

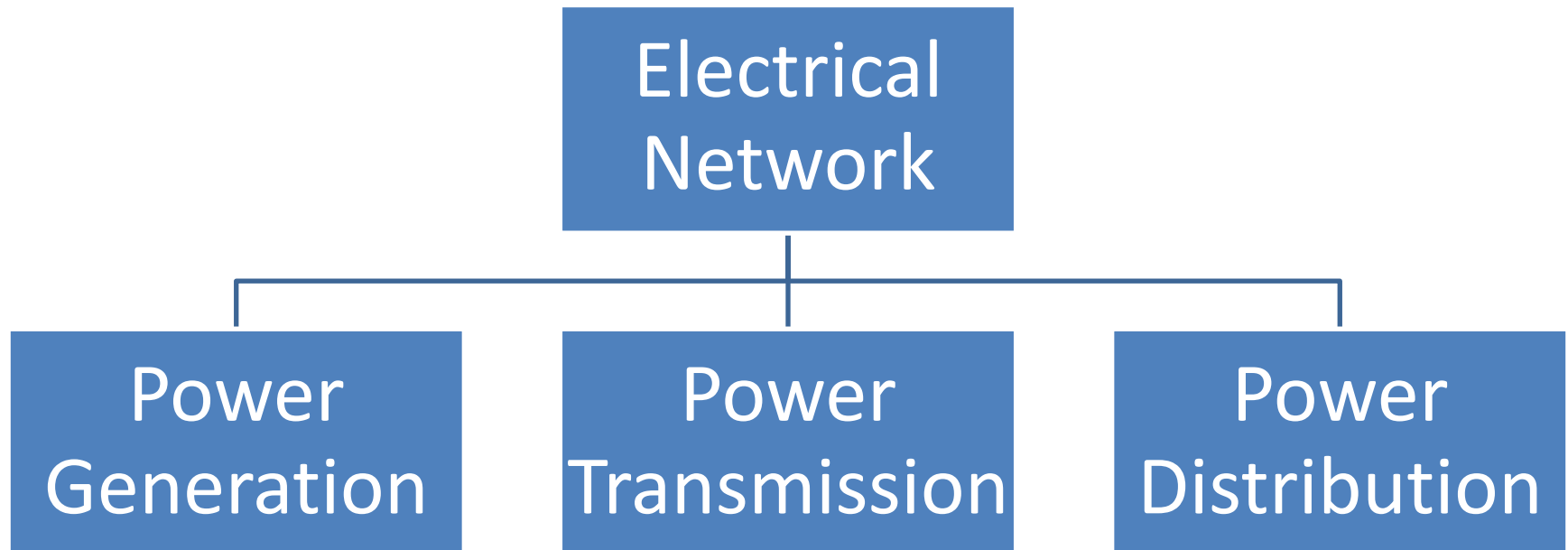
# Industrial Electronics

Industrial Power Supplies

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# Power Supplies to industrial loads



# Distributions System

- Electricity distribution

Upon arrival at the substation, the power will be **stepped down in voltage—from a transmission level voltage to a distribution level voltage**. As it exits the substation, it enters the distribution wiring. Finally, upon arrival at the service location, the power is **stepped down** again from the **distribution voltage** to the required service voltage(s).

# Type of Industries

- Small Industries
- Medium Industries
- Heavy Industries.

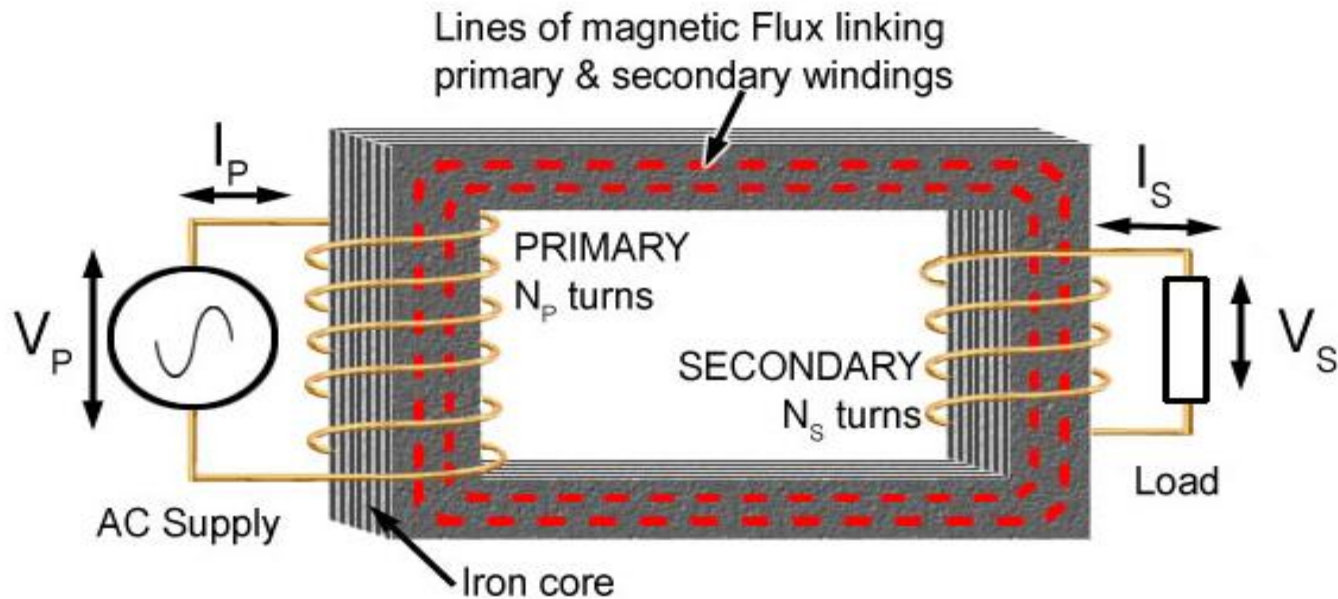
Voltage requirement may varies according to type and nature of industry.

# Power supplies in Industries

- AC source.
  - Load such as Induction Motors used in Industries
- DC Source.
  - DC Motors, and all other electronics devices involved in industries.

# Transformer

- An Electromagnetic static machine step down /Up distribution voltages.



$$\frac{\text{The number of primary turns } N_p}{\text{The number of secondary turns } N_s} = \frac{\text{The primary voltage } V_p}{\text{The secondary voltage } V_s}$$

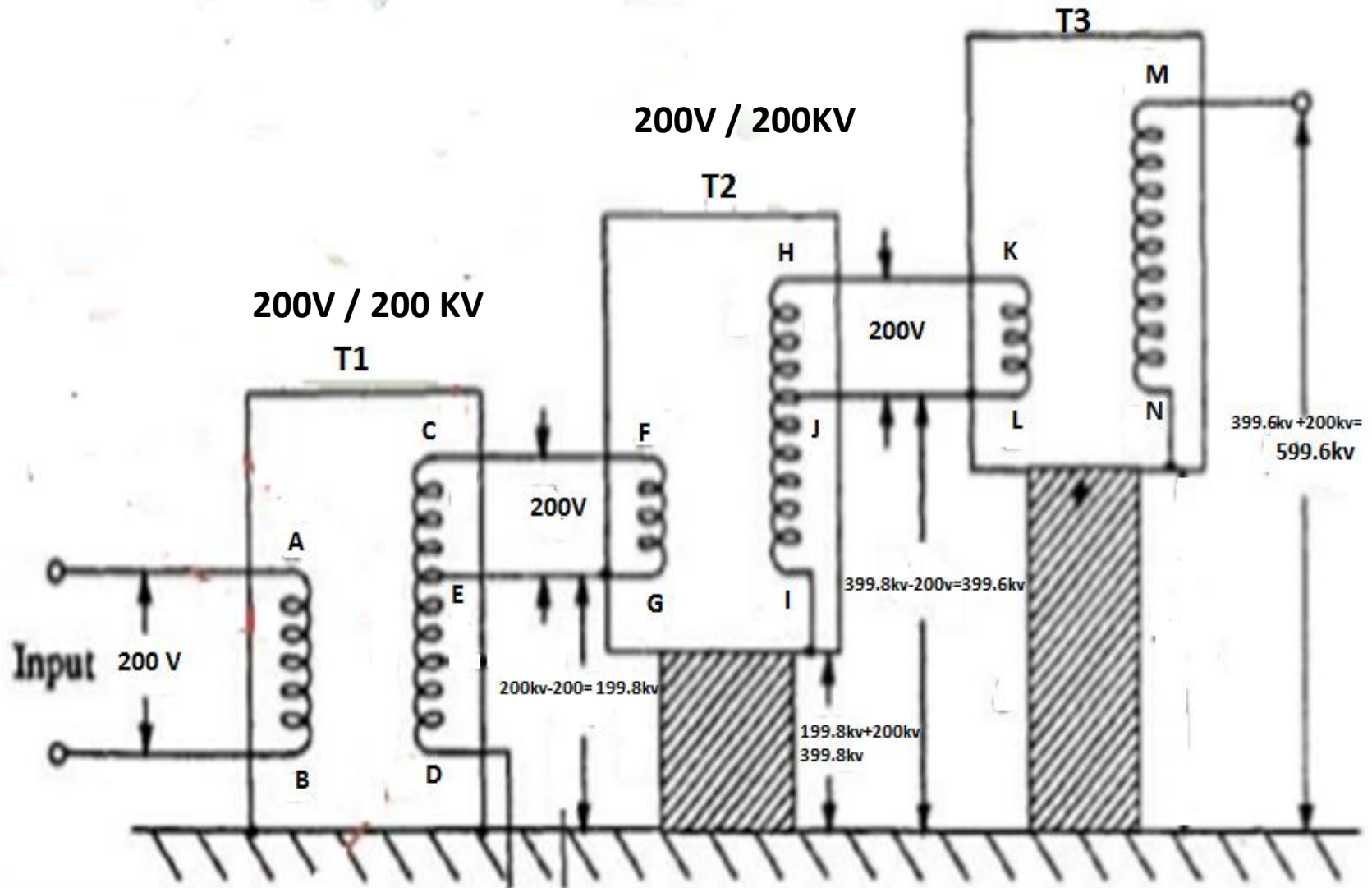
$$\frac{\text{The number of secondary turns } N_s}{\text{The number of primary turns } N_p} = \frac{\text{The primary current } I_p}{\text{The secondary current } I_s}$$

# Cascade Arrangement of Transformers

- In order to have high voltages for heavy industries/ testing laboratories.
- Transformers are arranged in such a way to achieve high voltages.
- Easy to arrange and dismantle/ occupy less space compared single step-up transformer of same ratings.
- Considering 3 units of 200V/200KV transformers

# Schematic

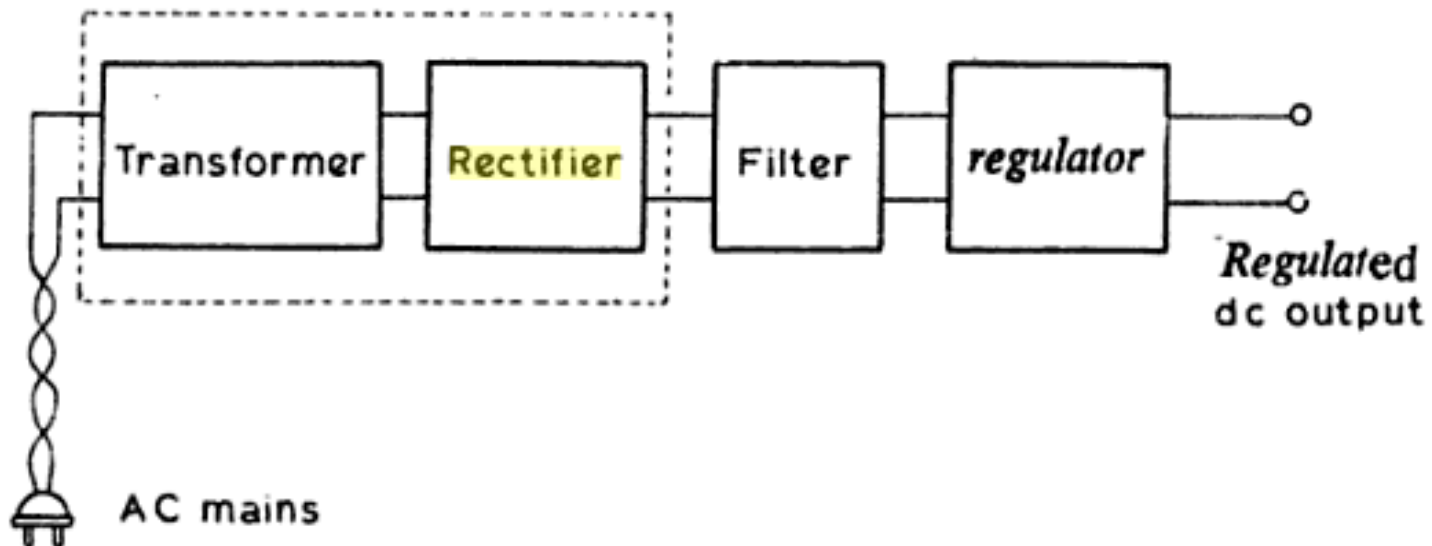
200V / 200KV



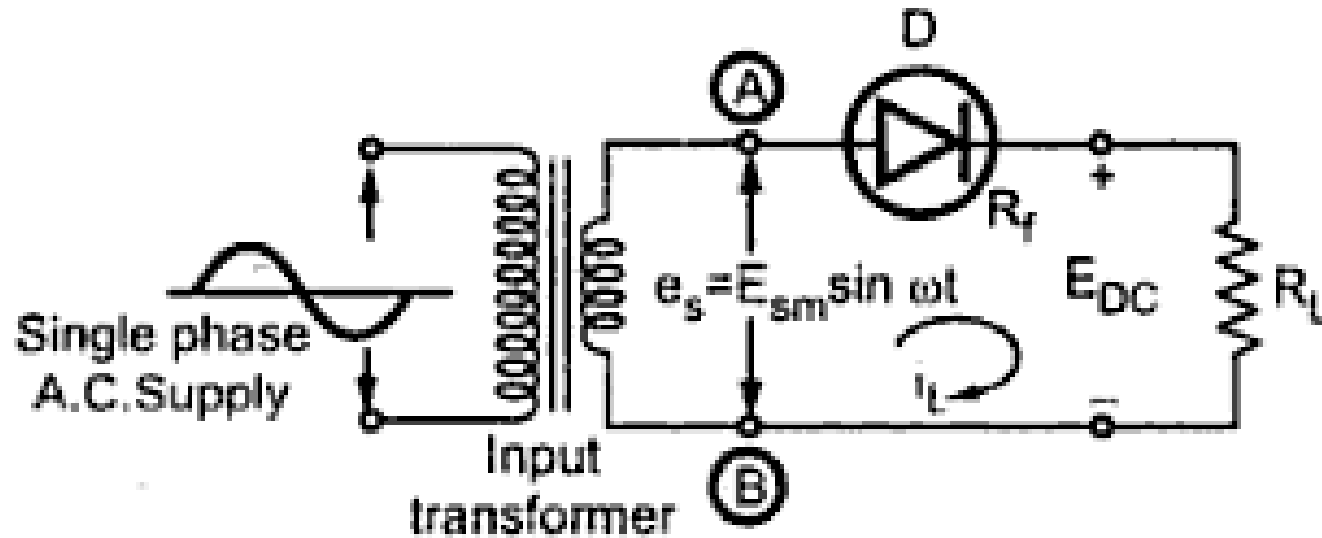


# Rectifiers

- Another important part of industrial power supplies is rectifier .
- Industrial application like thermal power stations , cement etc.

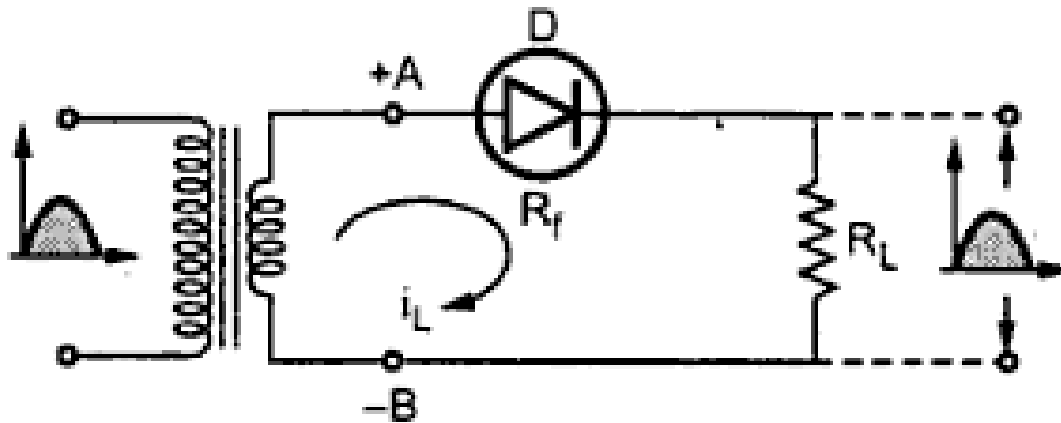


# Half-wave

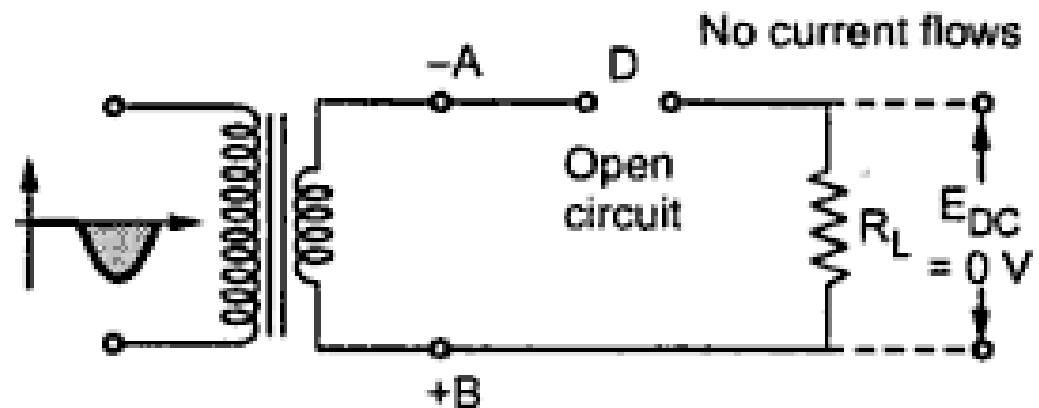


**Half wave rectifier**

# Operation of Half Wave Rectifier

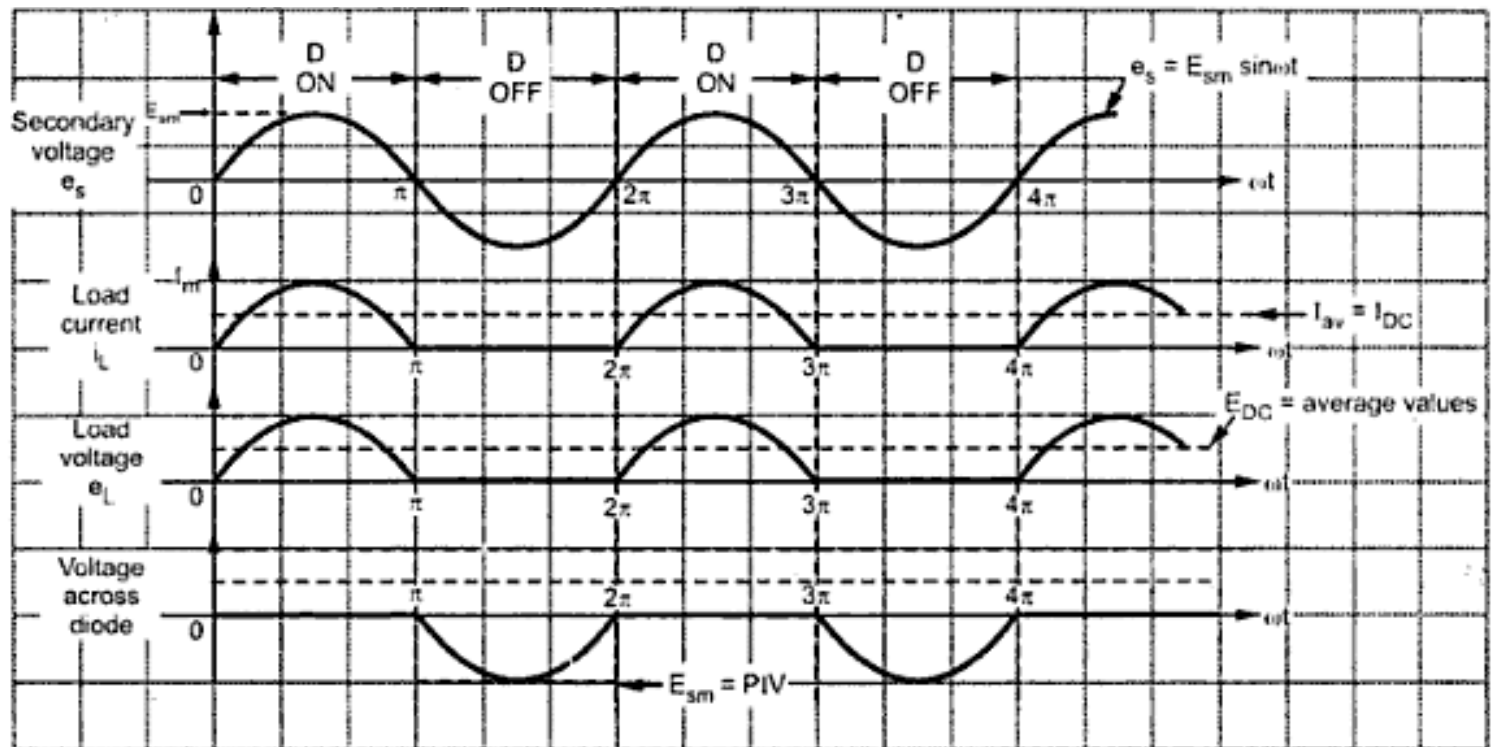
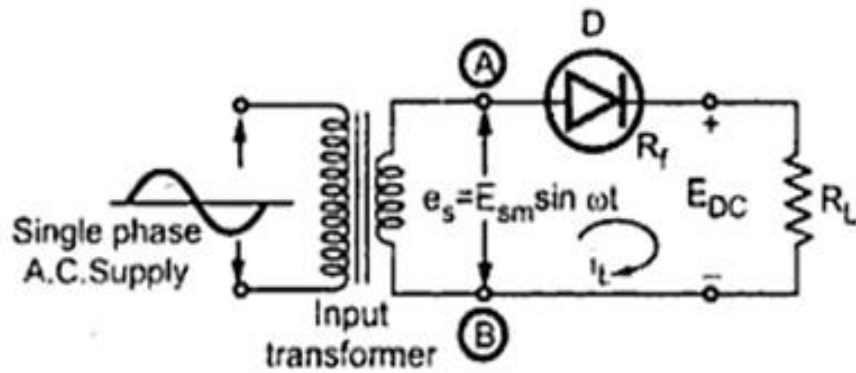


(a) Diode forward biased



(b) Diode reverse biased

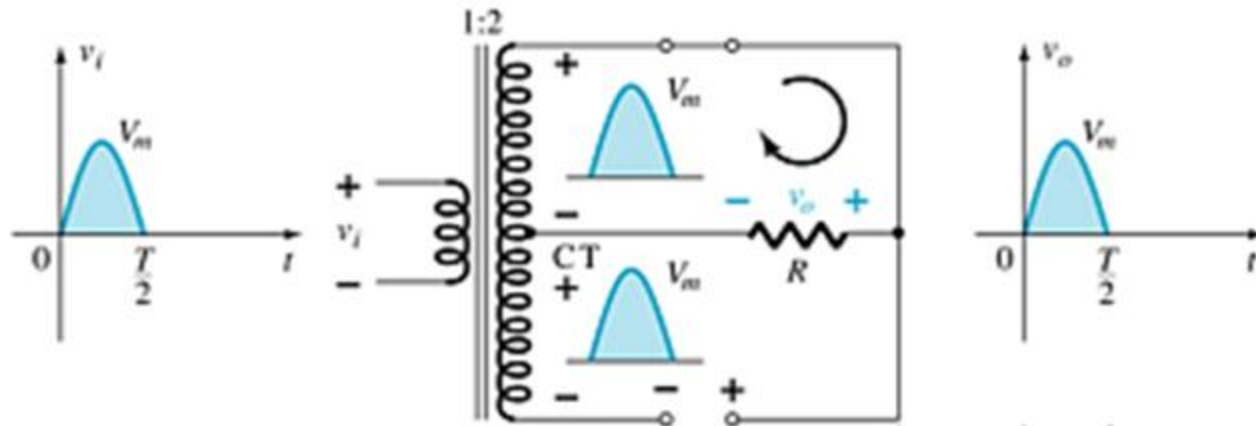
# Waveform of Half Wave Rectifier



Load current and load voltage waveforms for half wave rectifier

# Full Wave Rectifier

Current Flow during the positive half of the input cycle



Current Flow during the negative half of the input cycle

