

North South University
Department of Electrical & Computer Engineering

LAB REPORT

Course Code: EEE111.3

Course Title: Analog Electronics I

Course Instructor: MS. SYEDA SARITA HASSAN

Experiment Number: 02

Diode
rectifier
circuits

Experiment Name:

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Submitted To: MD. AL – AMIN BHUIYAN

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Score

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Name of the Experiment: Diode rectifier circuits

Objectives: Study of various rectifier circuits.

Apparatus:

1. 4xp-n junction diode.
2. 1x10k Register.
3. 1 x 0.22 μ F capacitor.
4. 1 x 10 μ F capacitor.
5. 1x oscilloscope.
6. Digital Multimeter.
7. Chords and Wires.

Theory: Rectification is the conversion of alternating current to direct current. It is also the one-way flow of electric charge. When AC voltage is applied it allows a half cycle during its forward bias condition, the other half cycle remains clipped off.

There are two major types of rectifiers -

1. Half wave rectifier.
2. Full wave rectifier.

Half wave rectifier: It's the simplest kind of rectifier. It converts only the half cycle of AC into DC. Another half remains clipped off.

Full wave rectifier: It has both positive and negative half cycles of the AC into DC. It provides double output voltage.

Circuit Diagram:

Experimental Procedures: First of all, we need to make the circuit by using those equipment. Then we check the output and input voltage. In the half wave rectifier We check the voltage across 10k Ω register. Then

gradually we added $0.22\mu F$ and $10\mu F$ capacitor. Now observe the graph. After this we remake the circuit for a full wave rectifier. First we check the voltage drop across the $10\mu K$ register then gradually add $0.22\mu F$ and $10\mu F$ capacitor and observe how the graph is behaving. Finally we vary the frequency from 10kHz to 100Hz and observe the graph's behaviour.

Simulation:

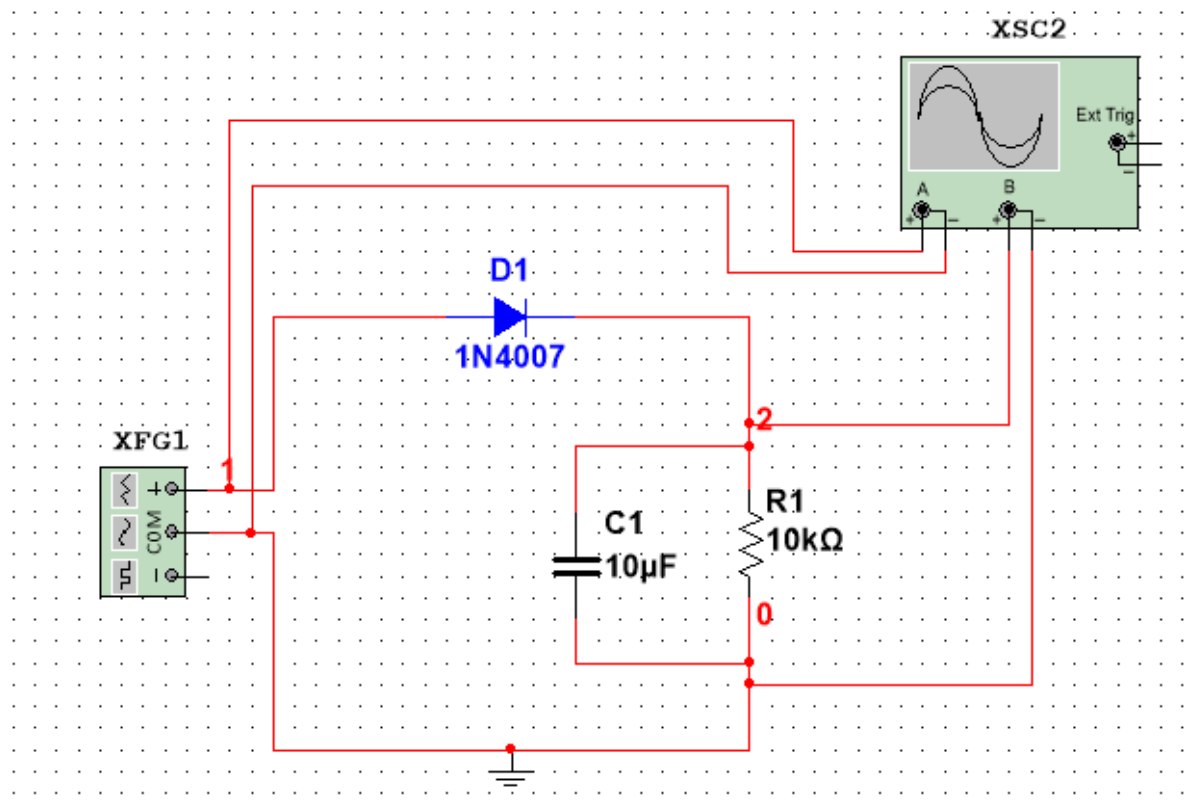
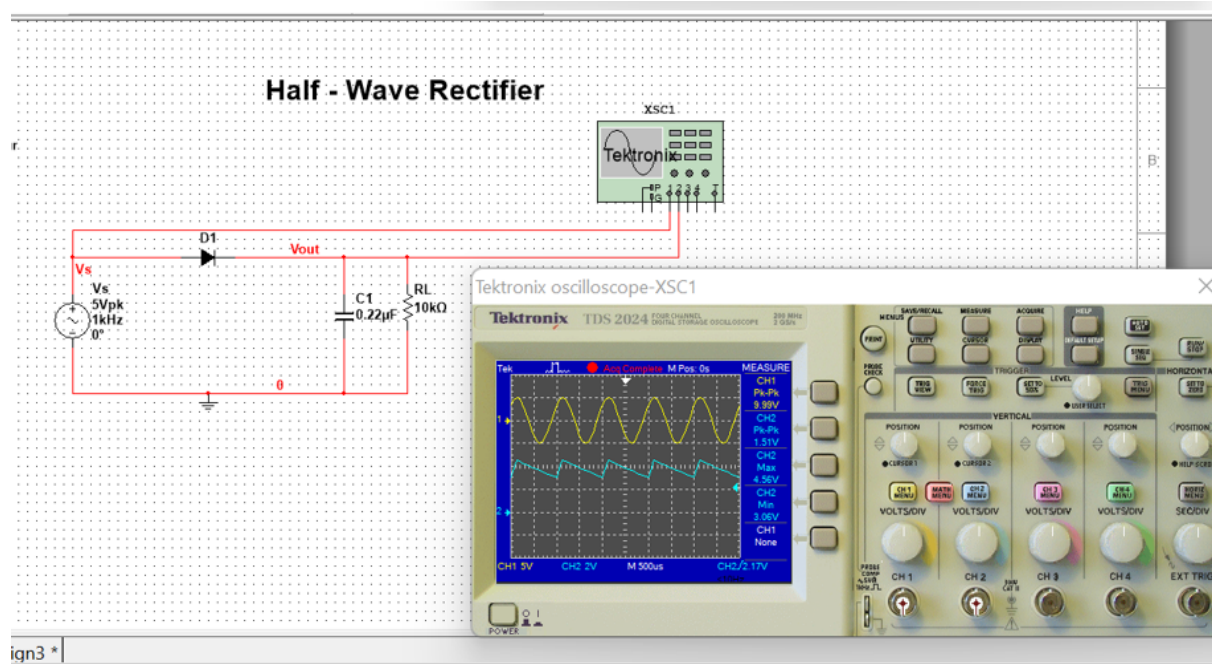
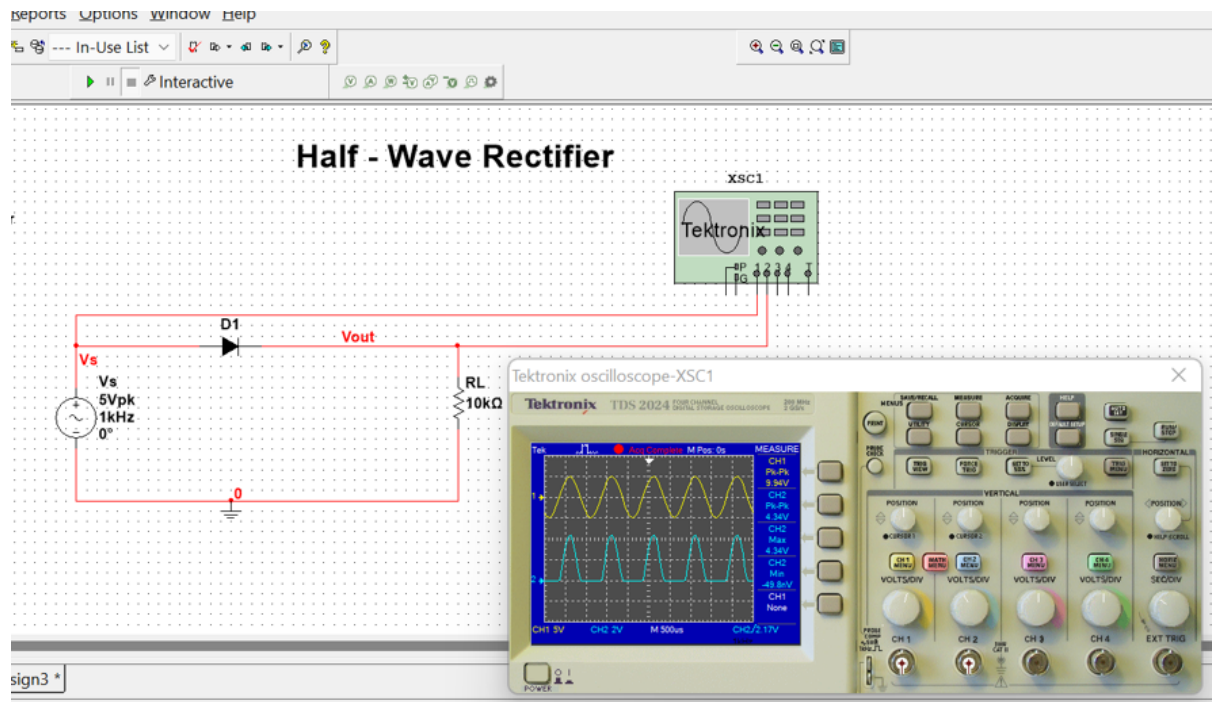


Fig: Half wave rectifier



Half - Wave Rectifier

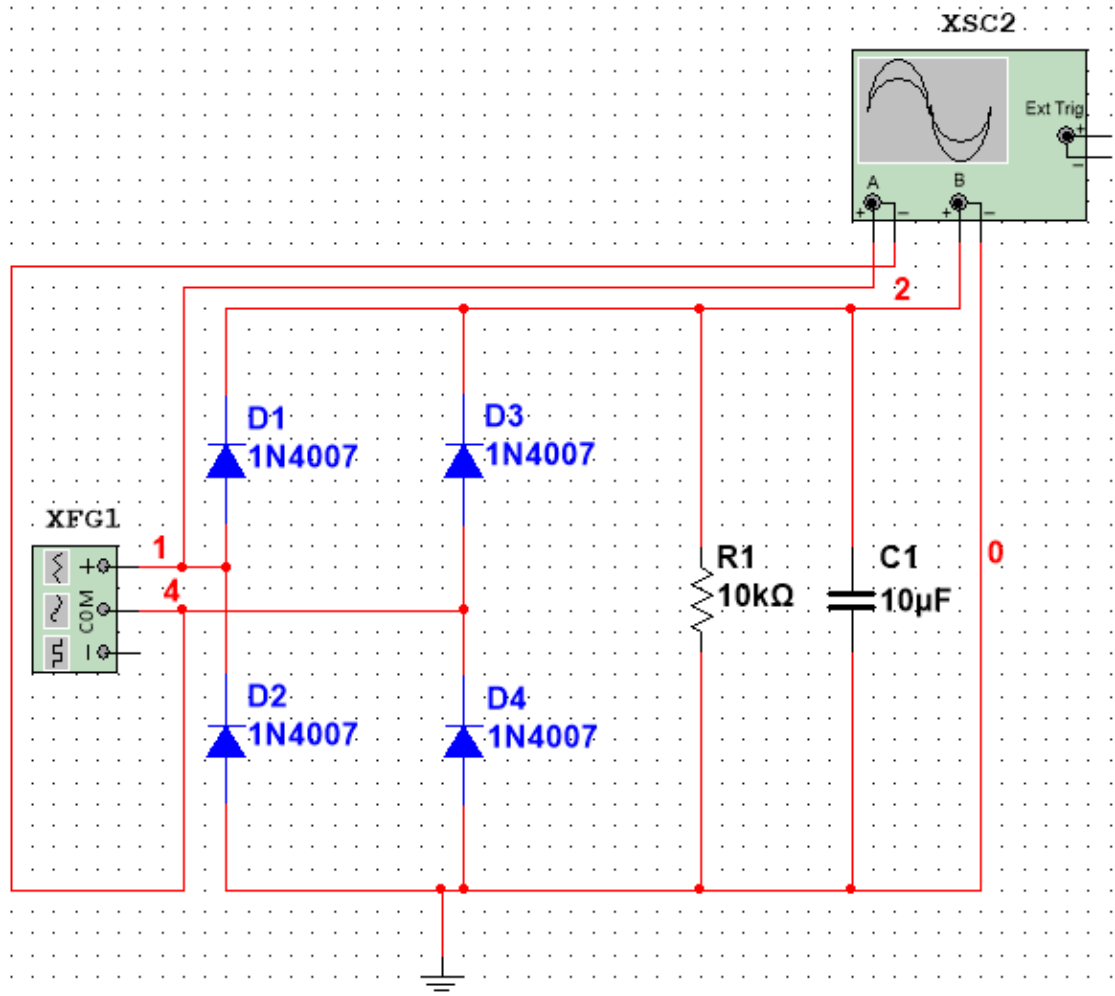
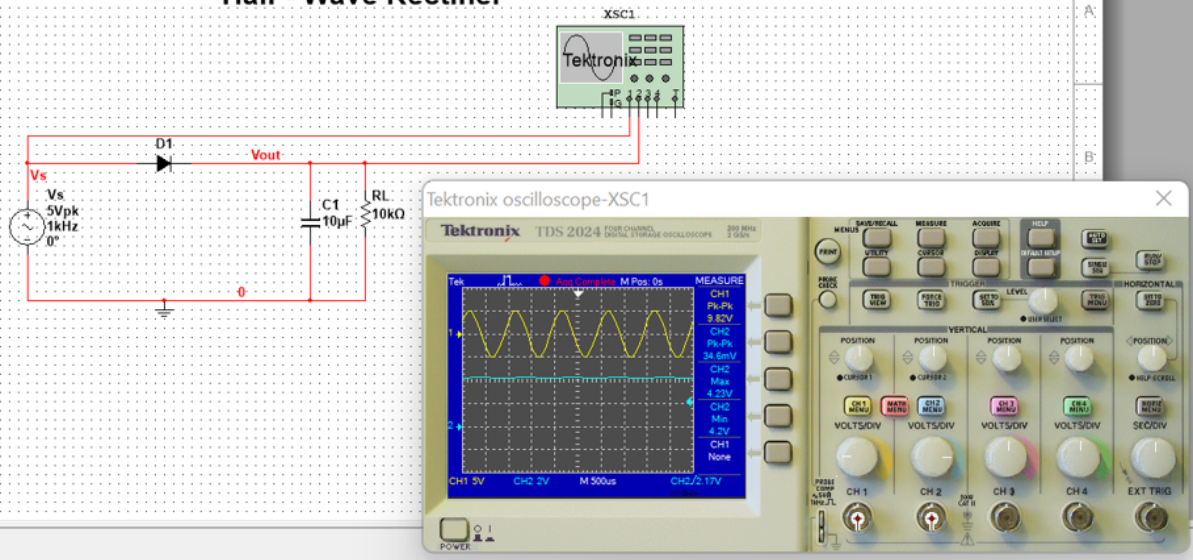
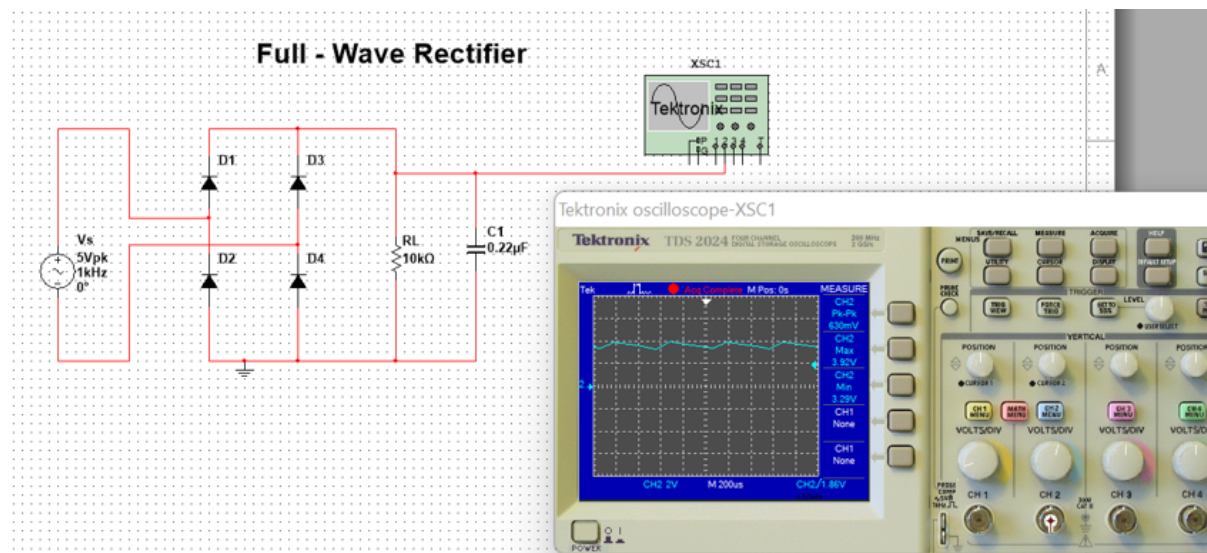
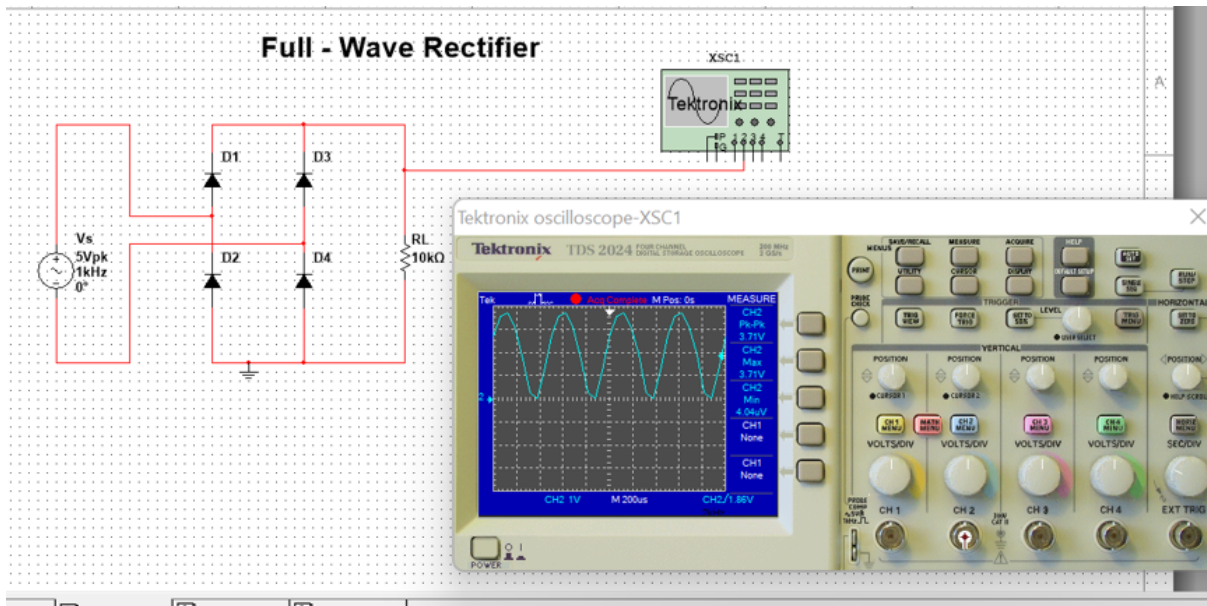
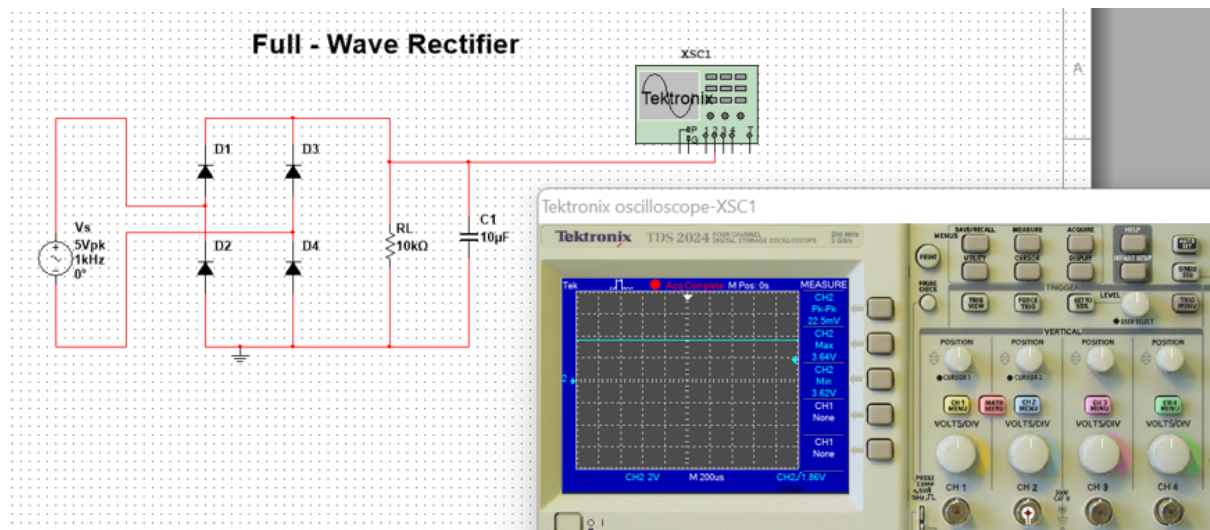


Fig: Full wave rectifier





Experimental data table:

	<u>Half Wave Rectifier</u>	<u>Full wave Rectifier</u>
V_{out} (without capacitor)	4.34V	3.71V
V_{out} (with 0.22 μF capacitor)	4.67V	3.93V
V_{out} (with 10 μF capacitor)	4.35V	3.61V

Question & Answer:

2. Ans: Shown in the simulation.

3. Ans: Frequency of DC output will be directly proportional to the input frequency with or without a capacitor

4. Ans: A Signal creates a ripple effect. A capacitor helps to reduce the ripples in the circuit. The capacitor is preferable to filter out the power.

Discussion: When we use $0.22\mu F$ capacitor in half wave rectifier. The negative half cycle clipped off. And it starts discharging. When We use $10\mu F$ so, $\tau = RC$ If the value of C increases, the time constant increases. And it holds the voltage more.
And if we increase the frequency to 100hz. Ripple will be increased.
For 1khz frequency ripple will decrease
For 10 khz frequency ripple will decrease more than 1khz
And 100 hz ripple will increase.