EEE-4384

Electronic Device and Circuits Lab

Experiment no: 02

Submitted by-

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Section: 2 (B)

Programmee: BSc in CSE

Department: CSE

Name of the Experiment: Study wave shapes of different types of cliping and clamping circuits

Objective:

1) To construct the clipping circuits and observe its corresponding wave shapes.

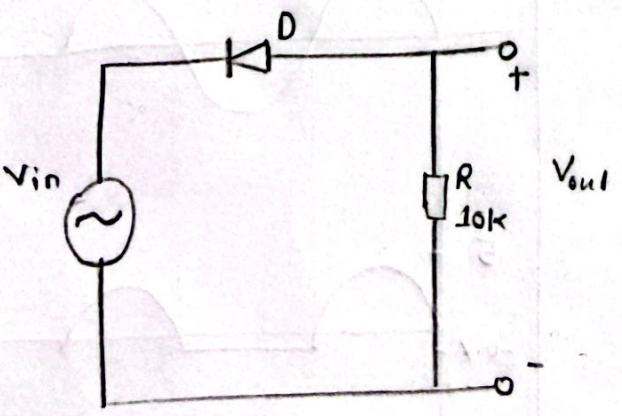
2) To construct the clamping circuits and observe its corresponding wave shapes.

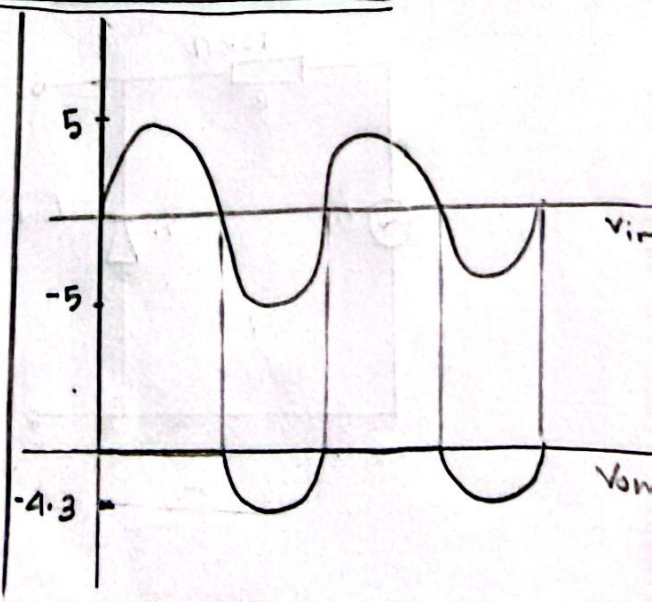
Apparatus required: Diode, resistor, capacitor, Oscilloscope, standard project board, Function / Signal generator, Connecting wires etc.

Task 1: To construct the clipping circuits and observe its corresponding waveshapes.

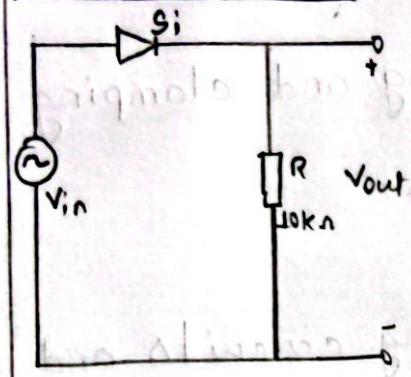
Series clipper Circuit (with Diode and Resistor):

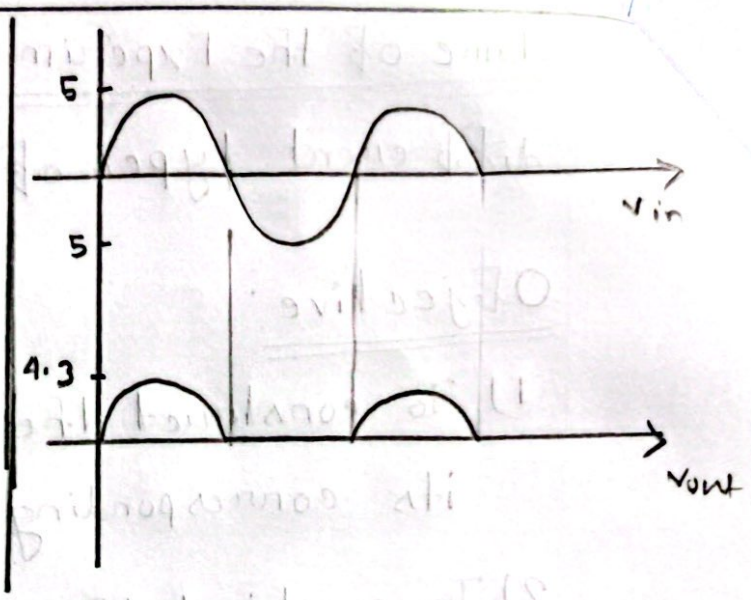
Positive Clipper:





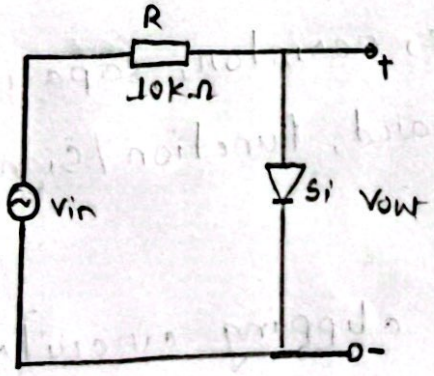
Negative Clipper:

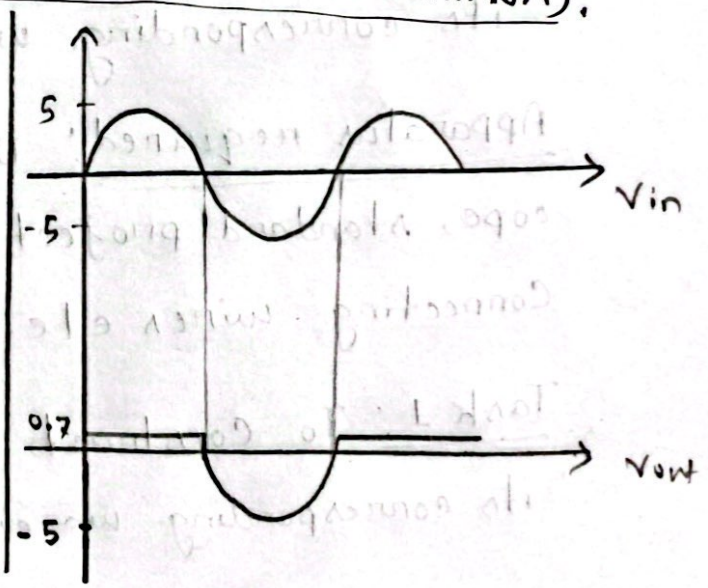




Parallel Clipper Circuit (with Diode and Resistor):

Positive Clipper:





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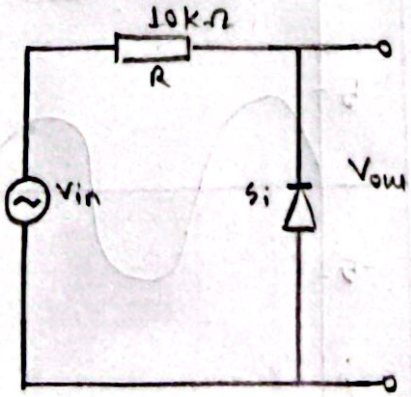
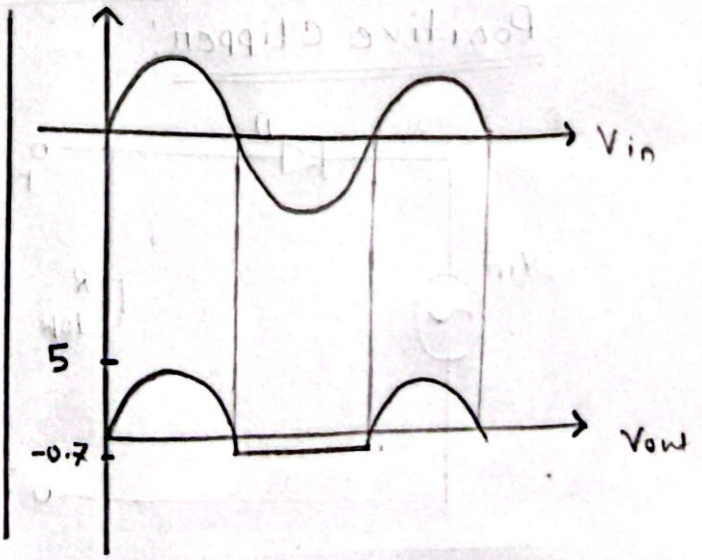
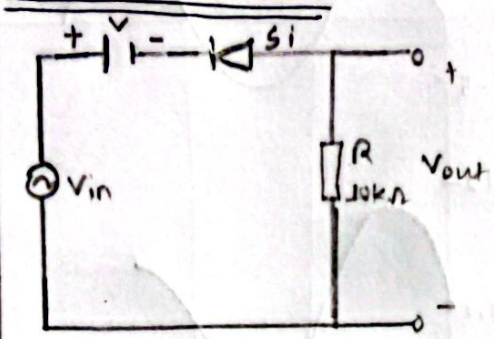
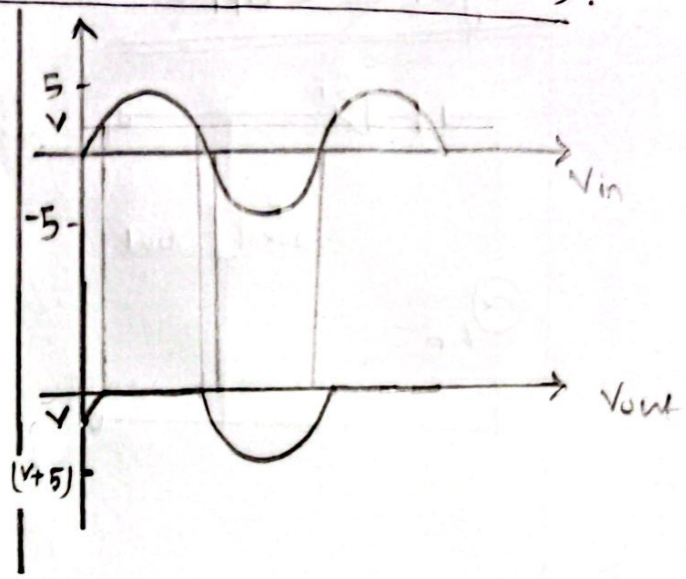




Biased Series clipper Circuit (with Diode and Resistor):

Positive Clipper:





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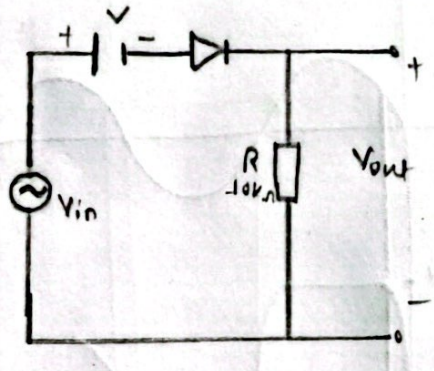

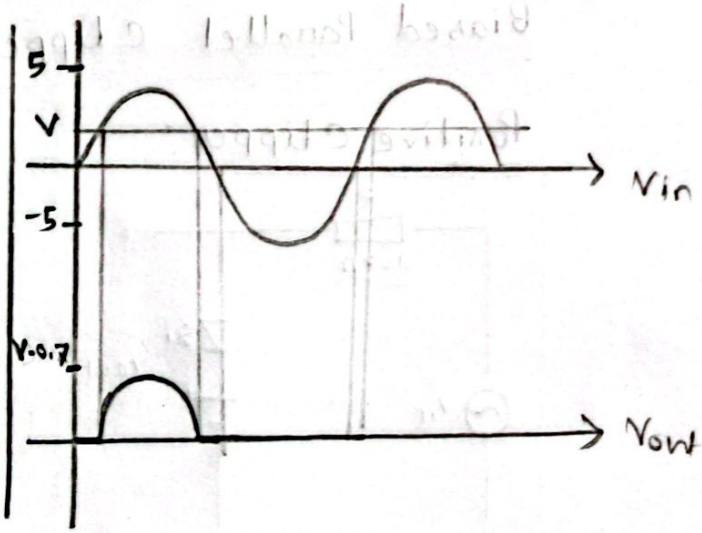

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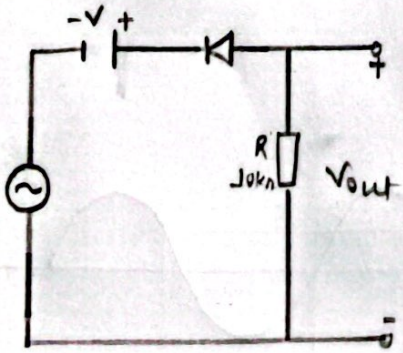

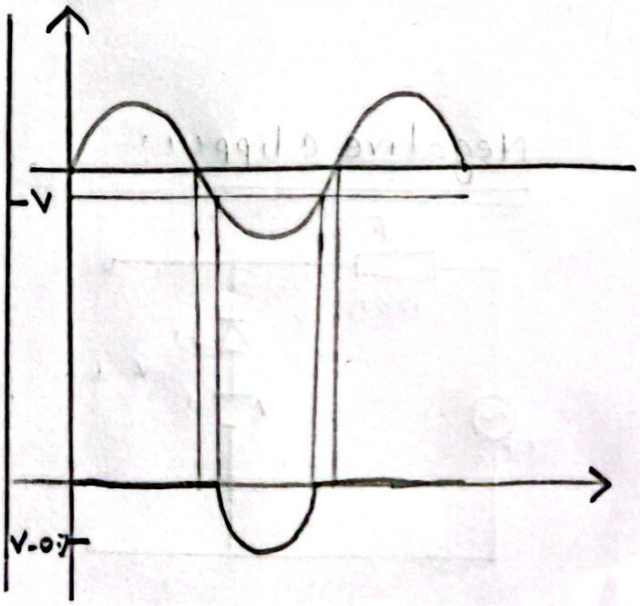

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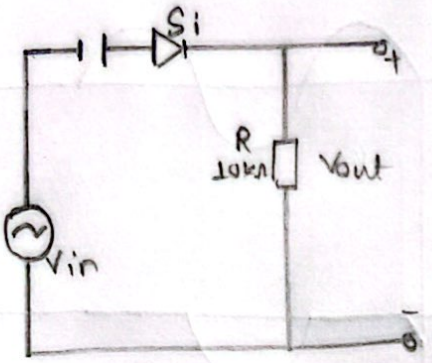
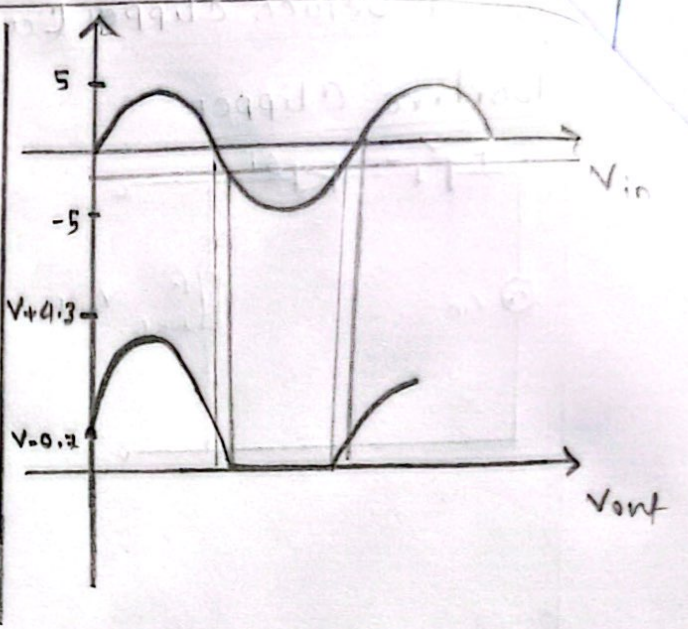
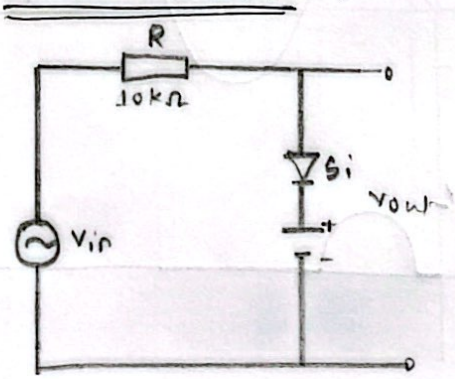
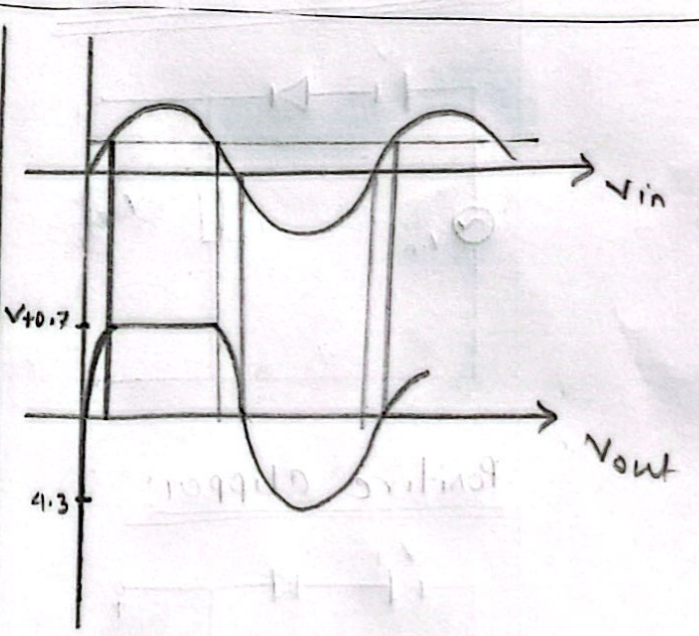




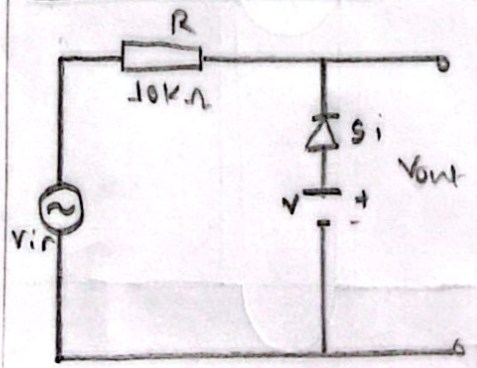
Biased Parallel Clipper circuit (with diode and Resistor)

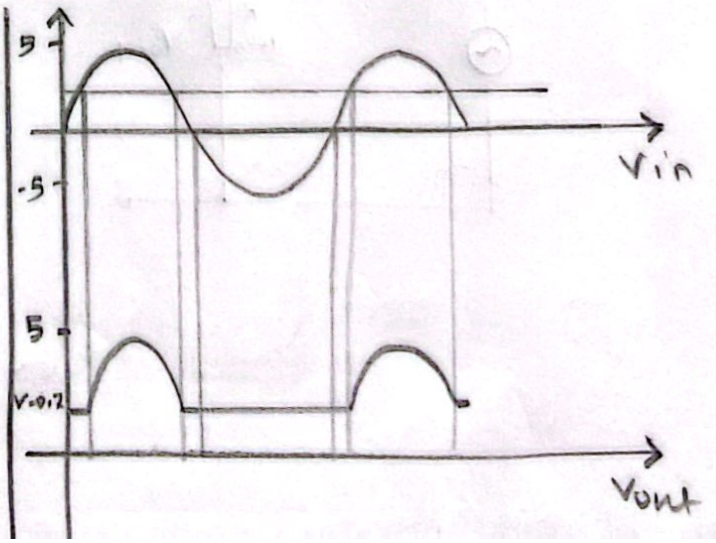
Positive Clipper:



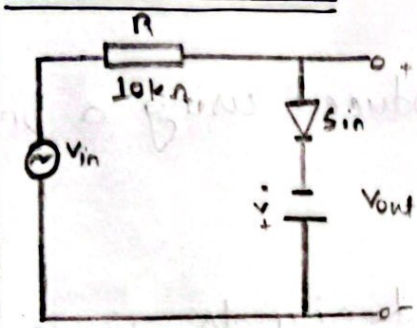


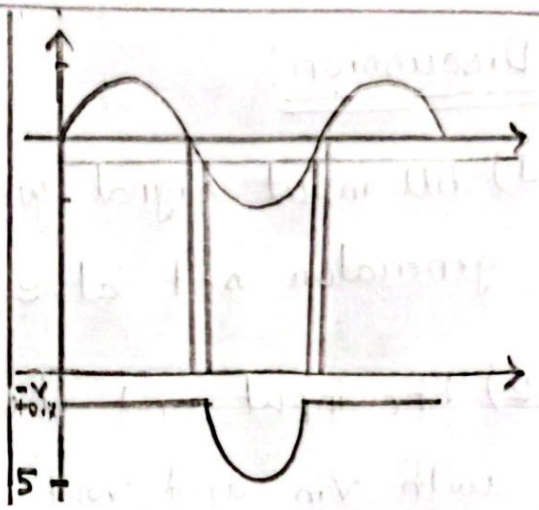
Negative Clipper:



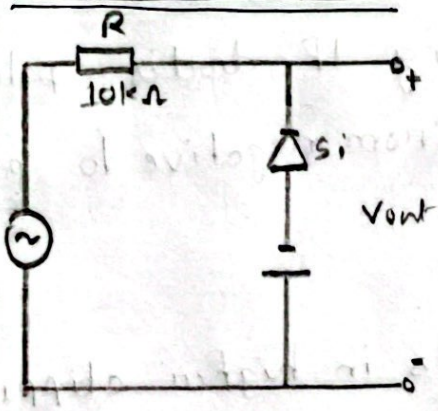


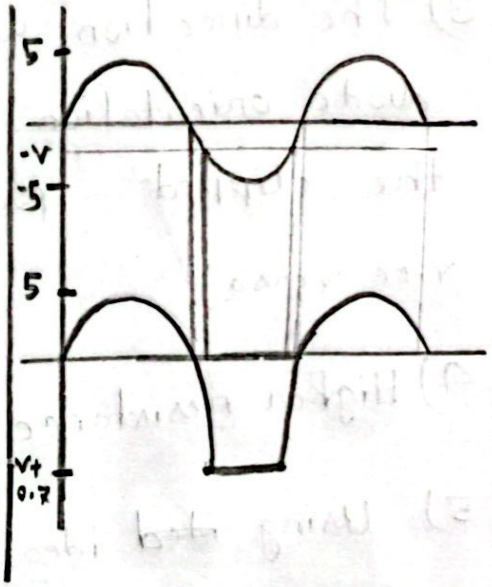
Positive Clipper:



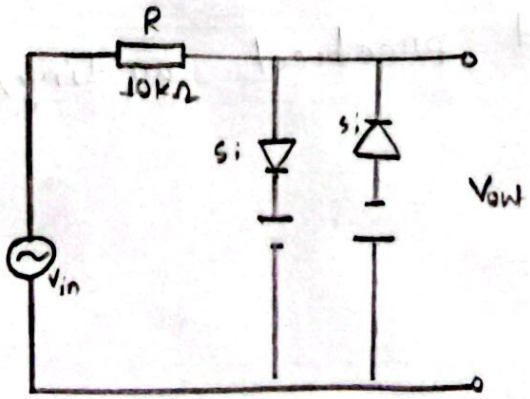


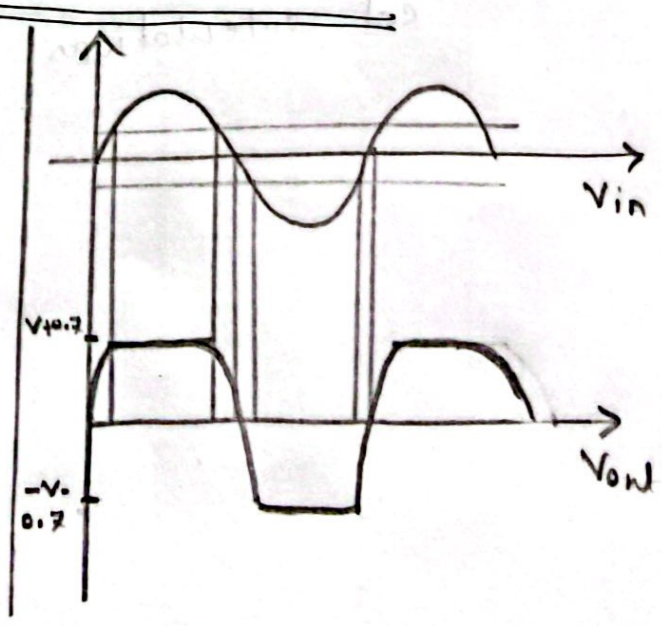
Negative Clipper:





Double Diode Biased Parallel Clipper Circuit:





Discussion:

1) All input signal were produced using a frequency generator set at ≈ 50Hz

2) The input and the output signals were labelled with Vin and Vout respectively.

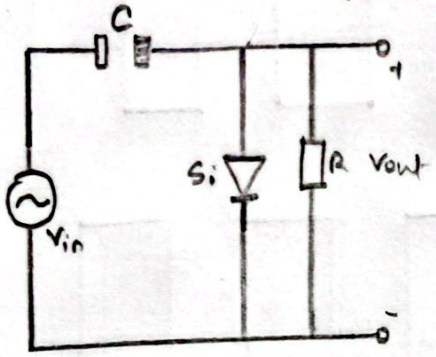
3) The direction of the clipping is decided by the diode orientation. Reversing the diode's polarity swaps the clipped portion (from negative to positive or vice versa)

4) Higher resistance results in higher clipping.

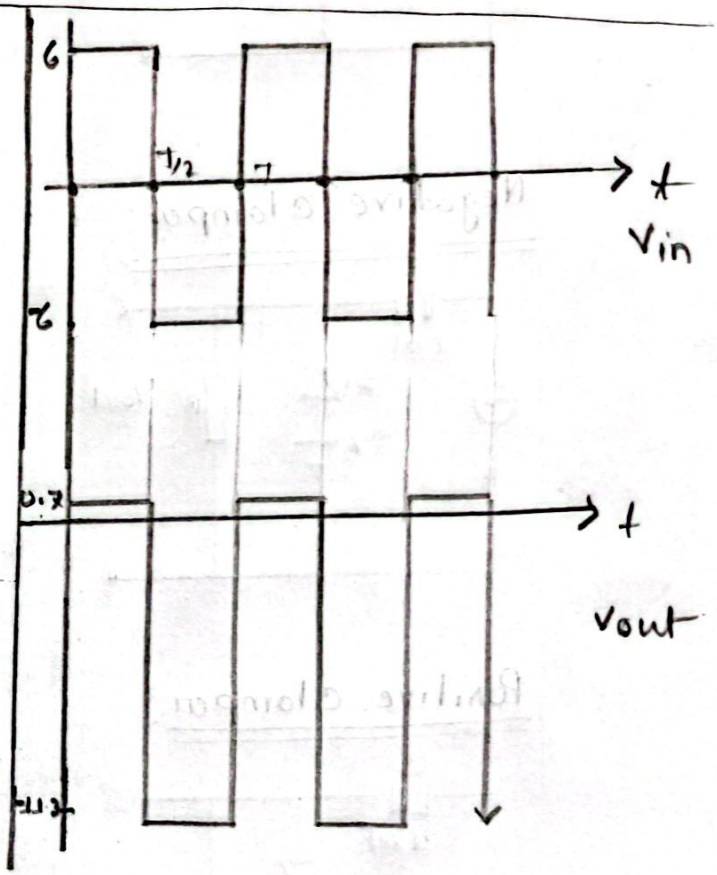
5) Using ~~ideal~~ ideal diodes instead of practical ones would have lessened the difference between theoretical calculations and practical findings.

Task 2: To construct a clamping circuit and observe its corresponding waves shapes.

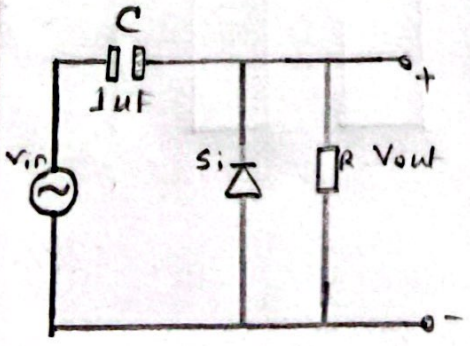
Series clamping circuit (with Capacitor diode and Resistor):

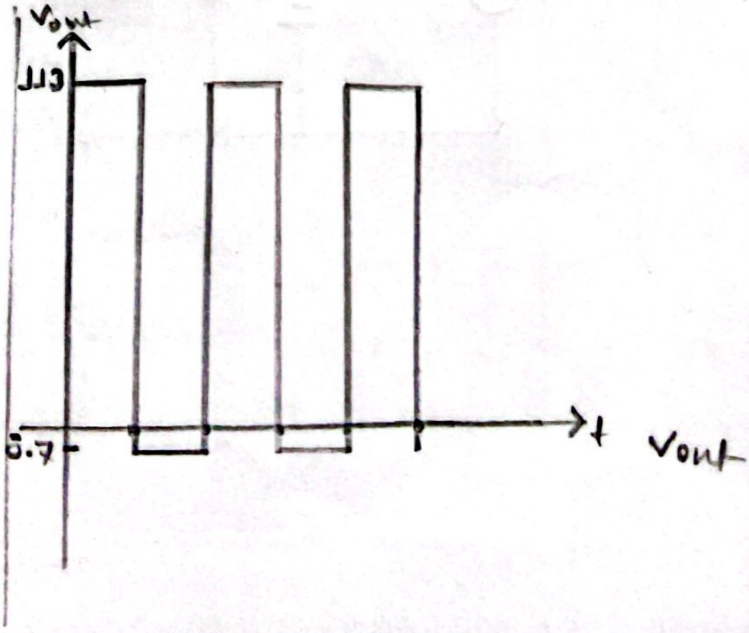


(Positive ~~clipper~~ clamper)

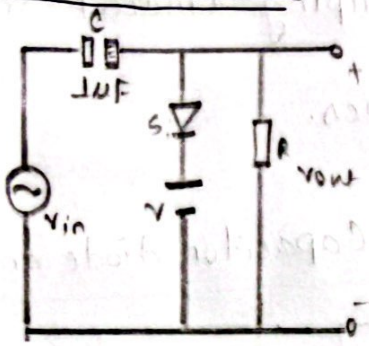


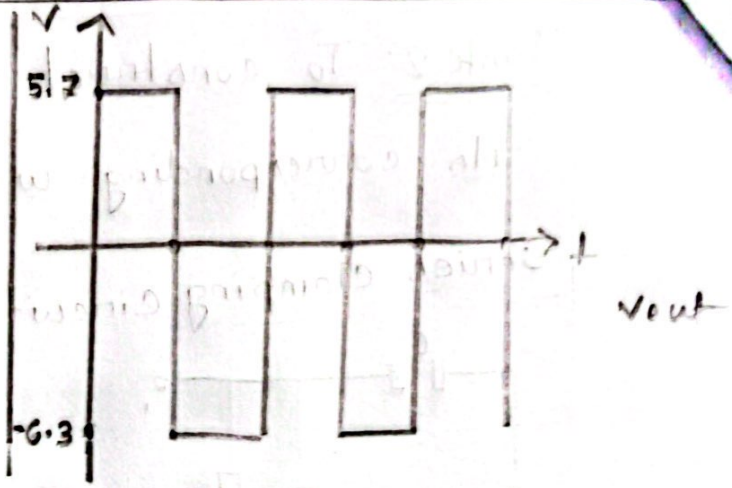
Negative ~~clipper~~ Clamper:



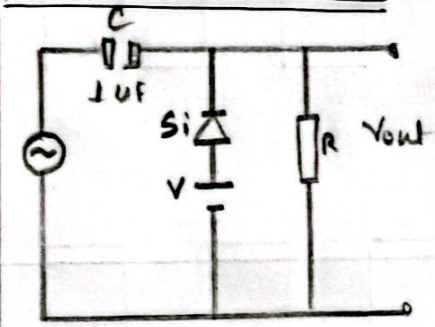


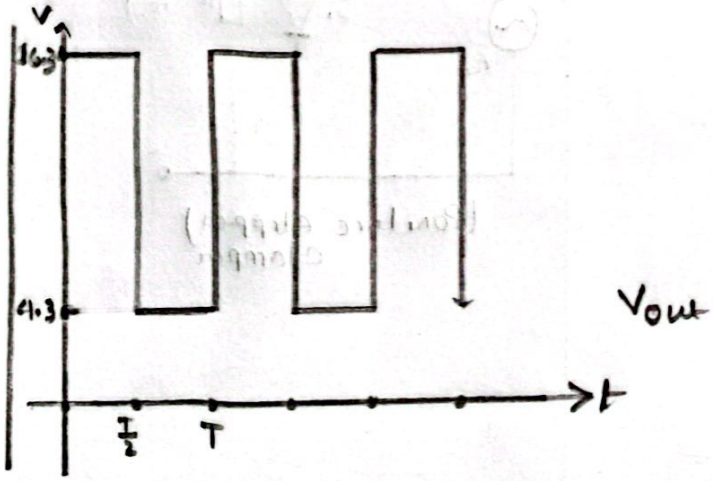
Positive Clamper:



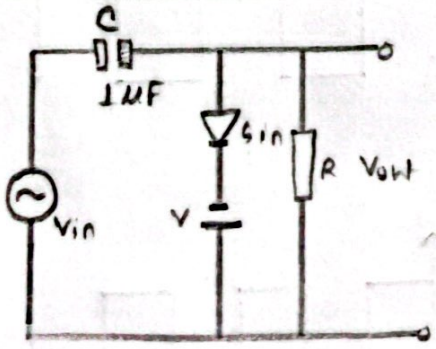


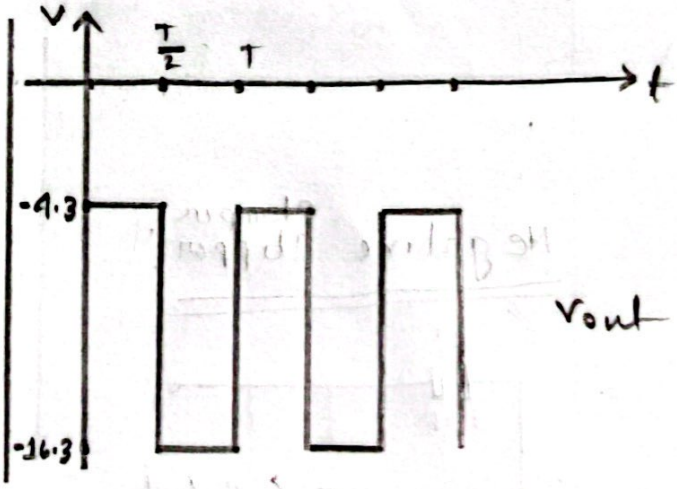
Negative clamper:



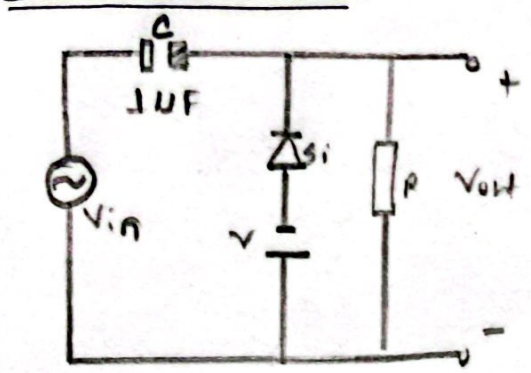


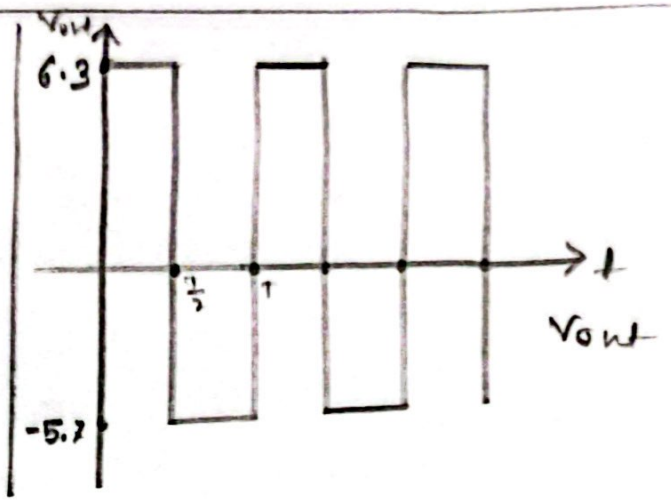
Positive clamper:





Negative Clamper:





Discussion:

1) Half of the time period ($T/2$) must be less than the discharge time ($T/2 << 5\tau$, where $\tau = RC$)

2) Diode orientation affect the direction of DC level shifting. Reversing diode orientation change the polarity of clamping.

3) clamper circuits ~~Right~~ shift the waveform up on down the x-axis.

4) Changing resistor and capacitor values in the circuits influence the clamping voltage and the time constant for discharging the capacitor.