Rectification-Half Wave Rectification and Full Wave Rectification

The process of converting A.C waveform into D.C waveform is called rectification. Rectification is the process of turning an alternating electric current waveform into a direct current waveform

The device used for rectification is called rectifier.

Two Semi conductor diodes are extensively used for this purpose.

Methods of rectification

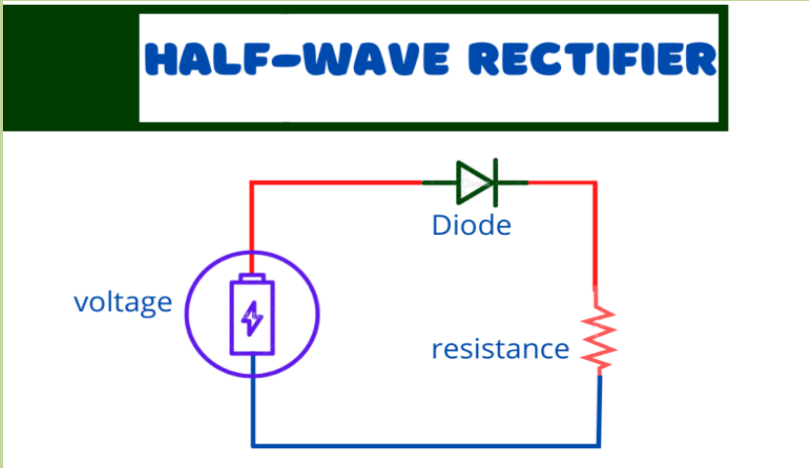
There are very common methods of rectification.

- Half-wave rectification
- Full-wave rectification

Half-Wave Rectification:

A type of rectification in which only one half cycle of the input AC current is converted into D.C. current is called Half-Wave rectification.

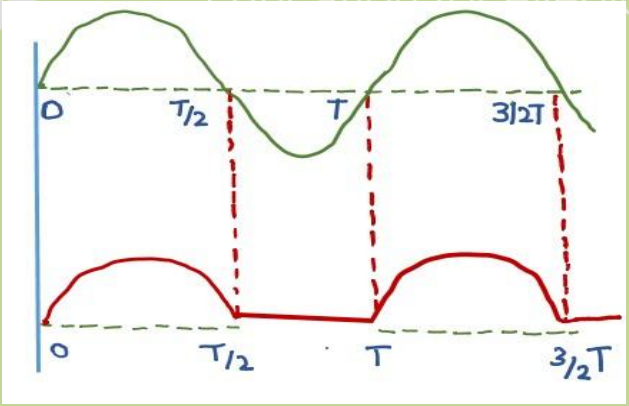
A diode is connected in series with a load resistor and they are connected to an alternating voltage source of period T.



Working of half wave rectifier

During the positive half cycle of the input 0 to T/2 the diode D is forward biased and offers very low resistance to current and it flows through the resistor R.

This current causes a potential drop across the resistor R in accordance with the alternating input.



During the negative half cycle T/2 to T the diode is reverse biased and it offers a very high resistance and no current flows through R and the potential difference across it almost zero.

This process is repeated for every cycle. The output voltage is not smooth but appear in pulses and is called pulsating D.C

Full-Wave Rectification:

That rectifier in which both the input cycles appears as the output DC is called full wave rectification.

It contains four diodes D_1,D_2,D_3,and D_4 connected to form a bridge.

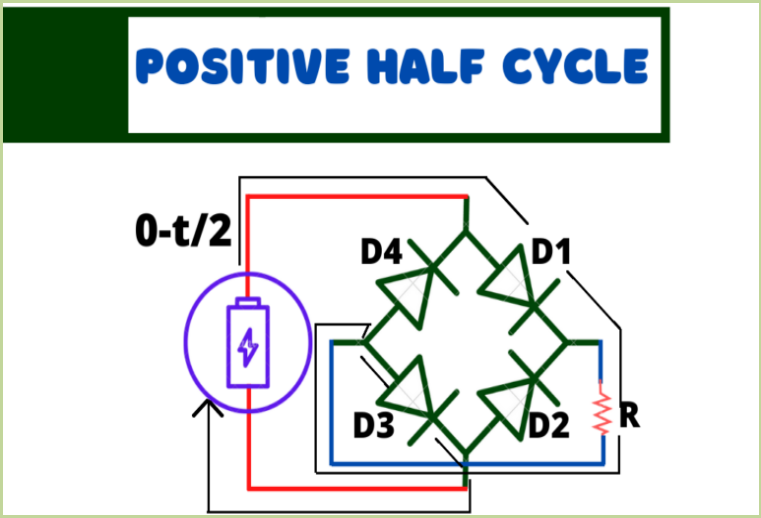
The A.C. supply to be rectified is applied diagonally to the opposite ends of the bridge through the transformer or directly.

Between the other two ends of the bridge, the load resistor R_L is connected.

Working of Full Wave Rectifier

During the positive half cycle of the input voltage, the end P becomes positive and Q becomes negative.

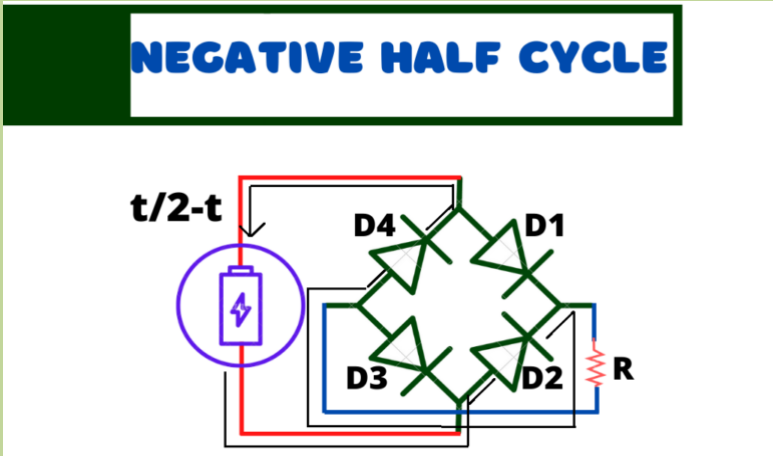
This makes diodes D_1 and D_3 forward biased while the diodes D_2 and D_4 are reverse biased.



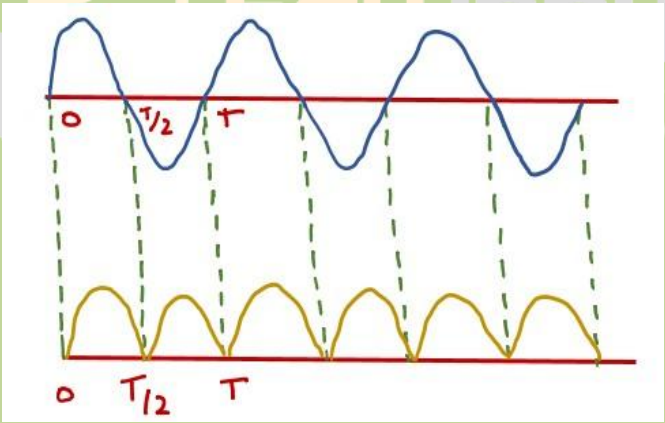
Therefore only diodes D_1 and D_3 conduct.

It can be seen that the current flows from A to B through

During the negative half cycle, the end P becomes negative and end Q becomes Positive. This makes the diodes D_2 and D_4 forward biased and D_1 and D_3 reverse biased.



Therefore only D_2 and D_4 conducts. Now again the current flows from A to B through the load resistor in the same direction.



Therefore D.C output is obtained across the load. The output Voltage is not smooth but pulsating. It becomes smooth by using a circuit called (Combination of capacitors and inductors in the circuit as a filter).

Frequently Asked Question

What is the purpose of rectification?

The main purpose of rectification is to provide a steady voltage output for electrical devices and appliances by converting the AC current into DC current.

How many types of rectification?

There are two types of rectification

- Half-Wave rectification
- Full-Wave rectification

What is a diode?

The diode is a semiconductor device that allows the flow of current in one direction only. It is used as rectifier.