LAB 3
Diode Circuits

A. Experimental Work

A.1. Diode Clamper

1. Construct the diode clamper circuit given below on NI ELVIS board. Use the oscilloscope to measure voltage across both the input and the output (through the diode).

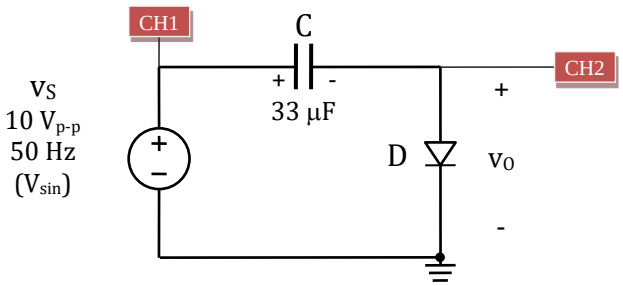
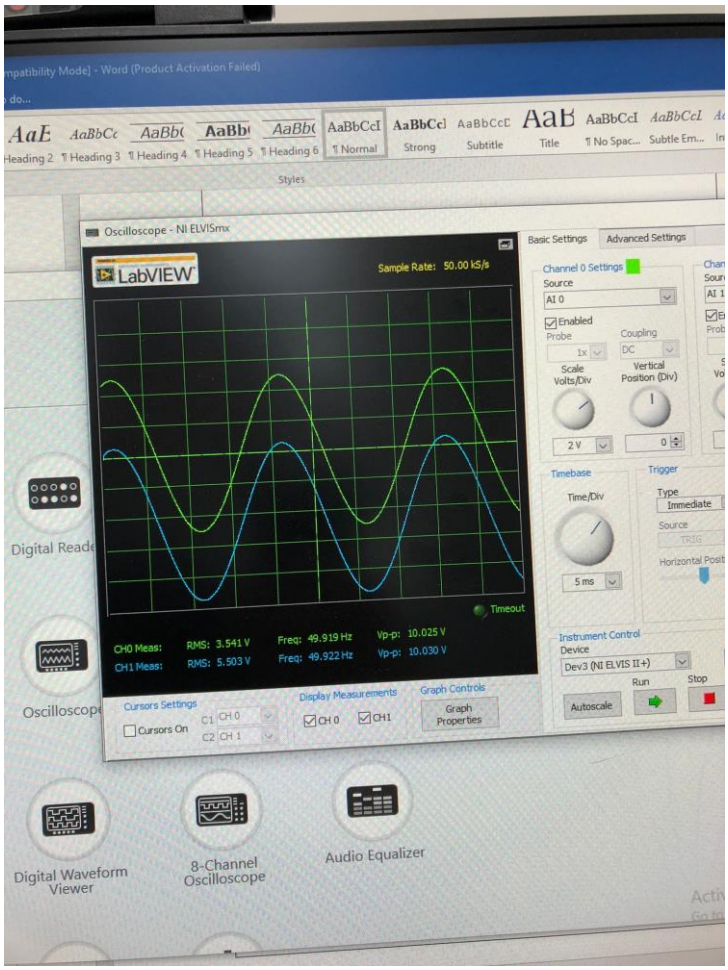


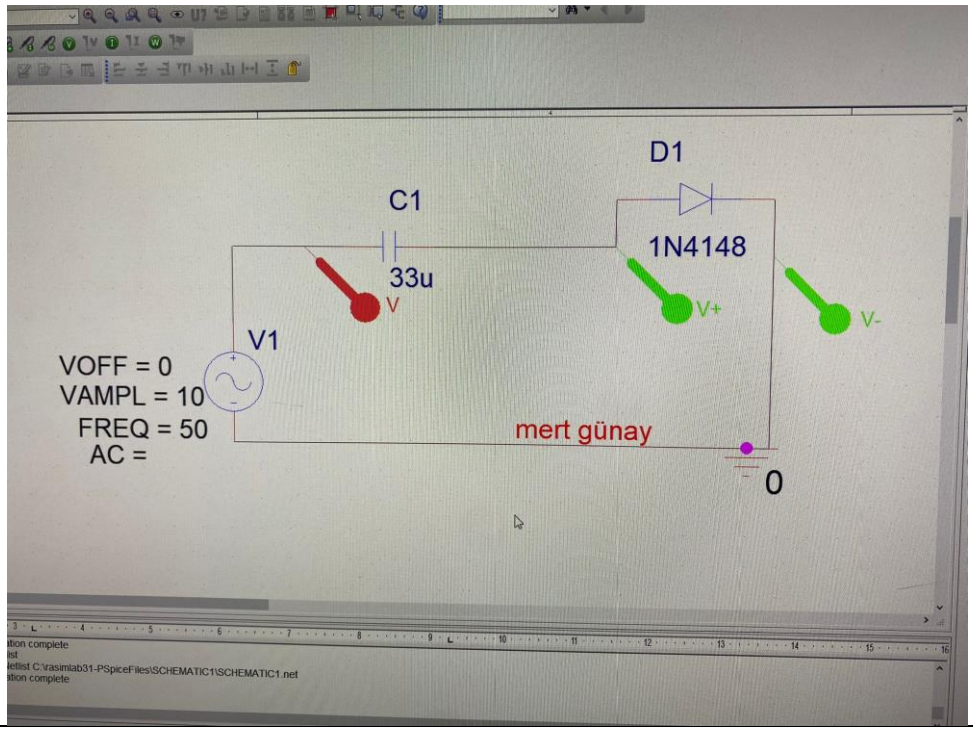
Figure 3.1

2. Construct the diode clamper circuit given above in ORCAD. Use the diode 1N4148.

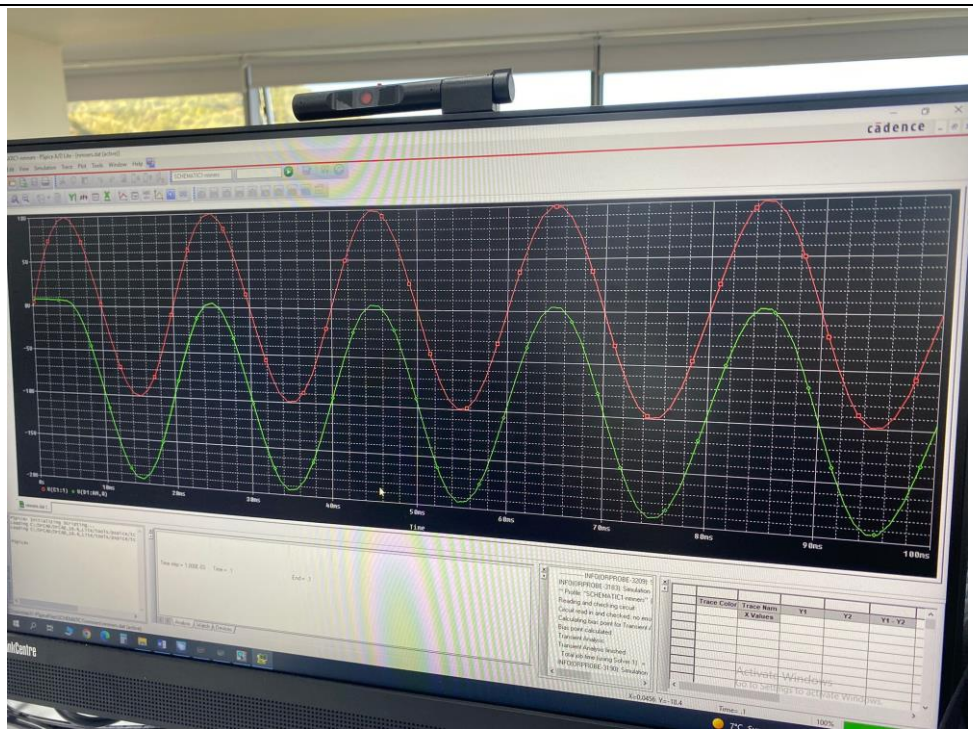
i. Oscilloscope measurement for both Vin (input) and Vo (diode) voltages.



ii. Circuit Schematic



iii. Simulation Results



iv. Discussion

. What is the voltage at which positive peaks are clamped?
According to the graph , the red voltage graph was clamped into negative area so

the greens pozitive peaks between 0<Vp<1

. What is the relationship between this peak voltage and the diode turn-on voltage?

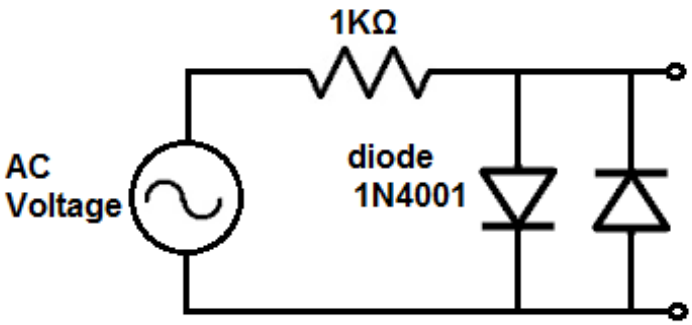
-V-V-Vo = 0 so the turn on voltage gives diode turn on voltage .

. What happens if we reserve the polarity of the diode?

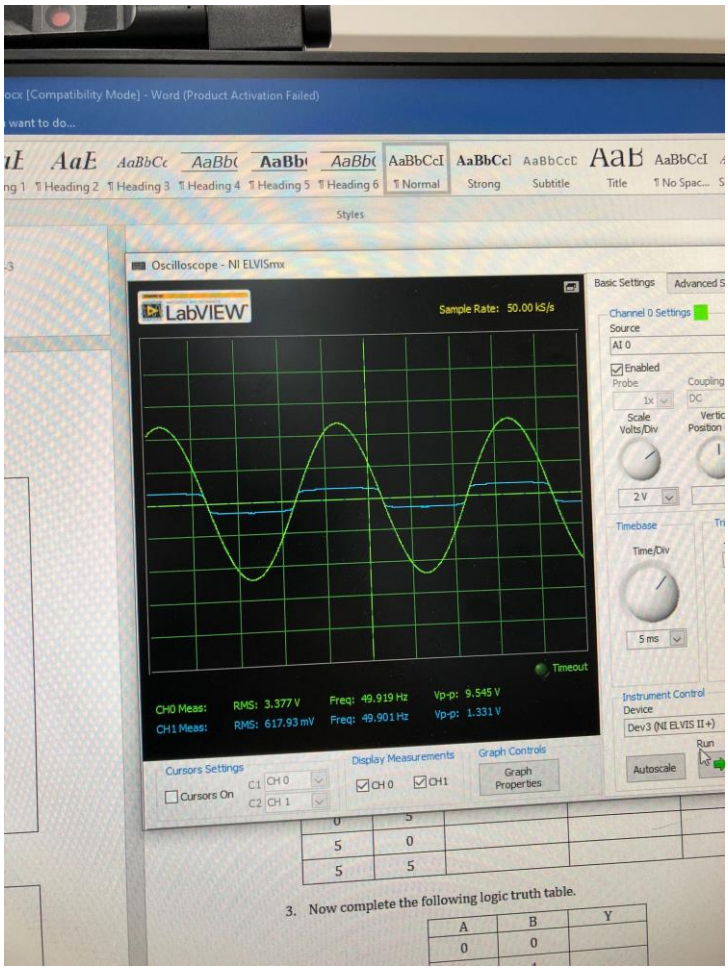
If we reserve the polarity of diode , the peaks points will go down a litbit . For instance , using Si diodes.

A.2. Diode Clipper

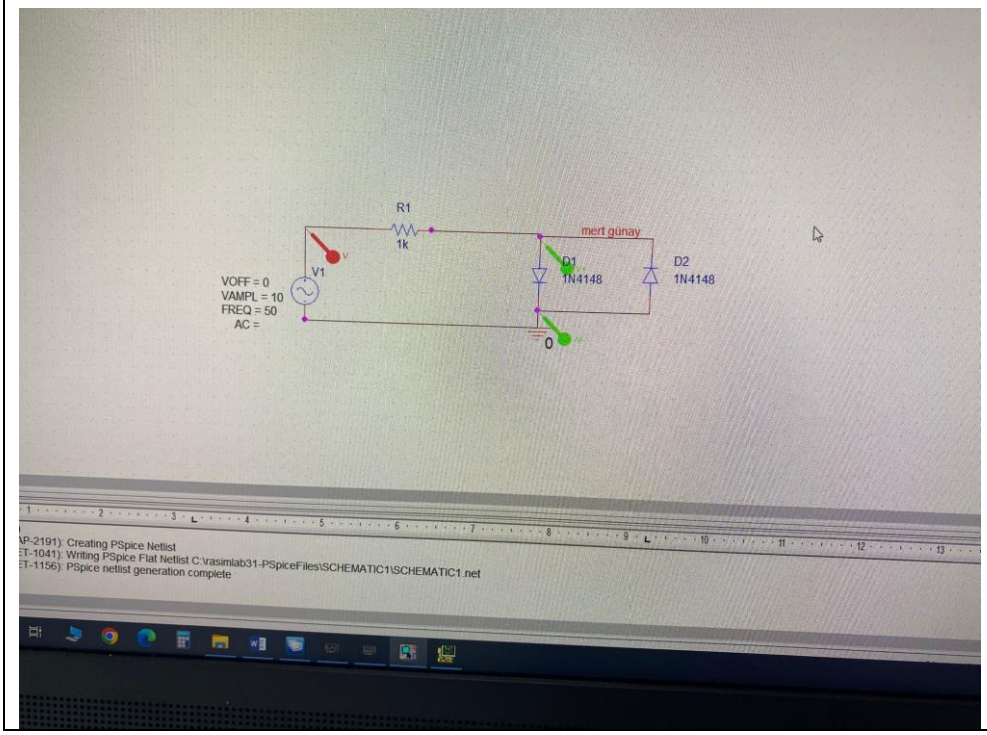
3. Construct the following circuit (Fig. 2.1) on NI ELVIS board. Use the oscilloscope to measure voltage across both the input and the output (through the diode). Please, also do the simulation for the same circuit in ORCAD.



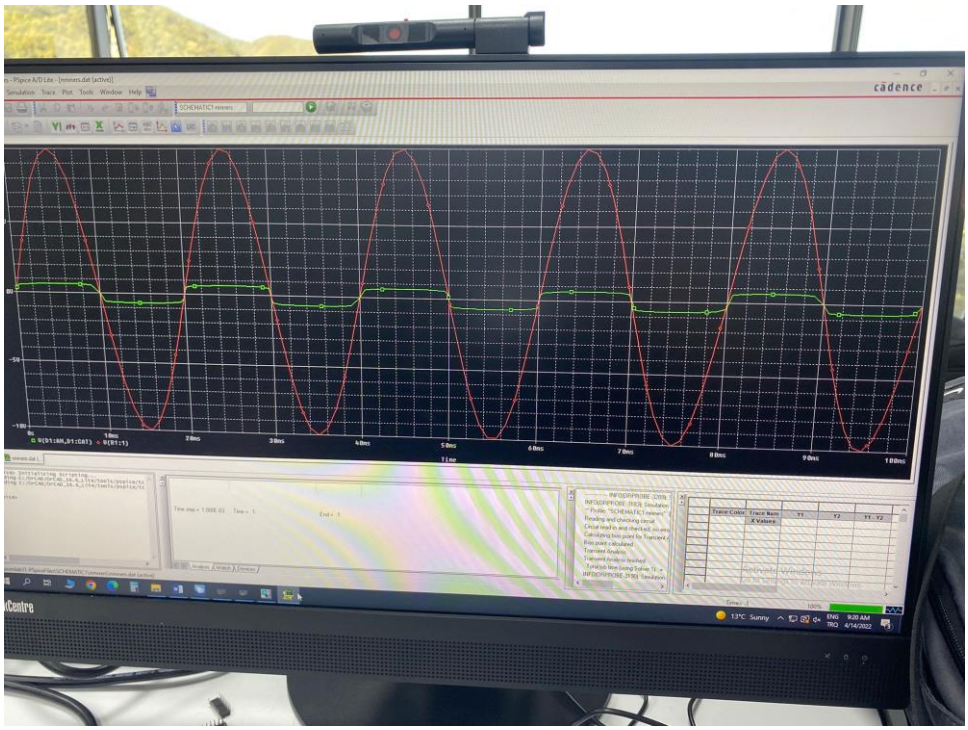
v. Oscilloscope measurement for both Vin (input) and Vo (diode) voltages.



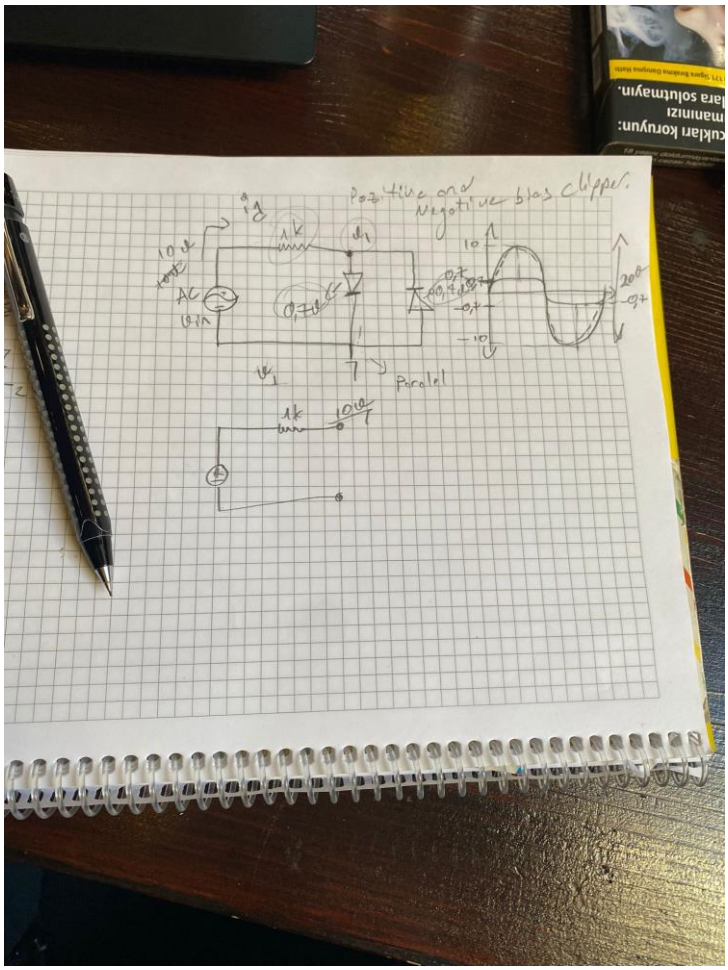
vi. Circuit Schematic



vii. Simulation Results

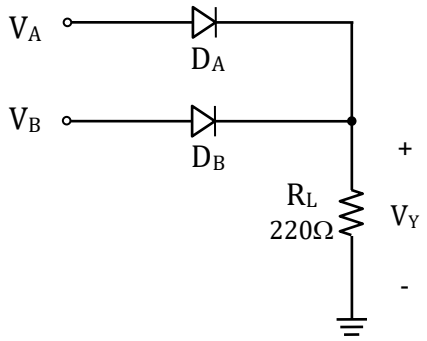


viii. Calculate and sketch the input and output voltage by hand.



A.3. OR & AND Gates

1. Construct the following logic gate using two **1N4148** diodes on PSpice.



2. Complete the following voltage truth table.

V_A (volt)	V_A (volt)	State of D_A (On/Off)	State of D_A (On/Off)	V_Y (volt)

0	0	off	off	0.261mv
0	5	off	on	4.18
5	0	on	off	4.2
5	5	on	on	4.22

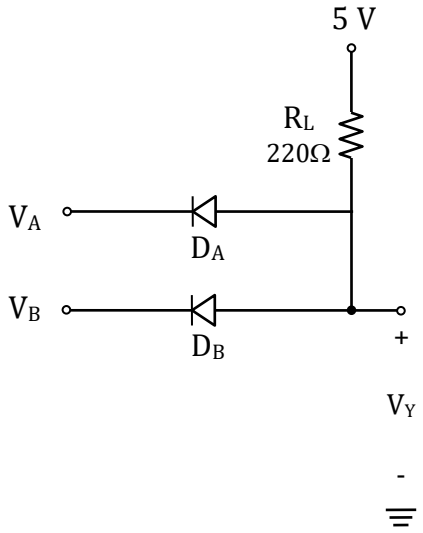
3. Now complete the following logic truth table.

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

4. Discuss the voltage ranges you assumed for logic levels and the type of the above logic gate

This was a simple or gate circuit . Logically both of them are off , the the voltage will be 0 . If both of them are open , (these are multiple as we know) the voltage will be 5 – 0.7 =4.3 V .

5. Construct the following logic gate using two **1N4148** diodes.



6. Complete the following voltage truth table.

V_A (volt)	V_A (volt)	State of D_A (On/Off)	State of D_A (On/Off)	V_Y (volt)
0	0	off	off	0.703
0	5	off	on	0.746
5	0	on	off	0.729
5	5	on	On	4.94

7. Now complete the following logic truth table.

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

8. Discuss the voltage ranges you assumed for logic levels and the type of the above logic gate.

This was a simple and gate . Output voltages will only 0.7 (diodes) when the diodes are/is off because diodes will not allow voltage to pass except at their own voltage level . If both of them open are open voltages will not change .