



DEPARTMENT OF PHYSICS
MAR THOMA COLLEGE FOR WOMEN, PERUMBAVOOR

FULL WAVE RECTIFIER (BRIDGE)

STUDY OF RIPPLE FACTOR AND LOAD REGULATION WITH AND WITHOUT FILTER CIRCUIT

A full-wave bridge rectifier is a circuit used to convert alternating current (AC) into direct current (DC). It is a widely used rectifier configuration due to its efficiency and simplicity. The full-wave bridge rectifier uses a combination of diodes arranged in a bridge configuration to achieve the rectification process.

Aim

To construct a full wave bridge rectifier and study its ripple factor and load regulation with and without filter circuit

Sl. No.	Component/Equipment	Specification	Quantity
1	Diodes	IN 4007	4 Nos
2	Capacitor	100 μ F	1 No
3	Resistors	100 Ω – 22k Ω	1 No each
4	Step down Transformer	6V	1 No
5	Digital Multimeter		
6	CRO		
7	Bread board		

Theory

The output of a rectifier contains dc components as well as ac components. The ac components in the rectified output is known as ripple. The ratio of rms value of ac components to the dc component in the output is known as ripple factor.



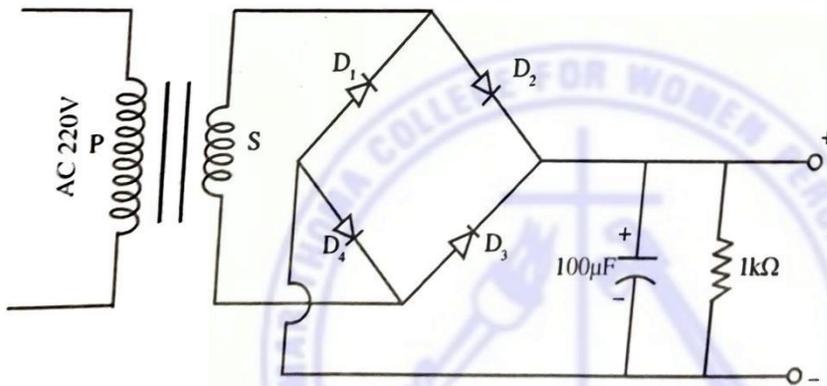
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Ripple factor,

$$\gamma = \frac{\text{value of ac component}}{\text{value of dc component}}$$

i.e., $\gamma = \frac{V_{ac}}{V_{dc}}$ (1)

Circuit Diagram



Percentage of Regulation

It is a measure of the variation of DC output voltage for variations in the load.

$$\text{Percentage of regulation} = \frac{V_{NL} - V_{FL}}{V_{FL}} \times 100\%$$

V_{NL} = DC voltage across load resistance, when minimum current flows through it (without connecting the load).

V_{FL} = DC voltage across load resistance, when maximum current flows through (with load connected).



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Procedure

1. Connections are made as shown in the circuit diagram.
2. Switch ON the AC power supply. Load broad
3. Observe the wave form on CRO across the load resistor.
4. Measure V_{dc} using de voltmeter and V_{rms} using ac voltmeter or digital millimetre.
5. Note down I_{dc} , from Ammeter.
6. Calculate ripple factor and rectification efficiency.
7. Repeat the experiment by a connecting capacitor across the load.

Observations and Tabulations

	$V_{dc} (= V_{FL})$ (volt)	V_{NL} (volt)	V_{rms} (volt)	Percentage of regulation $\frac{V_{NL} - V_{FL}}{V_{FL}} \times 100\%$	Ripple factor $\gamma = \frac{V_{rms}}{V_{dc}}$
Without filter					
With filter					

Result

Constructed a full wave bridge rectifier and measured its ripple factor and percentage of regulation with and without filter.

i) Ripple factor without filter =

ii) Ripple factor with filter =



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iii) Percentage of regulation with filter =

iv) Percentage of regulation without filter =

References

- Experimental Physics – I, For First, Second, Third and Fourth Semester, BSc Degree Programme, Dr.P.Sethumadhavan, Prof. K.C. Abraham, Prof .Sunil John, **Manjusha Publications**
- <https://youtu.be/PfWmIQfYIRI?si=v5MKo5fNdO6FfmBc>

