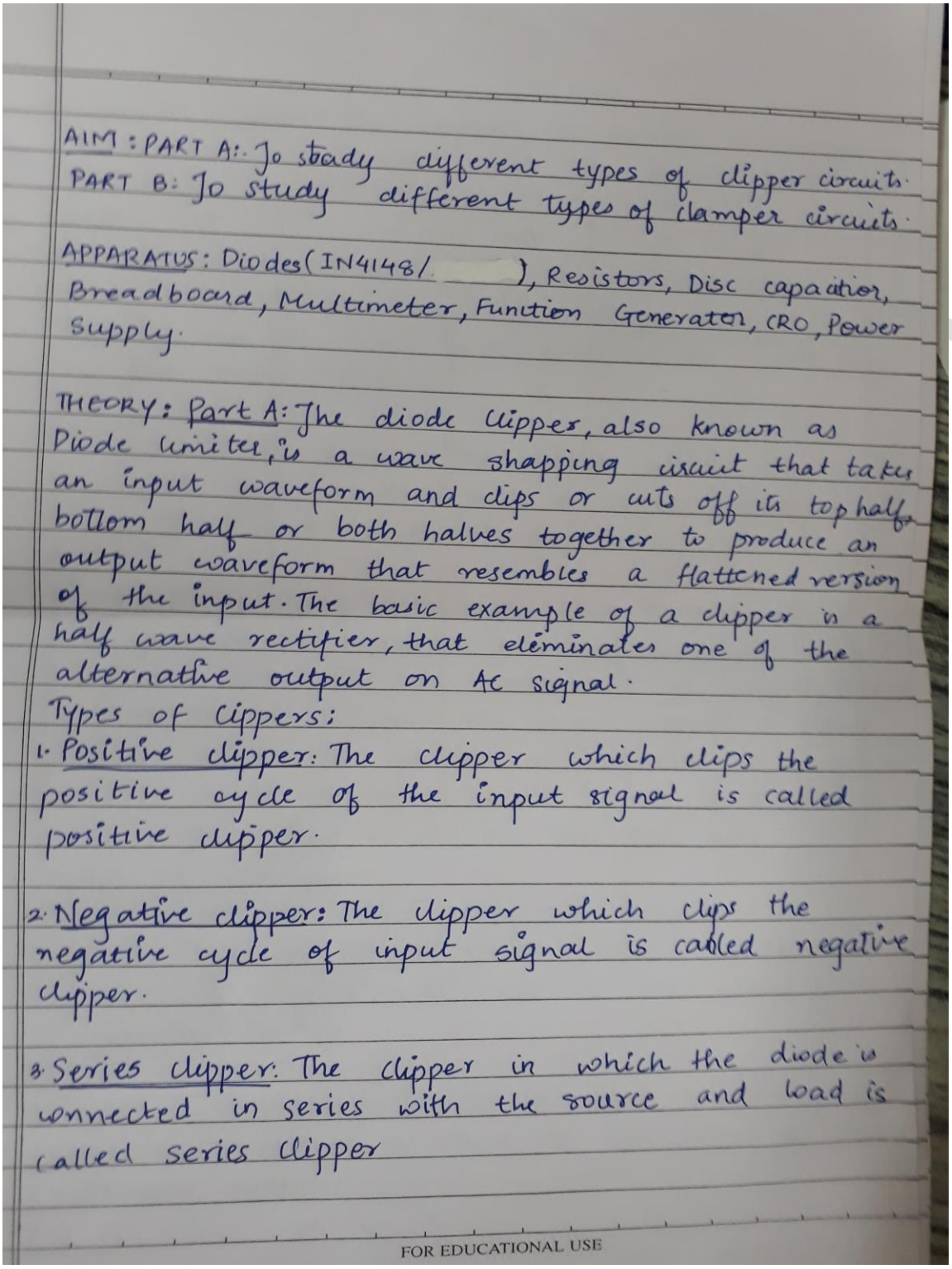
EXPERIMENT 2: CLIPPER & CLAMPER CIRCUITS



AIM: PART A: To study different types of clipper circuits.
PART B: To study different types of clamper circuits.

APPARATUS: Diodes (IN4148/), Resistors, Disc capacitor, Breadboard, Multimeter, Function Generator, CRO, Power supply.

THEORY: Part A: The diode clipper, also known as Diode limiter, is a wave shapping circuit that takes an input waveform and clips or cuts off its top half, bottom half or both halves together to produce an output waveform that resembles a flattened version of the input. The basic example of a clipper is a half wave rectifier, that eliminates one of the alternative output on AC signal.

Types of clippers:

1. Positive clipper: The clipper which clips the positive cycle of the input signal is called positive clipper.

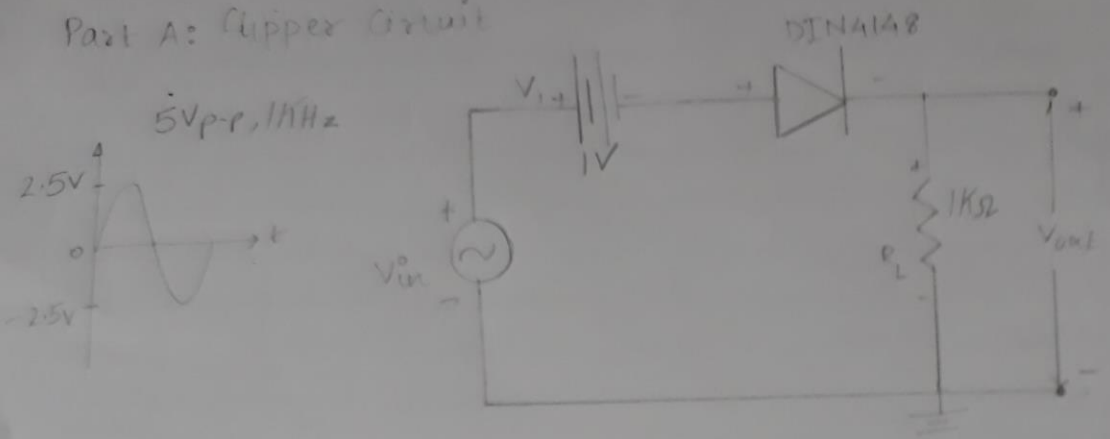
2. Negative clipper: The clipper which clips the negative cycle of input signal is called negative clipper.

3. Series clipper: The clipper in which the diode is connected in series with the source and load is called series clipper

FOR EDUCATIONAL USE

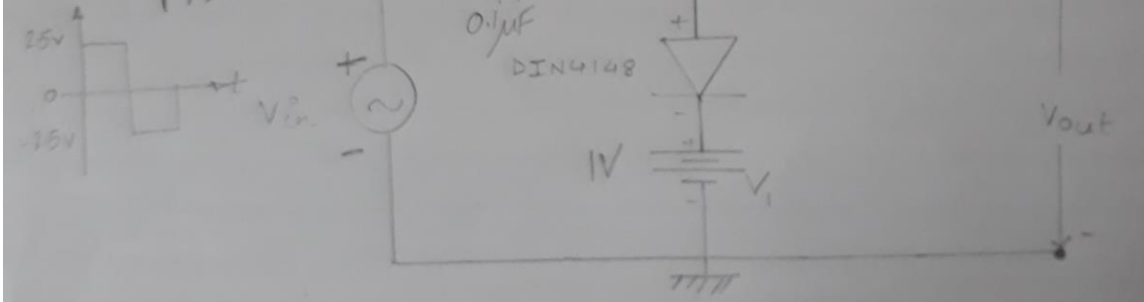
CIRCUIT DIAGRAM:

Part A: Clipper Circuit



Sample Clipper circuit

Part B: Clamper Circuit



Sample clamper circuit

4. Parallel clipper: The clipper in which the diode is connected in parallel with the source and load is called parallel clipper.

5. Biased clipper: Biased clipper means application of DC voltage to a clipper to clip a part of input signal, can be used ain combination with any of the above clippers.

6. Combinational clipper: The clipper which clips positive as well as negative cycle of input signal at a time is called combinational clipper.

Part B: A clamping circuit is used to place either the positive or negative peak of a signal at a desired limit. The dc component is simply added or subtracted to/from the input signal. A clamp circuit adds the positive or negative dc component to the input signal so as to push it either on the positive side or on the negative side.

Types of Clampers:

There are two basic types of clampers:

1. Positive Clamper: It shifts its input waveform in a positive direction, so that it lies above a dc reference voltage.

2. Negative Clamper: It shifts its input waveform in a negative direction, so that it lies below a dc reference voltage.

OBSERVATION TABLE:

Part A:

Sr no.	Name of the circuit	(observed) O/P Voltage		(calculated) O/P voltage	
		For +ve half cycle	For -ve half cycle	For. +ve half cycle	For -ve half cycle
1.	Series circuit				
2.	Parallel circuit				
3.	Biased circuit				
4.	Combinational circuit				

A clamping circuit consists of three components a diode, a capacitor and a resistor. Sometimes an independent dc supply is also required to cause an additional shift.

For a clamping circuit,

1. There will be no change in the peak to peak or rms value of the waveform due to the clamping circuit.
2. There will be a change in the peak and average values of the waveform. The clamped output varies from $2V_{max}$ and zero.
3. The values of resistor R & capacitor C affect the waveform.
4. The values for the resistor R & capacitor C should be determined from the time constant equation $t = RC$.

PROCEDURE:

Part A: 1) Assemble the circuit as per the given diagram
2) Apply input AC sine wave signal of 1KHz, $5V_{pp}$ using function generator.
3) Observe the output waveforms on the CRO and plot them wrt input.
4) Note down the observed value for the positive as well as negative half cycle and calculate the value for both cycles using KVL.
5) Repeat the procedure for different circuits and name the circuits.

Part B:

Sr No.	Name of the circuit	(observed) O/P voltage		(calculated) O/P voltage		DC Shift
		For +ve half cycle	For -ve half cycle	For +ve half cycle	For -ve half cycle	
1	Positive clamper circuit					
2	Negative clamper circuit					

Part B: 1) Assemble the circuit as per the given digram
2) Apply input AC sine wave signal of 1KHz, 5Vpp using function generator.
3) Observe the output waveforms on the CRO and plot them wrt input.
4) Note down the observed value for positive as well as negative half cycle and calculate the value for both cycles using KVL.
5) Repeat the procedure for different clamper circuits and name the circuit.

CONCLUSION:

No Post Lab questions for this experiment