

EXPERIMENT NO – 4

01. AIM OF THE EXPERIMENT: -

To study about the Half-wave & Full-wave Rectifier Circuits with and without capacitor filters and recording the output waveforms.

02. OBJECTIVE: -

- To trace the input and rectified output waveforms.
- Measurements of average and root mean square values of the rectifier output.

03. COMPONENTS REQUIRED: -

- Rectifier trainer kit
- CRO
- CRO Probe
- Voltmeter
- Connective wire

04. THEORY: -

Semiconductor diode is a simple the combination of P-type and N-type material. It is formed by doping half of the silicon crystal with trivalent impurity (P-type) and the half with pentavalent material (N-type). It has the characteristics of passing.

4.1.1 Rectifier: -

It is a device which converts AC voltage to pulsating DC voltage using one or more diodes. It is two types: - One is half wave rectifier and Second is full wave rectifier.

The conventional currents flow through D, load resistor (R_L) and upper half of the secondary winding, Similarly during –Ve half cycle.

4.1.2 Half wave rectifier: -

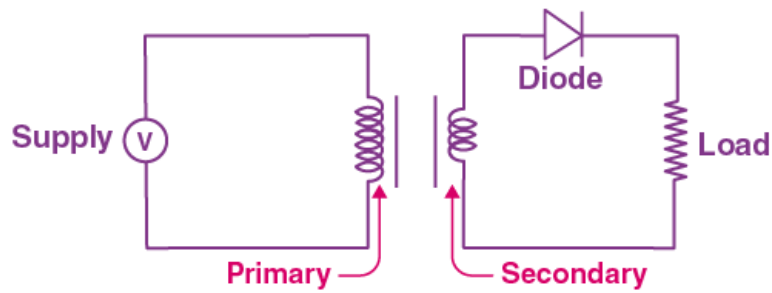
- The rectifier conducts current only during the positive half cycle at input AC supply, in which the diode is forward biased.

$$V_O = IR_L$$

- for negative half cycle of AC input supply no current flows and so no voltage appears across the load as diode is reverse biased and hence open circuit.

$$V_O = 0V$$

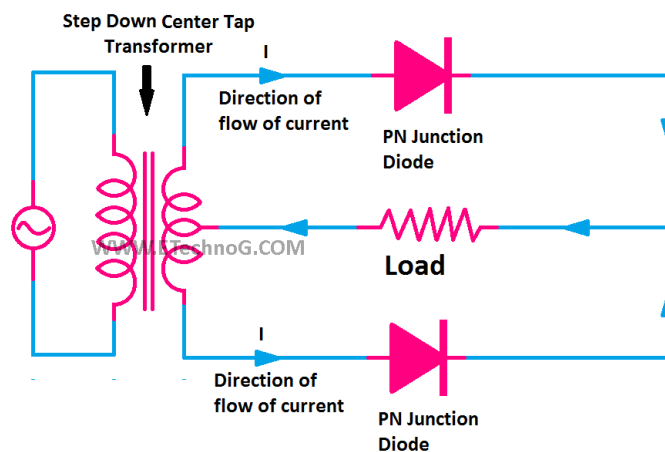
- The transformer allows to step up / step down the AC input voltage and also isolates the rectifier circuit from line and thus reduces the risk of electric shocks.
- The AC supplier delivers power only on the time i.e. output is low.



Half Wave Rectifier

4.1.3 Full wave rectifier: -

- In the positive half cycle, A becomes positive B becomes negative this makes D1 forward bias, D2 reverse bias and open circuit. Hence D1 conduct current while D2 does not.
- The conventional current flows through D1, load resistor (R_L) and upper half of the secondary winding.
- Similarly, during $-Ve$ half cycle end A becomes $-Ve$ and B is $+Ve$ and D1 is reversed and D2 is forward bias. Hence, current flows through D2, R_L and lower half of winding.

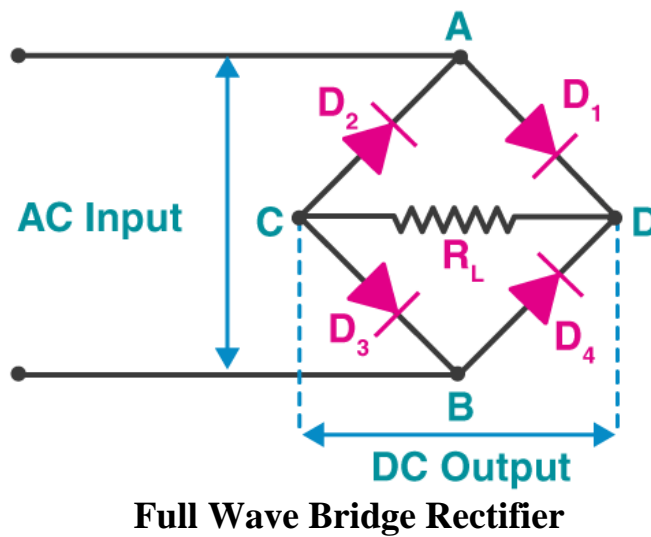


Full Wave Rectifier

4.1.4 Full wave bridge rectifier: -

- Here $+Ve$ diode are used without using center tapped transformer.
- The AC supply to be rectified is applied to the diagonally end of the bridge through transformer.
- During the $+Ve$ half cycle of the voltage and if A becomes $+Ve$ and B becomes $-Ve$ then D2 and D3 is forward bias. These two diode will be the forward biased. These two diode will be the series through the load (R_L). Hence DC output is obtained across R_L .

- In $-VE$ half cycle D_2, D_3 are reversed biased while D_1 and D_4 are forward bias. So, current conduction through D_1, D_4 and R_L . Hence output across it each case (P/V) of each diode is V_m .



05.PROCEDURE: -

- First configure the half wave rectifier circuit as shown in the circuit diagram.
- Note down all the values of components connect the primary side of transformer to a DC main and secondary the input circuit.
- Note down the DC and AC voltage and current without and with load and again absorb the AC and DC voltage current with ' α ' and ' π ' filter with load.
- Observe / repeat the above procedure for full wave rectifier and full wave bridge rectifier.

06.OBSERVATION AND CALCULATION TABLE: -

Sl No.	Types of Rectifier	Input Voltage (V)	Rectified out Voltage (V)
1			
2			
3			

07.CONCLUSION: -