



# **SNS COLLEGE OF TECHNOLOGY**

## **Coimbatore-35**

### **An Autonomous Institution**



Accredited by NBA – AICTE and Accredited by NAAC – UGC with ‘A++’(III Cycle) Grade  
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

## **DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

### **23ECB101 – CIRCUIT ANALYSIS AND DEVICES**

I YEAR/ II SEMESTER

#### **UNIT 4 – SEMICONDUCTOR DIODES AND THEIR APPLICATIONS**

**TOPIC - Clampers**



# Clampers



- **Definition: Clamper circuits** are the electronic circuits that **shift the dc level of the AC signal.**
- Clampers are also known as DC voltage restorers or level shifter.
- Clampers are basically classified as **positive** and **negative** that includes both biased and unbiased conditions individually.
- Clamper circuit is a combination of a **resistor** along with a **diode** and **capacitor.**
- It sometimes also employs **dc battery** so as to have an **additional shift** in the signal level.



# Operating principle of Clamper circuits



- The **working** of clamper circuits **depends** on the **variation in the time constant of the capacitor**.
- This variation is the outcome of changing the current path of the diode with the change in input signal polarity.

- Here, the magnitude of the time constant is

$$\tau = RC$$

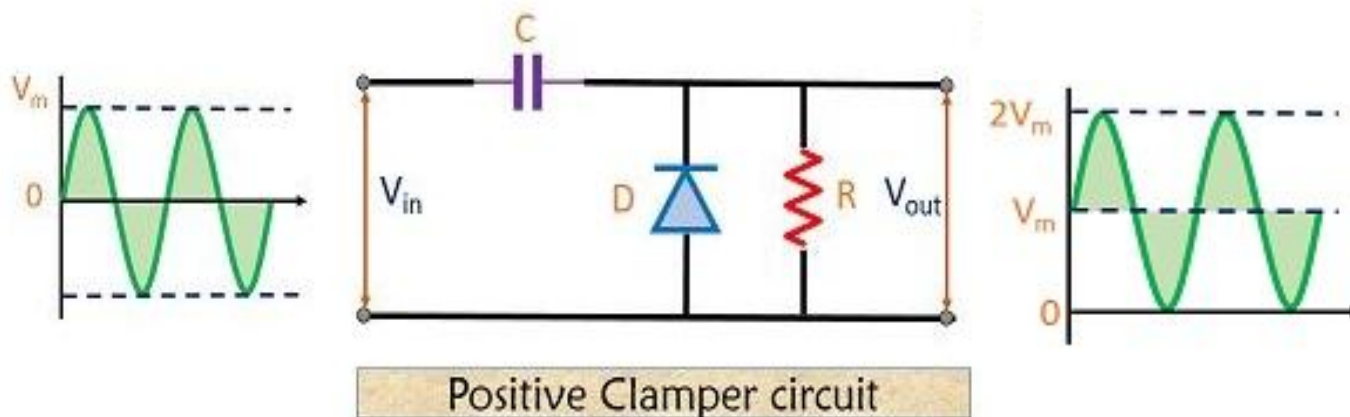
this is chosen large enough in order to assure that voltage across the capacitor does not discharge consequently at the non-conducting interval of the diode.



# Classification of Clamper Circuits



## Positive Clamper circuit

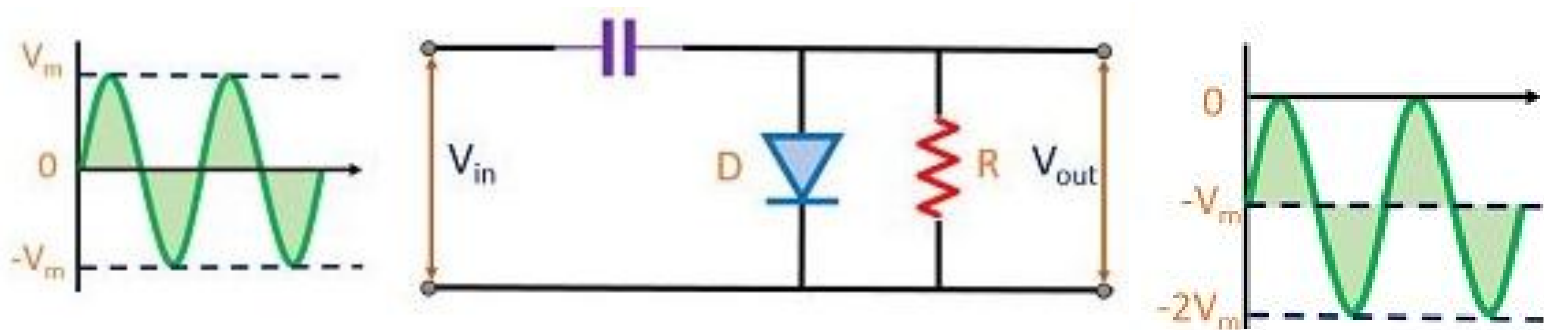




# Classification of Clamper Circuits



## Negative Clamper circuit



Negative Clamper circuit

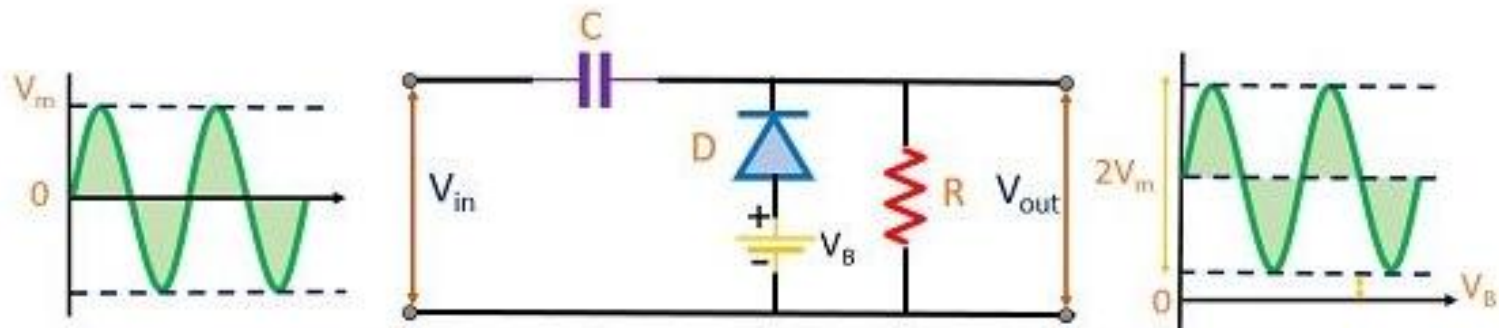


# Classification of Clamper Circuits



## Positive clamper circuit with biasing

### 1. Case of positive biasing



Case of positive biasing in positive clamper circuit

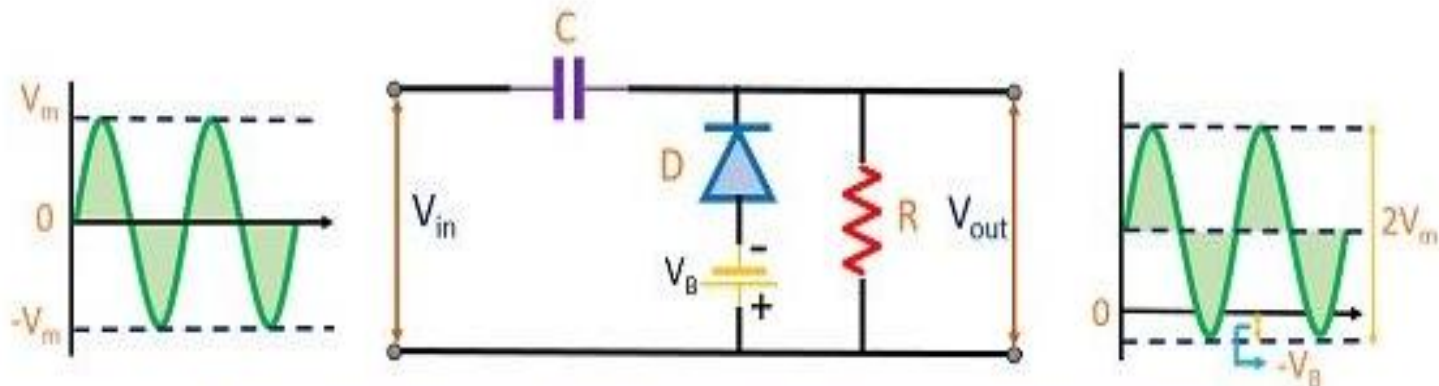


# Classification of Clamper Circuits



## Positive clamper circuit with biasing

### 2. Case of negative biasing



Case of negative biasing in positive clamper circuit

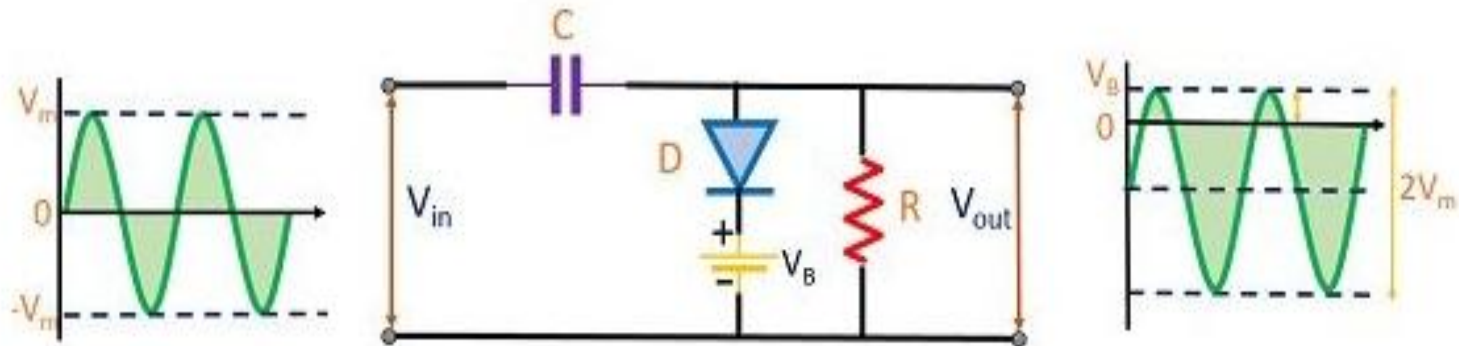


# Classification of Clamper Circuits



## Negative Clamper circuit with biasing

### 1. Case of positive biasing



Case of positive biasing in negative clamper circuit



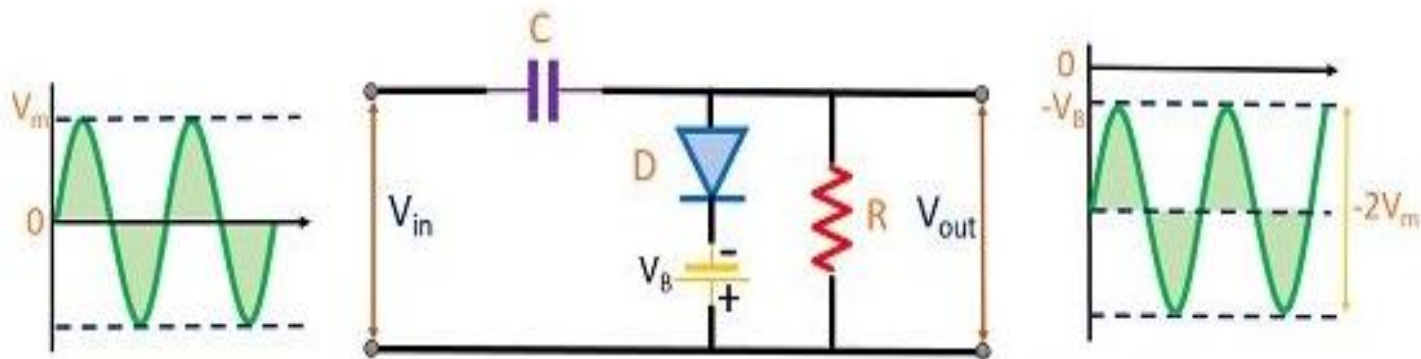


# Classification of Clamper Circuits



## Negative Clamper circuit with biasing

### 2. Case of negative biasing



Case of negative biasing in negative clamper circuit



# Applications of Clamper Circuits



- Clampers are used to **identify the polarity of the circuits.**
- These circuits are used as voltage doublers and help in eliminating distortions.
- **Reverse recovery time** can be improved using Clampers.



# Assessment Questions



1. Which of the following is not true regarding clamper?
  - a) A positive clamper adds a positive DC voltage
  - b) A clamper can also be called as a re-inserter
  - c) To reduce tilt, reduce the RC value**
  - d) Negative clamper will clamp the positive peak of output to the reference voltage
  
2. A circuit with a predetermined dc level is added to the output voltage of the op-amp is called
  - a) Clamper**
  - b) Positive clipper
  - c) Halfwave rectifier
  - d) None of the mentioned
  
3. An clamper circuit is also referred as
  - a) DC cutter
  - b) DC inserter**
  - c) DC lifter
  - d) DC leveller

