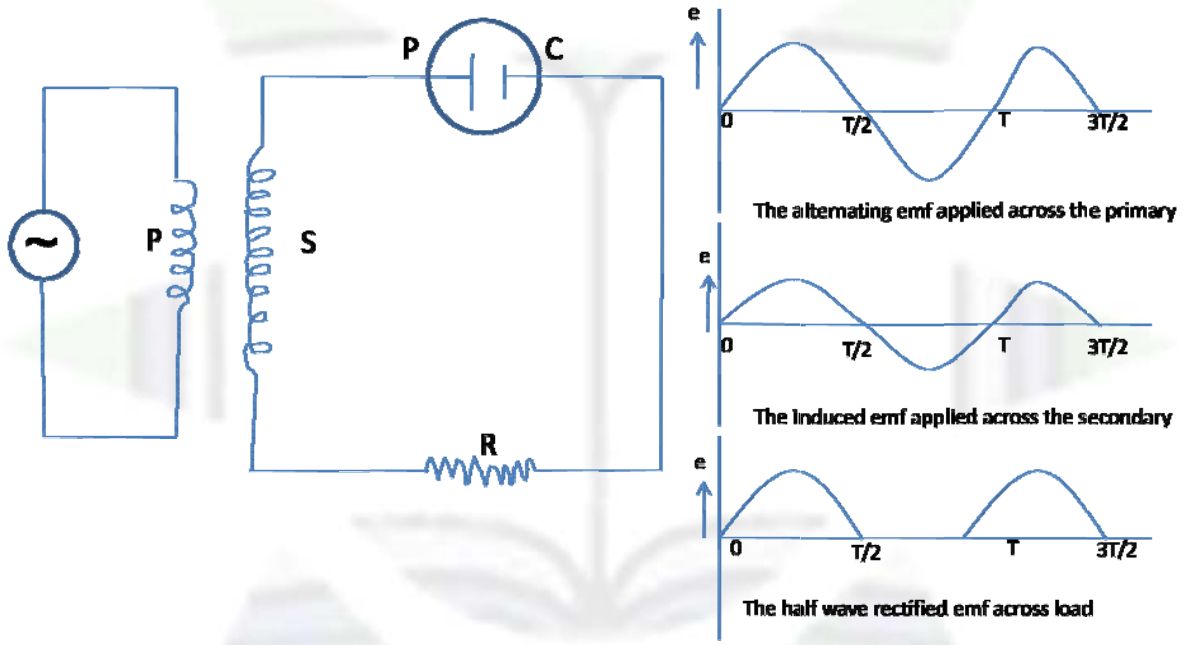
Diode As A Rectifier

Rectification: The process of conversion of alternating current into direct current i.e. Uni-directional current is known as rectification.

Rectifier: The device which converts A.C into D.C is known as rectifier. The device which converts D.C into A.C is known as oscillator.

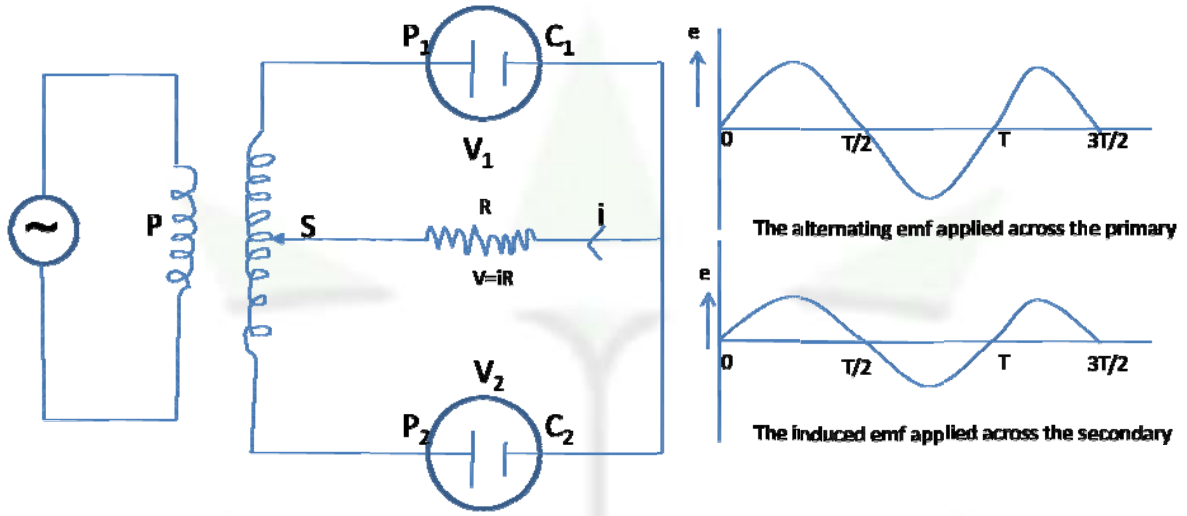
Diode as a half wave rectifier: The A.C to be rectified is applied across the primary of a mutual inductance (or transformer) and the secondary is connected between the plate and the cathode of a diode valve through a resistance R.



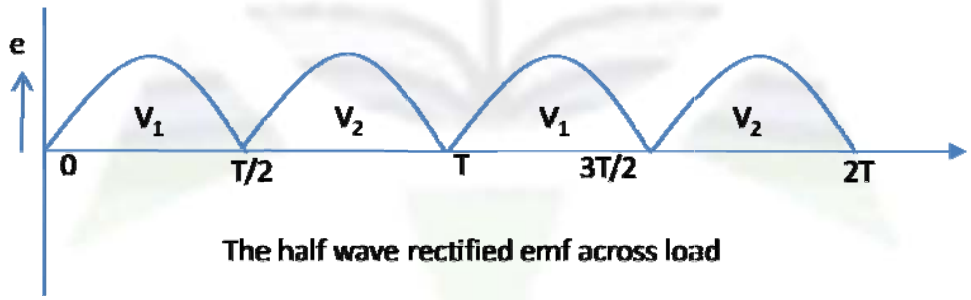
During the first half cycle the induced emf makes the plate of the valve at (+)ve potential with respect to the cathode hence the valve conducts current in the circuit. This current being varying the potential difference V= iR across the resistance also varies exactly in the same way.

During the second half cycle T/2 to T the plate is at negative potential with respect to the cathode and the valve does not conduct any current and V is zero. The same is repeated for the successive half cycles. Thus valve conducts current during the (+)ve half cycles only and hence the half of the wave is rectified only, giving an intermittent unidirectional varying current.

Diode as a full wave rectifier: The source to be rectified is connected across the primary of mutual inductance and the secondary is connected between the plate P_1 and P_2 of a cathode valve V_1 and V_2 respectively. The cathode C_1 and C_2 are connected through a resistance R at any point in the secondary.



During the first half cycle (t=0 to T/2) the induced emf is such that P_1 is at (+)ve potential with respect to P_2 for valve V_1 the plat P_1 is at higher potential than cathode C_1 hence the valve V_1 conducts current through the circuit giving a potential difference V= iR across the resistance which is also varying in magnitude as shown. But the plate P_2 of valve V_2 is (-)ve potential with respect to the cathode C_2 and hence valve V_2 does not conduct any current.



During second half cycle (t= T/2 to T) , P_1 is at (-)ve potential with respect to C_1 and hence valve V_1 does not conduct any current, but P_2 being at (+)ve potential with respect to C_2 valve V_2 conducts current through R in the same direction as in the first half cycle and the same is repeated for the next half cycles. Thus the full wave is rectified. Flow of current through the resistance is uni-directional but varying. The current can be made smooth by using a filter circuit.