Electrical Science: 2021-22

Lecture 23

Diode Clipper and Clamper Circuits

By Dr. Sanjay Vidhyadharan

Clippers

- **Clipping circuit**: A wave shaping circuit which controls the shape of the output waveform by removing or clipping a portion of the applied wave.
- Half wave rectifier is the simplest example. (It clips negative half cycle).
- Also referred as voltage limiters/ amplitude selectors/ slicers.
- Applications:

  - In radio receivers for communication circuits.
  - In radars, digital computers and other electronic systems.
  - Generation for different waveforms such as trapezoidal, or square waves.
  - Helps in processing the picture signals in television transmitters.
  - In television receivers for separating the synchronising signals from composite picture signals

Clippers

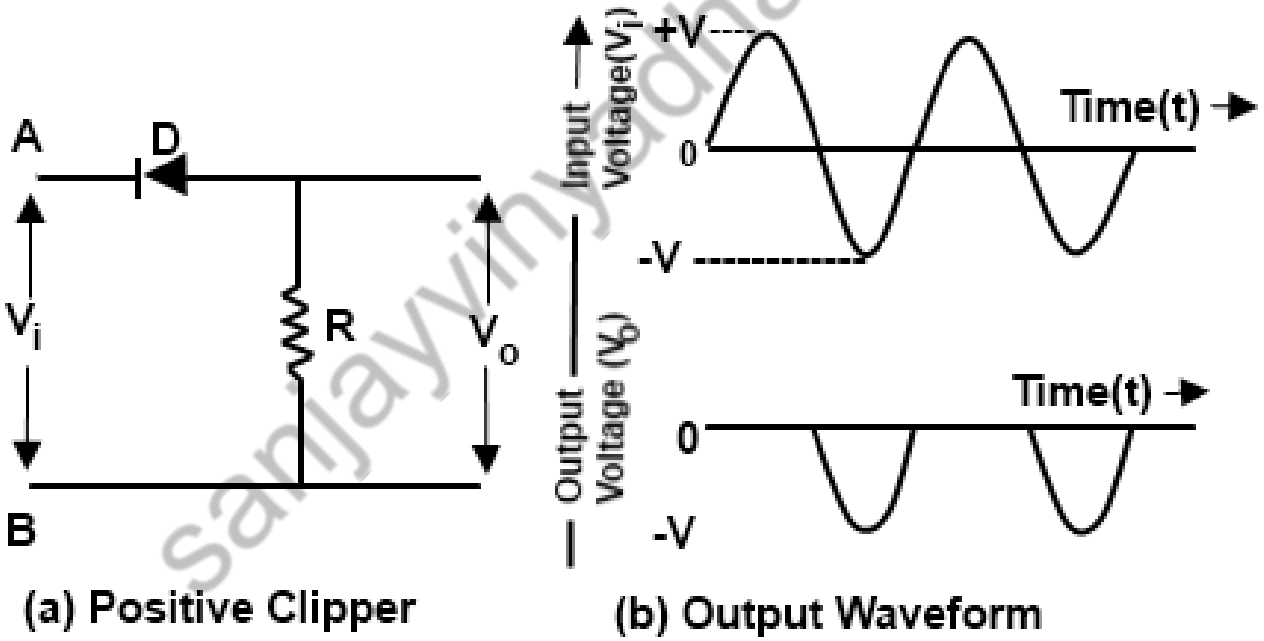
THUMB RULE

Action of biasing on diode

- When diode is forward biased, it acts as a closed switch (ON state).
- When diode is reverse biased, it acts as an open switch (OFF state).

Clippers

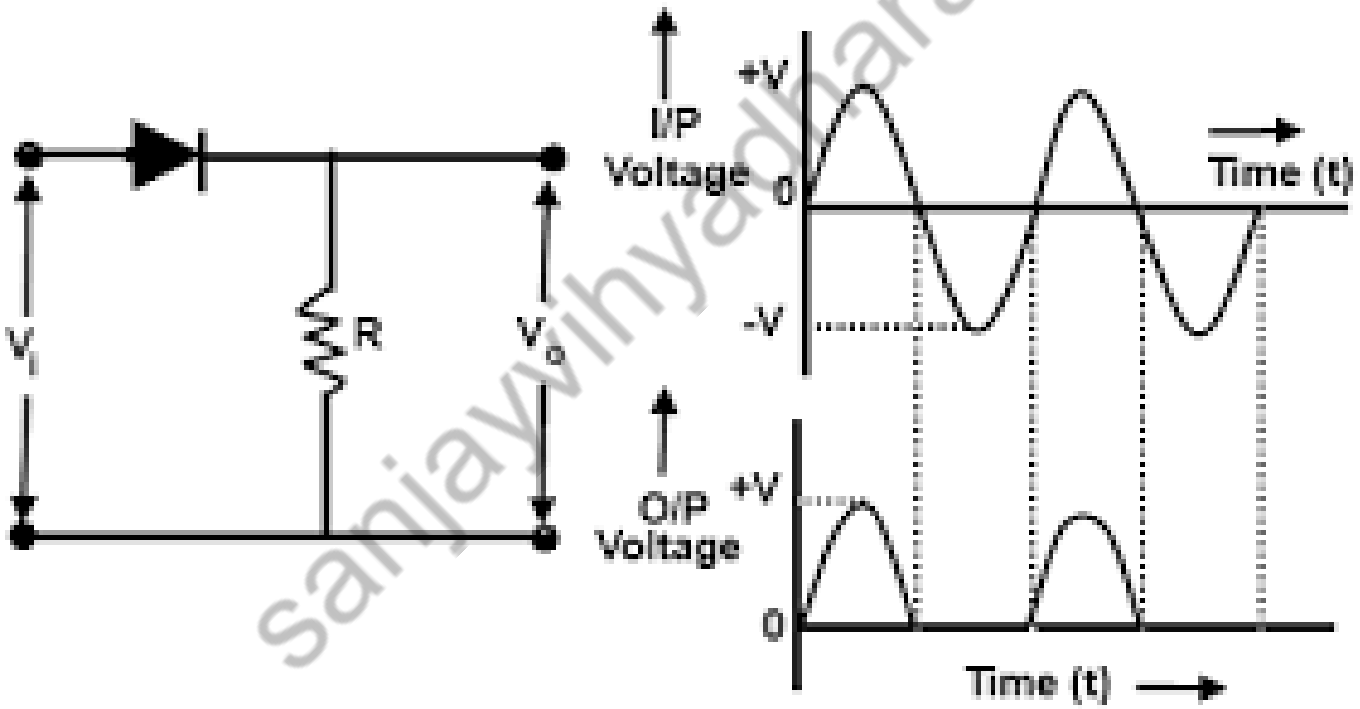
Series Positive Clipping:



(a) Positive Clipper (b) Output Waveform

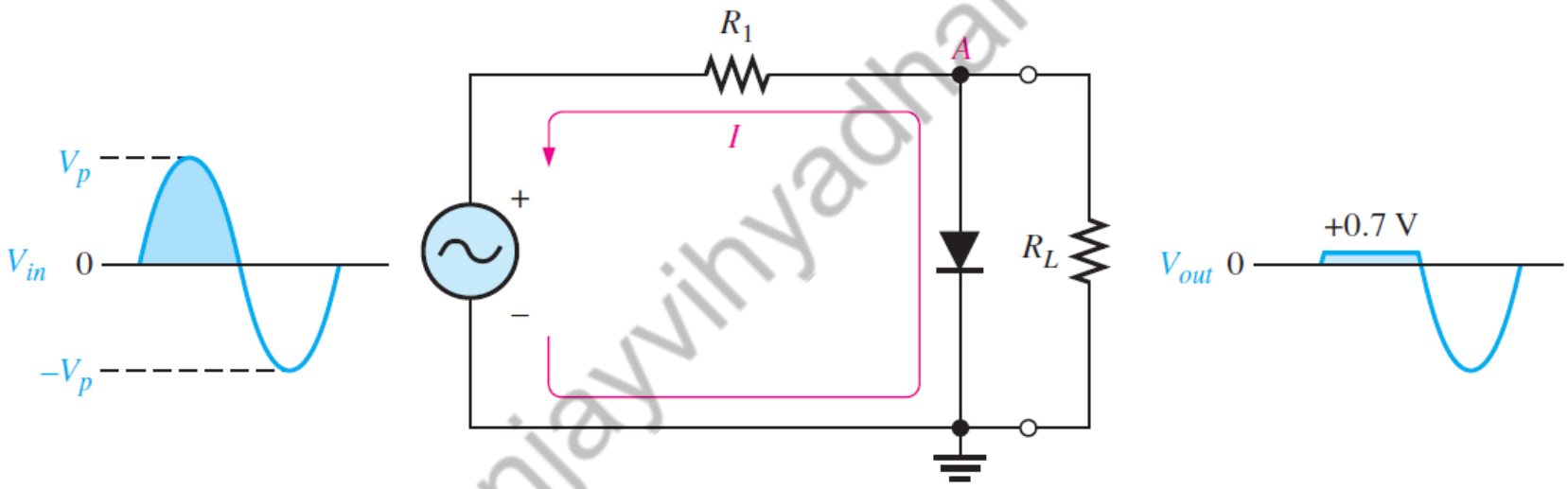
Clippers

Series Negative Clipping:



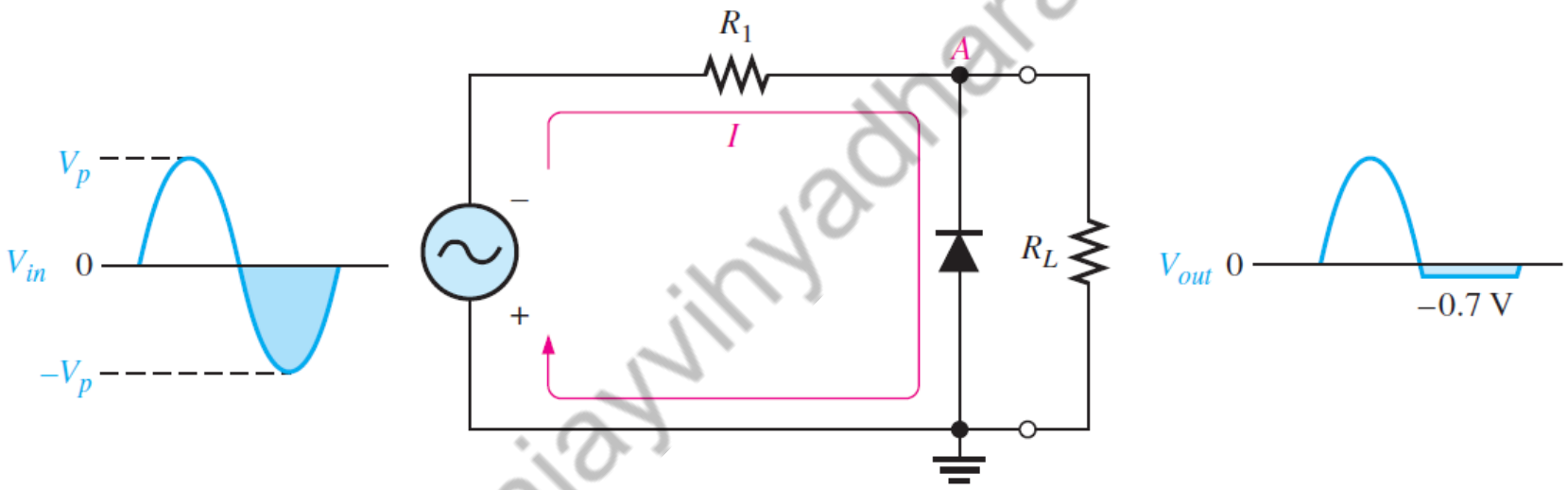
Clippers

Shunt Positive Clipping:



Clippers

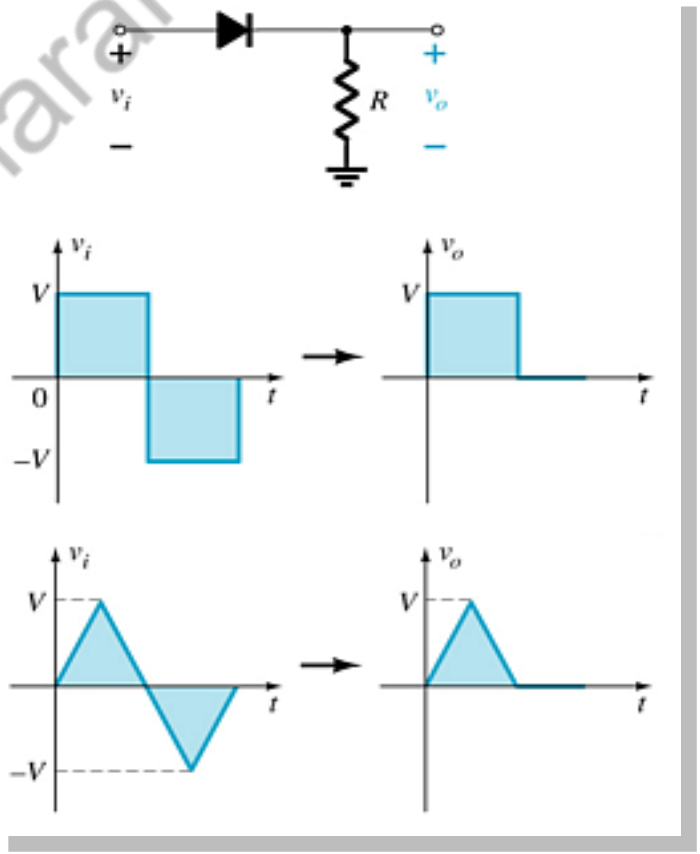
Shunt Negative Clipping:



Clippers

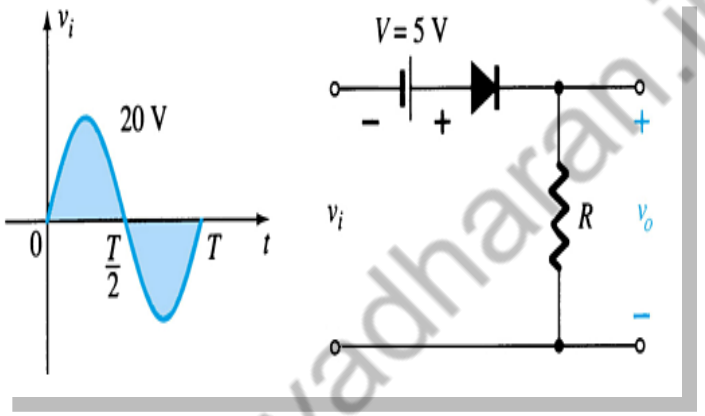
The diode in a series clipper "clips" any voltage that does not forward bias it:

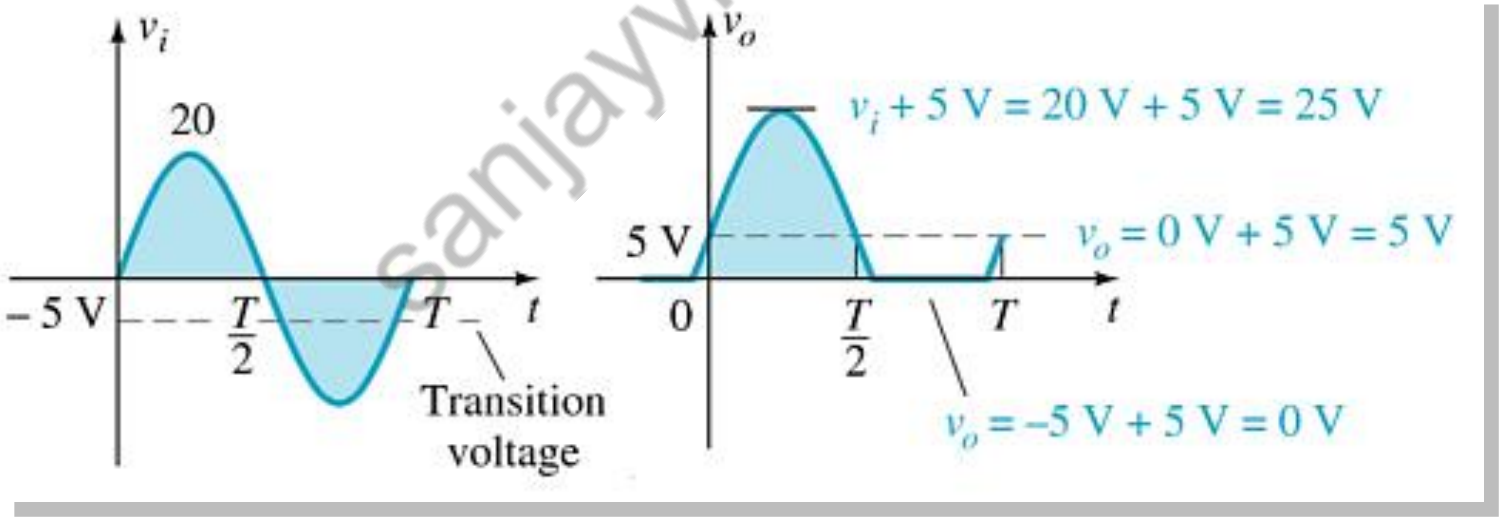
- **A reverse-biasing polarity**
- **A forward-biasing polarity less than 0.7 V (for a silicon diode)**



Clippers

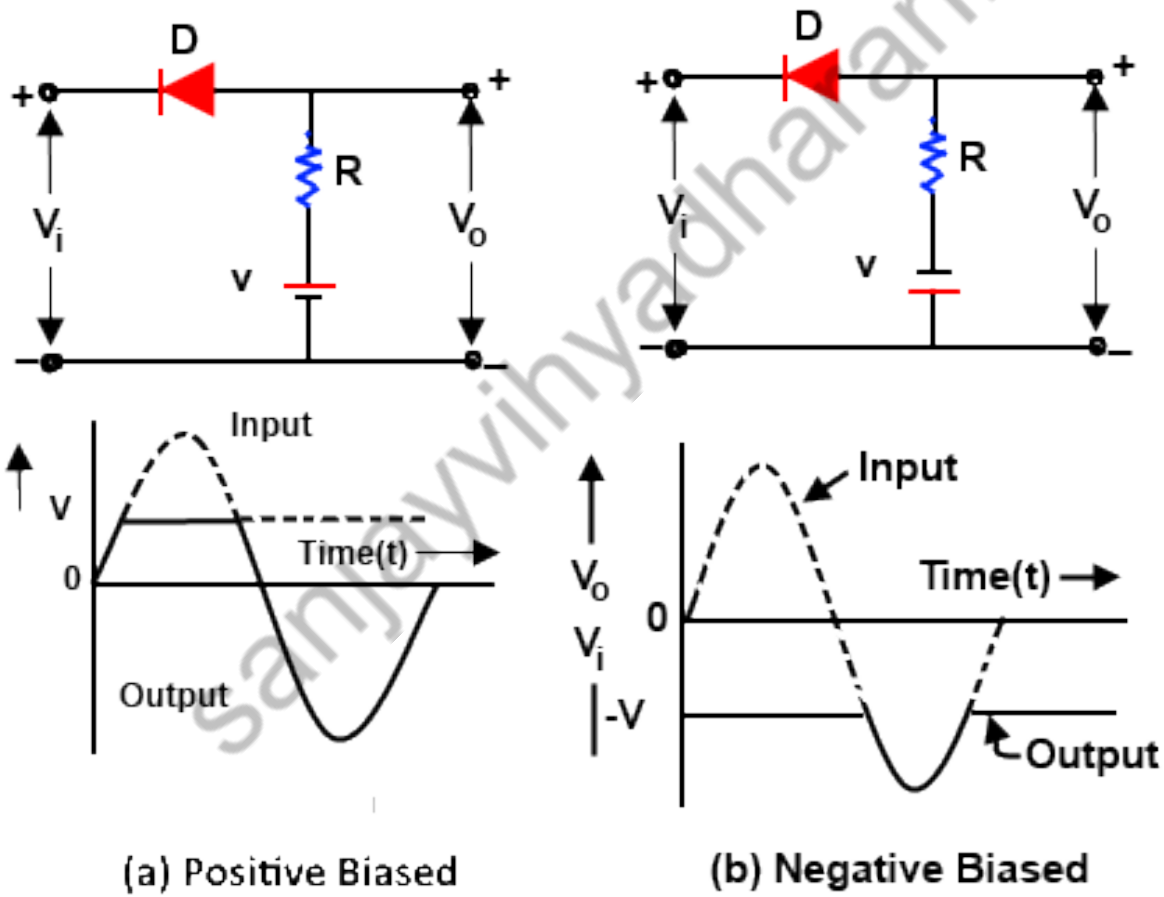
Biased Series Clippers





Clippers

Biased Clippers

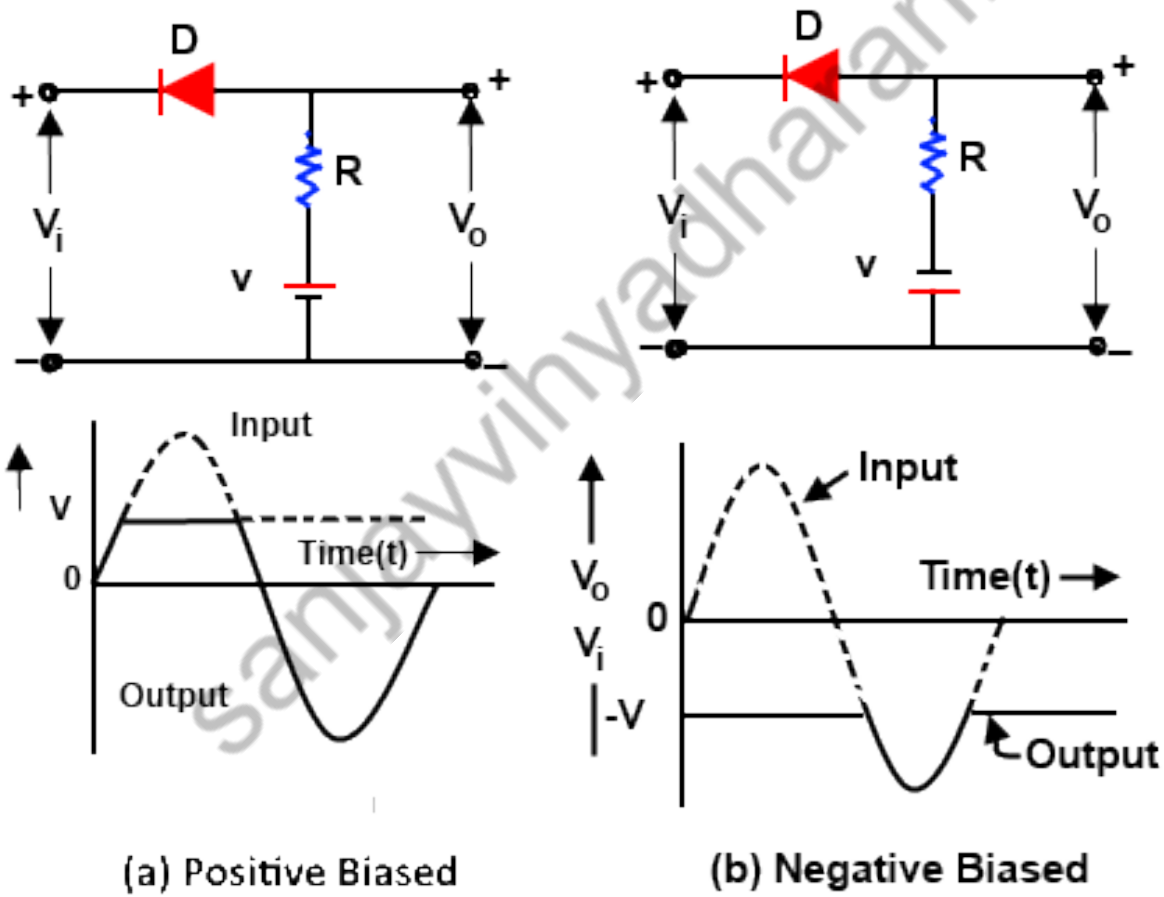


(a) Positive Biased

(b) Negative Biased

Clippers

Biased Clippers



(a) Positive Biased

(b) Negative Biased

Clippers

Combination Clipper

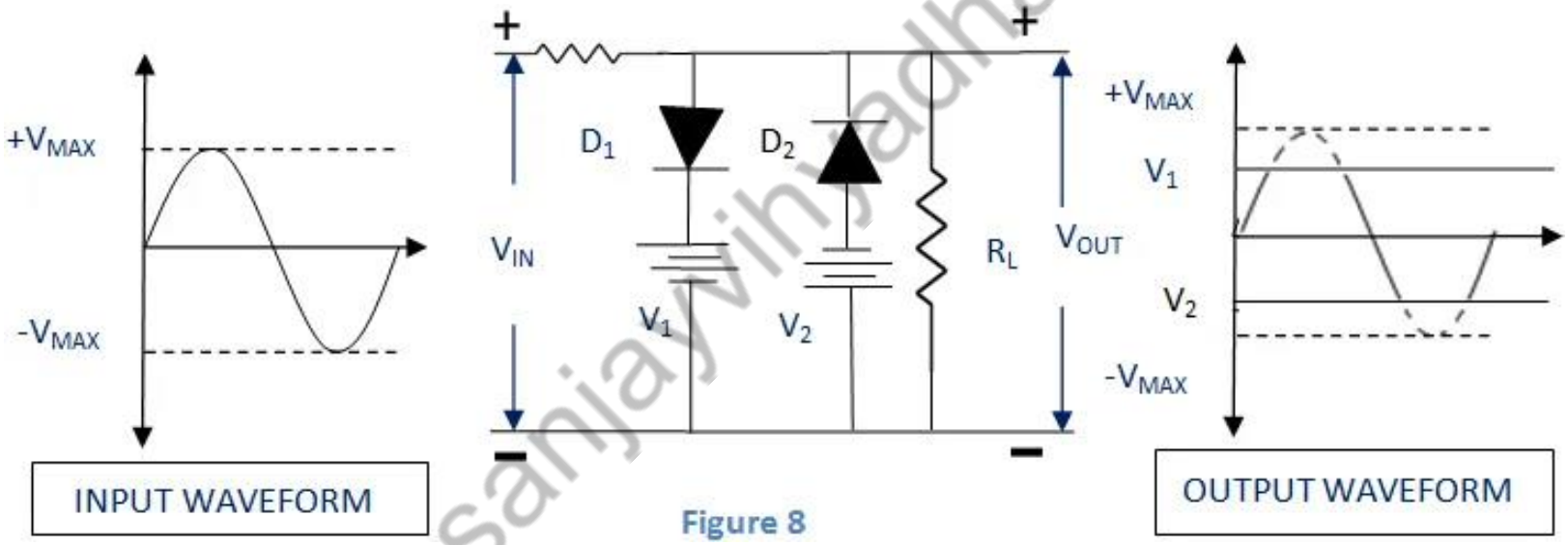
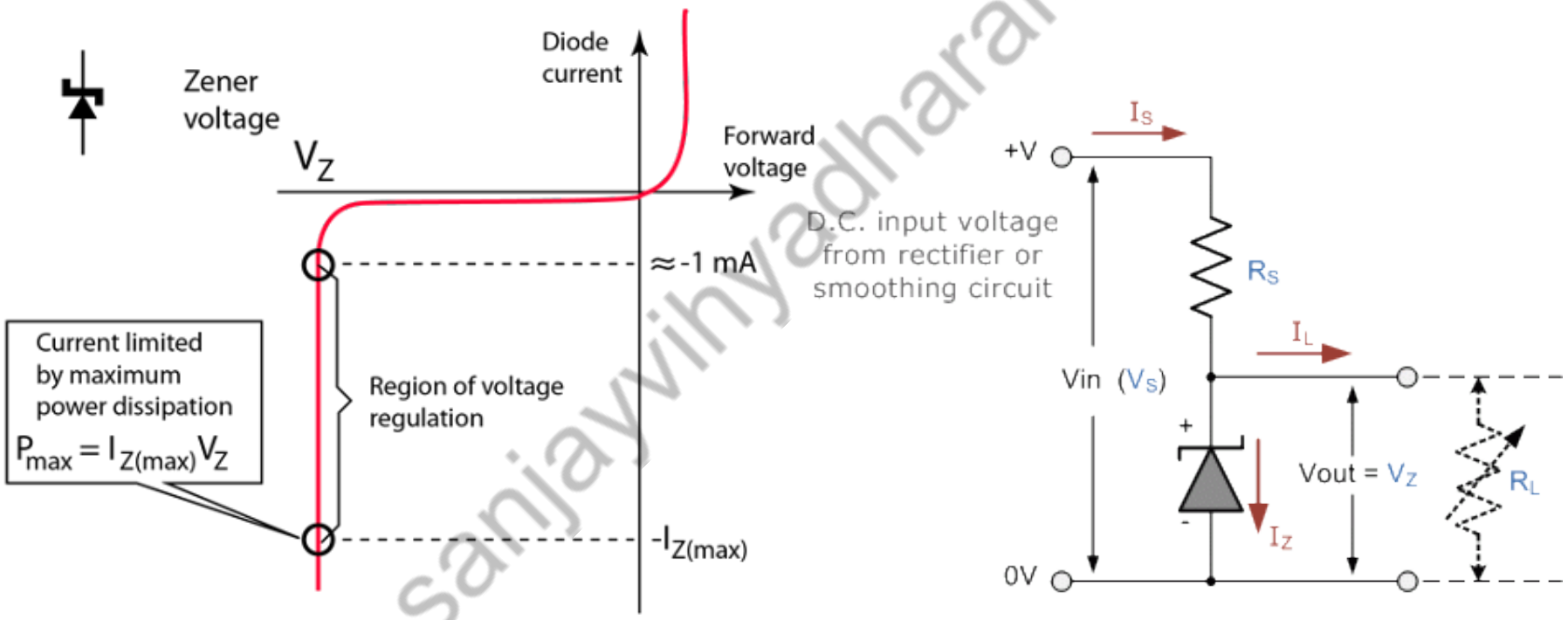
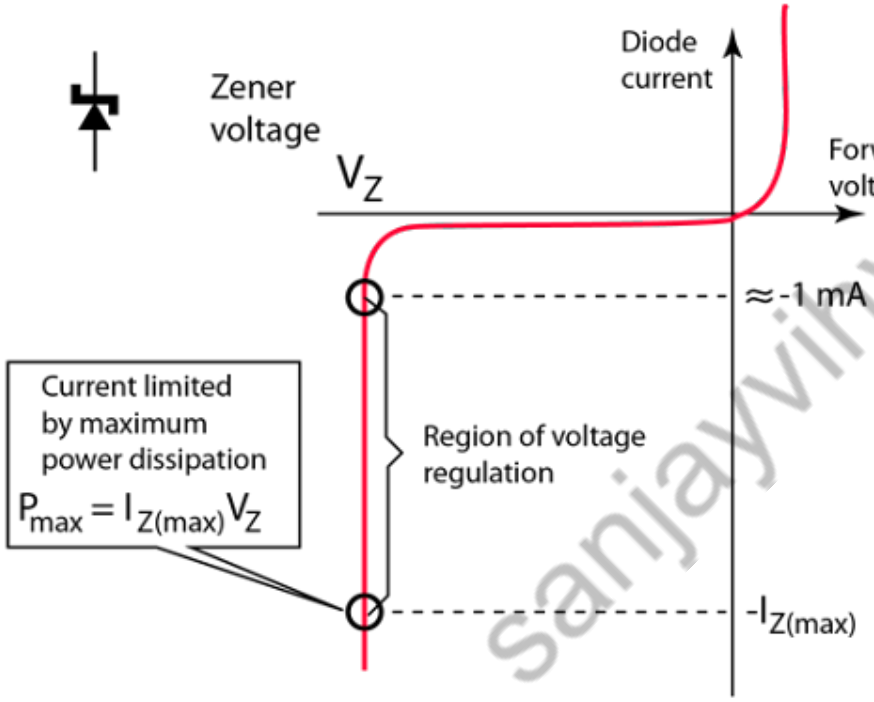


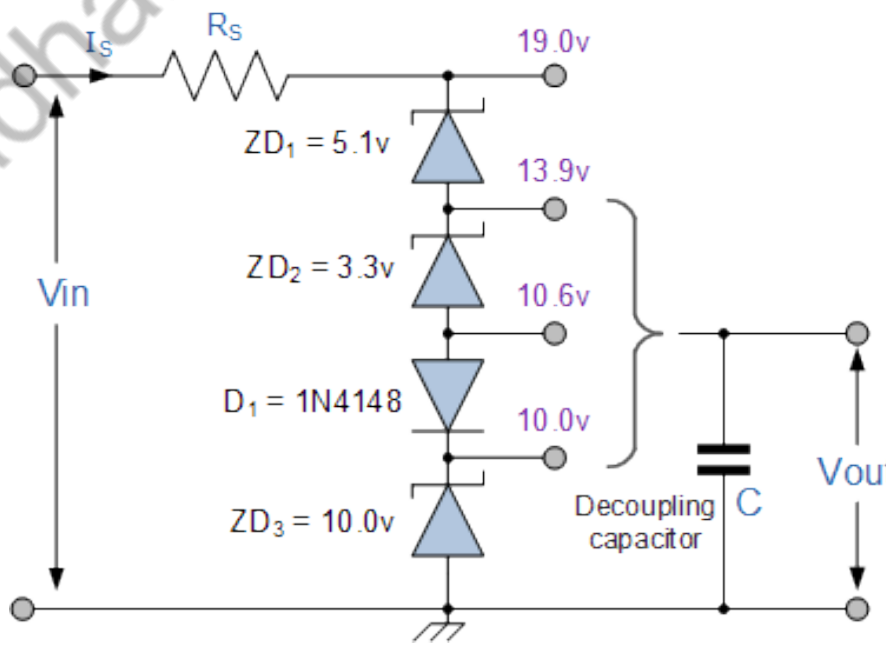
Figure 8

Zener Diodes

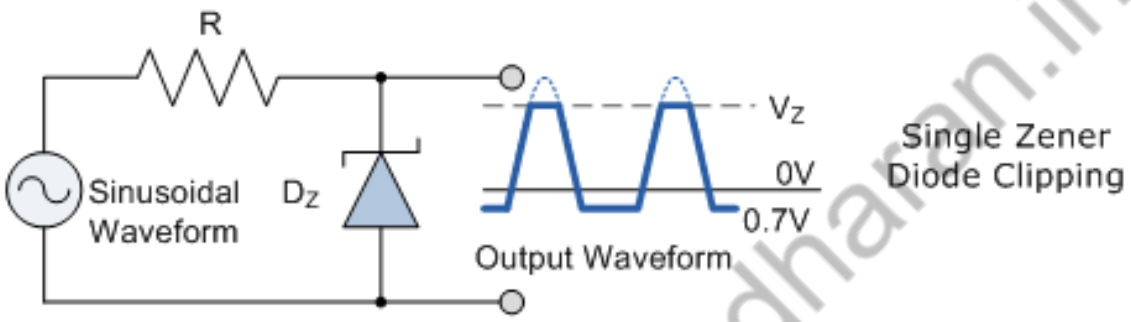


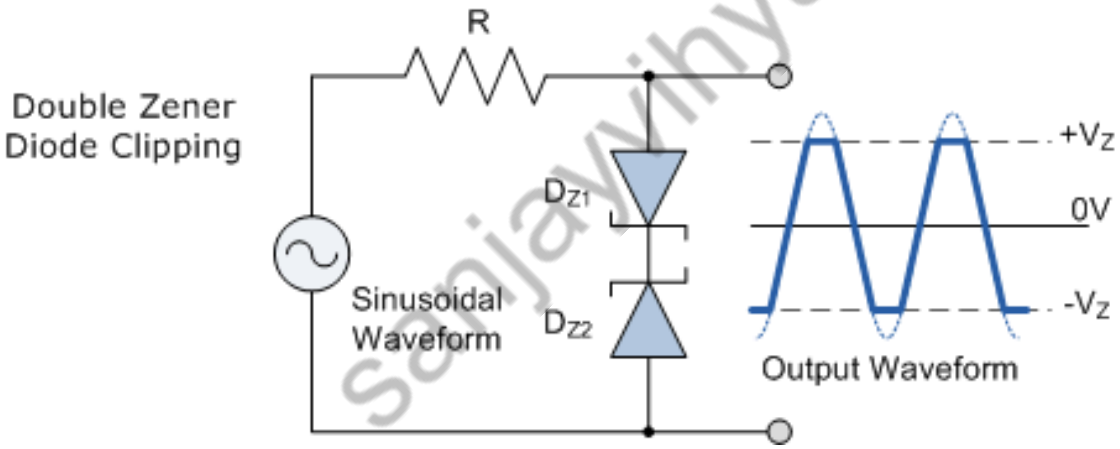
Zener Diodes



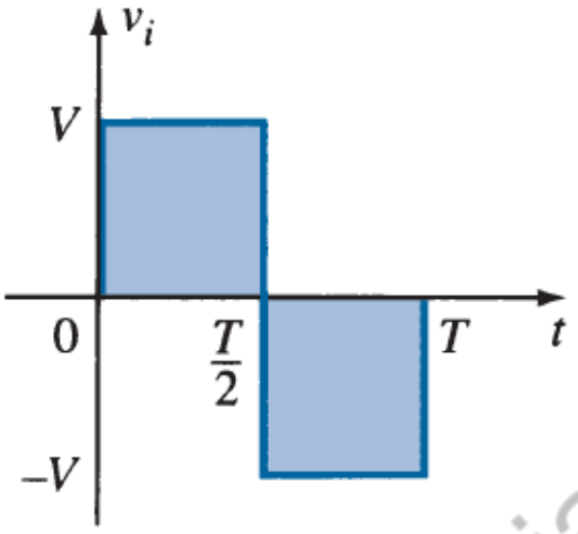


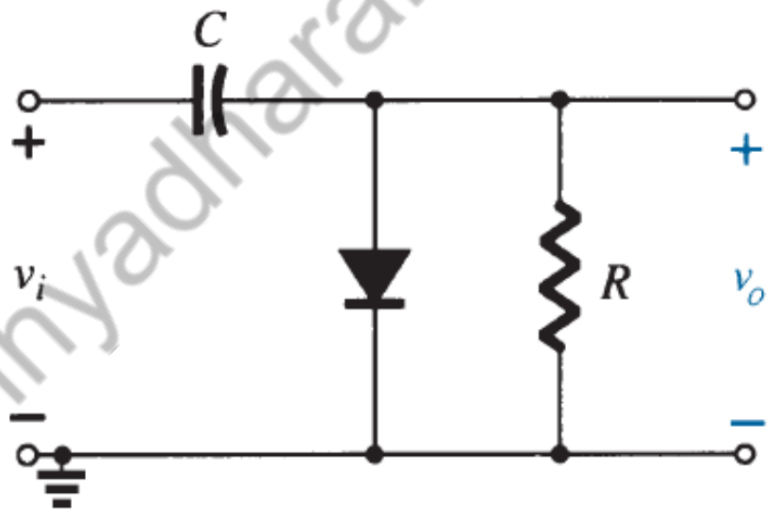
Zener Clippers



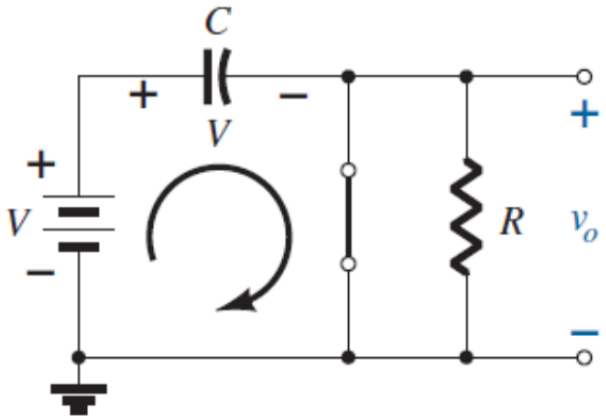


Clampers

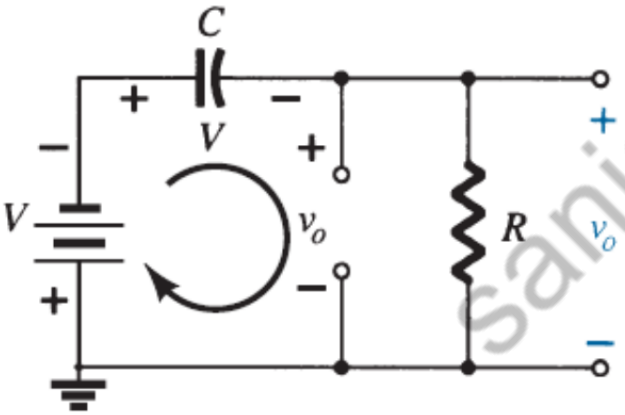




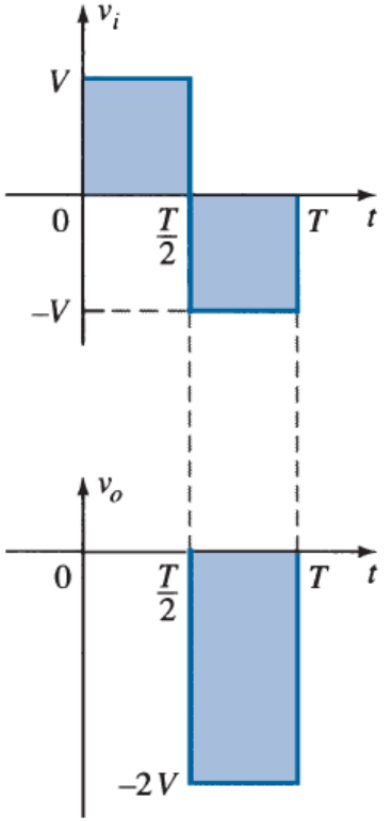
Clampers



Circuit during Diode ON
(positive half cycle of supply)

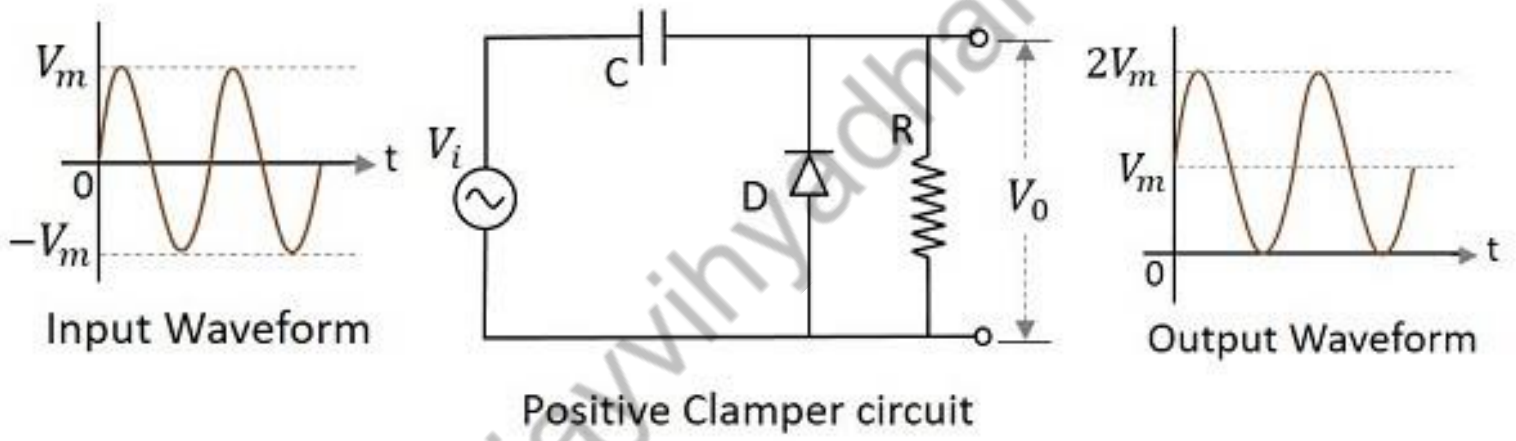


Circuit during Diode OFF
(negative half cycle of supply)

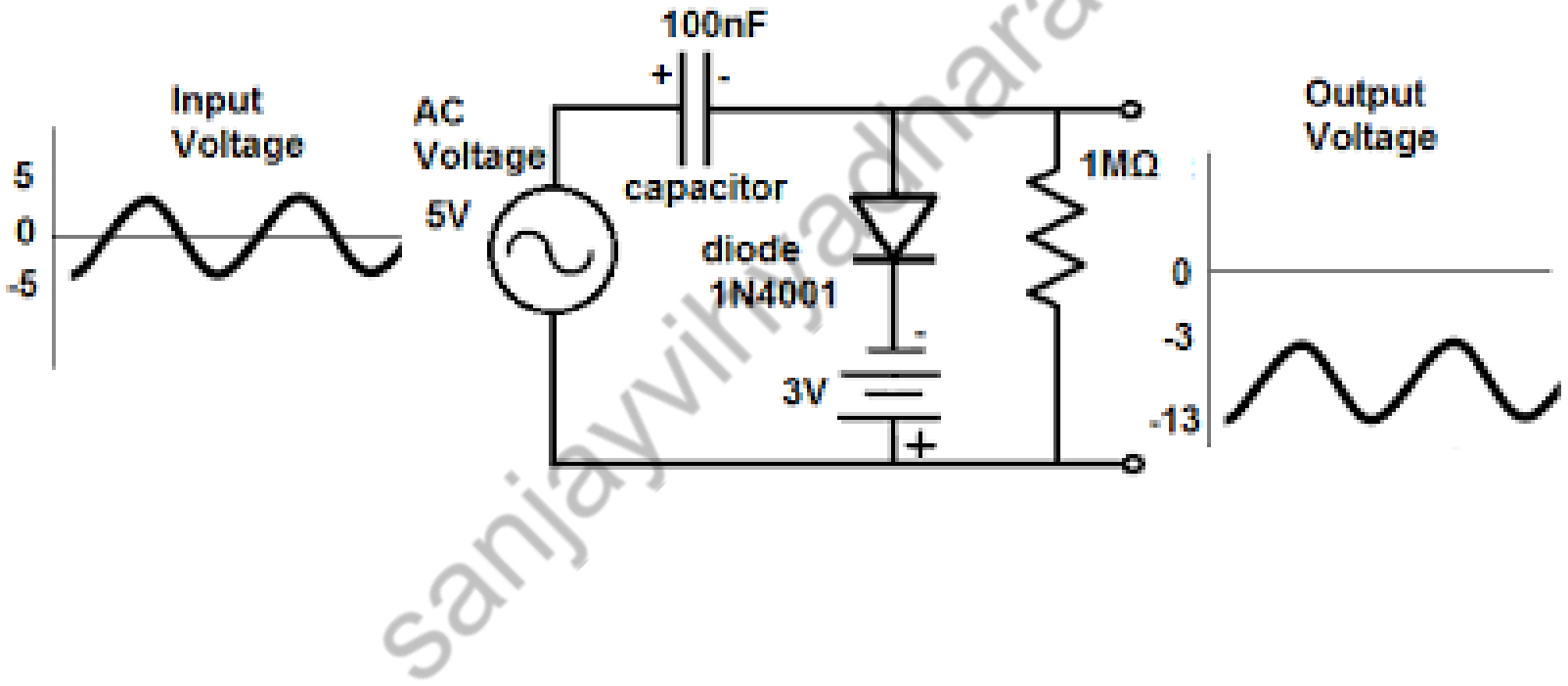


Input and Output voltage waveform

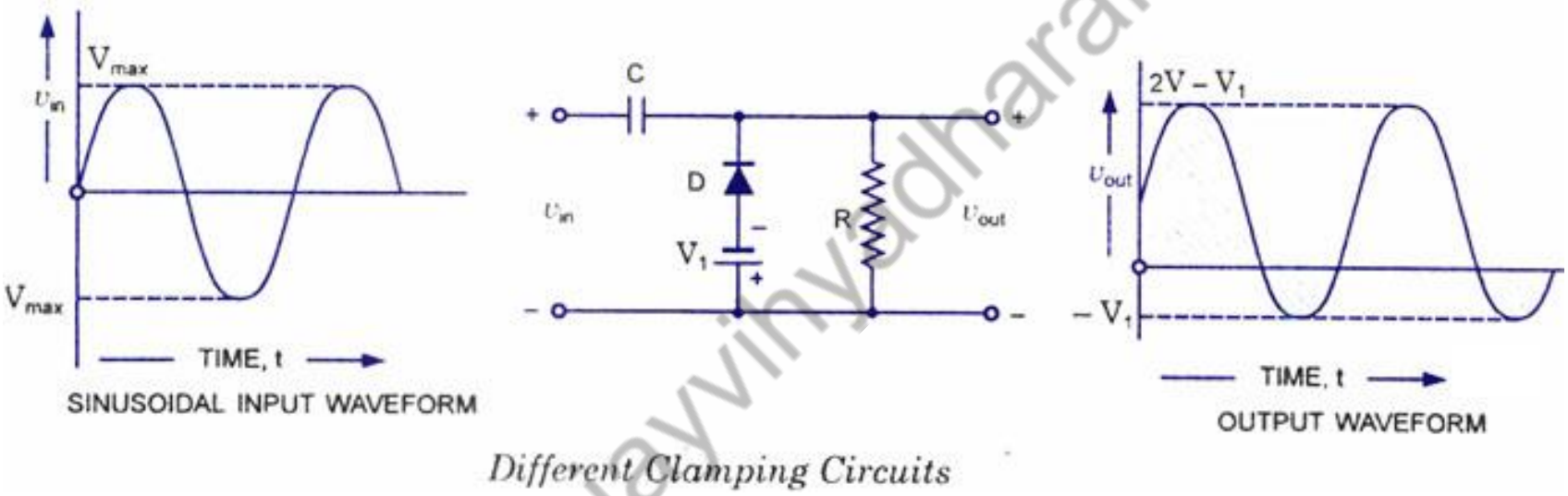
Clampers



Clampers



Clampers



Different Clamping Circuits

Thank you