EEE Digital Assignment (Software)

Half Wave and Full Wave Rectifier

Name: Om Ashish Mishra

Registration Number: 16BCE0789

Slot: L11+L12

Batch: 10(B-Tech Computer Science (Core))

HALF WAVE AND FULL WAVE RECTIFIERS

AIM:

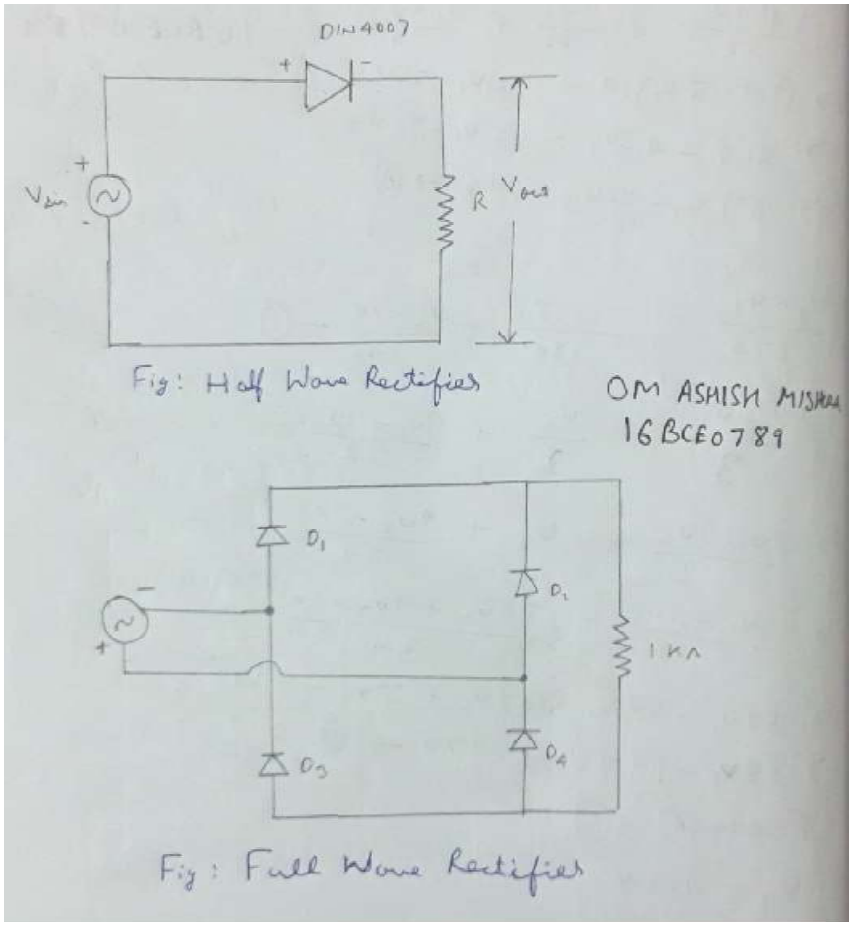
Design of an uncontrolled rectifier circuit with different load conditions

APPARATUS/TOOL REQUIRED:

ORCAD / PSpice simulator -> **Diode Library - D1N4007,**
Source Library – Vsin & Ground (GND) – 0(zero)
Analog Library – R, L & C

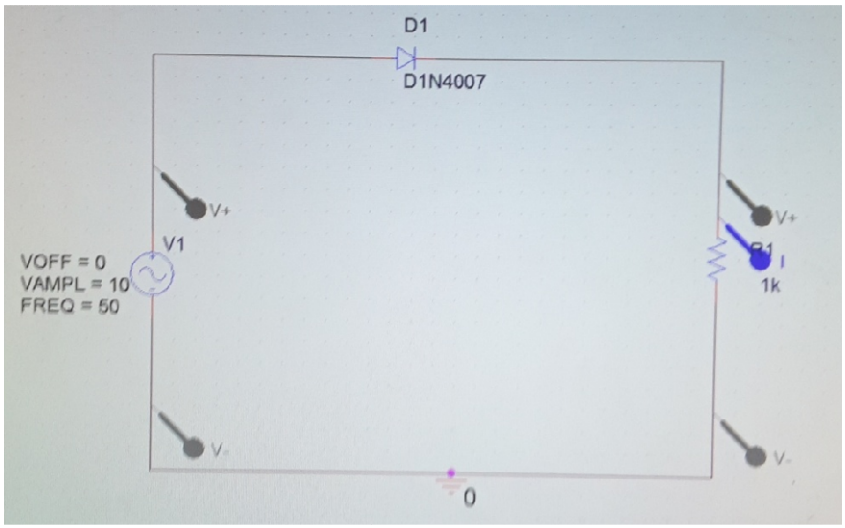
Simulation Settings: **Analysis Type - Time Domain**
Run to time - 40ms (for 2 cycles)

CIRCUIT DIAGRAM:

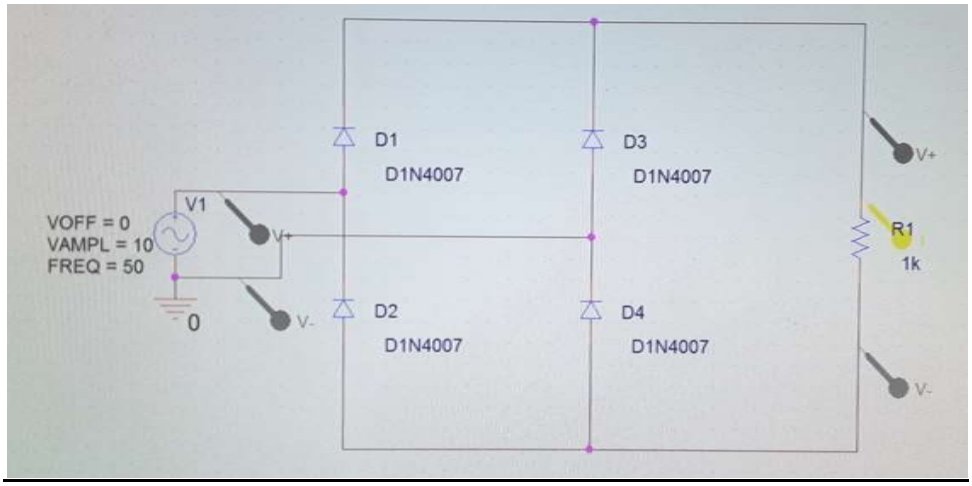


SIMULATION CIRCUIT DIAGRAM:

SINGLE PHASE HALF – WAVE RECTIFIER:



SINGLE PHASE FULL – WAVE RECTIFIER:



THEORY:

RECTIFIER:

A rectifier is an electronic device that converts AC voltage into DC voltage. In other words, it converts alternating current to direct current. A rectifier is used in almost all the electronic devices. Mostly it is used to convert the main voltage into DC voltage in the power supply section. By using DC voltage supply electronic devices work. According to the period of conduction, rectifiers are classified into two categories: Half Wave Rectifier and Full Wave Rectifier

HALF – WAVE RECTIFIER:

During the positive half cycle the diode is under forward bias condition and it conducts current to RL (Load resistance). A voltage is developed across the load, which is same as the input AC signal of the positive half cycle. Alternatively, during the negative half cycle the diode is under reverse bias condition and there is no current flow through the diode. Only the AC input voltage appears across the load and it is the net result which is possible during the positive half cycle. The output voltage pulsates the DC voltage.

FULL – WAVE RECTIFIER:

In a full wave rectifier circuit we use two diodes, one for each half of the wave. A multiple winding transformer is used whose secondary winding is split equally into two halves with a common center tapped connection. Configuration results in each diode conducting in turn when its anode terminal is positive with respect to the transformer center point C produce an output during both half-cycles. Full rectifier advantages are flexible compared to that of half wave rectifier.

PROCEDURE:

Step 1: Open Capture CIS

Step 2: Click on the File button

Step 3: Click on New Project

Step 4: Select Blank Project

Step 5: Go to Library and click on Sources

Step 6: Select Diode Library - D1N4007

Step 7: Select Library – Vsin & Ground (GND) – 0(zero)

Step 8: Select Analog Library – R

Step 9: Click on New Simulation

Step 10: Analysis Type - Time Domain

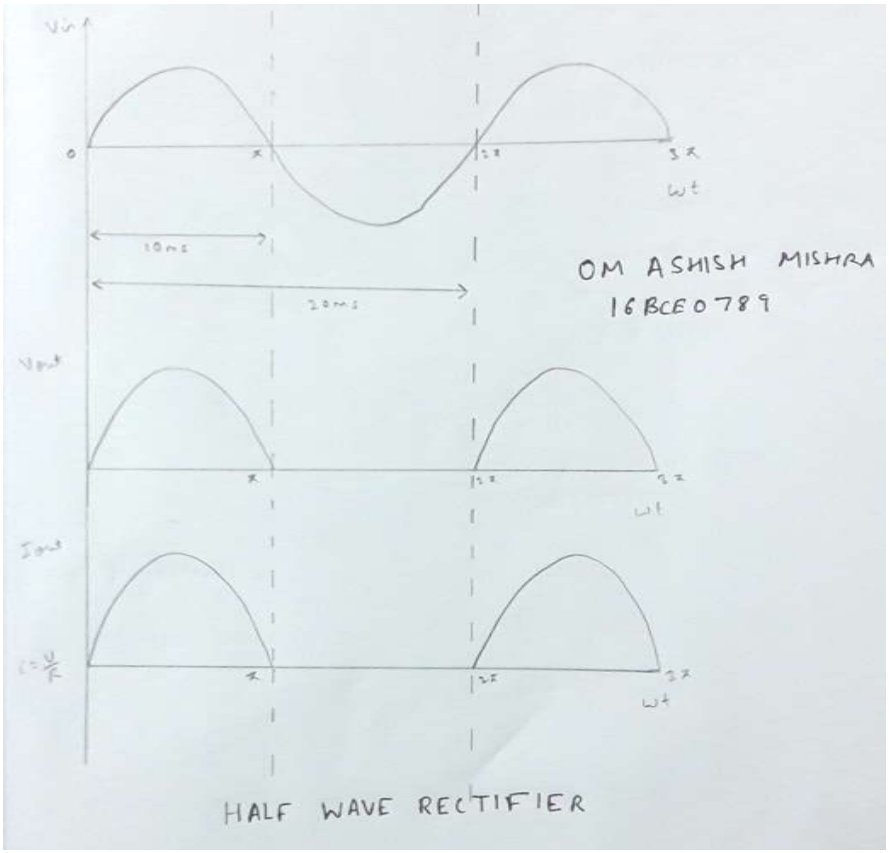
Step 11: Run to time - 40ms (for 2 cycles)

Step 12: Apply it

Step 13: Then we run the simulated program

Step 14: Then we get the graph as the output.

MODEL GRAPH:



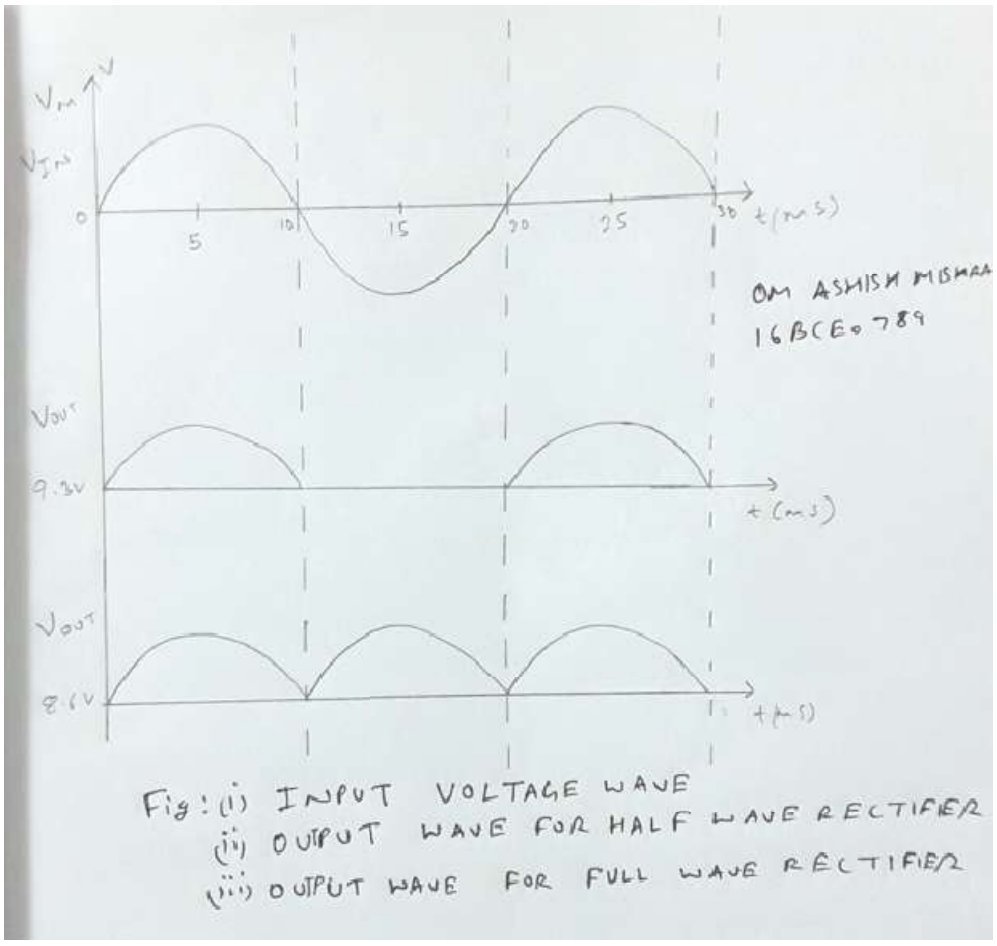


Fig: (i) INPUT VOLTAGE WAVE
(ii) OUTPUT WAVE FOR HALF WAVE RECTIFIER
(iii) OUTPUT WAVE FOR FULL WAVE RECTIFIER

SIMULATION GRAPH:

HALF – WAVE RECTIFIER:

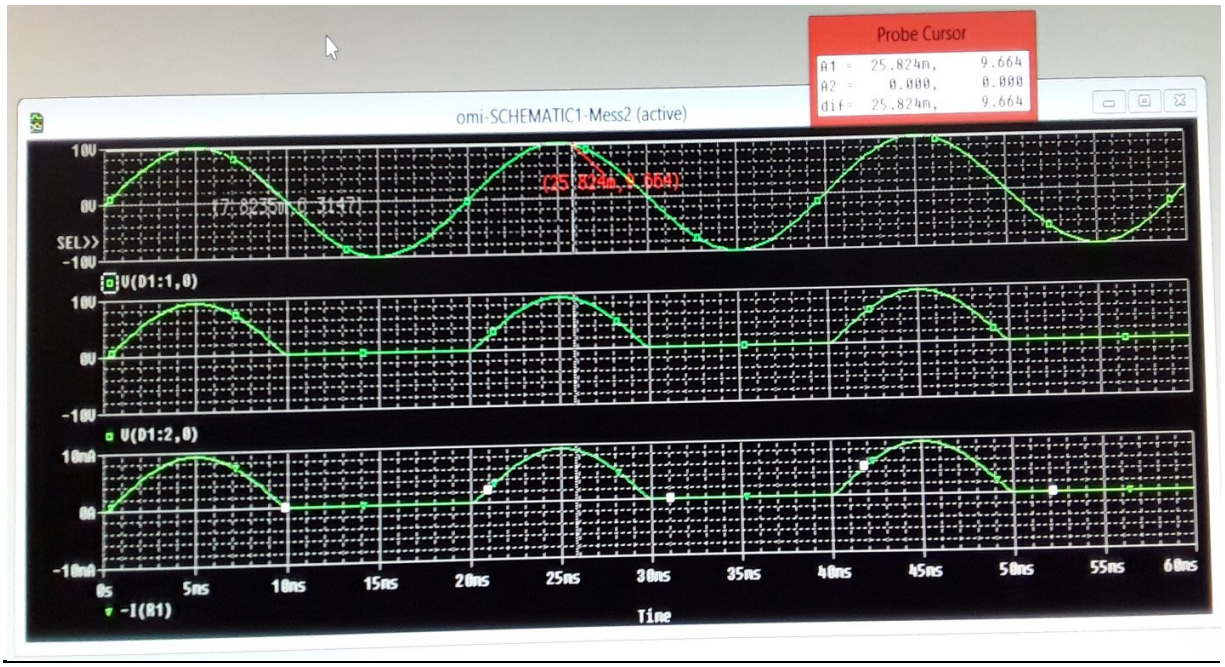


Fig : The First Graph is the input wave and the next two are the output wave of the voltage and current of the output pulses respectively.

FULL –WAVE RECTIFIER:

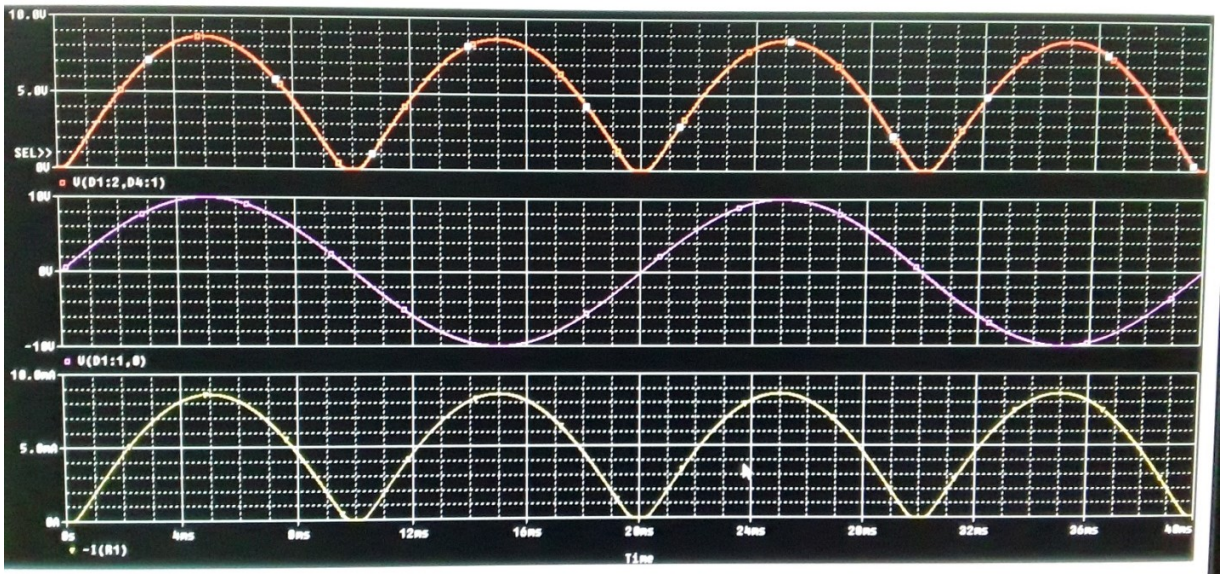


Fig: The first graph represents the Output Voltage graph, the next one represents the Input Voltage Graph and the last one represents the Input Current graph.

RESULT:

The graph shows that the half wave rectifier gives half of the input and full wave rectifier gives full of the input in the positive cycle.

INFERENCE:

This experiment gave us a clear picture about the working of the full and half wave rectifier and helped us to properly differentiate between them.