



## **UNITED INTERNATIONAL UNIVERSITY**

### **Exp. No: 3: Study of Diode Rectifier Circuits**

**Name of course:** Electronics Laboratory

**Course Code:** CSE 124/EEE

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(Lecturer United International University)

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**Section:** B

**Department:** Computer science and Engineering (CSE)

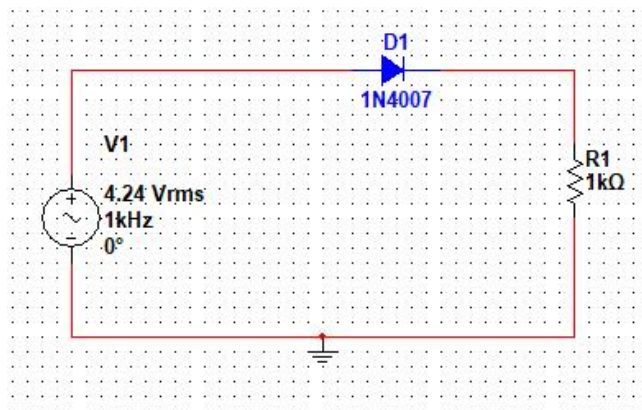
## Objective:

1. Explain the operation of different types of diode rectifiers
2. Convert A.C. signal into appropriate D.C. signal
3. Compare the efficiency of different scheme
4. Construct circuits with rectifier and voltage divider

## Apparatus:

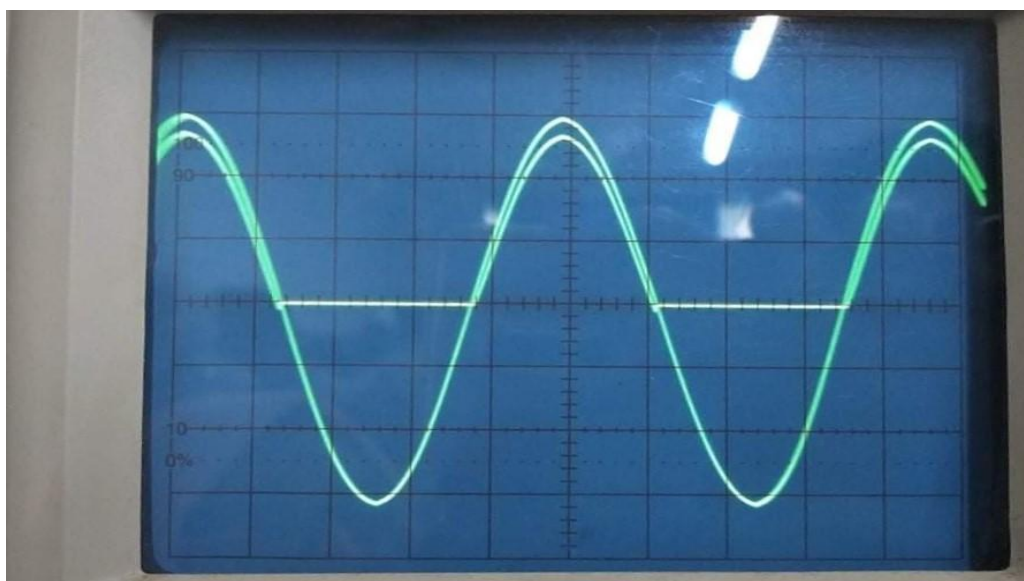
p-n junction diode(1N4007)	4 pieces
Resistor (1K)	1 piece
Zener diode (4.7 V)	1 piece
Capacitor (1 $\mu$ F, 10 $\mu$ F)	1 piece each
Digital Oscilloscope	1 unit
Chords and wire	lot

## PART A Half Wave Rectifier:

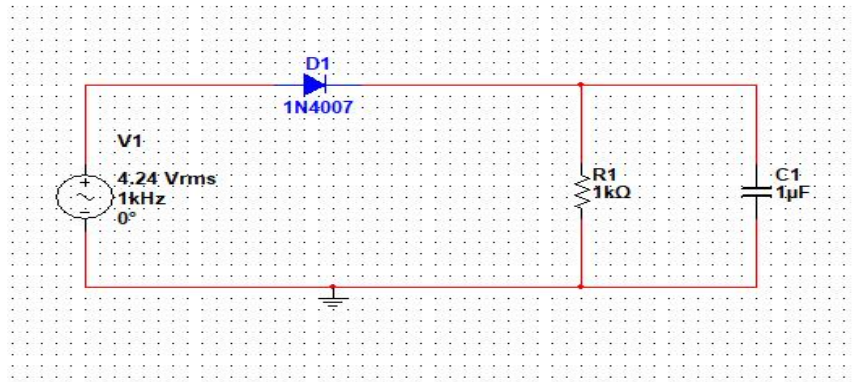


### Circuit 01 Output:

Vin and Vout (Dual Mode) Without Capacitor

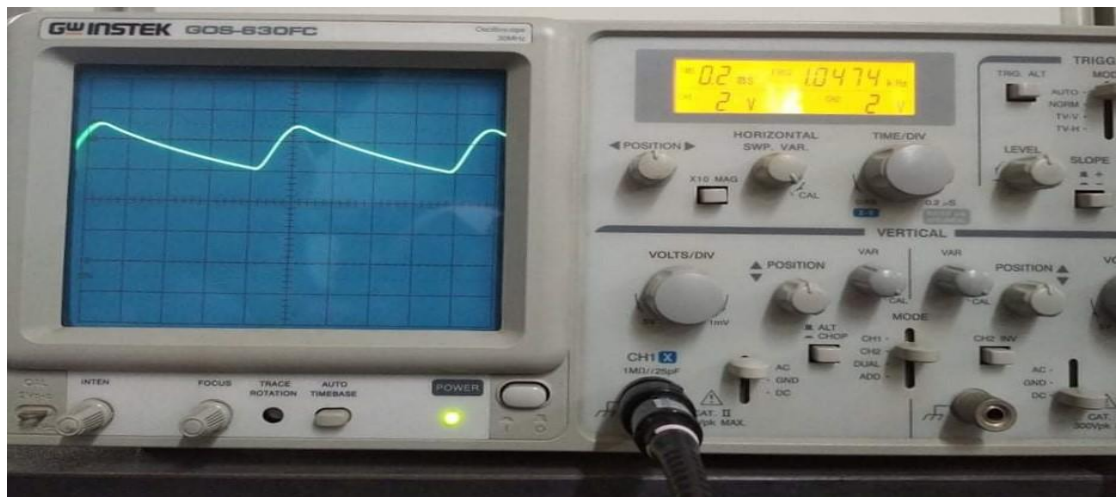


## Circuit 02 :

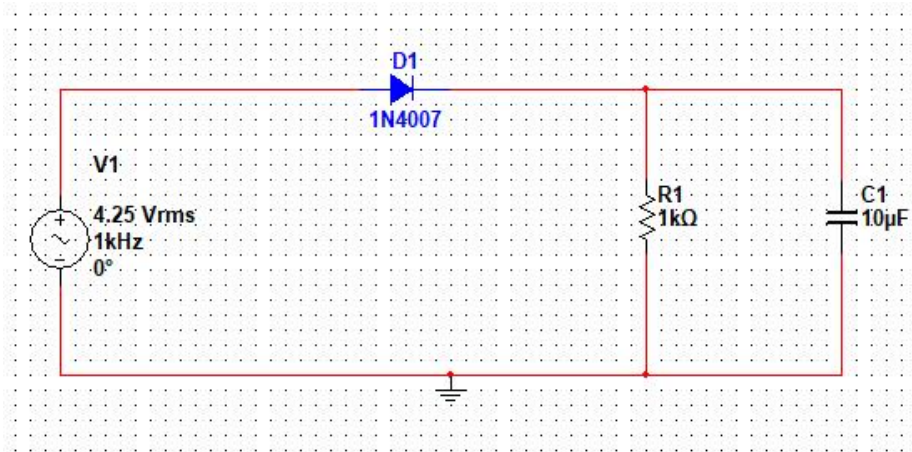


## Circuit 02 Output:

Vin and Vout (Dual Mode) With 1μF Capacitor

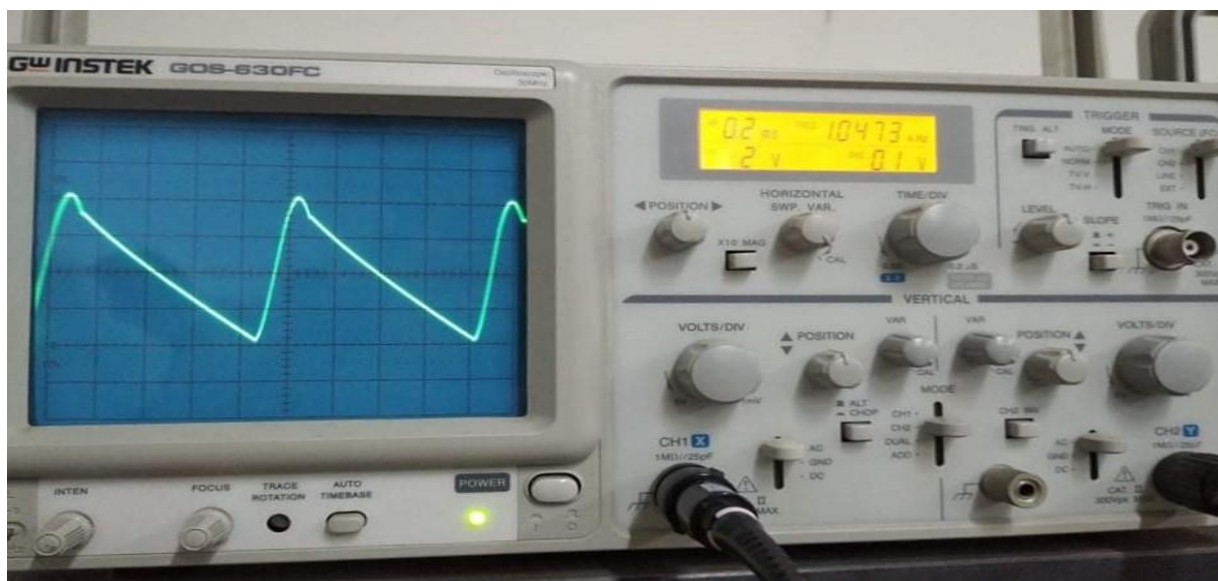


### Circuit 03:



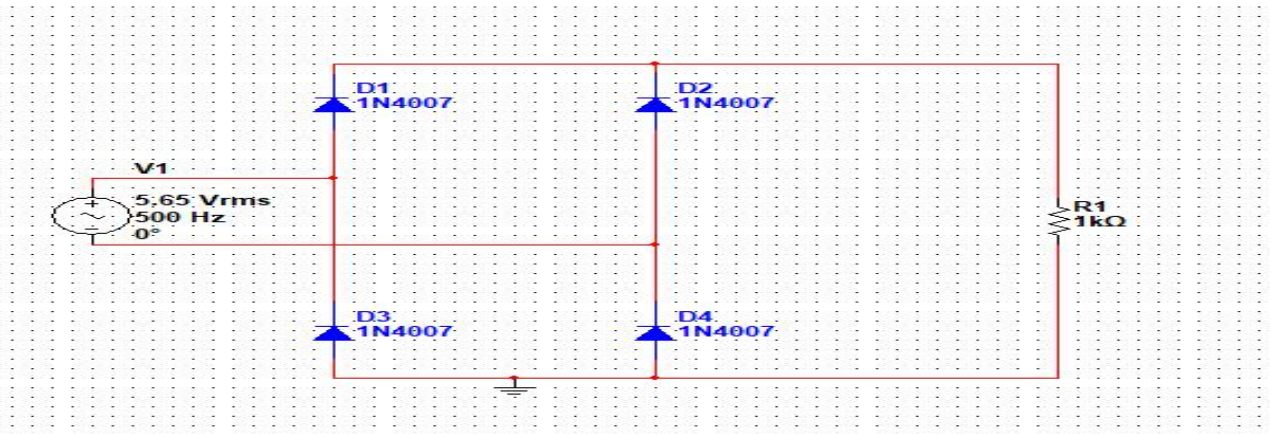
### Circuit 03 Output :

Vin and Vout (Dual Mode) With  $10\text{ }\mu\text{F}$  Capacitor

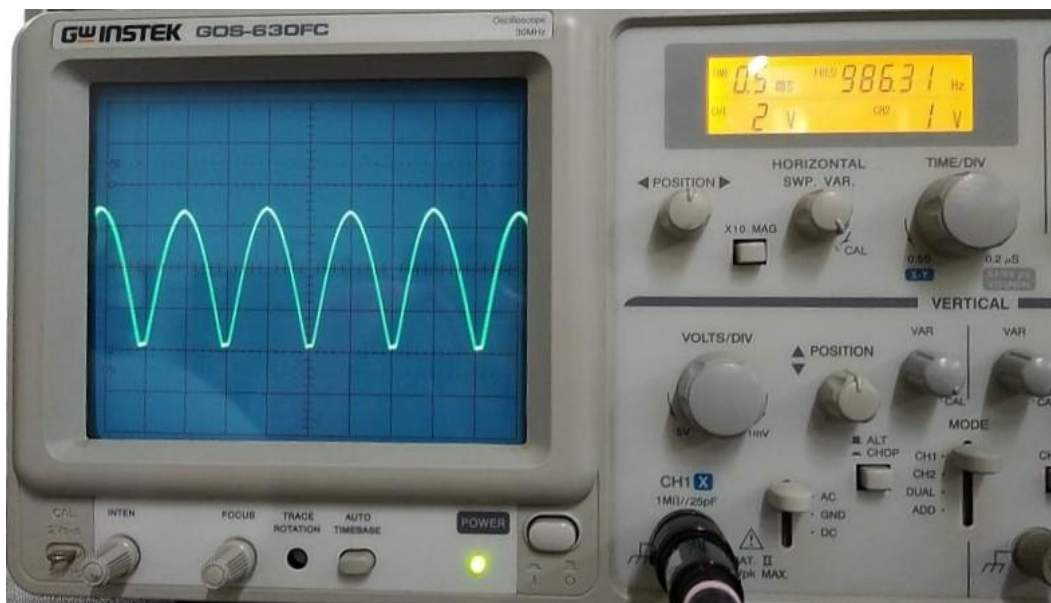


## PART B Full Wave Rectifier:

Circuit 01 :

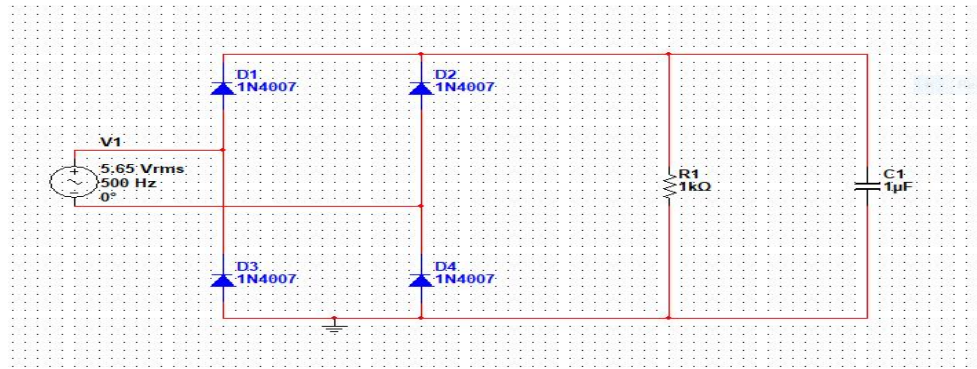


Circuit 01 output :

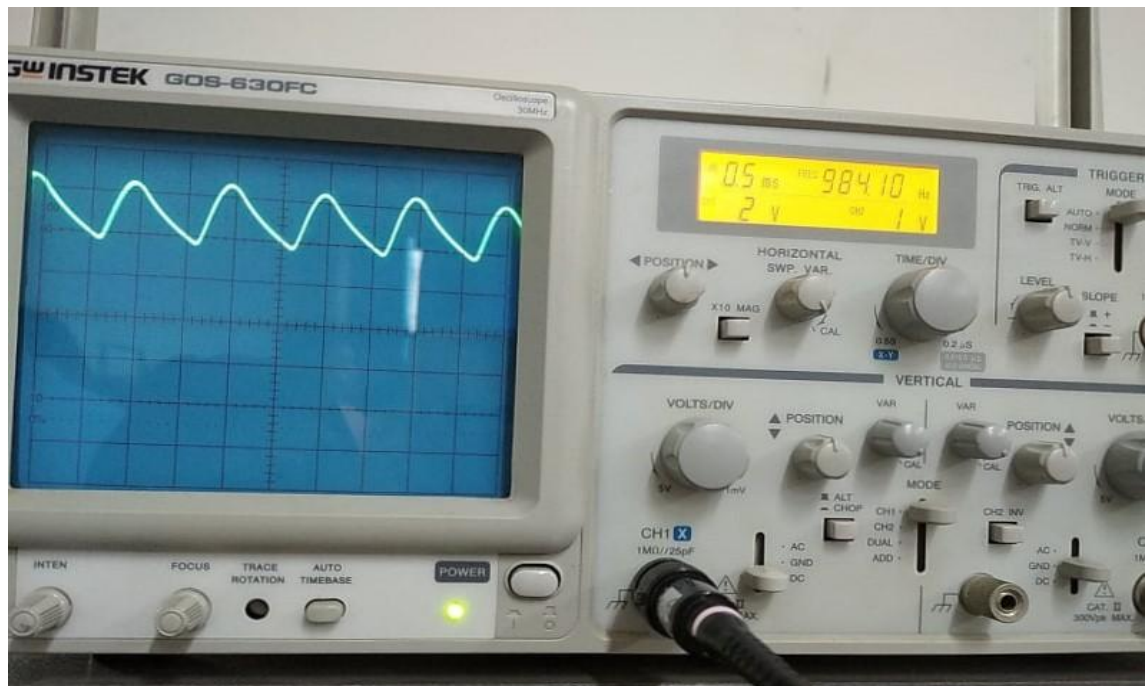




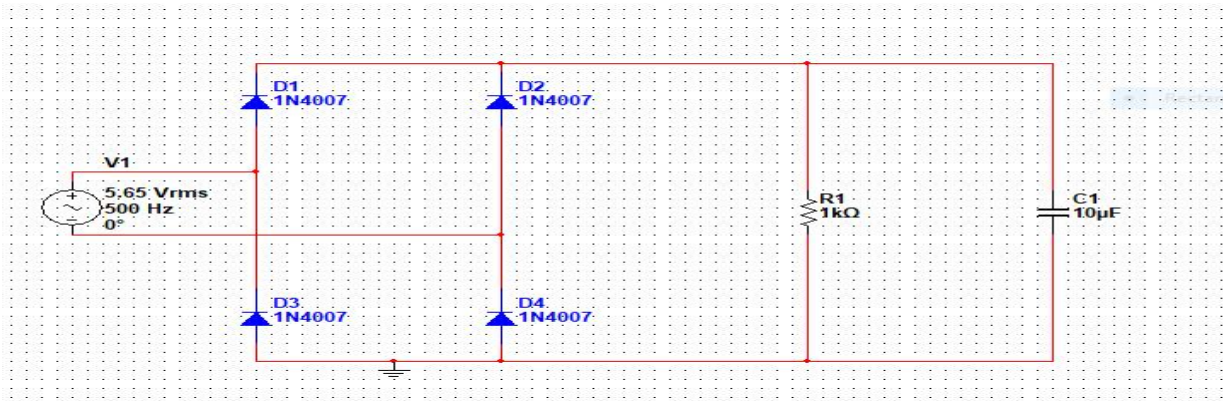
Circuit 02 with 1uF :



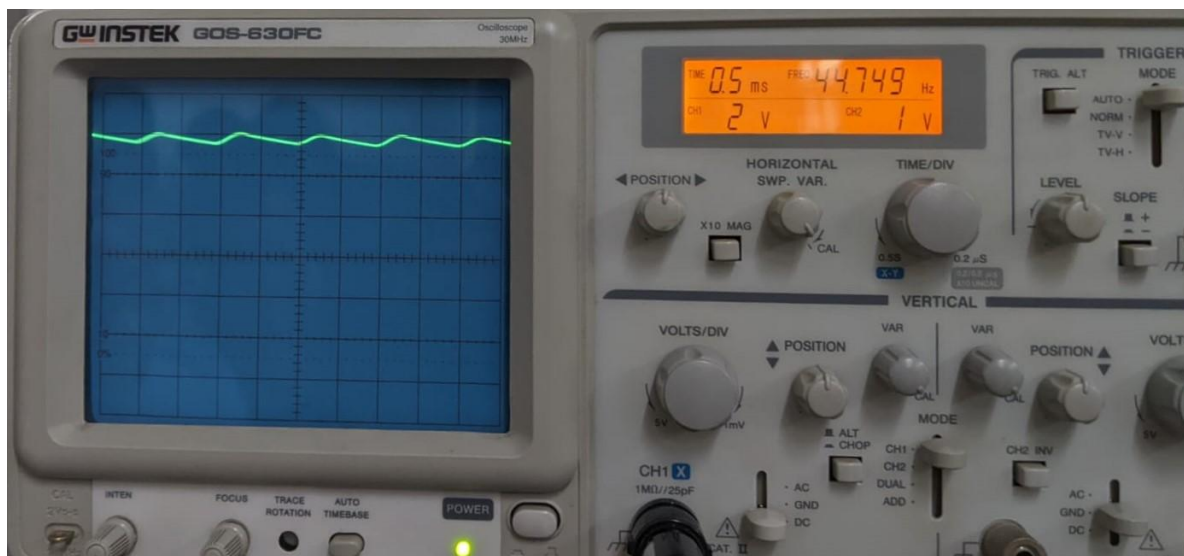
Circuit 02 output :



Circuit 03 with 10uF :



Circuit 03 output :



**Discussion :**

In full wave rectification we use bridge rectifier which consist of four diodes. For a positive cycle two diode operate and for the negative cycle the other two diode operate. These diodes help in converting the AC to pulsating DC. Full wave rectification is efficient because we are using both the cycle of input and get a positive cycle output for both positive and negative cycle.



**Q/A :**

**1. Write a short note on rectifier circuit and its use in electronics?**

A rectifier is an electrical device that converts alternating current (AC), which periodically reverses direction, to direct current (DC), which flows in only one direction. The reverse operation is performed by the inverter. The process is known as rectification, since it "straightens" the direction of current.

Half Wave Rectifier.

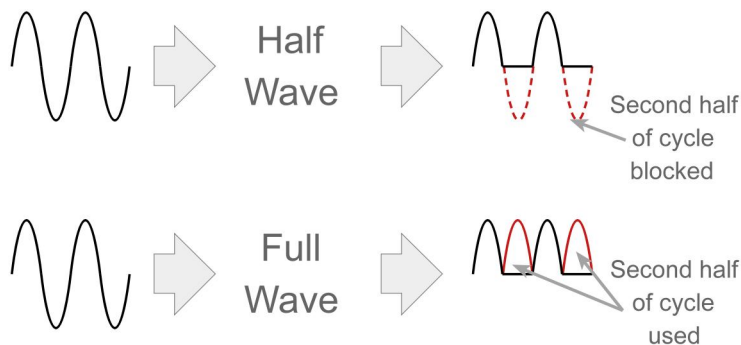
Full wave Rectifier.

Center Taped full wave rectifier.

Bridge Rectifier.

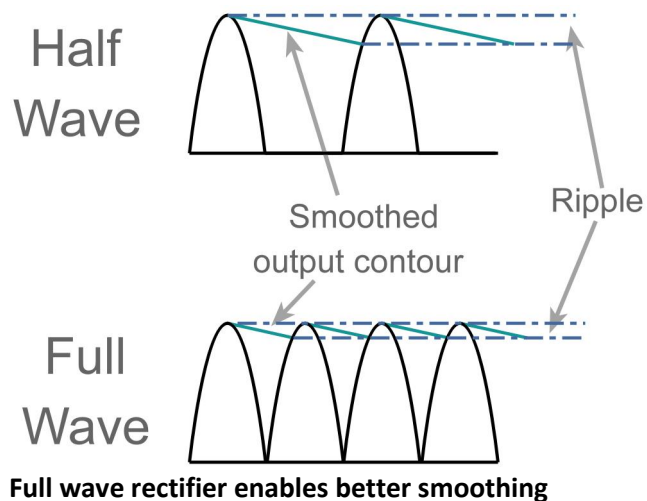
**2. Why is Full wave rectifier better than half wave rectifier? Explain in detail.**

The concept of the full wave rectifier is that it utilizes both halves of the waveform to provide an output and this greatly improves its efficiency.



**Comparison between the half wave and full wave rectifier operation**

A further advantage when used in a power supply is that the resulting output is much easier to smooth. When using a smoothing capacitor, the time between the peaks is much greater for a half wave rectifier than for a full wave rectifier.



It can be seen from the circuit diagram, that the fundamental frequency within the rectified waveform is twice that of the source waveform - there are twice as many peaks in the rectified waveform. This can often be heard when there is a small amount of background hum on an audio circuit.

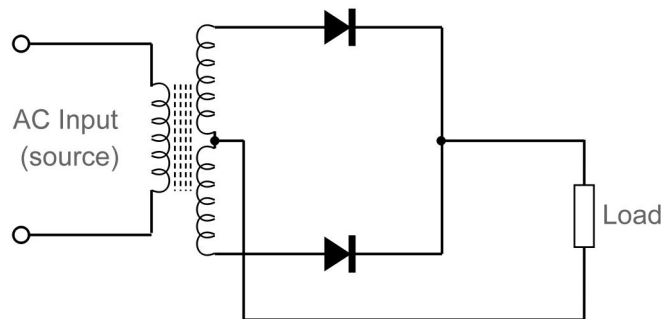
## Full wave rectifier advantages

- Utilises both halves of the AC waveform
- Easier to provide smoothing as a result of ripple frequency

### 3. Discuss various types of full wave rectifier circuit.

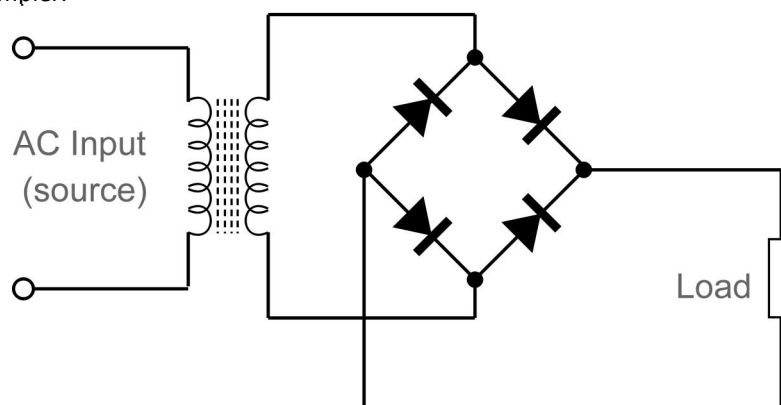
#### Types of full wave rectifier circuit

**Two diode full wave rectifier circuit(Center – Tapped):** The two diode full wave rectifier circuit is not so widely used with semiconductor diodes as it requires the use of a centre tapped transformer. However this rectifier circuit was widely used in the days of thermionic valves / vacuum tubes. As a rectifier circuit using four valves would be large, the two diode version was much more preferable.



Full wave rectifier using two diodes and a centre tapped transformer

- **Bridge rectifier circuit:** The full wave bridge rectifier circuit configuration is far more widely used these days. It offers a more efficient use of the transformer as well as not requiring a centre-tapped transformer. The additional cost is two additional diodes - not an expensive addition these days. Often four diode bridges can be bought as single items, making construction of the overall circuit much simpler.



Full wave rectifier using a bridge rectifier

