ABHISHEK SHARMA

Year : Third

Section : "3I"

Class Roll No.: 01

Enrolment No.: 12019009001127

ANALOG ELECTRONICS CIRCUIT LAB

DAY 3

ASSIGNMENT NO.: 1

EXPERIMENT NO. 1

DATE : 20.07.2021

Platform Used : Multisim Online Live Simulator

UNIVERSITY OF ENGINEERING & MANAGEMENT, KOLKATA

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Experiment No.: 01
Date : 30.07.2021

TITLE : STUDY OF RIPPLE AND REGULATION CHARACTERISTICS OF HALF WAVE AND FULL WAVE RECTIFIER WITH AND WITHOUT A CAPACITOR.

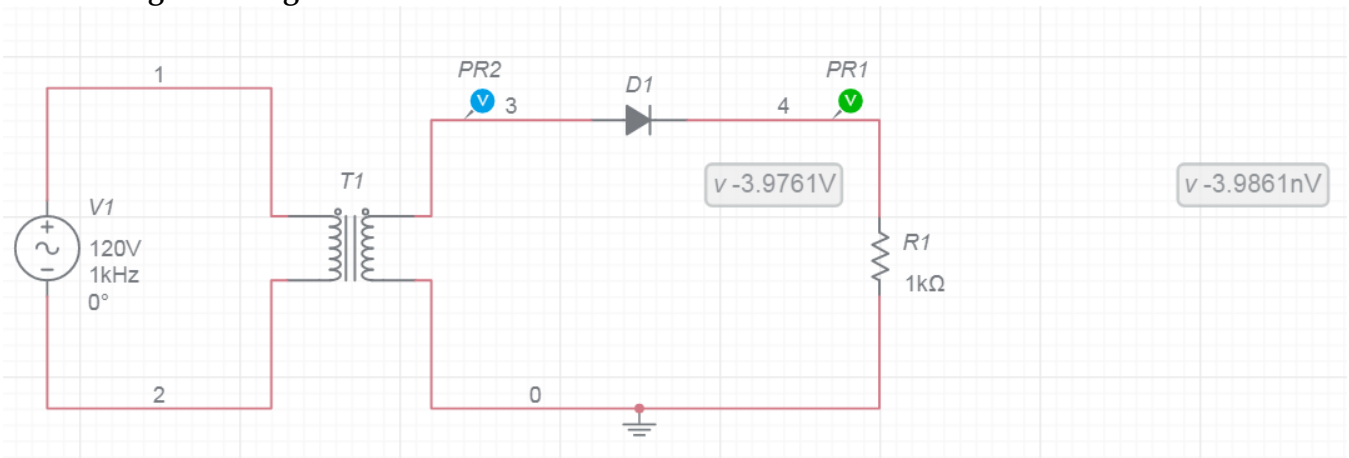
AIM :
The aim of this experiment is to make a circuit which will show the effect on Ripple factor for both the Full wave and Half wave rectifiers based on with and without capacitors. Also, this same principle is used in Half wave rectifier while converting from AC to DC.

Section A. Half wave Rectifier without using the capacitor.

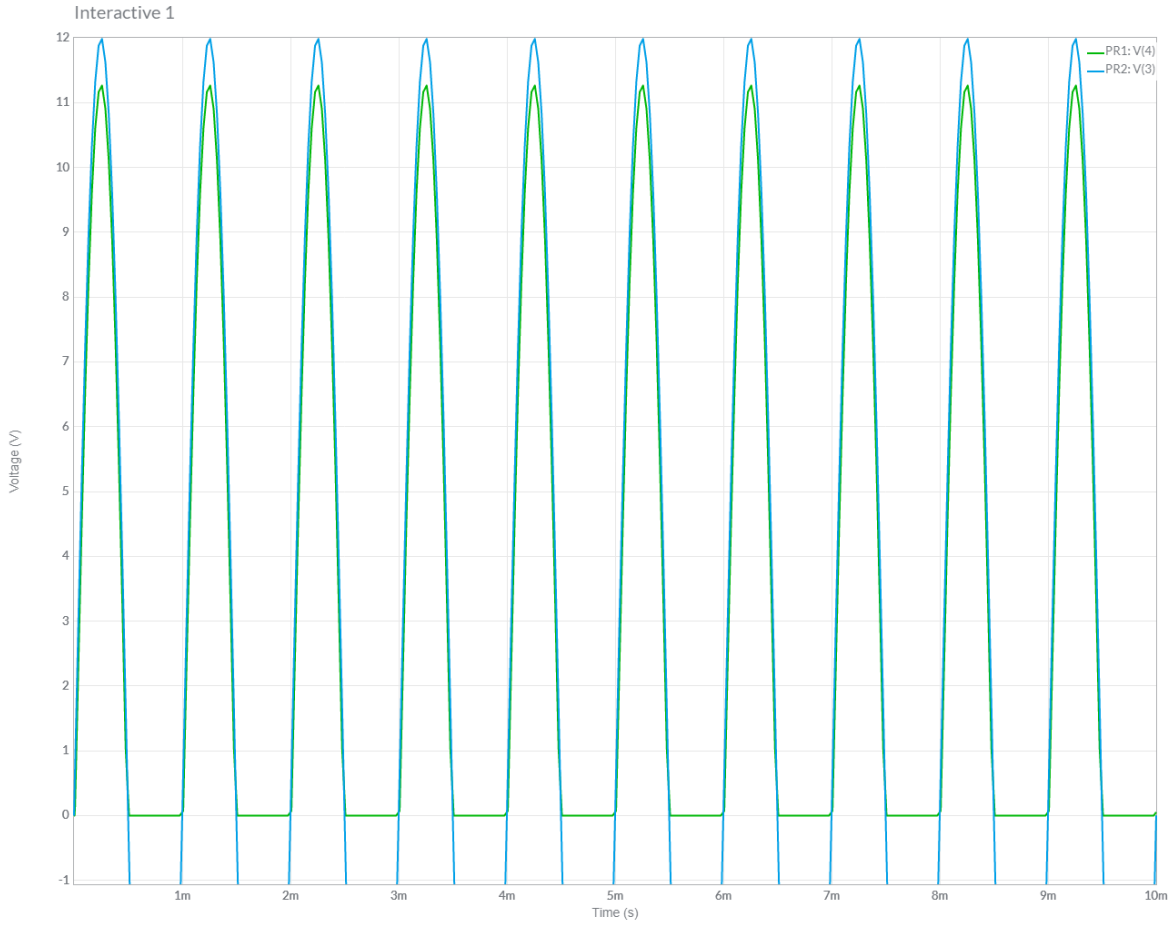
Apparatus Required :
1. AC Power Source [120 V]
2. Diode
3. Resistor [1kΩ]
4. Transformer [1P1S]
5. Ground
6. Voltmeters

Procedure :
To make this following circuit we need go through proper steps,
1. Open Multisim Live simulator in your browser and click on new circuit for creating a new circuit.
2. Drag all the apparatus from the apparatus box and place them accordingly.
3. After placing the apparatus, connect them using the wire.
4. Place the voltmeters for taking the readings.
5. Save the circuit.
6. Run the simulation and from split graph area find out the graph based on the readings that the circuit is providing.
7. Take the readings and the graph and then provide the analysis based on the data.

Circuit Diagram using Multisim Online Live Simulator :



Graphical Representation of the Voltage :



Section B. Half wave Rectifier using the capacitor of different values and analyze.

Apparatus Required :

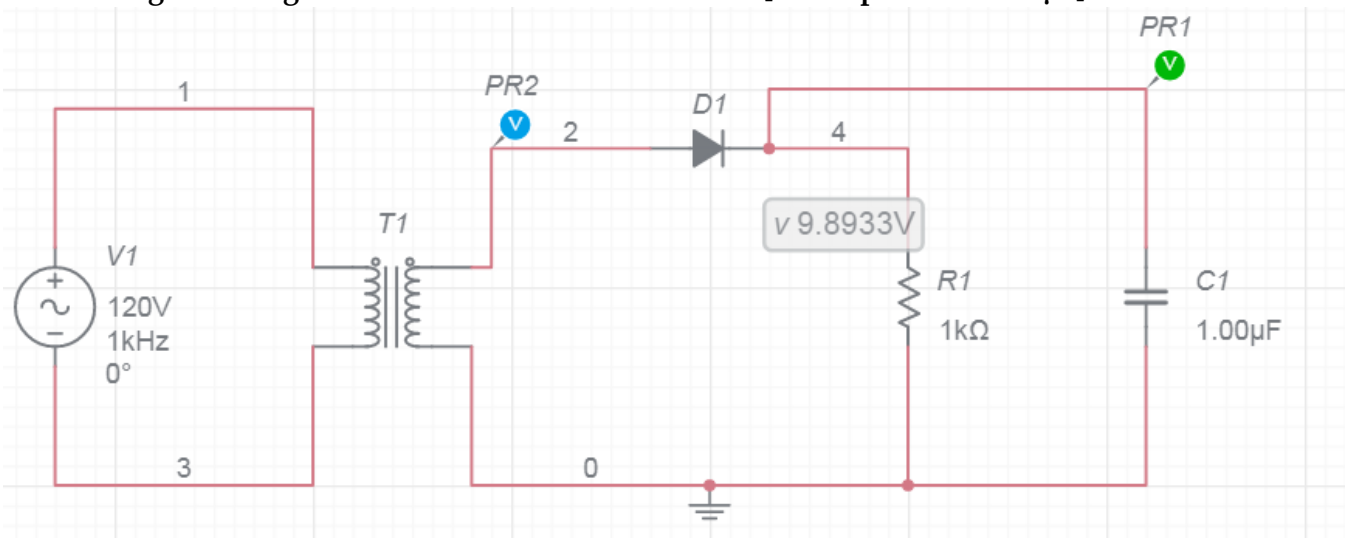
1. AC Power Source [120 V]
2. Diode
3. Resistor [1kΩ]
4. Transformer [1P1S]
5. Ground
6. Voltmeters
7. Capacitors [1μF, 4.5μF and 10μF]

Procedure :

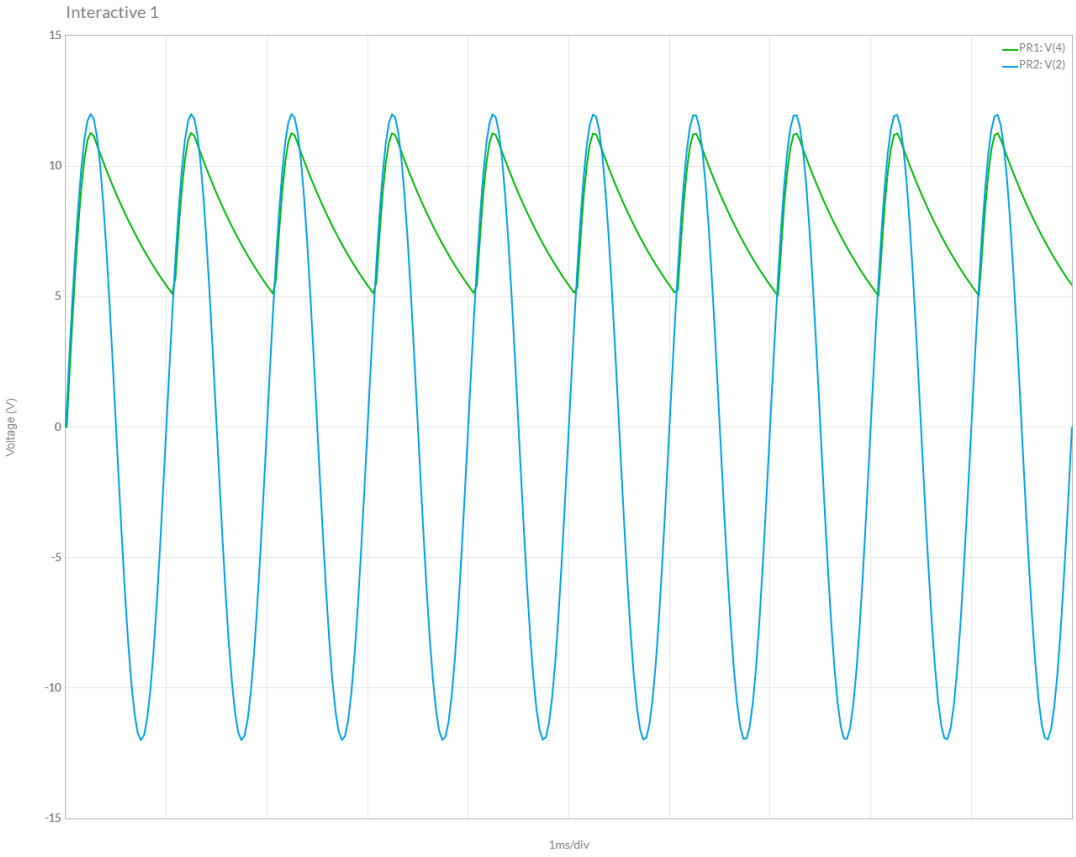
To make this following circuit we need go through proper steps,

1. Open Multisim Live simulator in your browser and click on new circuit for creating a new circuit.
2. Drag all the apparatus from the apparatus box and place them accordingly.
3. After placing the apparatus, connect them using the wire.
4. Place the voltmeters for taking the readings.
5. Save the circuit.
6. Run the simulation and from split graph area find out the graph based on the readings that the circuit is providing.
7. Take the readings and the graph and then provide the analysis based on the data.

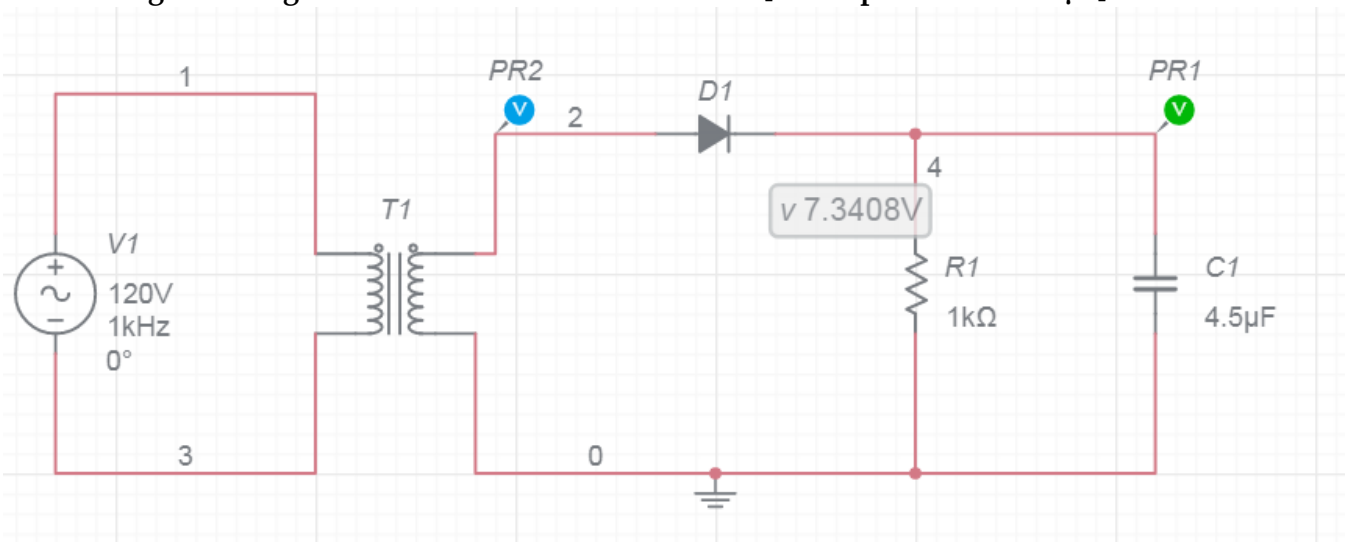
Circuit Diagram using Multisim Online Live Simulator : [For Capacitance of 1μF]



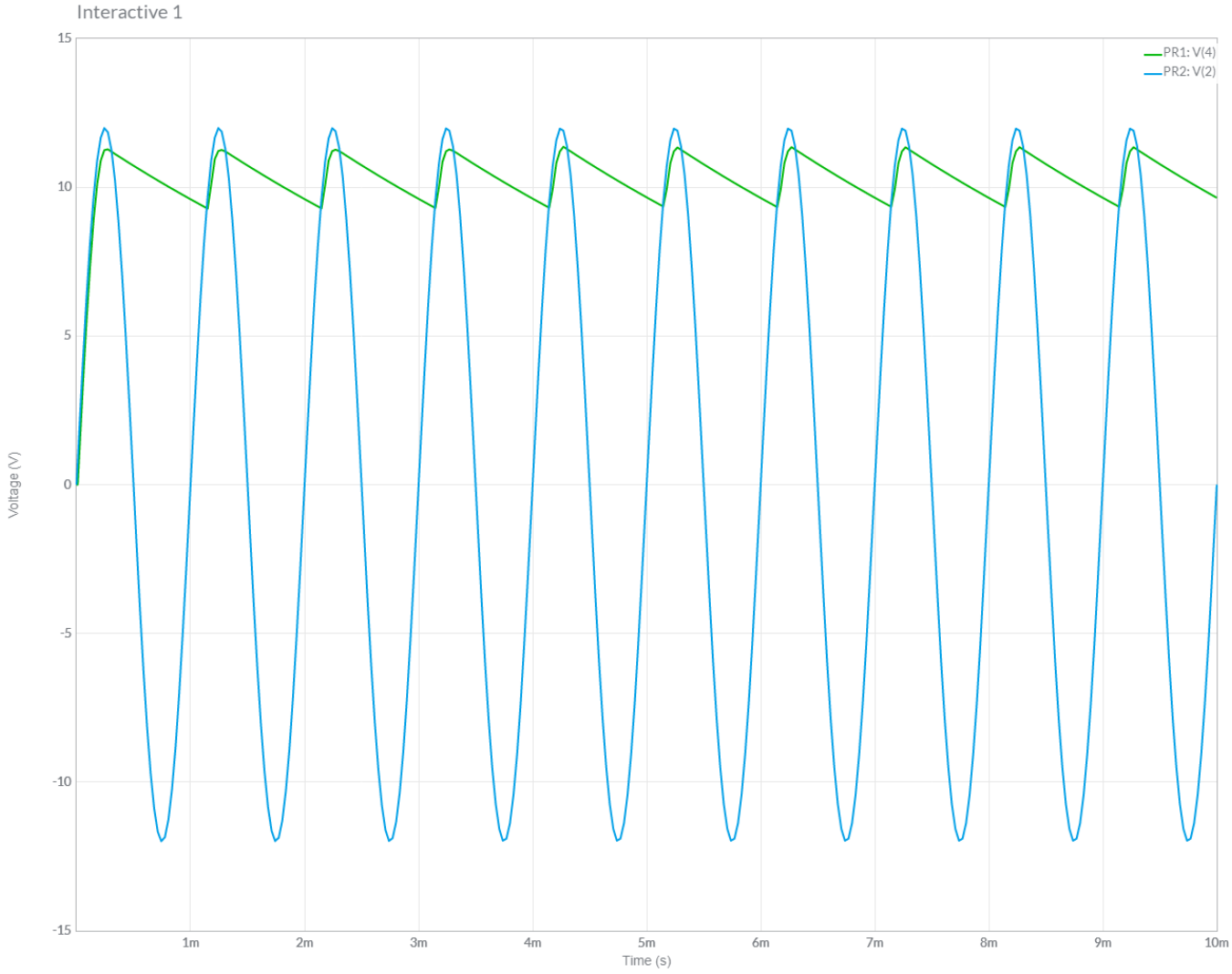
Graphical Representation of the Voltage :



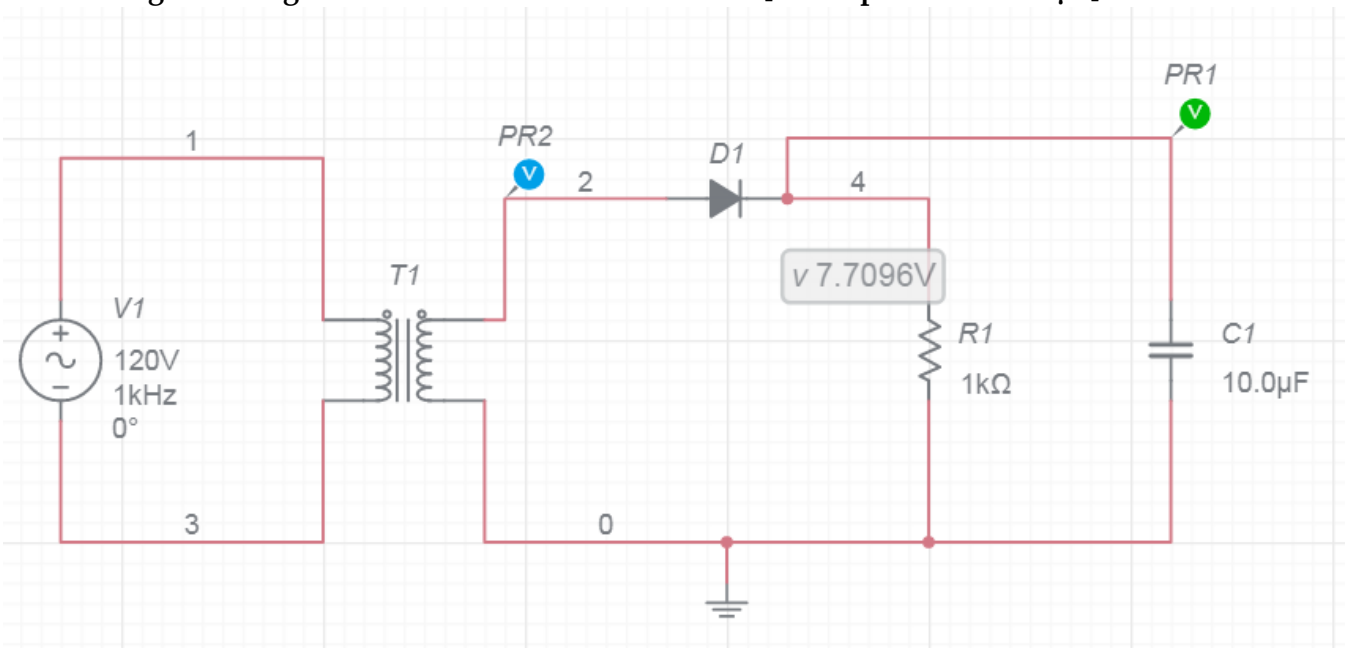
Circuit Diagram using Multisim Online Live Simulator : [For Capacitance of 4.5μF]



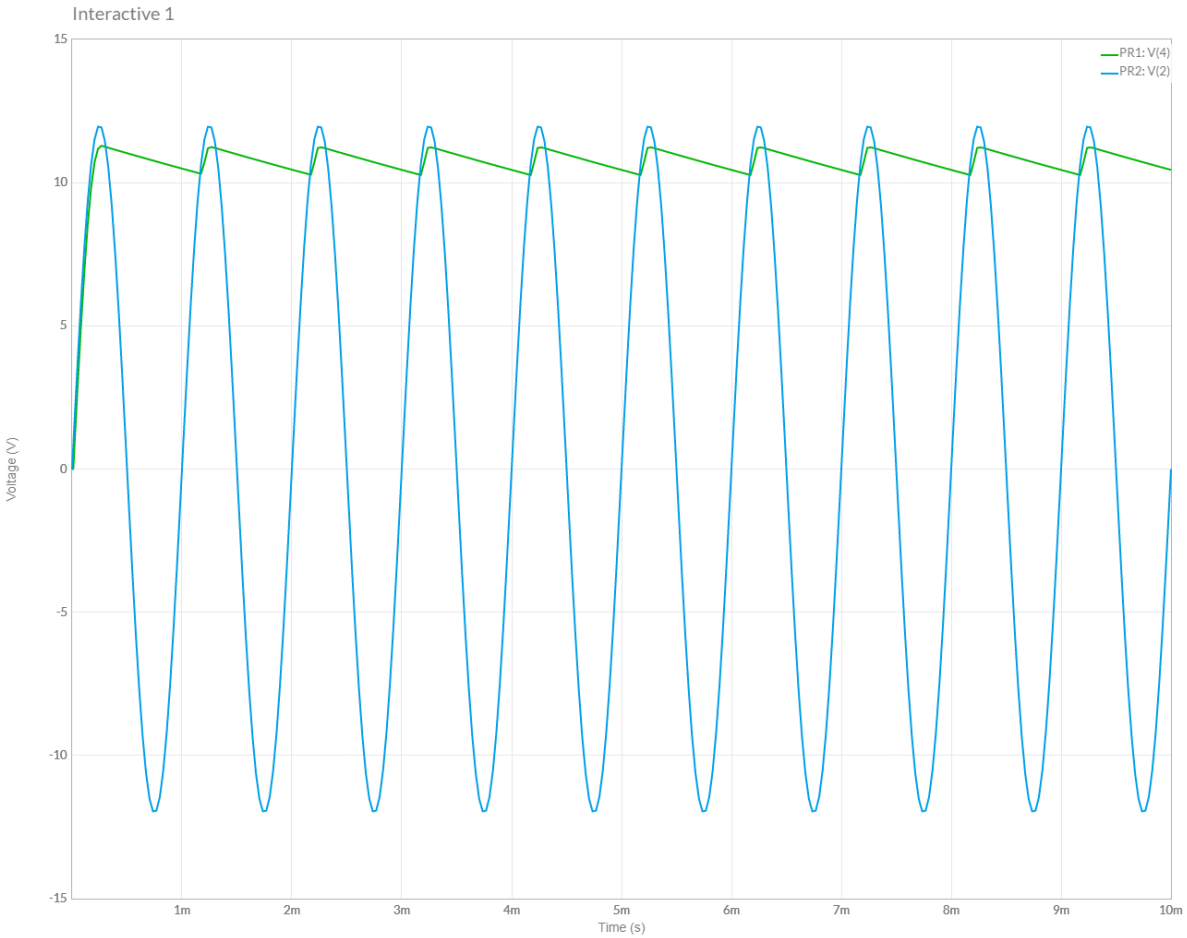
Graphical Representation of the Voltage :



Circuit Diagram using Multisim Online Live Simulator : [For Capacitance of 10μF]



Graphical Representation of the Voltage :



Observation :

As the capacitance values increase, the AC voltage gets more bypassed by the capacitor and the resistor is having the pure DC voltage through the line. That's why the graph is considering to be like that and the voltage becomes more DC rather tends to be pure DC.

Section C. Full wave Rectifier without using the capacitor.

Apparatus Required :

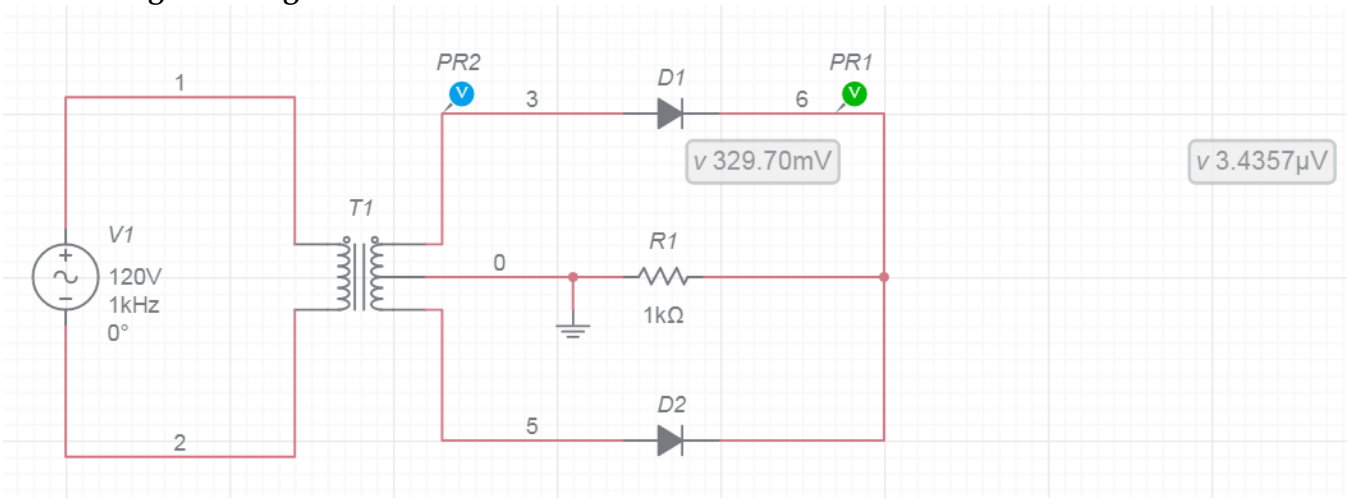
1. AC Power Source [120 V]
2. Diodes
3. Resistor [1kΩ]
4. Transformer [1P1S Centre Tapped]
5. Ground
6. Voltmeters

Procedure :

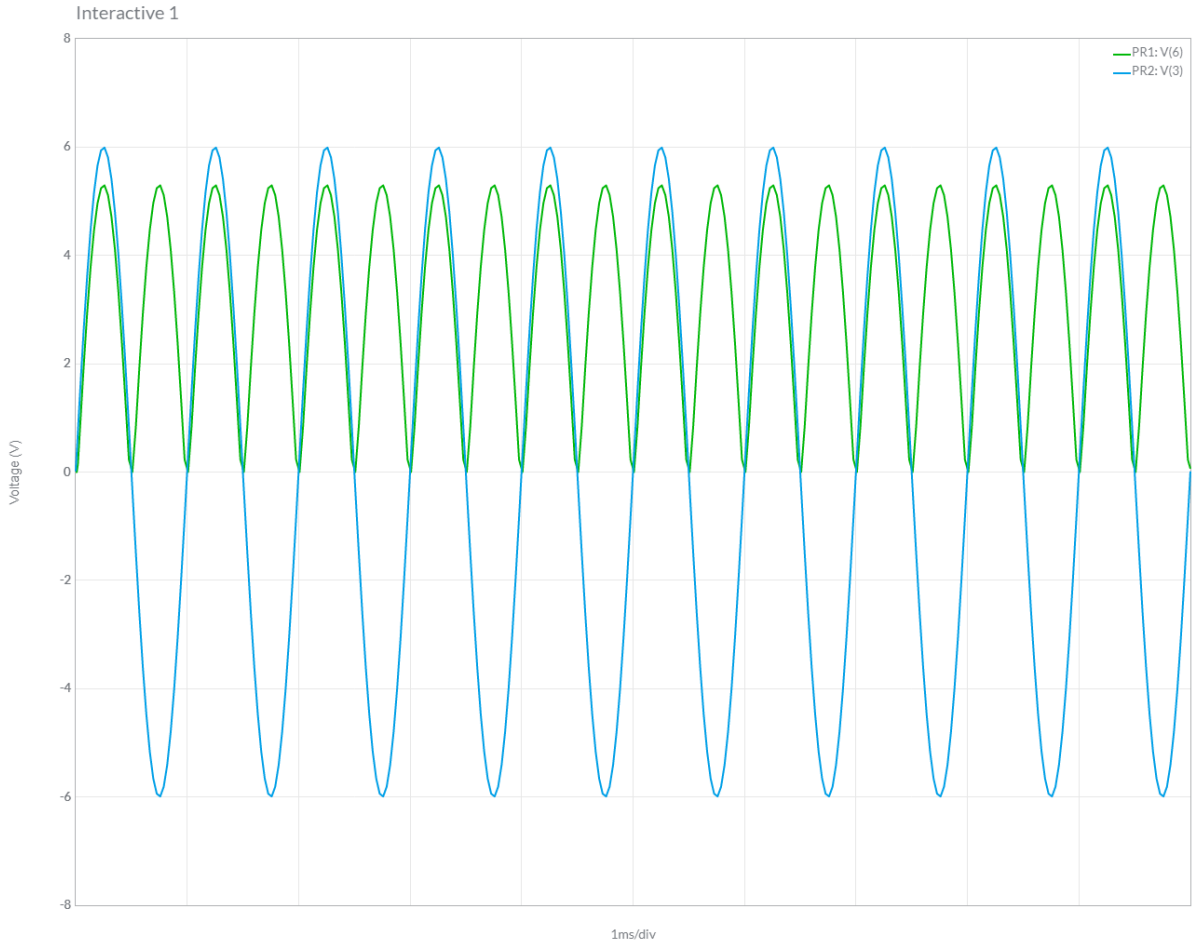
To make this following circuit we need go through proper steps,

1. Open Multisim Live simulator in your browser and click on new circuit for creating a new circuit.
2. Drag all the apparatus from the apparatus box and place them accordingly.
3. After placing the apparatus, connect them using the wire.
4. Place the voltmeters for taking the readings.
5. Save the circuit.
6. Run the simulation and from split graph area find out the graph based on the readings that the circuit is providing.
7. Take the readings and the graph and then provide the analysis based on the data.

Circuit Diagram using Multisim Online Live Simulator :



Graphical Representation of the Voltage :



Section D. Full wave Rectifier using the capacitor of different values and analyze.

Requirements :

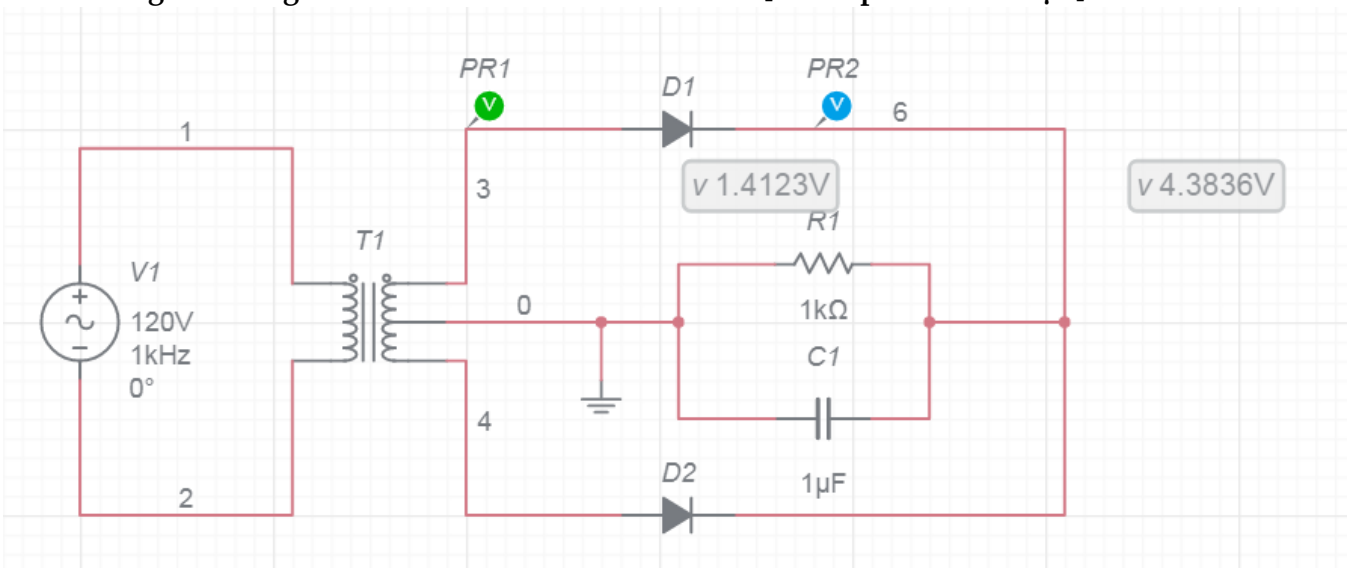
1. AC Power Source [120 V]
2. Diodes
3. Resistor [1kΩ]
4. Transformer [1P1S Centre Tapped]
5. Ground
6. Voltmeters
7. Capacitors [1µF, 5µF and 10µF]

Procedure :

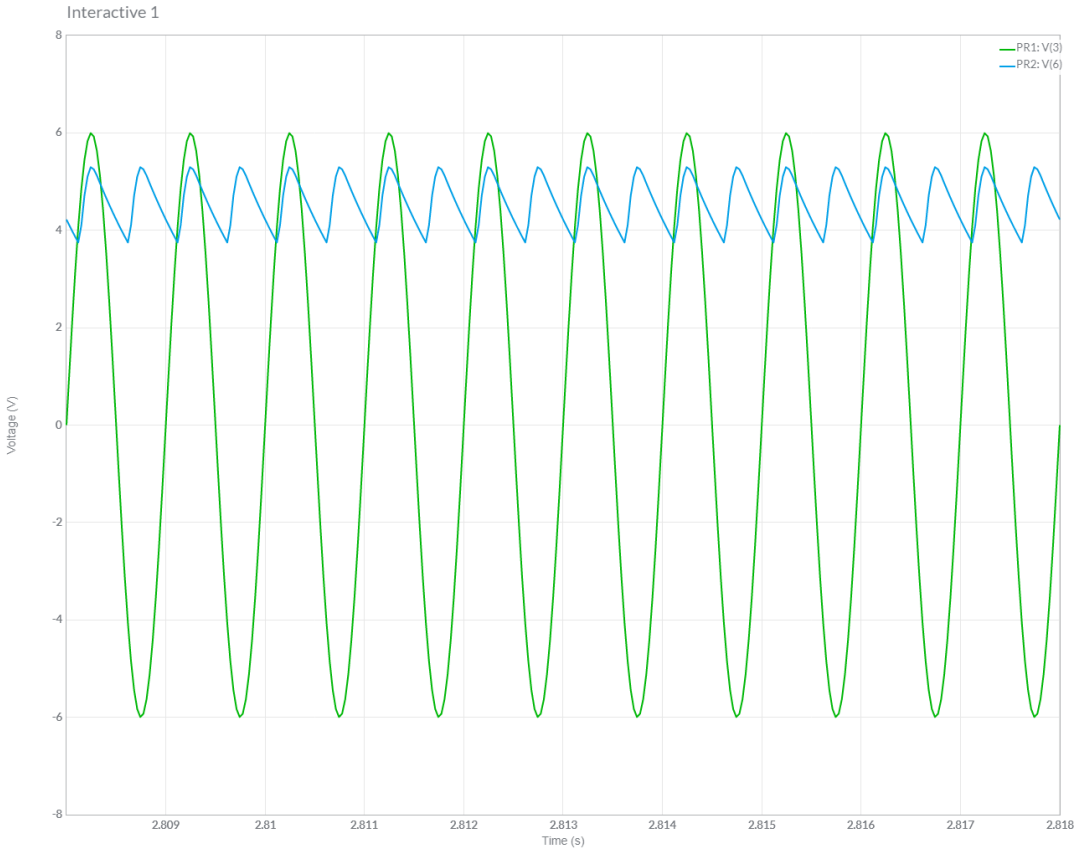
To make this following circuit we need go through proper steps,

1. Open Multisim Live simulator in your browser and click on new circuit for creating a new circuit.
2. Drag all the apparatus from the apparatus box and place them accordingly.
3. After placing the apparatus, connect them using the wire.
4. Place the voltmeters for taking the readings.
5. Save the circuit.
6. Run the simulation and from split graph area find out the graph based on the readings that the circuit is providing.
7. Take the readings and the graph and then provide the analysis based on the data.

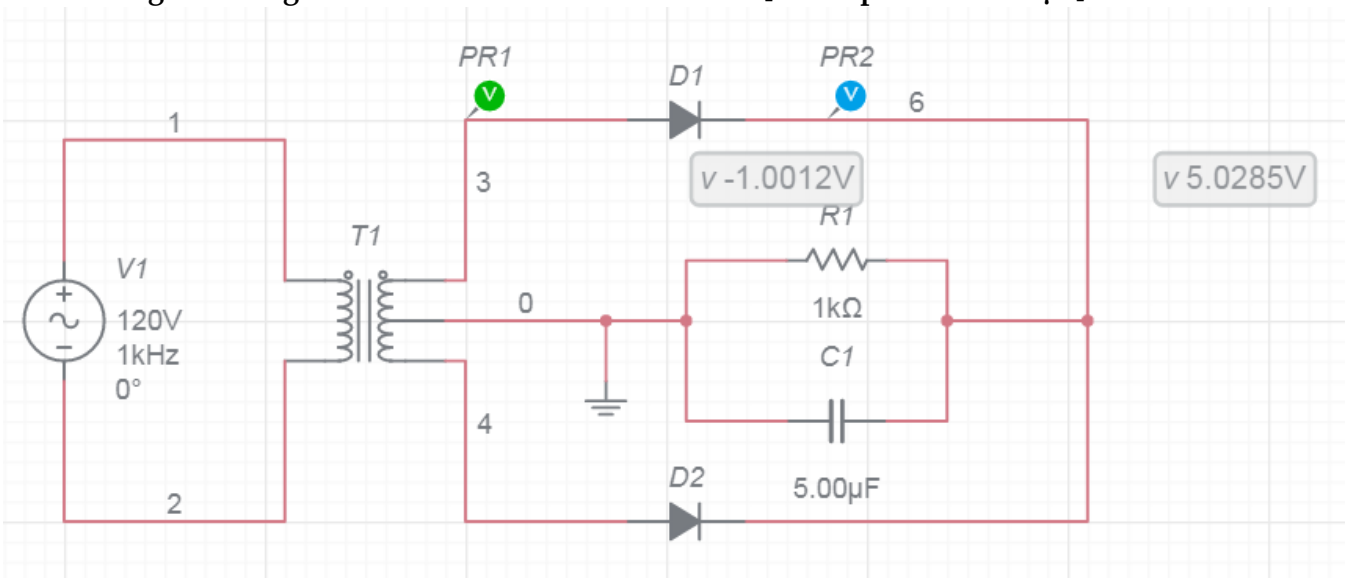
Circuit Diagram using Multisim Online Live Simulator : [For Capacitance of 1μF]



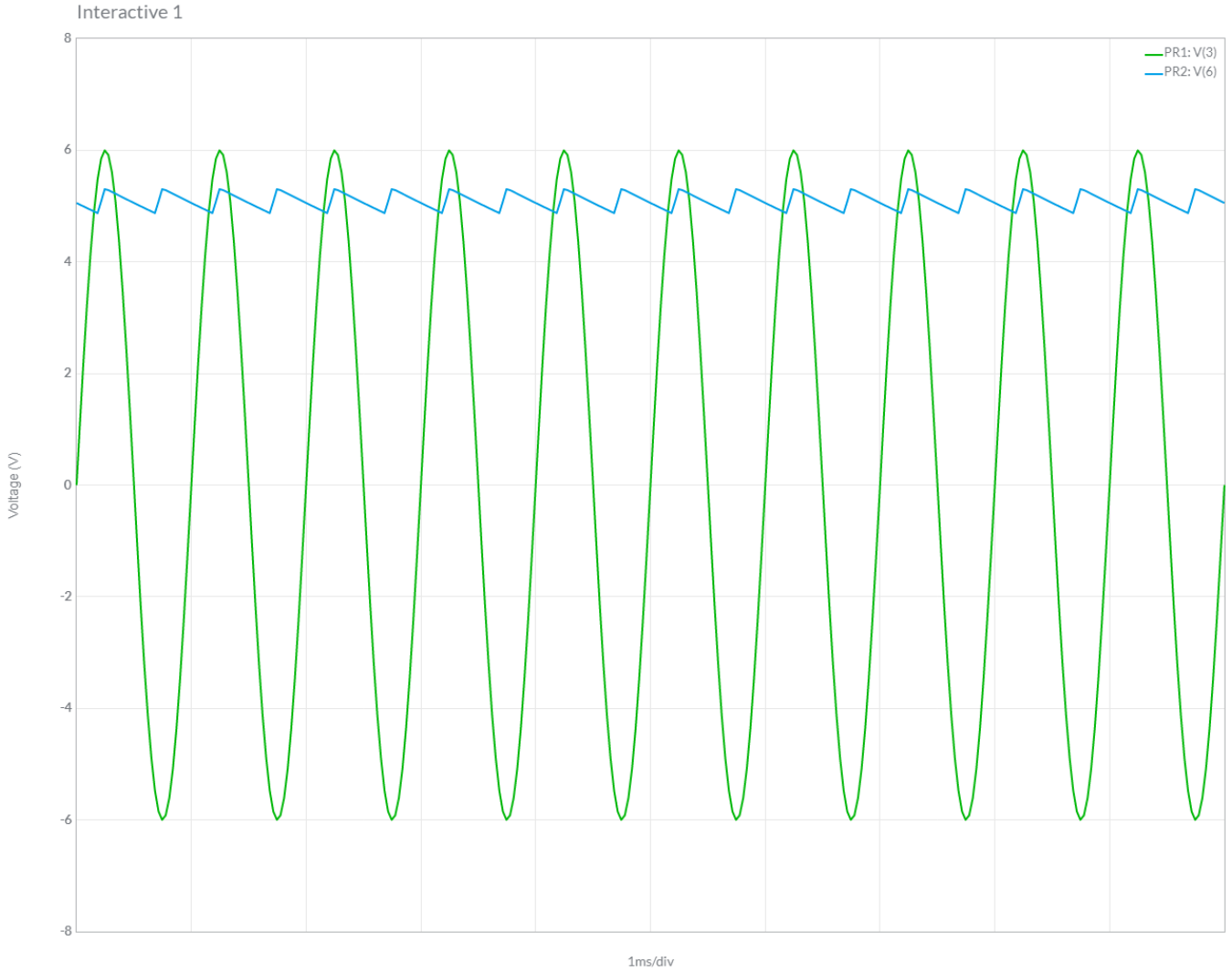
Graphical Representation of the Voltage :



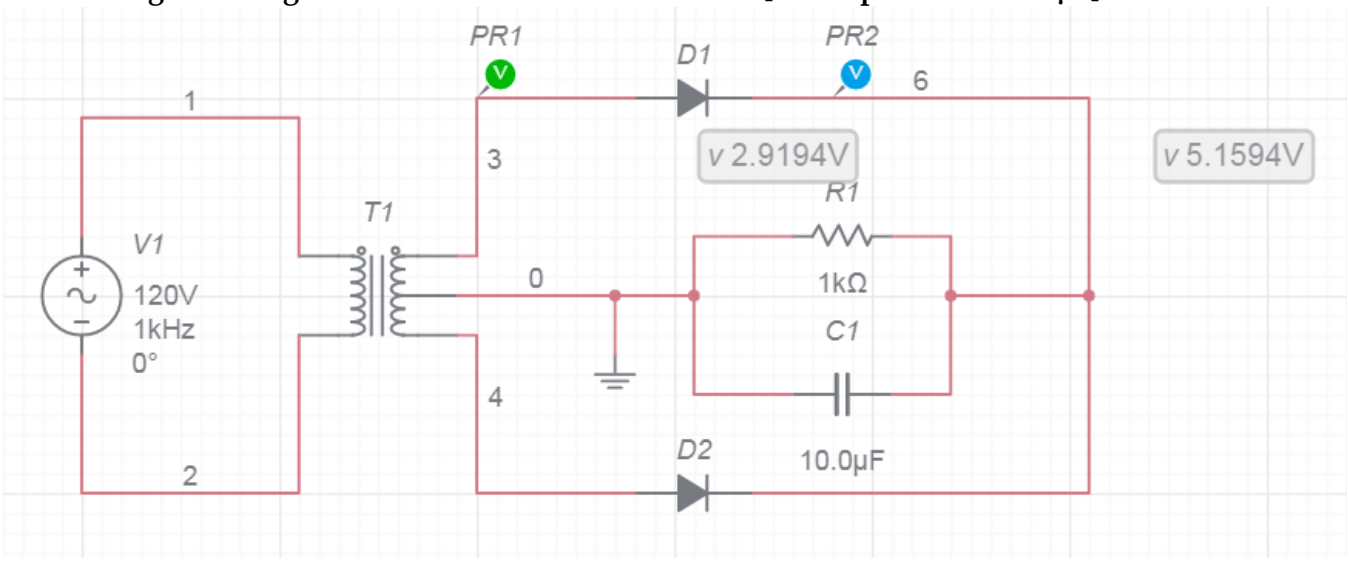
Circuit Diagram using Multisim Online Live Simulator : [For Capacitance of 5μF]



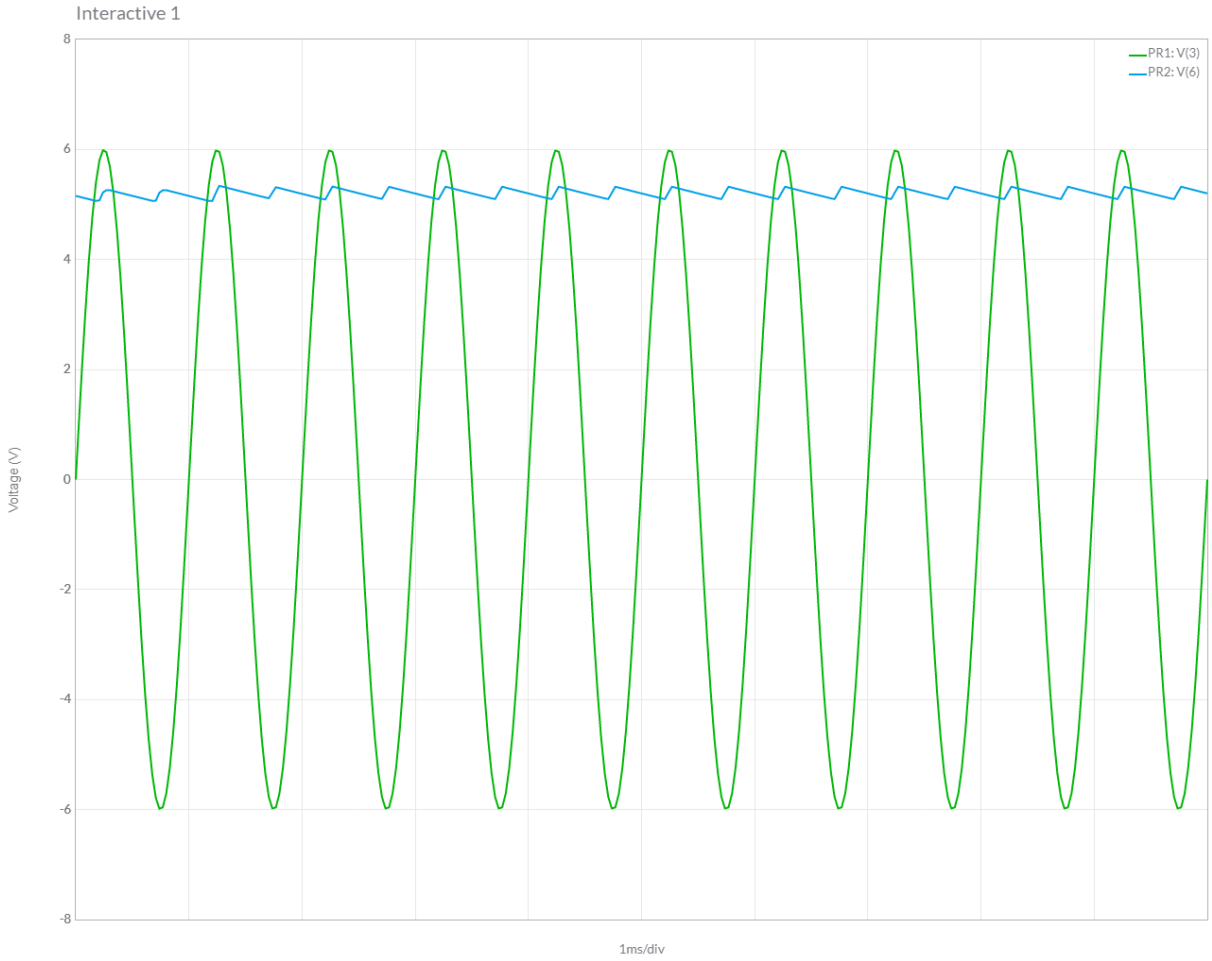
Graphical Representation of the Voltage :



Circuit Diagram using Multisim Online Live Simulator : [For Capacitance of 10μF]



Graphical Representation of the Voltage :



Observation :

As the capacitance values increase, the AC voltage gets more bypassed by the capacitor and the resistor is having the pure DC voltage through the line. That's why the graph is considering to be like that and the voltage becomes more DC rather tends to be pure DC.

For both the half and full wave rectifiers we have seen that capacitance decreased the ripple factor and make the voltage tends to be pure DC by increasing the value of the C.

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