Result Report

Basic Information Laboratory

Subject: Basic Information Laboratory

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Submission Date: 2024. 12. 4.

Result

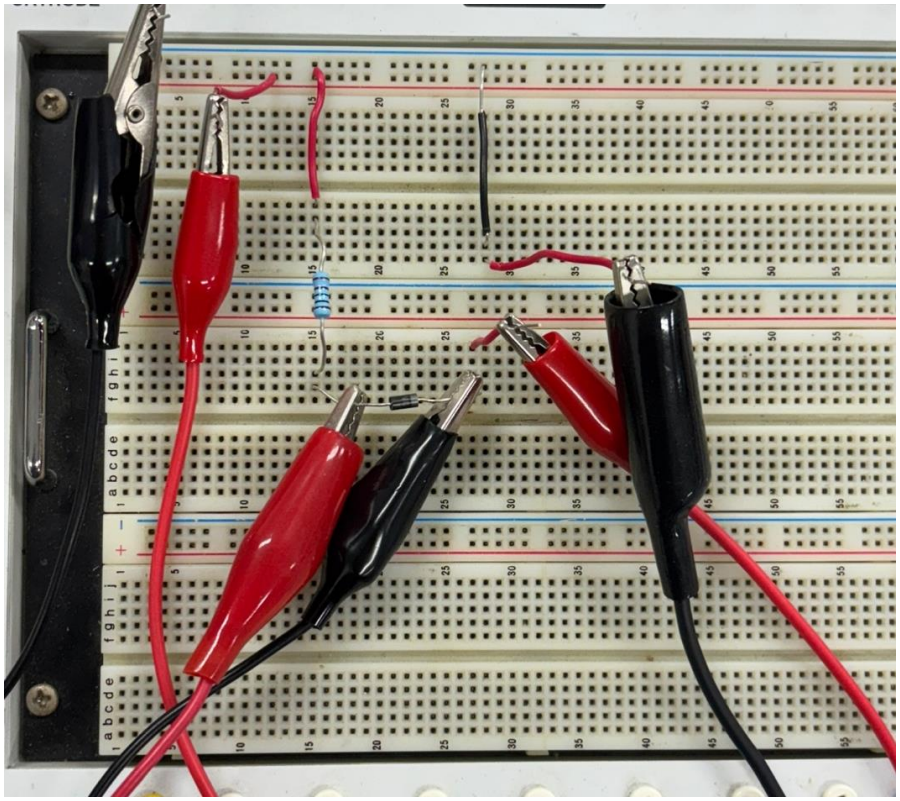
I completed the planned eleventh experiment. I will include the results related to our learning below this line.

procedure

Task 1: I-V characteristics of a diode

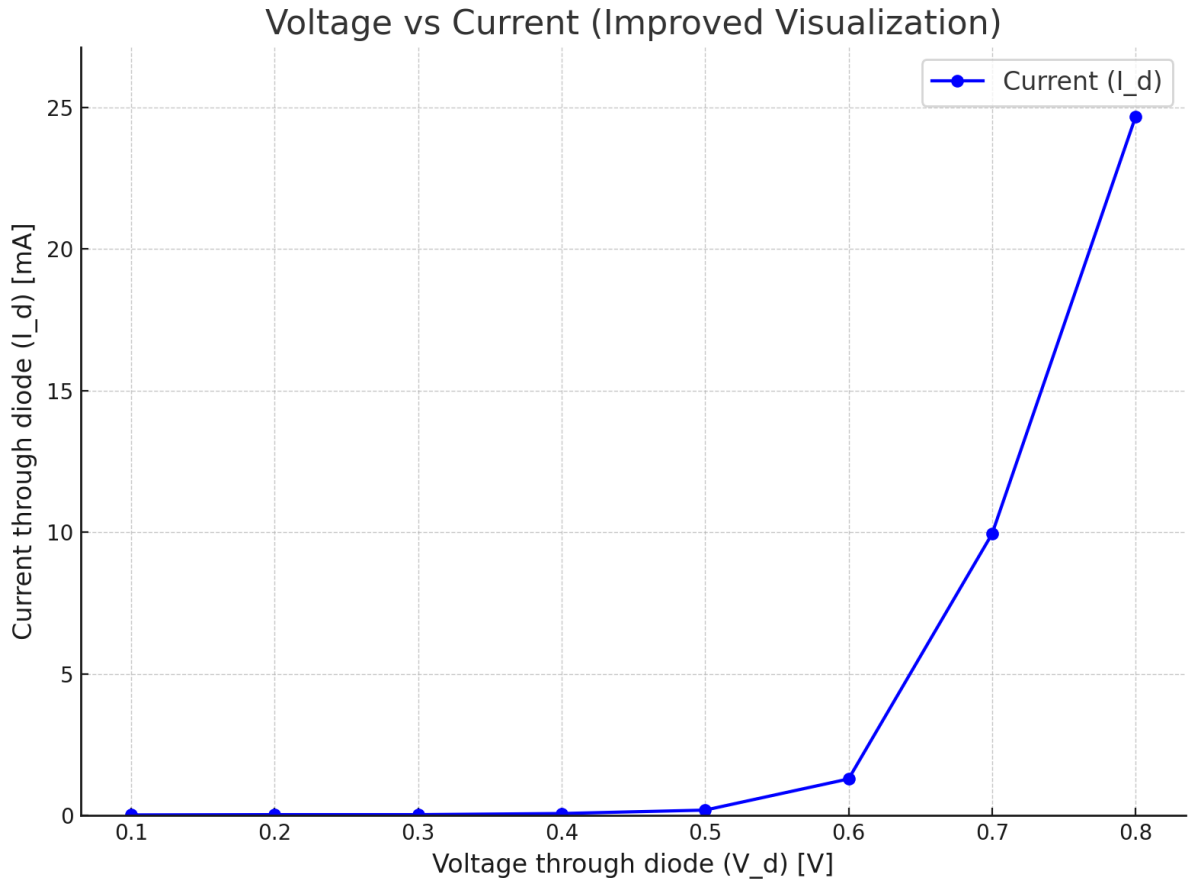
Task 1-1: Observing current versus voltage

We composed the circuit like the picture below. With 1kohms, and IN4001 diode and the power supplier is connected as input



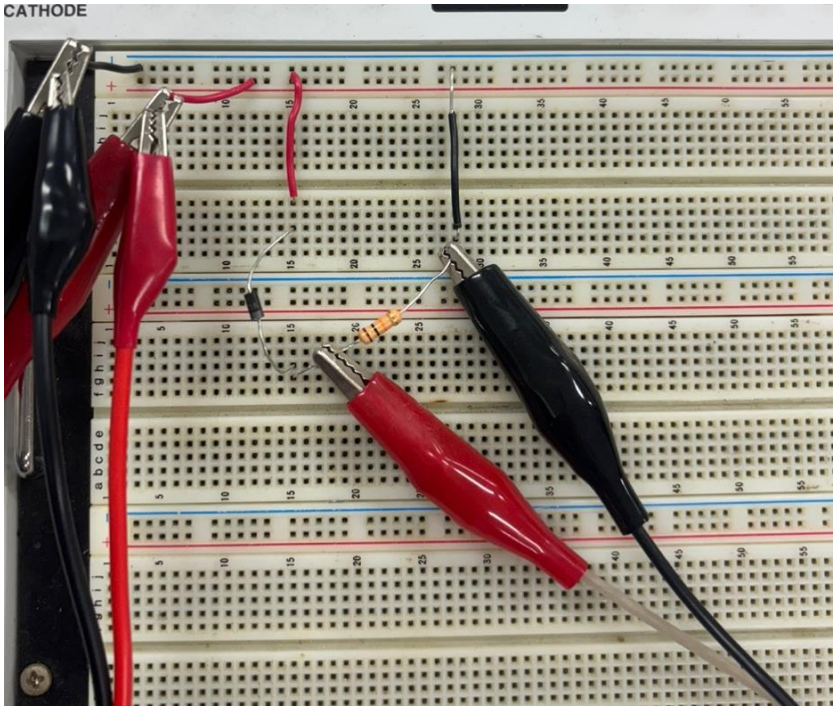
In task 1-1, we varied the voltage values from 0.1V to 1.5V in 0.1V intervals. This is our result table and V-I characteristics graph

V_D	*0.1V*	*0.2V*	*0.3V*	*0.4V*	*0.5V*	*0.6V*	*0.7V*	*0.8V*	*0.9V*	*1.0V*	*1.1V*	*1.2V*	*1.3V*	*1.4V*	*1.5V*
i_D	*0.02*	*0.03*	*0.03*	*0.07*	*0.19*	*1.29*	*9.94*	*24.66*							



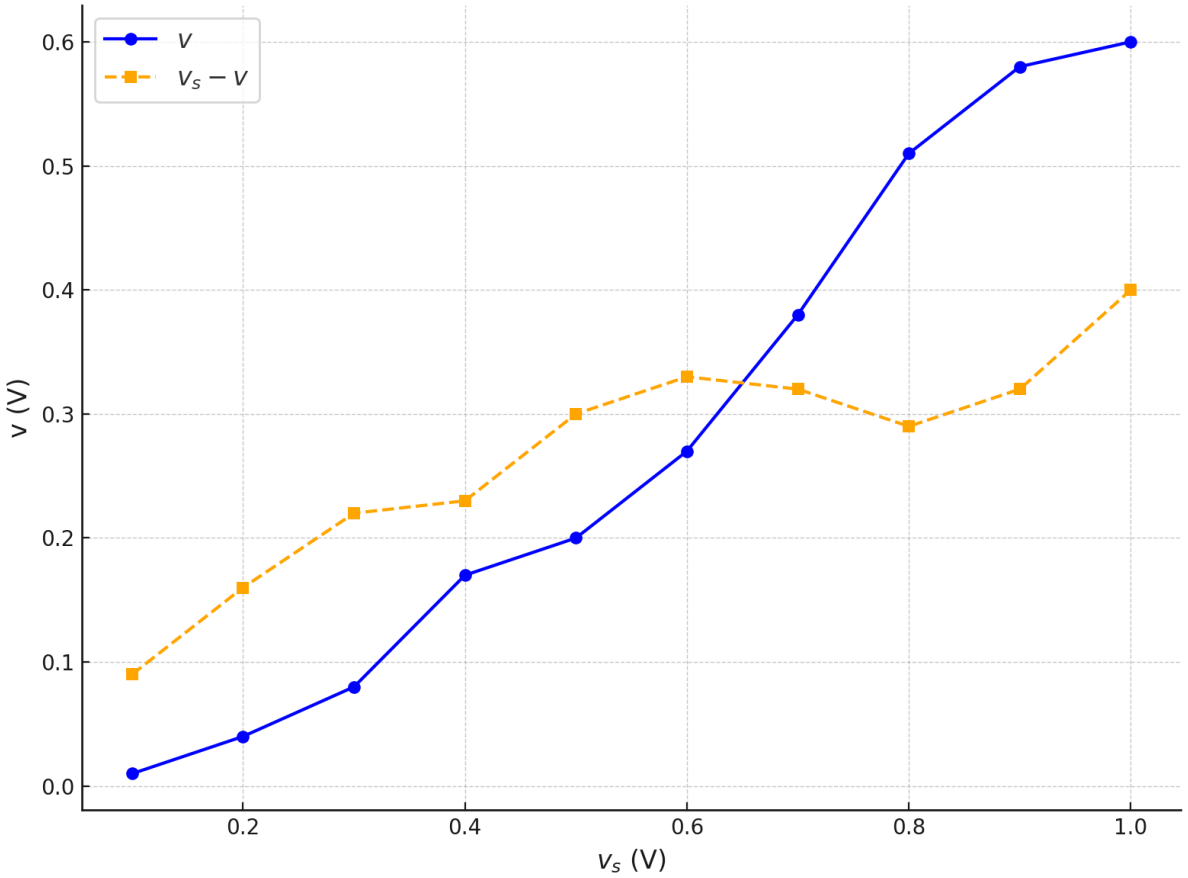
Task 1-2: Observing output voltage versus input voltage

We set up the circuit to see V-V characteristics like below



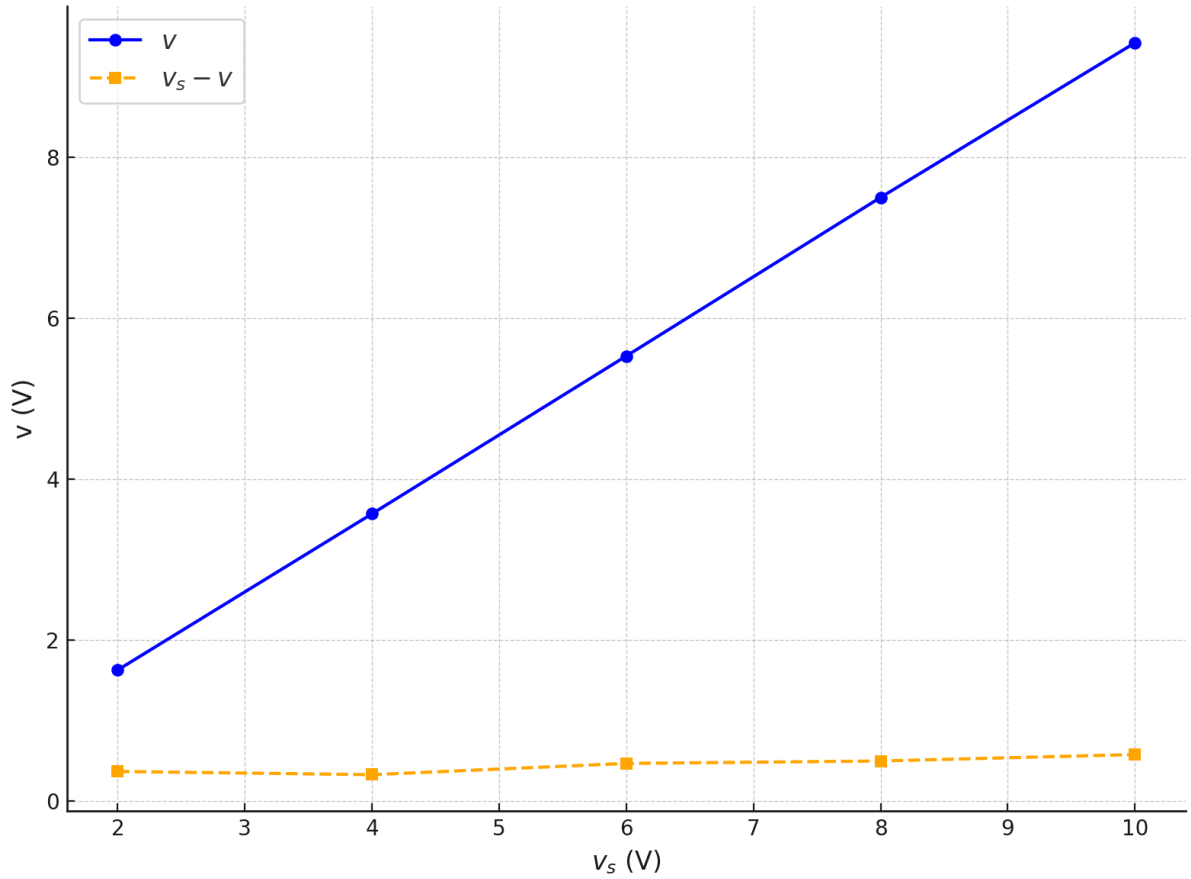
In set 1 of tasks 1-2, we varied the voltage values from 0.1V to 1.0V in 0.1V intervals. This is our result table and V-V characteristics graph

v_s	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
v	0.01	0.04	0.08	0.17	0.2	0.27	0.38	0.51	0.58	0.6
$v_s - v$	0.09	0.16	0.22	0.23	0.3	0.33	0.32	0.29	0.32	0.4



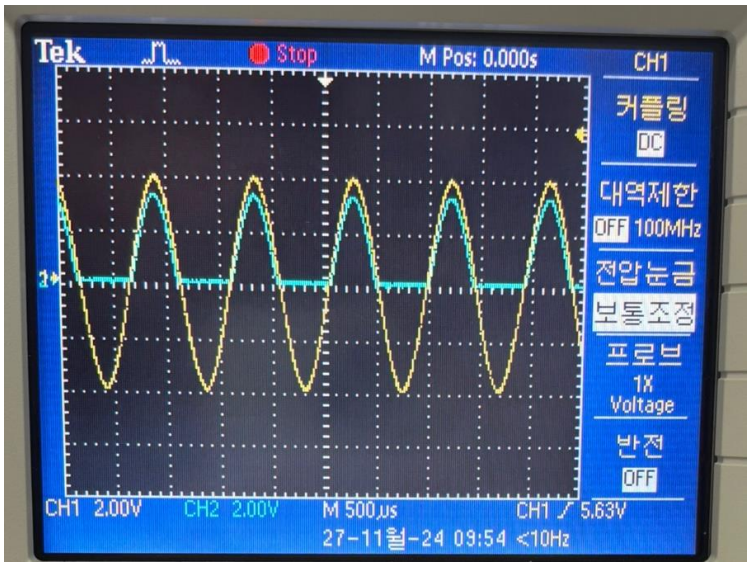
In set 2 of tasks 1-2, we varied the voltage values from 2V to 10V in 2V intervals. This is our result table and V-V characteristics graph

v_s	2	4	6	8	10
v	1.63	3.57	5.53	7.5	9.42
$v_s - v$	0.37	0.33	0.47	0.5	0.58

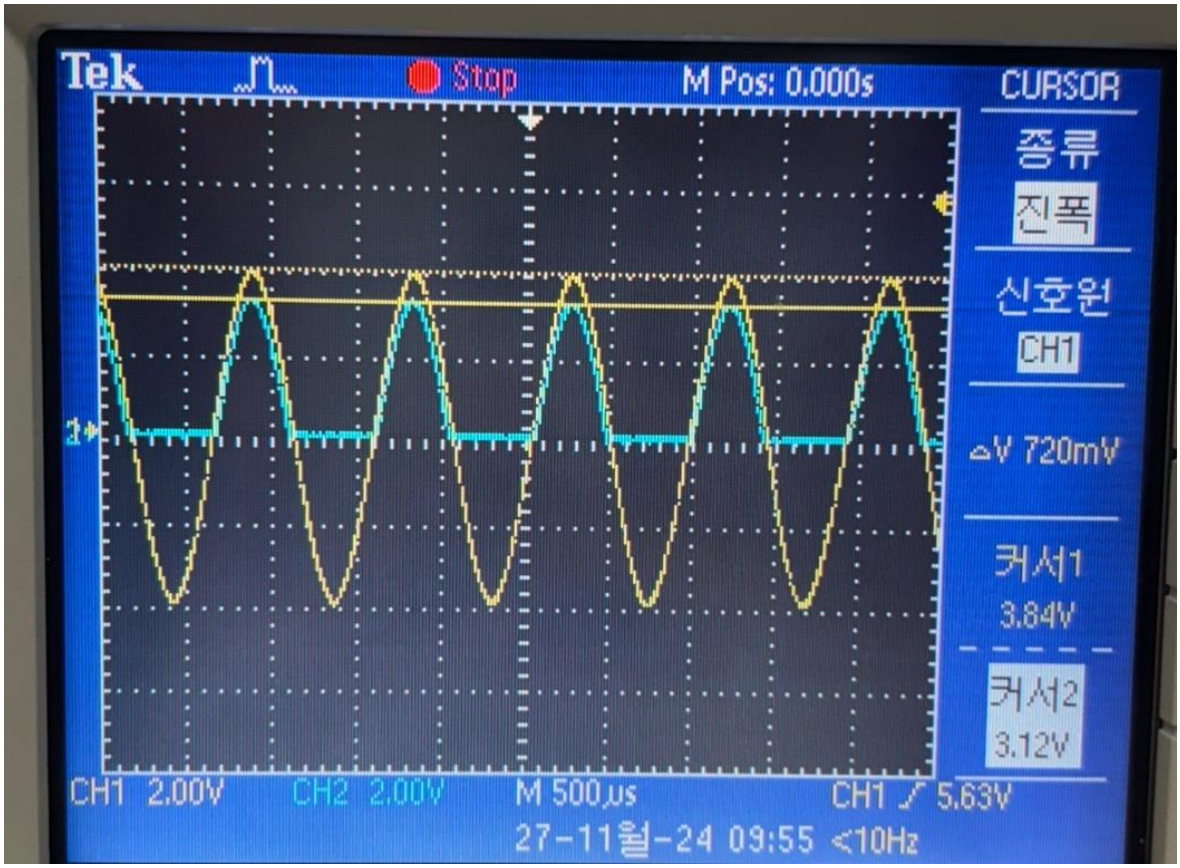


Task 1-3: observe waveform with a function generator

We replaced the power supplier with a function generator and applied a sinusoidal waveform with a frequency of 1 kHz and an amplitude of 4V.



Now, we can see that the diode rejects the negative signal.



In addition, by using cursors, we could observe that the output signal v is set to approximately 3.3V, which matches a theoretical value in the preliminary report. (I mentioned that the barrier potential would be 0.7V with a silicone diode.)

This circuit is called a rectifier

Discussion

These are the group's discussions about the assigned tasks.

Task 1: I-V characteristics of a diode

- A diode is a two-terminal electronic component that allows current to flow in one direction while blocking it in the reverse direction.

- Checking the anode and cathode is essential when working with this element. Confirming the correct direction is vital for circuit design.

-The V-I graph of the diode is non-linear and shows a significant upward trend.

- The barrier potential is the voltage level where the V-I graph begins to increase significantly. We assume that current flows into the element from this point. Each diode has its barrier potential.

- Using the characteristics of a diode, we can design a rectifier that rejects negative signals.

- The output signal’s peak point is theoretically set to $V_{peak\ of\ input}$-0.7 V

Conclusion

Through this lecture, I discovered several things about basic electrical knowledge.

- Since the diode is sensitive to the current direction, check the line on the element to determine the allowed direction in the circuit.

- Make sure to check the barrier potential when planning your experiment.

- After the barrier potential, we can get a wide range of current by adjusting the voltage slightly.