



Shri Vile Parle Kelavani Mandal's

DWARKADAS J. SANGHVI COLLEGE OF ENGINEERING

(Autonomous College Affiliated to the University of Mumbai)

NAAC Accredited with "A" Grade (CGPA : 3.18)



First Year (Semester I) B.Tech.

Basic Electrical and Electronics Engineering

Experiment No : 07

Clipper and Clamper Circuit

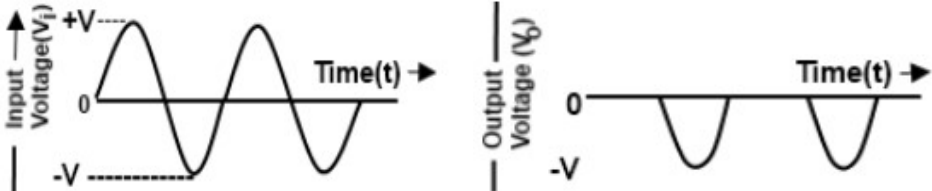
Name : Ayush Jain

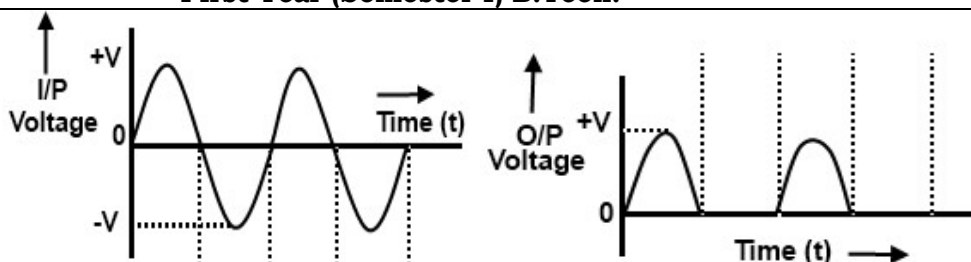
SAP No. : 60004200132

Date of performance : 17/4/2021

Signature of teacher-in-charge : _____

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Aim:	To design clipper and clamper circuit .
Apparatus:	Online simulation tools (Suggested Tinkercad)
Theory:	<p>Clipper circuit</p> <p>The Clipper circuit that is intended to attenuate positive portions of the input signal can be termed as a Positive Clipper.</p> <p>Positive Clipper circuit:</p> <p>A Clipper circuit in which the diode is connected in series to the input signal and that attenuates the positive portions of the waveform, is termed as Positive Series Clipper.</p> <p>.</p> <p>The diode will conduct until the supply voltage is less than the battery potential. As battery potential dominates the supply voltage, the signal appears at the positive half of output waveform. But as the supply voltage exceeds the battery potential, the diode is now reverse biased. Resultantly no further current will flow through the diode.</p>  <p>Negative clipper circuit</p> <p>As we can see in the circuit shown above, the diode is reverse bias due to both supply voltage and battery potential. This cuts off the complete positive half of the input waveform.</p> <p>But during the negative half cycle of the input waveform, the diode is in forward biased condition due to supply voltage but is reverse biased by the battery potential.</p> <p>Here also initially when battery dominates the supply voltage, the diode is in reverse biased condition. But, as the supply voltage becomes greater than the battery potential, the diode will automatically come in forward biased condition. Thus, the signal starts to appear at the output.</p>

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Clamper circuit

A Clamper Circuit is a circuit that adds a DC level to an AC signal. Actually, the positive and negative peaks of the signals can be placed at desired levels using the clamping circuits. As the DC level gets shifted, a clamper circuit is called as a **Level Shifter**.

Clamper circuits consist of energy storage elements like capacitors. A simple clamper circuit comprises of a capacitor, a diode, a resistor and a dc battery if required.

Clamper Circuit

A Clamper circuit can be defined as the circuit that consists of a diode, a resistor and a capacitor that shifts the waveform to a desired DC level without changing the actual appearance of the applied signal.

In order to maintain the time period of the wave form, the τ must be greater than, half the time period discharging time of the capacitor should be slow. discharging time of the capacitor should be slow.

$$\tau = RC$$

Where

- R is the resistance of the resistor employed
- C is the capacitance of the capacitor used

The time constant of charge and discharge of the capacitor determines the output of a clamper circuit.

- In a clamper circuit, a vertical shift of upward or downward takes place in the output waveform with respect to the input signal.
- The load resistor and the capacitor affect the waveform. So, the discharging time of the capacitor should be large enough.

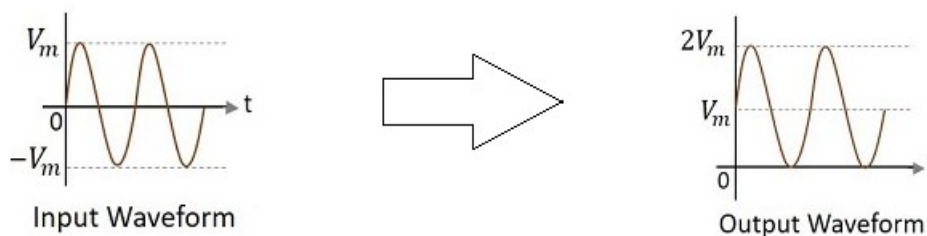
Positive Clamper Circuit

A Clamping circuit restores the DC level. When a negative peak of the signal is raised above to the zero level, then the signal is said to be **positively clamped**.

A Positive Clamper circuit is one that consists of a diode, a resistor and a capacitor and that shifts the output signal to the positive portion of the input

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signal. The figure below explains the construction of a positive clamper circuit.



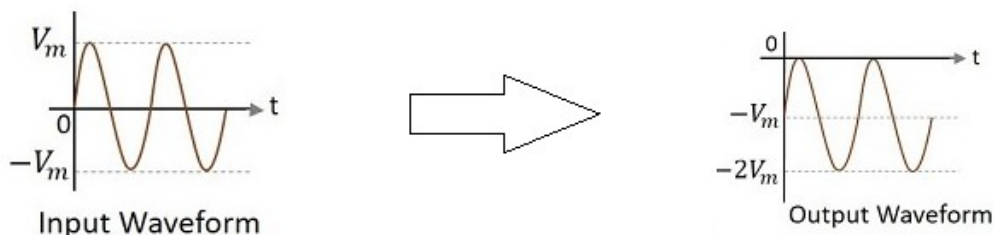
Negative Clamper

A Negative Clamper circuit is one that consists of a diode, a resistor and a capacitor and that shifts the output signal to the negative portion of the input signal. The figure below explains the construction of a negative clamper circuit.

During the positive half cycle, the capacitor gets charged to its peak value v_m . The diode is forward biased and conducts. During the negative half cycle, the diode gets reverse biased and gets open circuited. The output of the circuit at this moment will be

$$V_0 = V_i + V_m$$

Hence the signal is negatively clamped as shown in the above figure. The output signal changes according to the changes in the input, but shifts the level according to the charge on the capacitor, as it adds the input voltage.



Circuit Diagram:

Clipper circuit

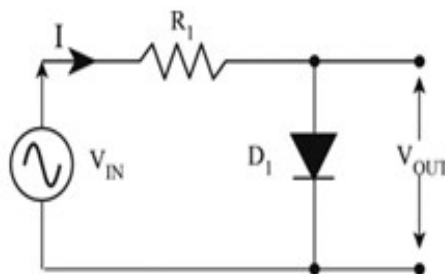


Fig 1. Positive clipper circuit

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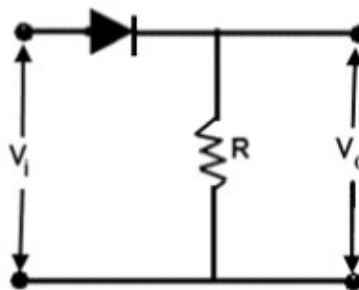
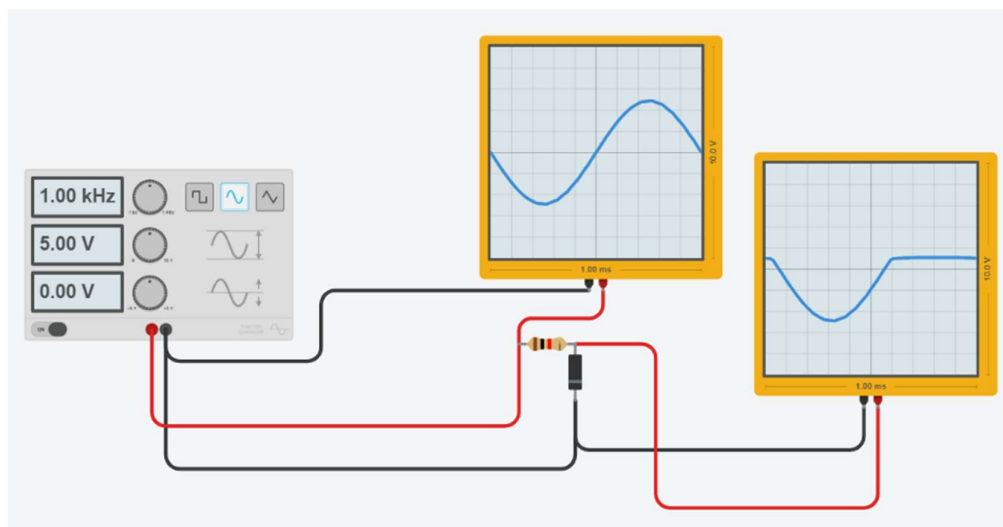


Fig 2. Negative clipper circuit

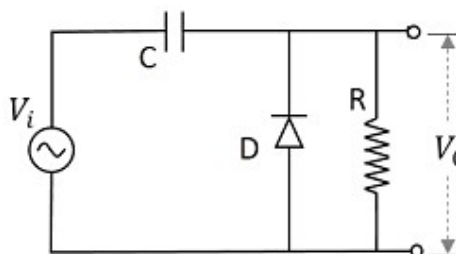
Observation waveform



Positive Clipper

Clamper circuit

Circuit Diagram





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Fig 3. Positive Clamper Circuit

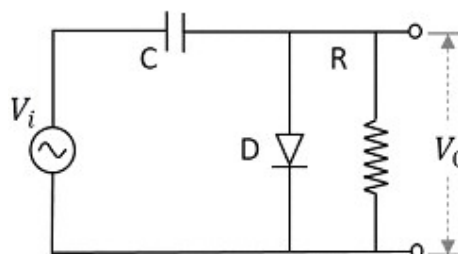
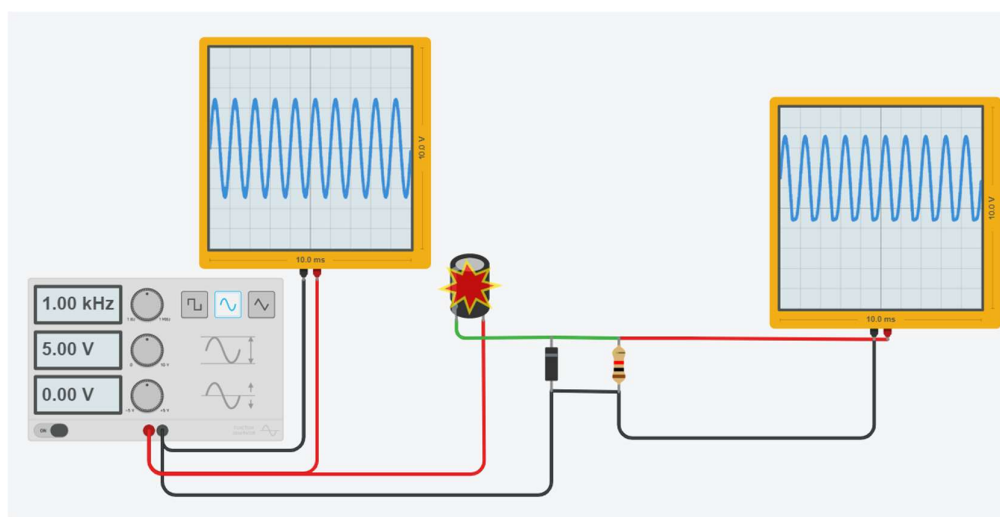
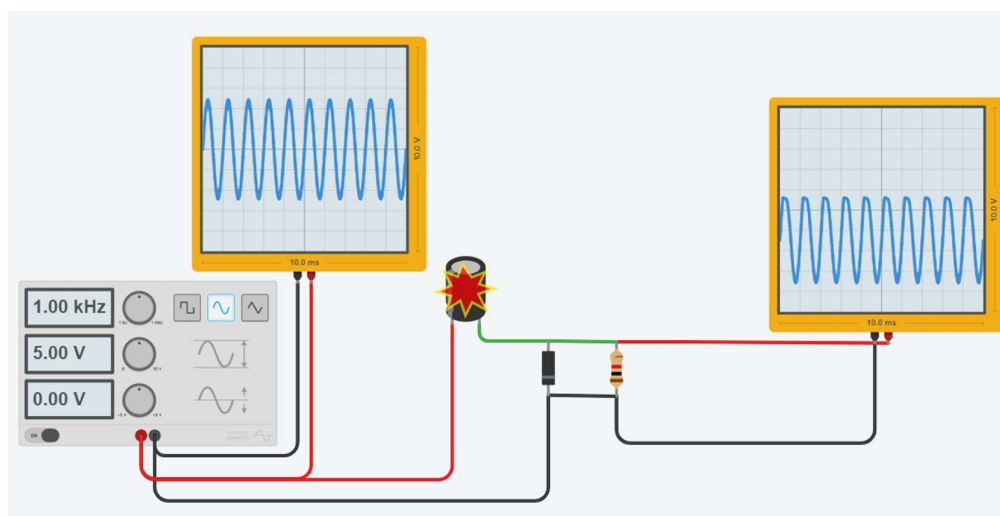


Fig 4. Negative Clamper Circuit

Observation waveform



Positive Clamper



Negative Clamper



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Conclusion

- This Experiment helped us study the waveforms generated by a clipper and clamper.
- This Experiment was performed by implementing the circuit and taking readings in an online simulation tool, TinkerCad.