



SNS COLLEGE OF TECHNOLOGY

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Department of Biomedical Engineering

Course Name: 23BMB101-Electron Devices and Circuits

I Year : II Semester

Unit I –Semiconductor Diodes

Topic : Full Wave Rectifiers



INTRODUCTION



- The main application of p-n junction diode is in rectification circuits.
- A rectifier is nothing but a simple diode or group of diodes which converts the Alternating Current (AC) into Direct Current (DC). Vision Title 3
- A diode allows electric current in one direction and blocks electric current in another direction. This principle is used to construct various types of rectifiers.
- Rectifiers are classified into different types based on the number of diodes used in the circuit or arrangement of diodes in the circuit.



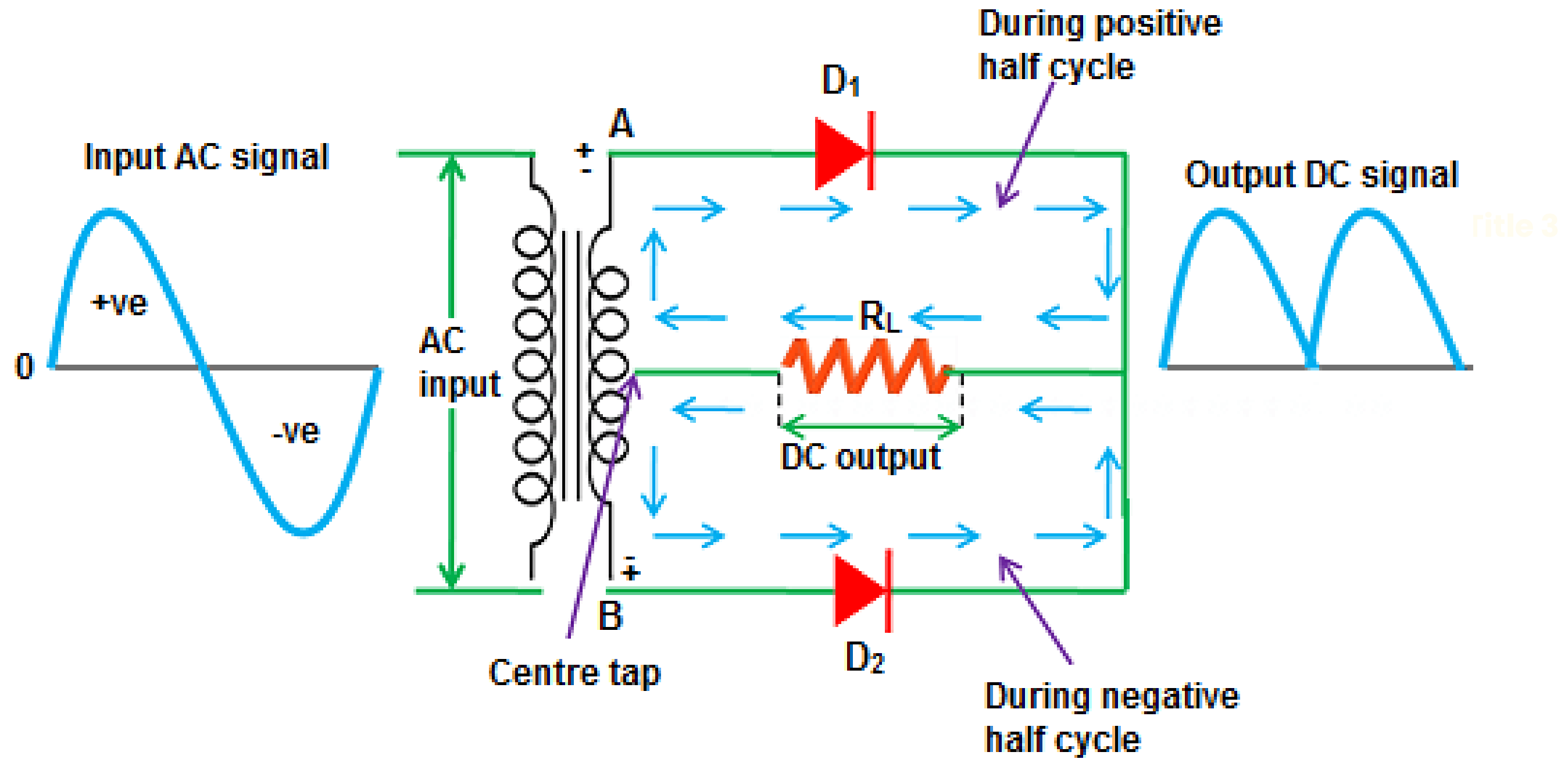
Full Wave Rectifier



- Full-wave rectifier circuits are used for producing an output voltage or output current which is purely DC.
- The main advantage of a full-wave rectifier over half-wave rectifier is that such as the average output voltage is higher in full-wave rectifier, there is less ripple produced in full-wave rectifier when compared to the half-wave rectifier.

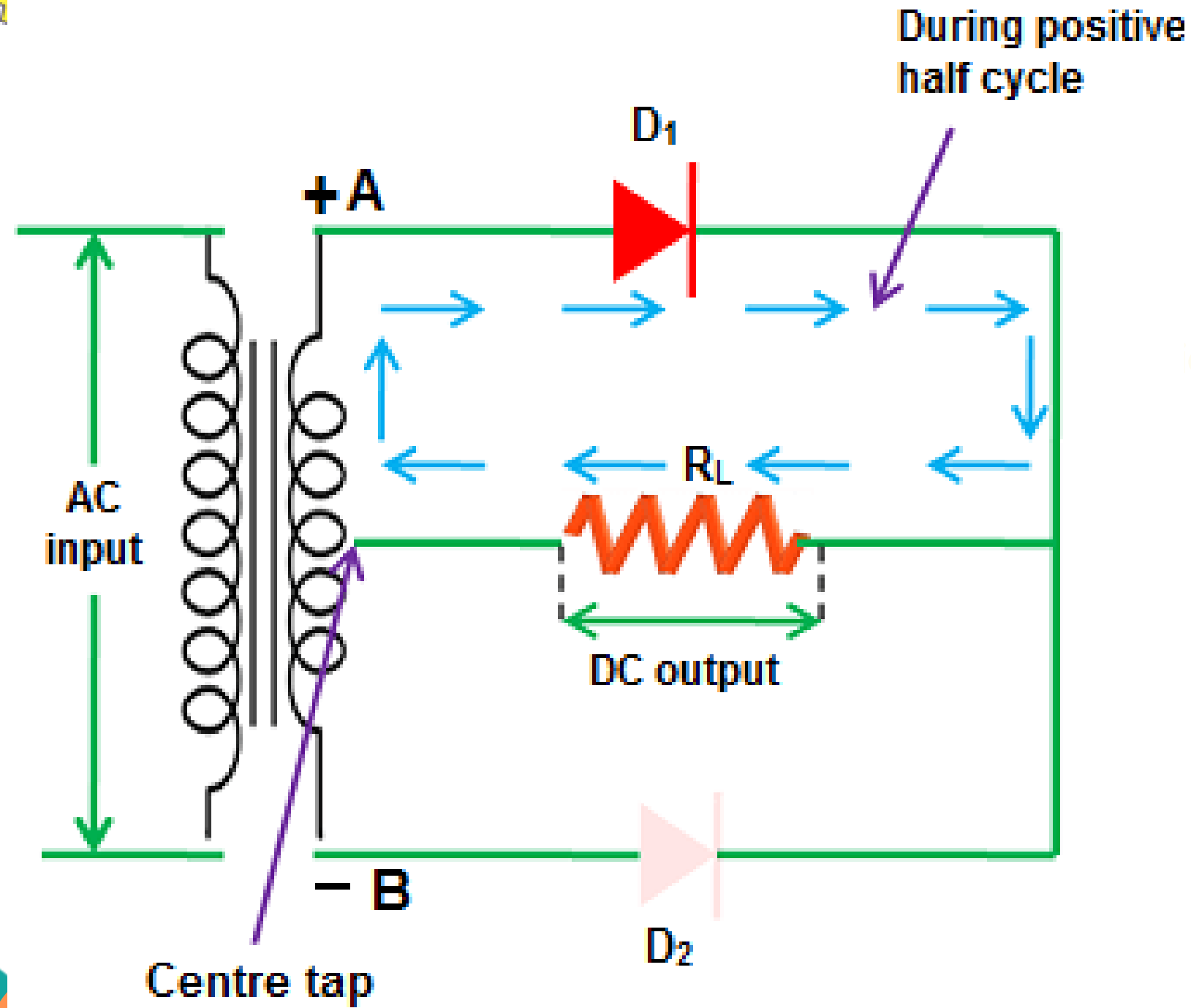


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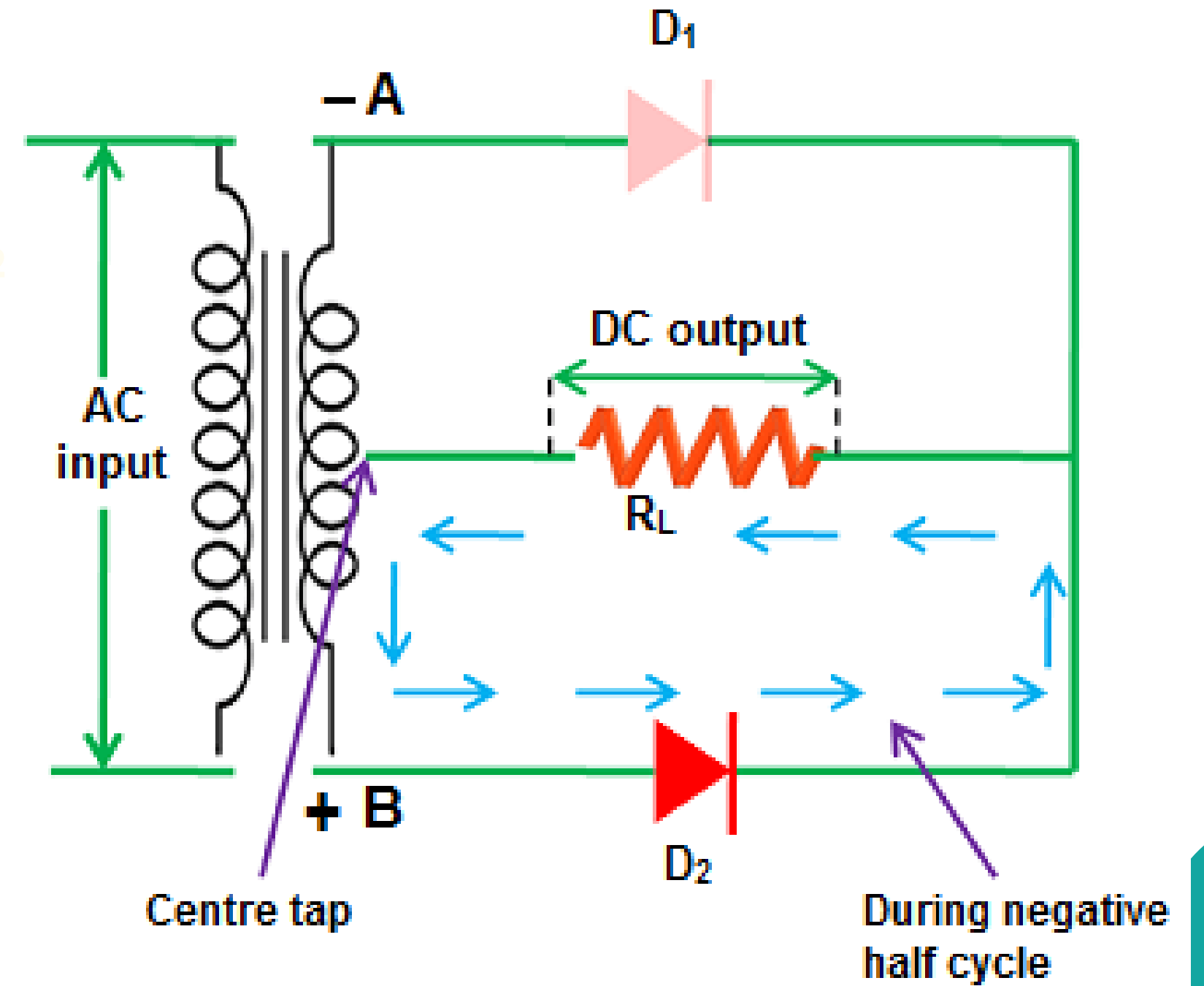




Working



ion Tit 2





Characteristics of Full Wave Rectifier



RIPPLE FACTOR

Ripple factor is the ratio of RMS value of the AC component of the output voltage to the DC component of the output voltage.

$$\gamma = \sqrt{\left(\frac{V_{rms}}{V_{DC}}\right)^2 - 1}$$



Characteristics of Full Wave Rectifier



DC Current

DC Output voltage

Vision Tit 2

$$I_{DC} = \frac{2I_{max}}{\pi}$$

$$V_{DC} = \frac{2V_{max}}{\pi}$$

I_{max} is the maximum DC load current

V_{max} is the maximum secondary voltage



Characteristics of Full Wave Rectifier



Form Factor

The form factor is the ratio of RMS value to the DC value. For a half-wave rectifier, the form factor is 1.11

Rectifier Efficiency

Rectifier efficiency is the ratio of output DC power to the input AC power. For a half-wave rectifier, rectifier efficiency is 81.2%.



Bridge Rectifier

- Bridge rectifiers are defined as a type of full-wave rectifier that uses four or more diodes in a bridge circuit configuration to efficiently convert alternating (AC) current to a direct (DC) current.
- In bridge rectifier, center tap is not required. If stepping down or stepping up of voltage is not required, then even the transformer can be eliminated in the bridge rectifier.
- The four diodes are arranged in such a way that only two diodes conduct electricity during each half cycle



Bridge Rectifier

