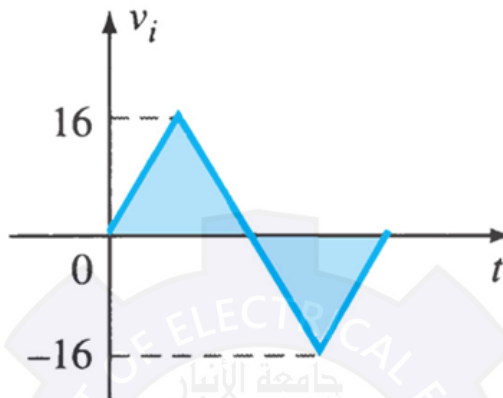




## Example 2.21

Determine  $v_o$  for the network if silicon diode is used.

### Solution



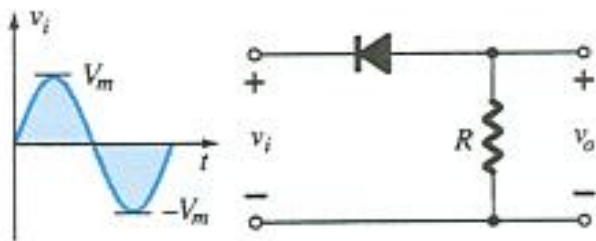
.Determining  $v_o$  for the diode in the "on" state



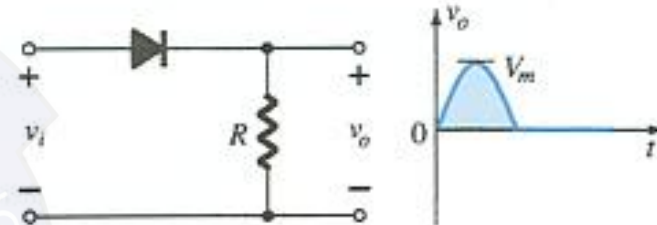
# Summary of Clipper Circuits

## Simple Series Clippers (Ideal Diodes)

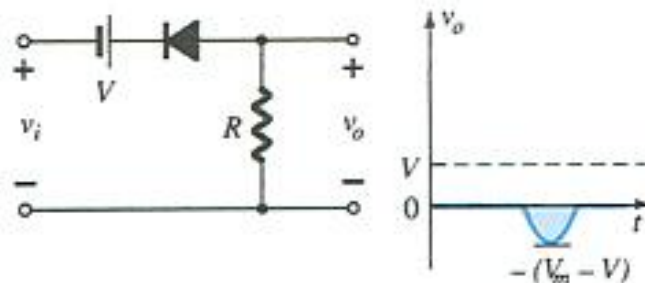
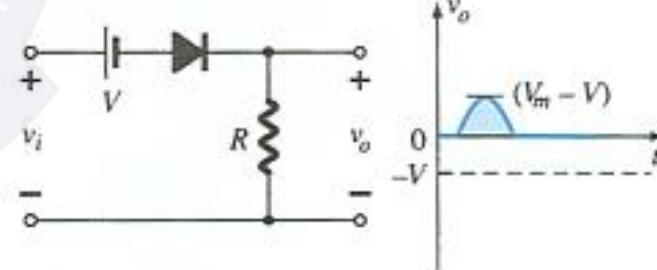
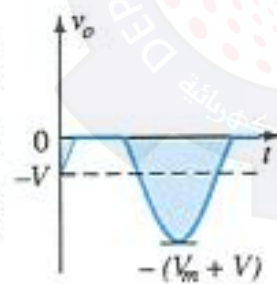
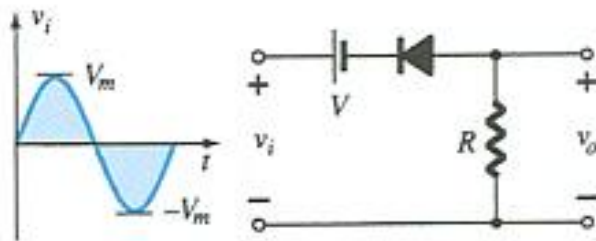
POSITIVE



NEGATIVE



## Biased Series Clippers (Ideal Diodes)



more...

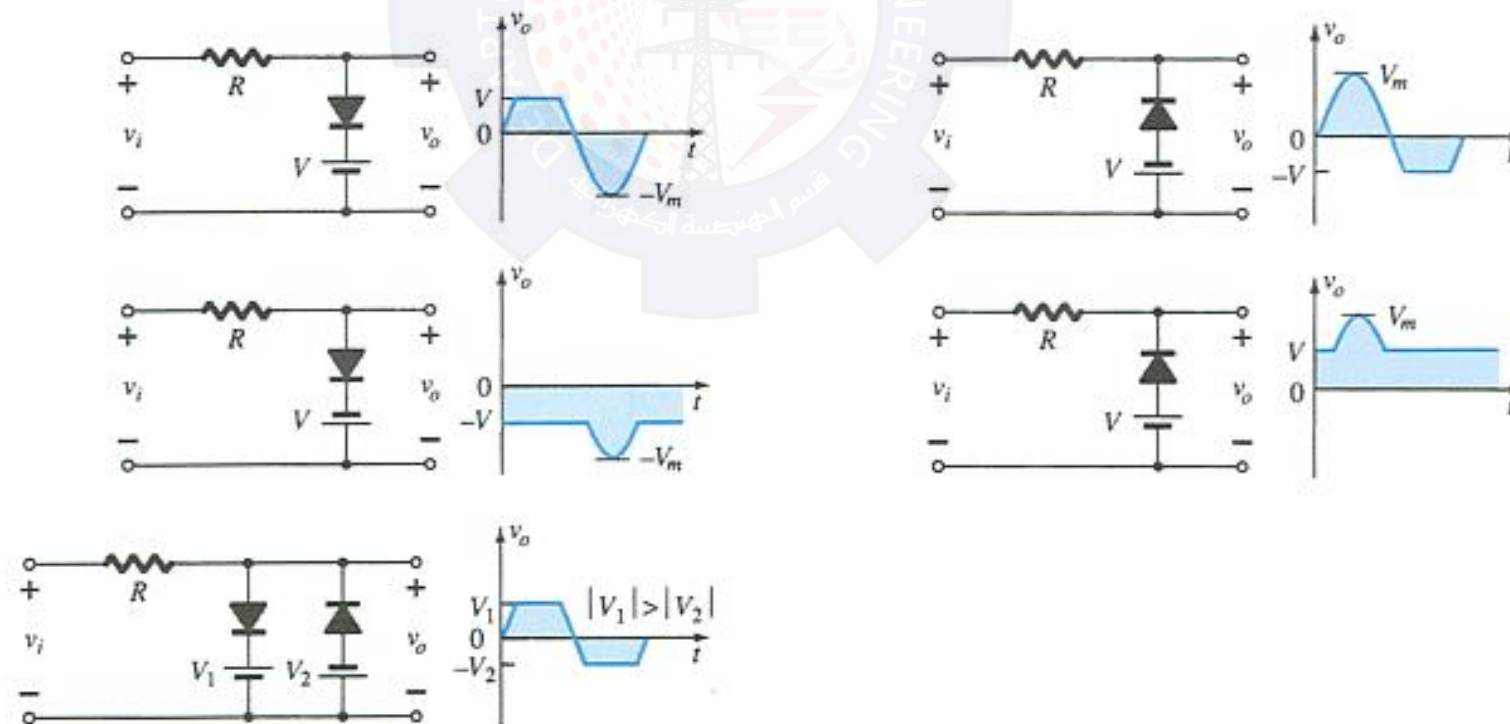


# Summary of Clipper Circuits

## Simple Parallel Clippers (Ideal Diodes)

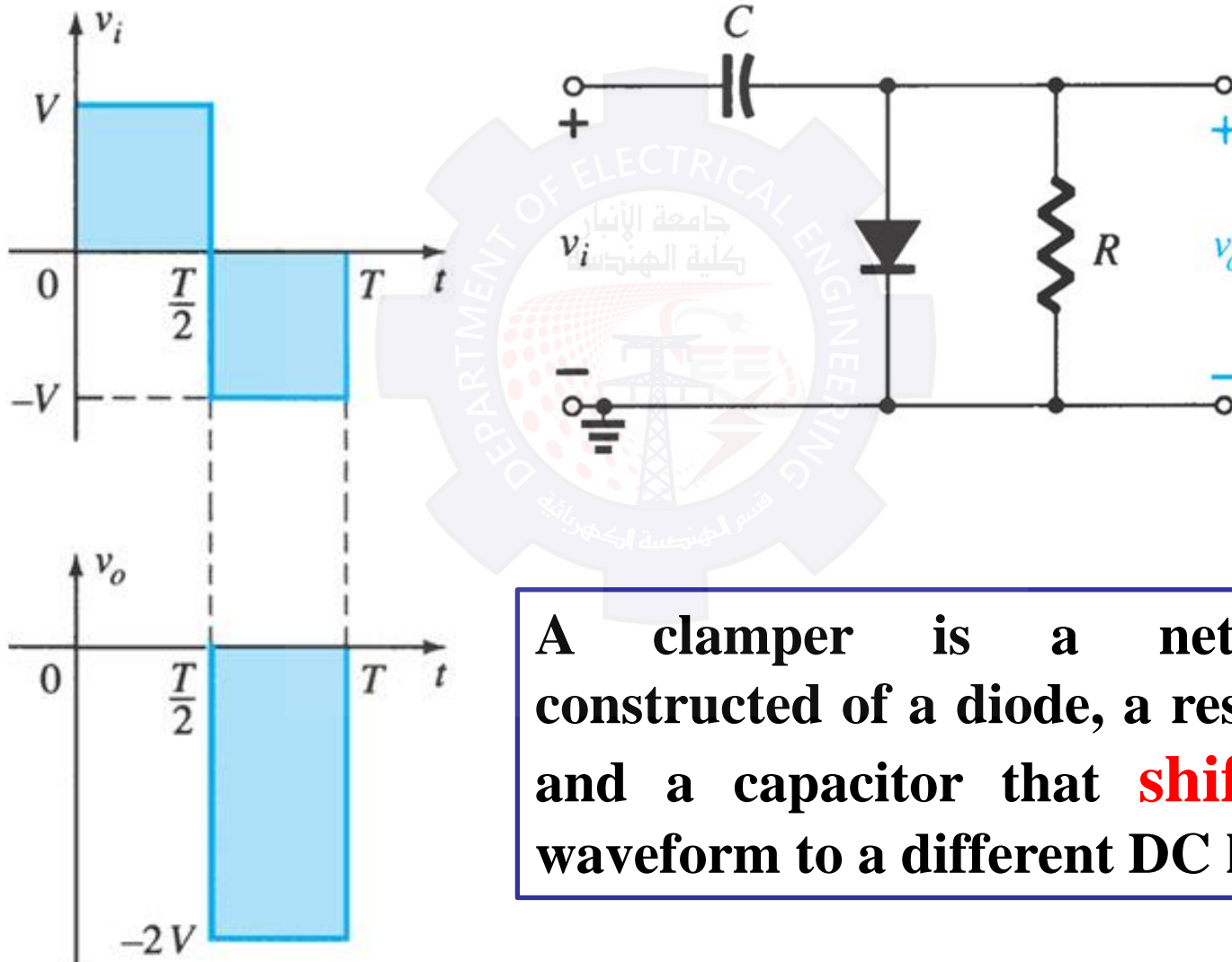


## Biased Parallel Clippers (Ideal Diodes)





# Clampers

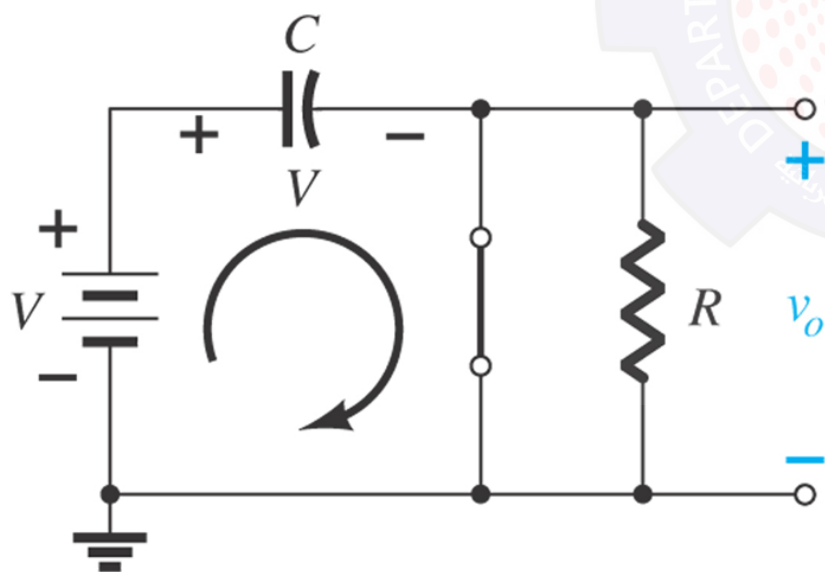
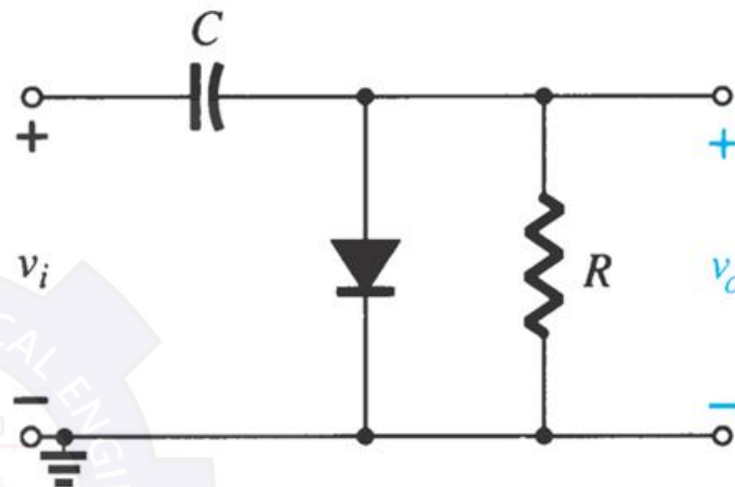


A clamper is a network constructed of a diode, a resistor, and a capacitor that **shifts** a waveform to a different DC level.

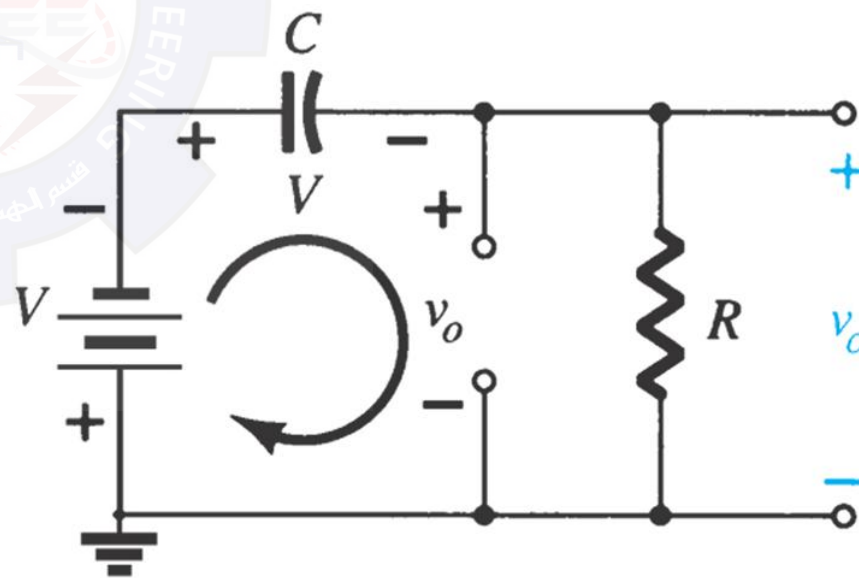


# Clampers

$R$  is chosen such that the discharge period  $5\tau=5RC$  is much larger than the period  $T/2 \rightarrow T$ , and the capacitor is assumed to hold onto all its charge.



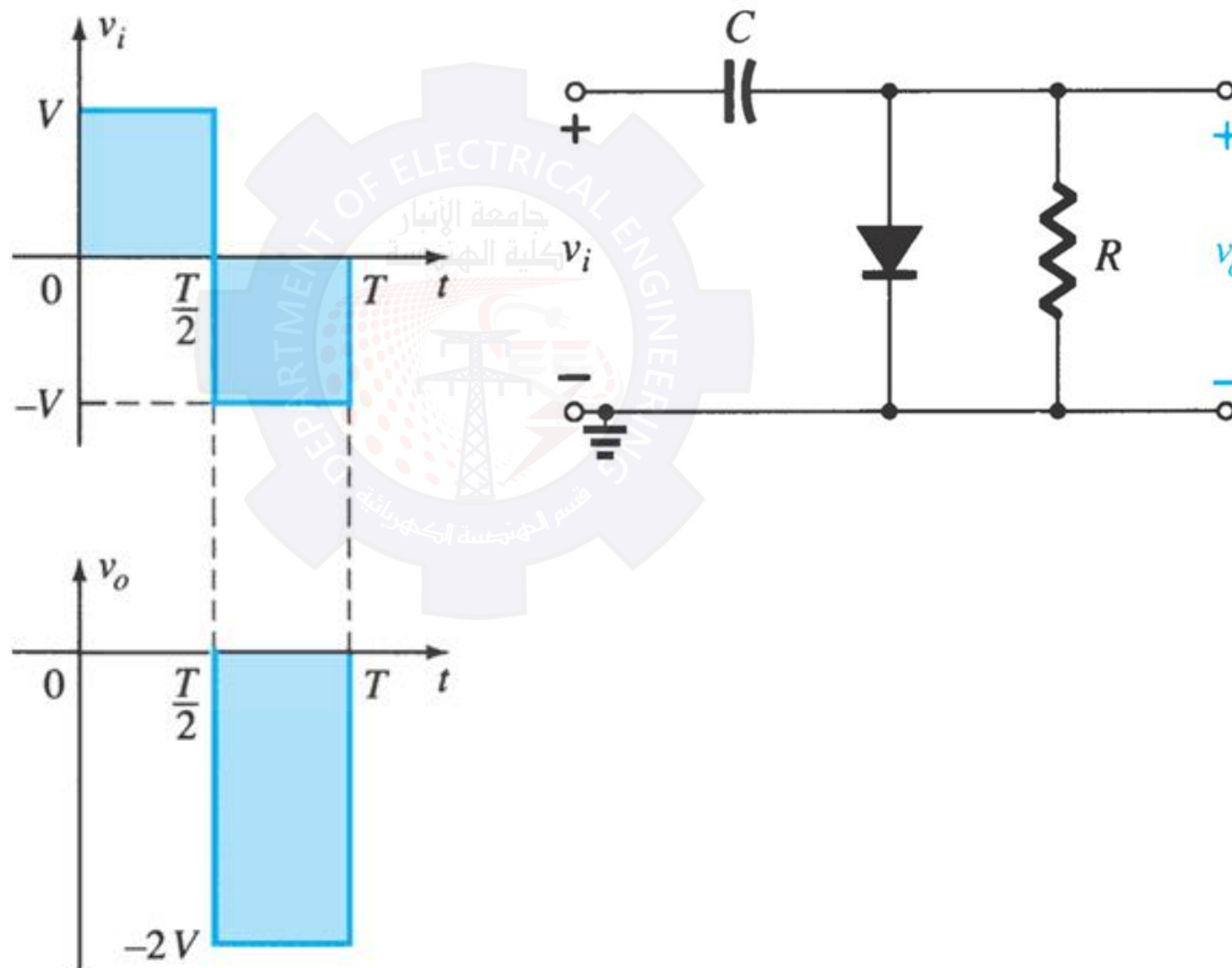
Diode "on" and the capacitor charging to  $V$  volts.



Determining  $v_o$  with the diode "off."



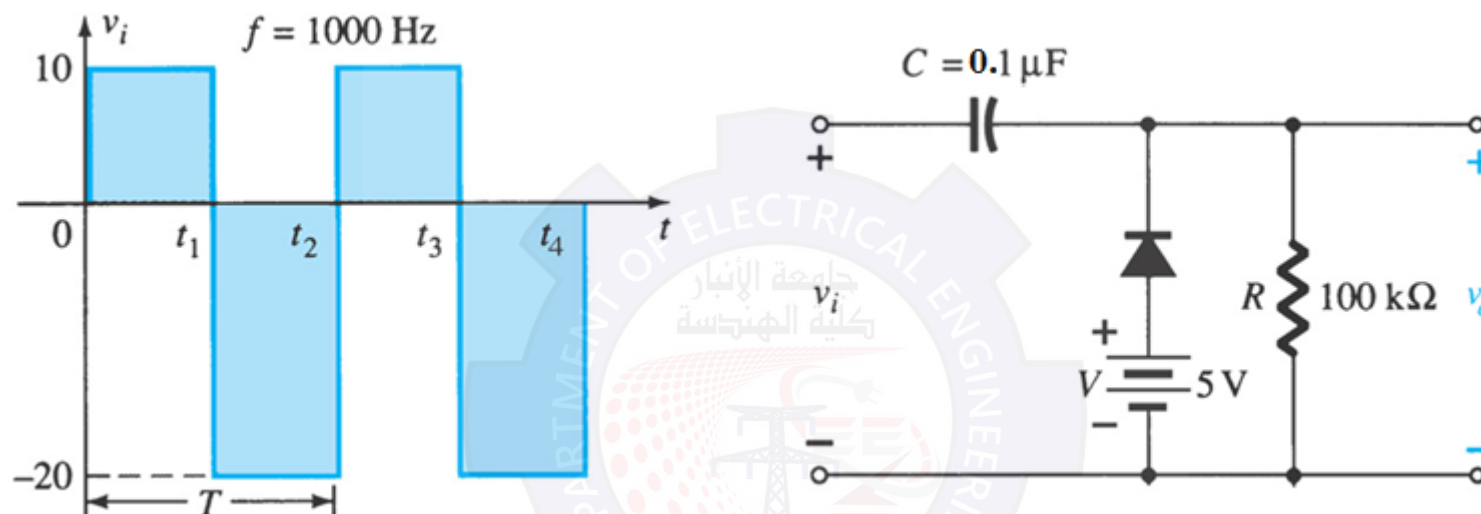
# Clampers



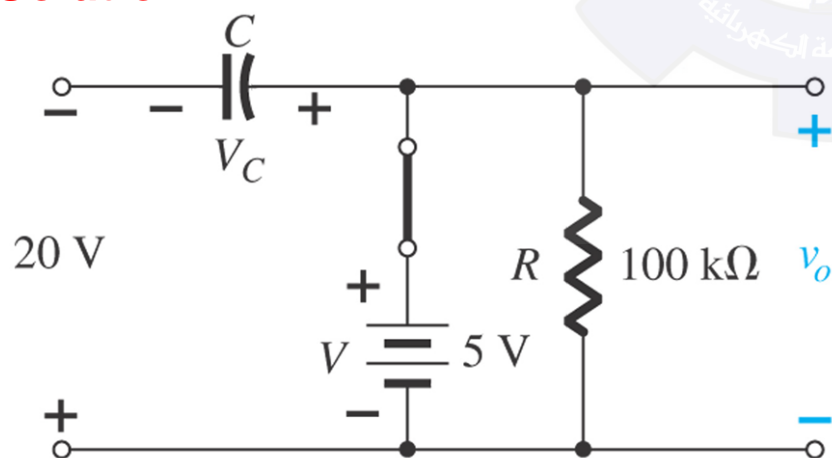




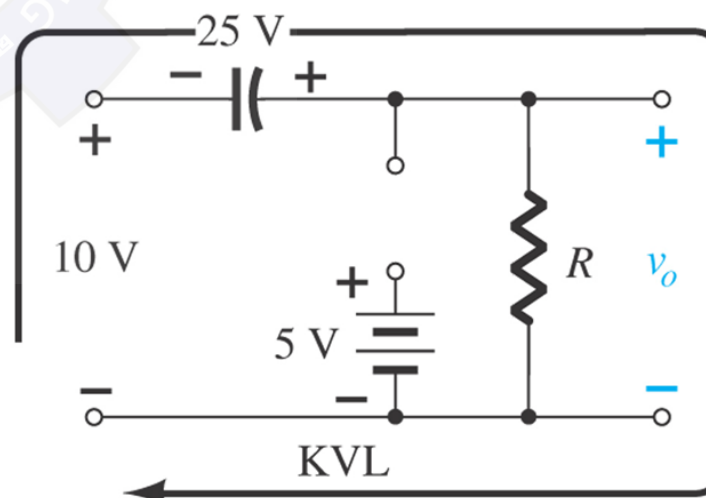
## Example 2.22 Determine $v_o$ for the network.



### Solution



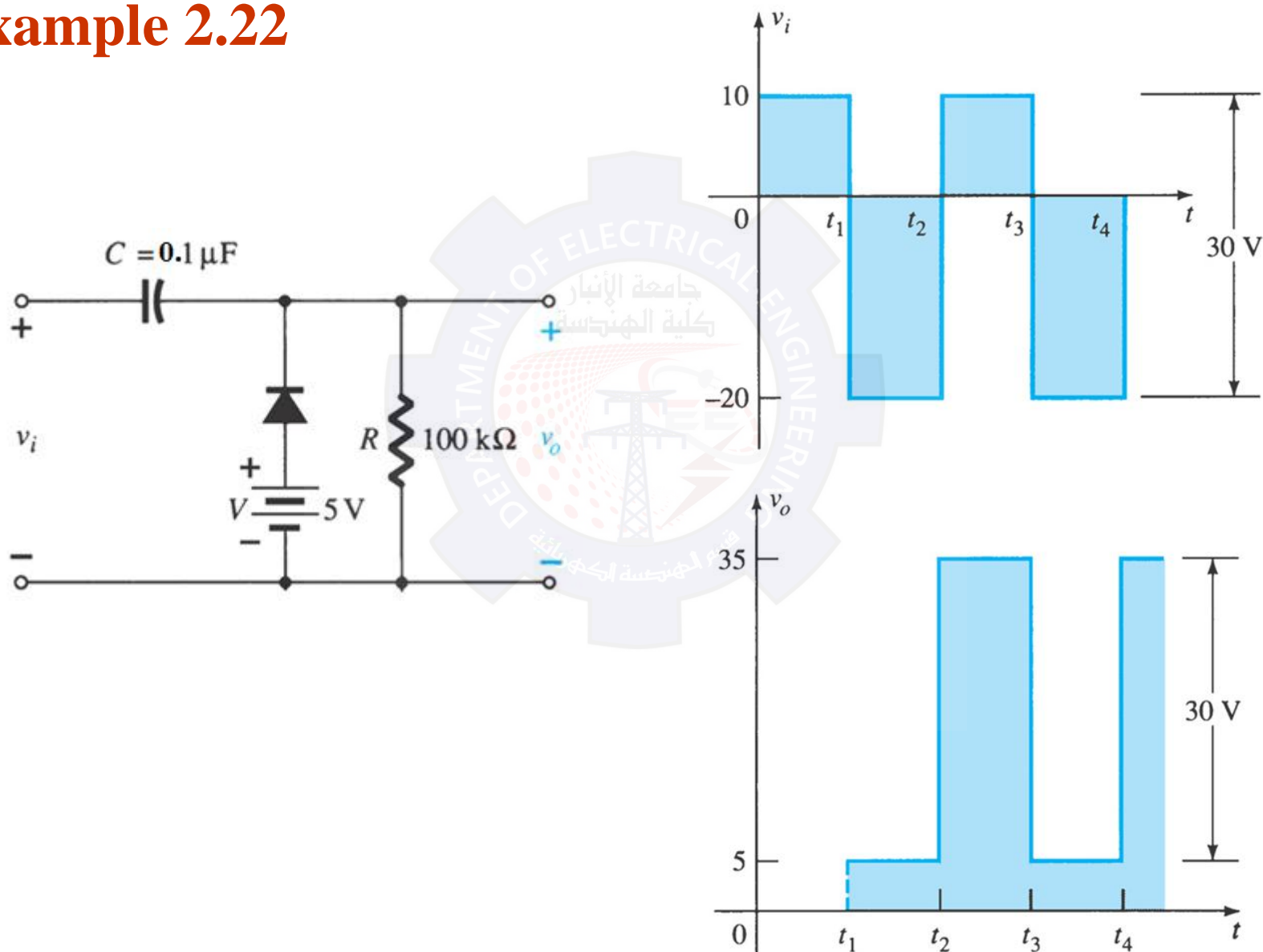
Determining  $v_o$  and  $V_C$  with the diode in the "on" state.



Determining  $v_o$  with the diode in the "off" state.



## Example 2.22

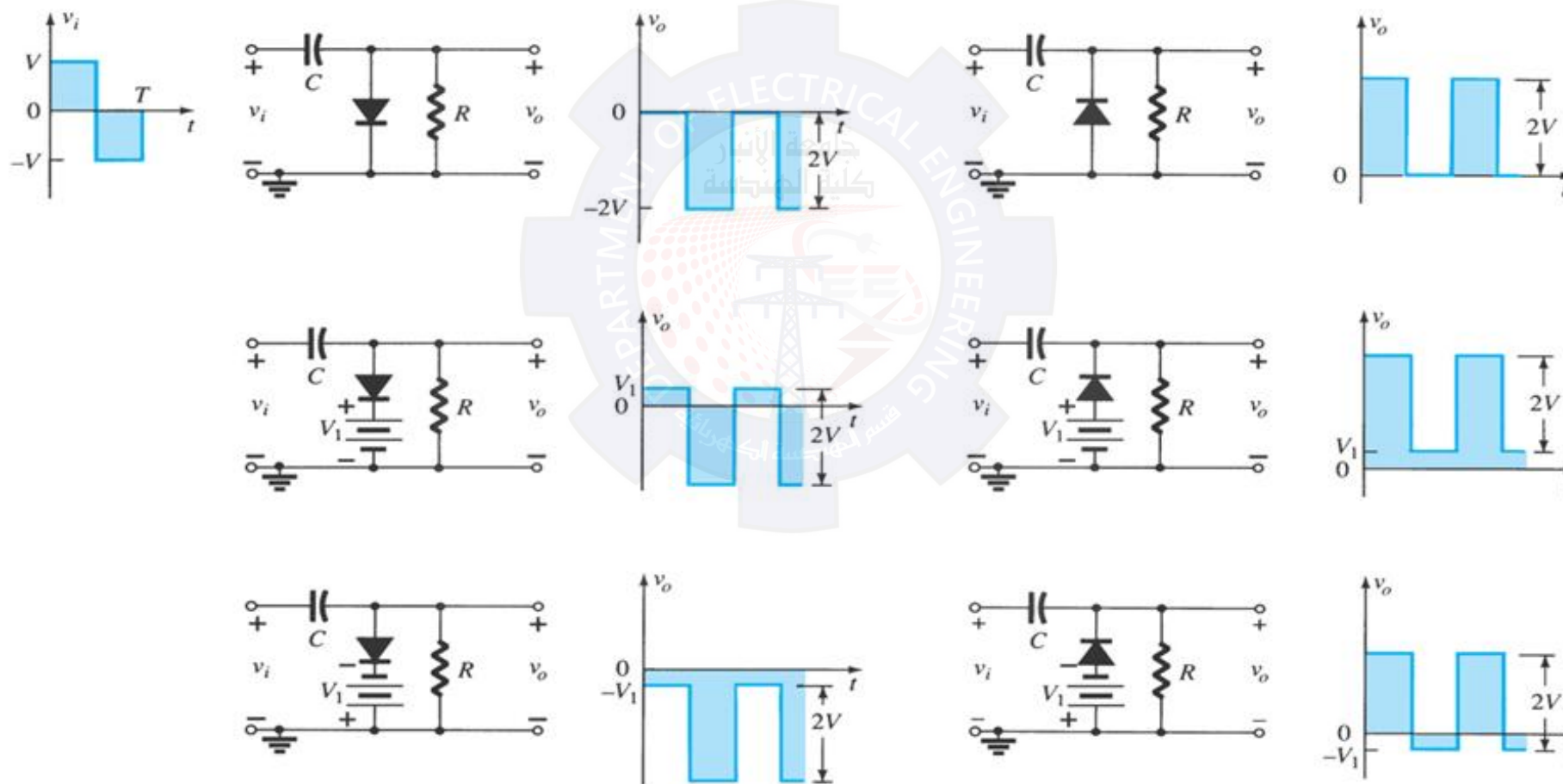






# Summary of Clamper Circuits

## Clamping Networks



Clamping circuits with ideal diodes ( $5\tau = 5RC \gg T/2$ ).