EXPERIMENT-5
CLAMPERS

I. Aim: Design different types of clamper circuits.

II. Design specifications: Vin=10v, C=1uF, PN Junction diode.

III. Hardware: PN Junction diodes

a) Capacitor:1uF
b) CRO
c) DSO Probes
d) Function Generator
e) Bread board

IV. Theory:

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.

When the input signal swings positive, the diode conducts, and the capacitor charges to the peak voltage of the input signal plus the voltage of the DC source. When the input signal swings negative, the diode blocks current flow, and the capacitor discharges through the load resistor. This results in the output signal being clamped to the desired DC level.

This is useful in various applications, including signal conditioning, data transmission, and power management.

V. Types of clampers circuit:

1. Positive clamper with 0 reference voltage
2. Positive clamper with positive reference voltage
3. Positive clamper with negative reference voltage
4. Negative clamper with 0 reference voltage
5. Negative clamper with positive reference voltage
6. Negative clamper with negative reference voltage

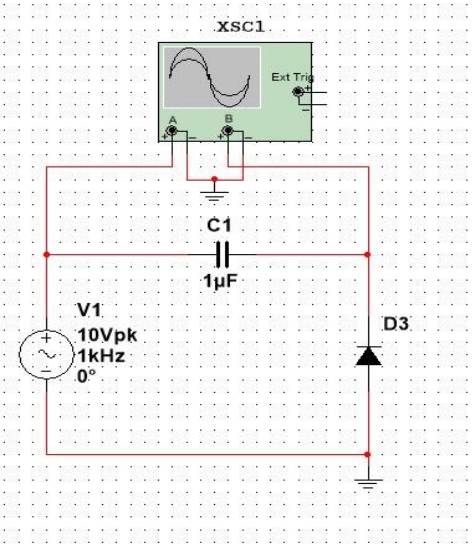
VI. Procedure:

1. Open the Multisim software and place the required components on the sheet.
2. Connect the components to design required single tuned amplifier.
3. Change the active analysis to parameter sweep.
4. Select the device type as inductor and choose the component to be analyzed as inductor. 5. Run the design and observe the plot between magnitude and frequency for different values of inductances.
5. Observe the peak of the frequency in the plots.

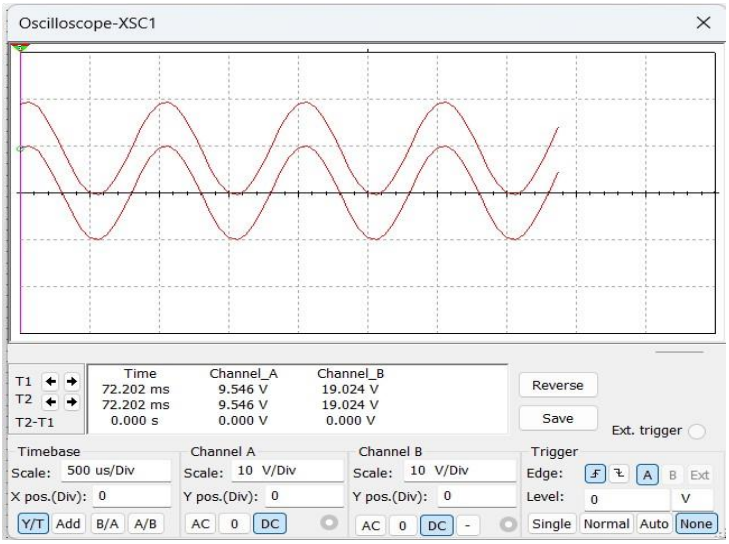
VI. SOFTWARE SIMULATION

1. Positive clamper with 0 reference voltage:

Circuit:



Observations:

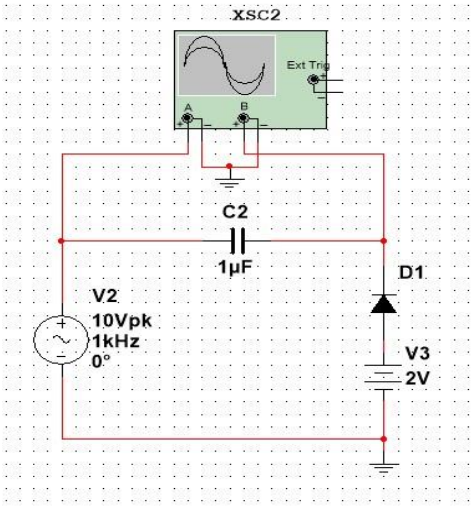


Conclusion:

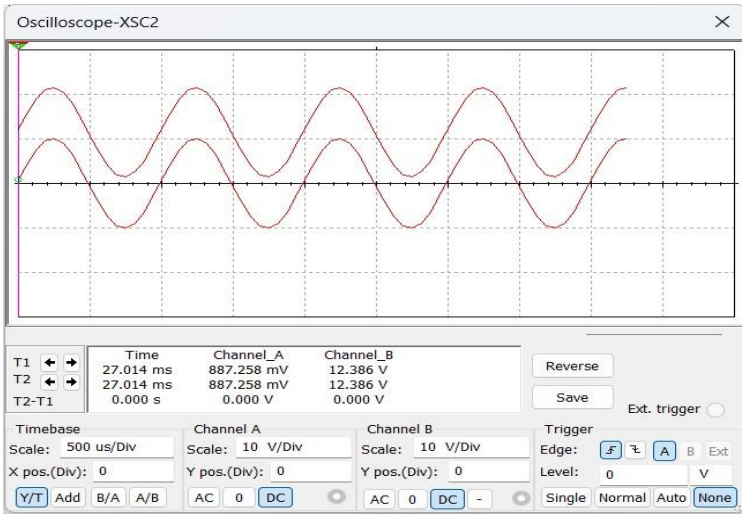
We observe that the output signal changes according to the changes in the input, but shifts the level according to the charge on the capacitor, as it adds the input voltage.

2. Positive clamper with positive reference voltage:

Circuit:



Observations:

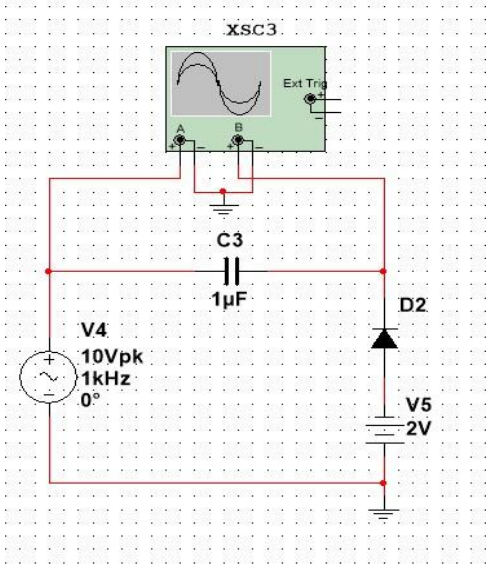


Conclusion:

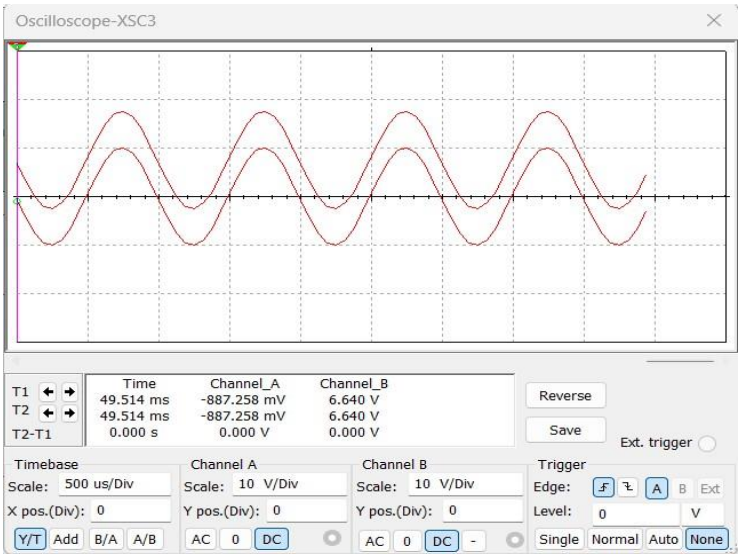
When a Positive clamper circuit if biased with some positive reference voltage, that voltage will be added to the output to raise the clamped level.

3. Positive clamper with negative reference voltage:

Circuit:



Observations:

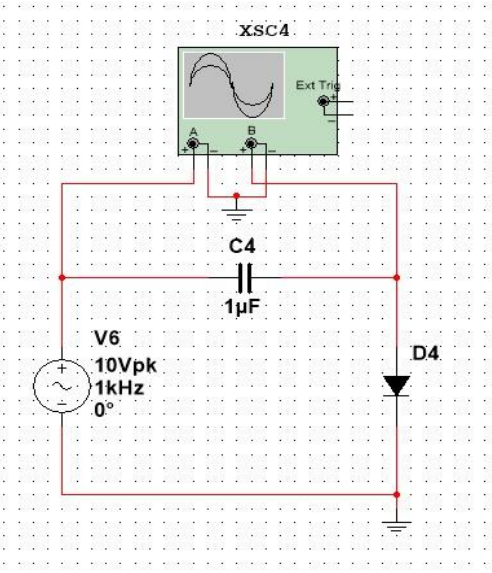


Conclusion:

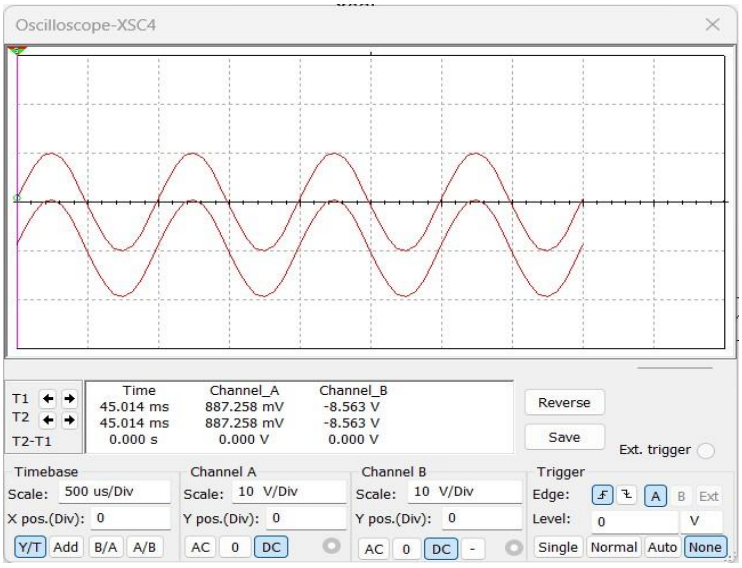
When a Positive clamper circuit if biased with some negative reference voltage, that voltage will be added to the output to raise the clamped level.

4. Negative clamper with 0 reference voltage:

Circuit:



Observations:

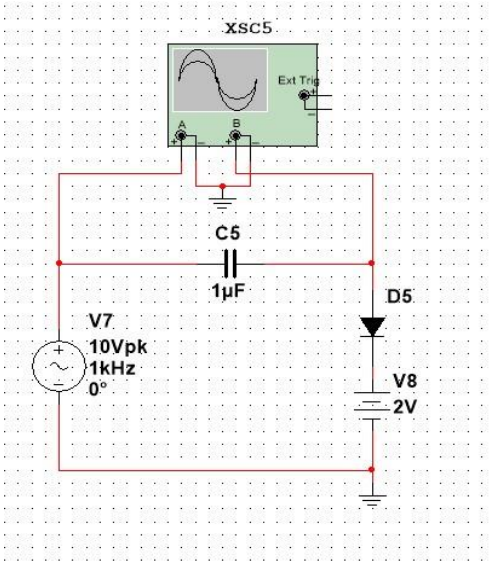


Conclusion:

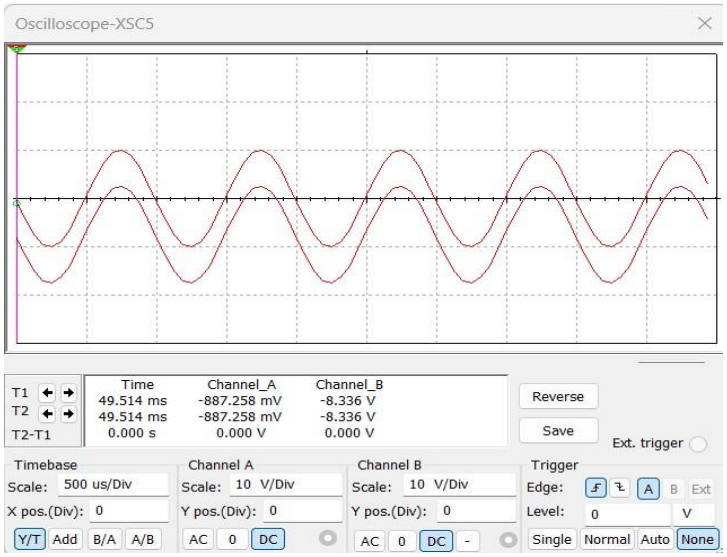
We observe that the output signal changes according to the changes in the input, but shifts the level according to the charge on the capacitor, as it adds the input voltage.

5. Negative clamper with positive reference voltage:

Circuit:



Observations:

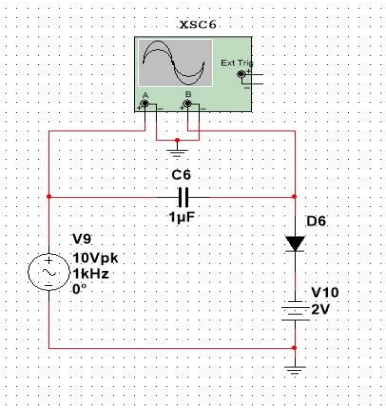


Conclusion:

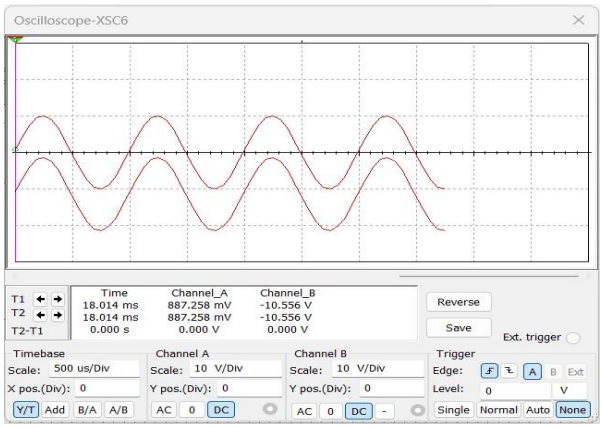
When a Negative clamper circuit if biased with some positive reference voltage, that voltage will be added to the output to raise the clamped level.

6. Negative clamper with negative reference voltage:

Circuit:



Observations:



Conclusion:

When a Negative clamper circuit if biased with some negative reference voltage, that voltage will be added to the output to raise the clamped level.

RESULT:

Hence we have designed different types of Clampers.

Signature of the faculty.