SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35

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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE NAME: 19EEB201- DC Machines and Transformers

II YEAR / III SEMESTER

Unit 1 – DC Generator

Topic 1: Construction of DC Machine

What We'll Discuss

TOPIC OUTLINE

Case study

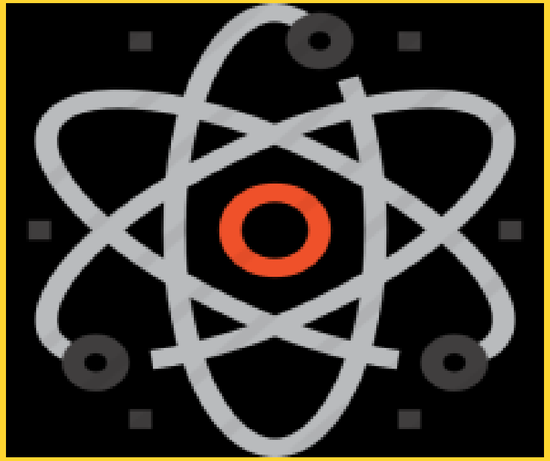
Construction of DC Machine

Various parts

Types of Windings

Assessment

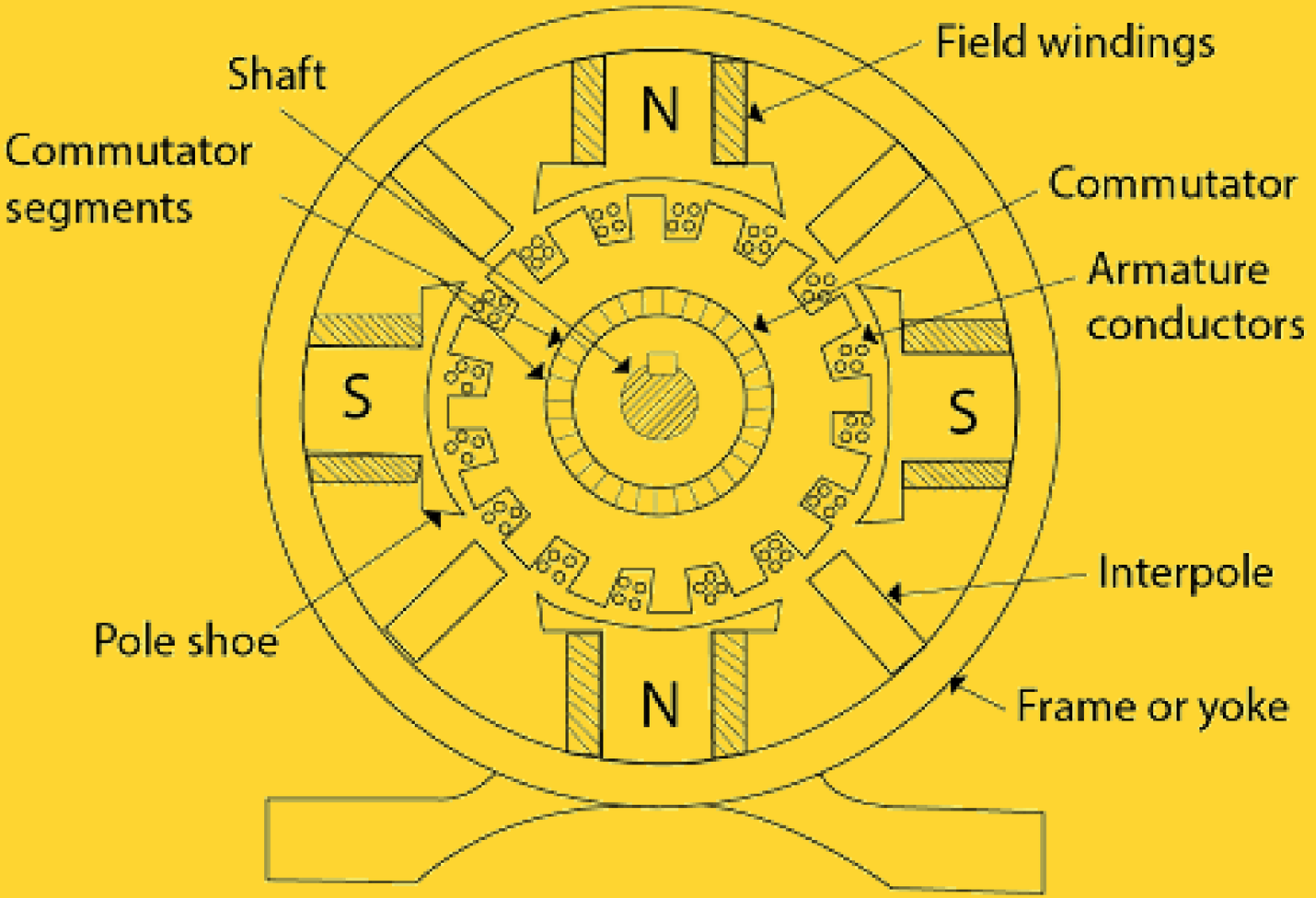
CASE



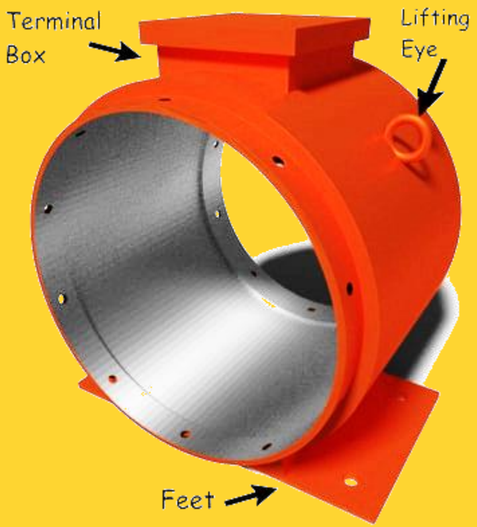
Identify the various forms of Natural Energy sources available

How to convert all these forms of Energy into

CONSTRUCTION



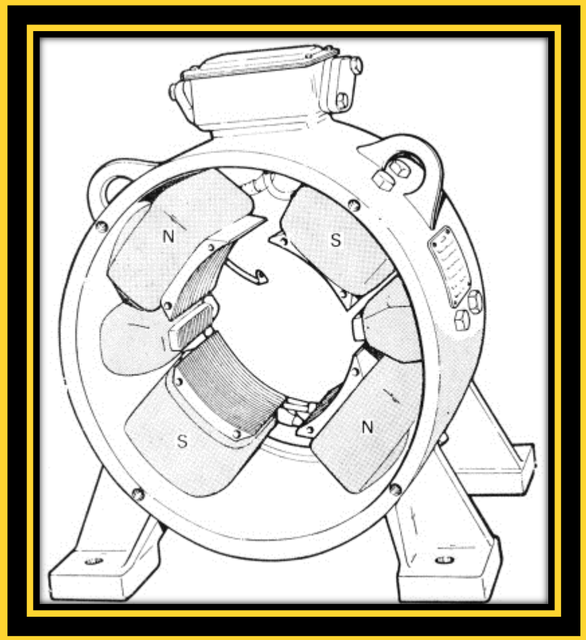
Various Parts of DC Machine



Yoke

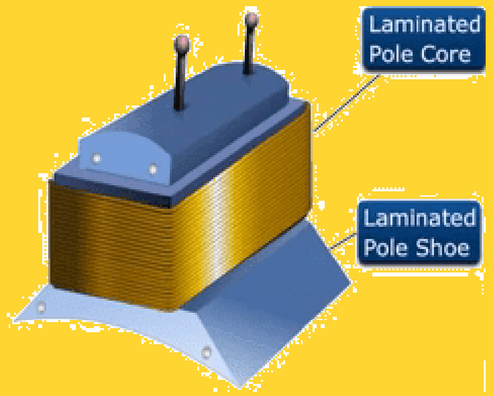
- Acts as frame of the machine
  - Mechanical support
  - low reluctance for magnetic flux
  - High Permeability
    - -- For Small machines -- Cast iron—low cost
    - -- For Large Machines -- Cast Steel (Rolled steel)

Various Parts of DC Machine



Pole core & shoes

a) Pole core (Pole body) :- --Carry the field coils
--Rectangle Cross sections
--Laminated to reduce heat losses
--Fitted to yoke through bolts



b) Pole shoe:- Acts as support to field poles and spreads out flux
laminated of annealed steel
(Of thickness of 1mm to 0.25 mm)

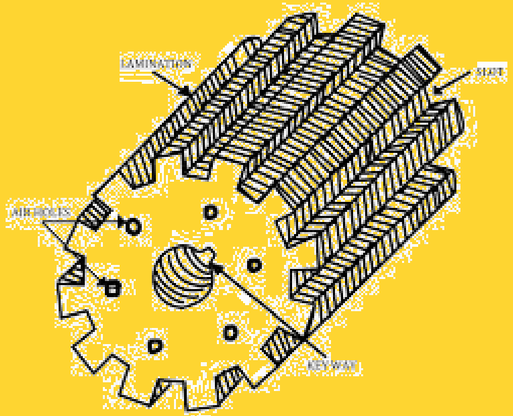
c) Field coils (Magnetizing coils):- -- Provide excitation
(exciting coils) I . e field flux

Various Parts of DC Machine

Armature core

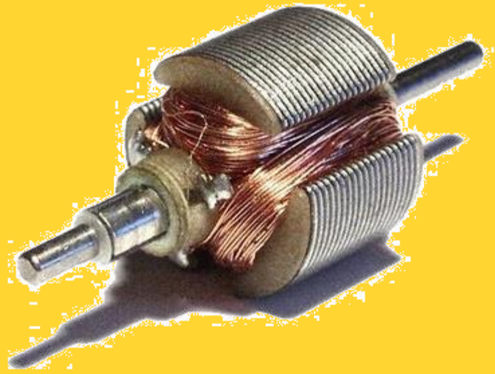
a) Armature core (Armature):-

--To rotate conductors in a magnetic field
-- it is cylindrical or drum shaped is built
--Laminated to reduce eddy current losses
-- High grade silicon steel used to reduce
i) Hysteresis loss ii) Eddy current loss

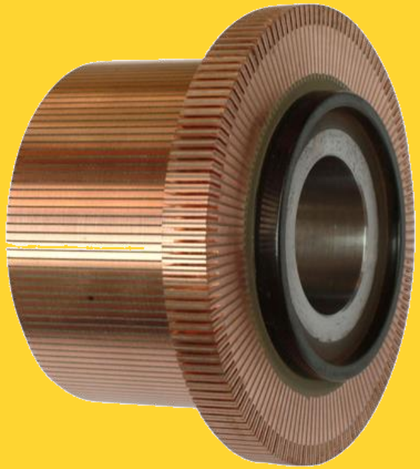


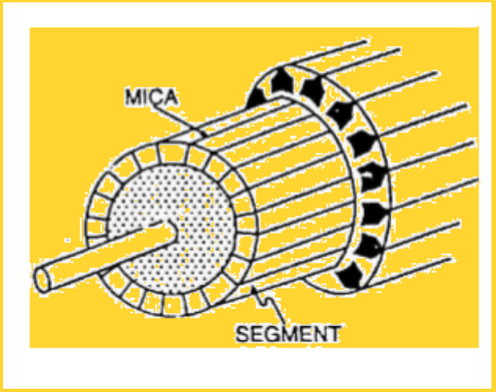
b) Armature Winding:-

--winding made of Copper (or) Aluminum
--windings are insulated each other



Various Parts of DC Machine





Commutator

Commutator:--Hard drawn copper bars segments insulated from each other by mica segments (insulation)

-- Between armature & External circuit

-- Split-Rings (acts like Rectifier AC to DC)

Various Parts of DC Machine

Bearings and Brushes

Brushes and brush gear:-

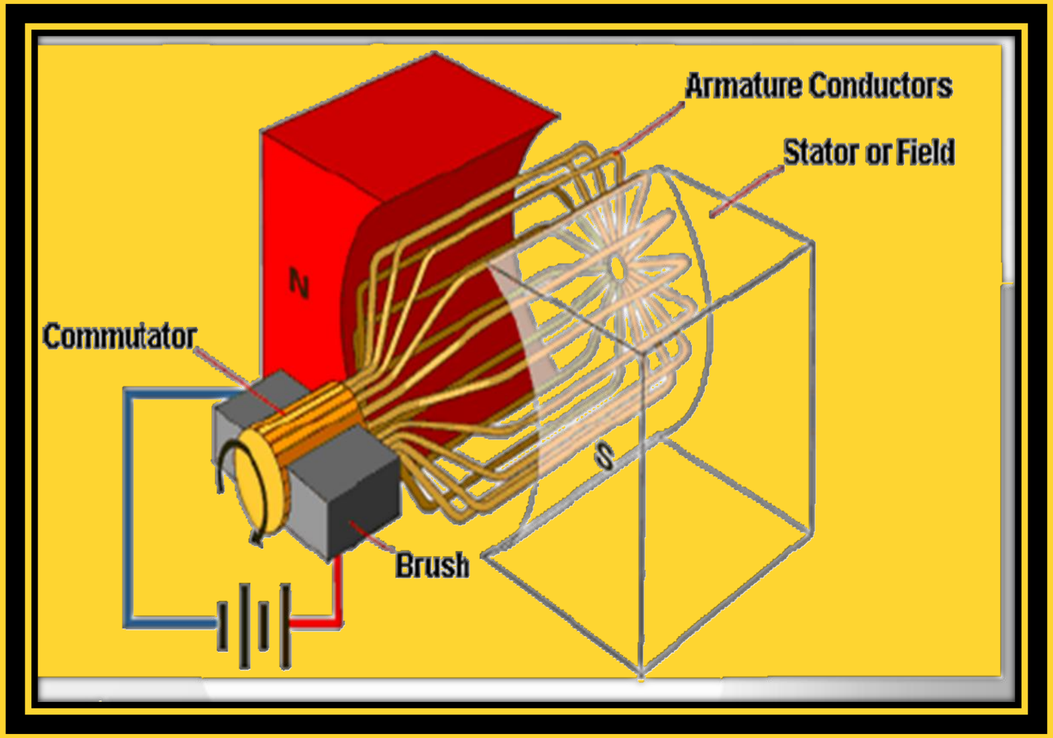
Carbon, Carbon graphite, copper used to Collects current from commutation (in case of Generator)

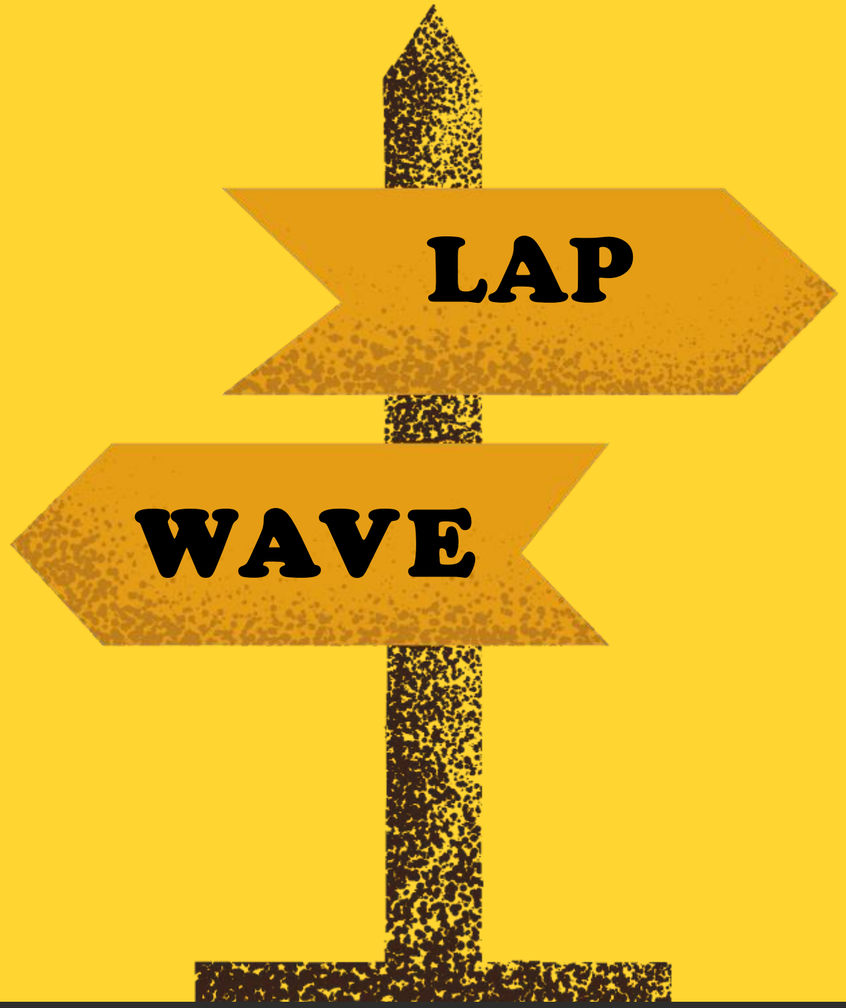
Shaft and bearings:-

Shaft-- Mechanical link between prime over and armature

Bearings– For free rotation

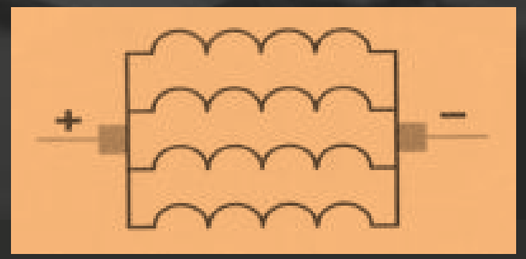
Armature Winding





LAP WINDING

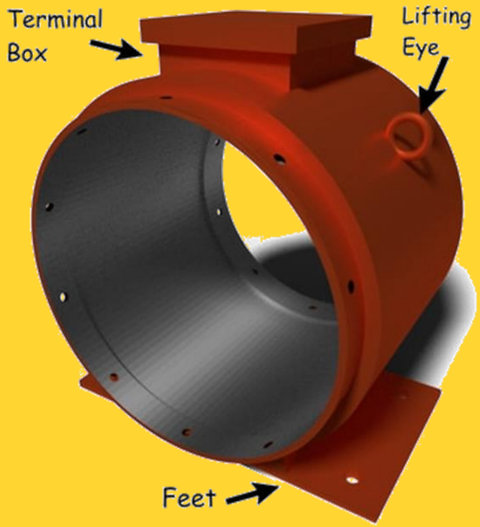
- Used in machines designed for low voltage and high current
- Armatures are constructed with large wire because of high current
- Their windings connected in Parallel
- This permits the current capacity of each winding to be added and provides a higher operating current.
- No of parallel path, A=P ; P = no. of poles

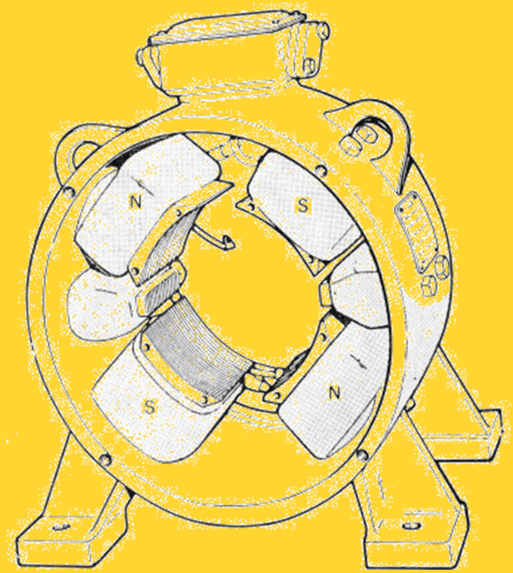


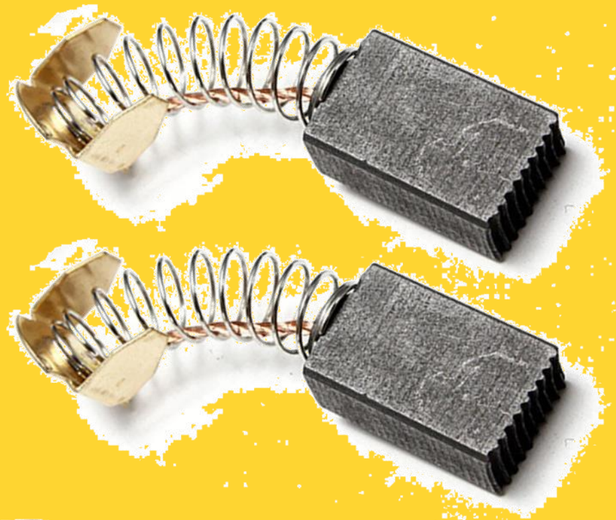
WAVE WINDING

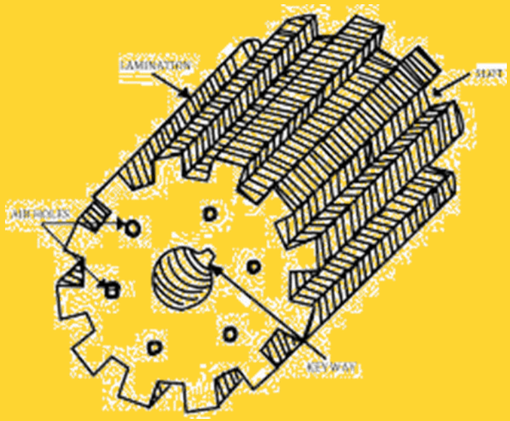
- Used in machines designed for high voltage and low current
- Their windings connected in series
- When the windings are connected in series, the voltage of each winding adds, but the current capacity remains the same
- No of parallel path, A=2.

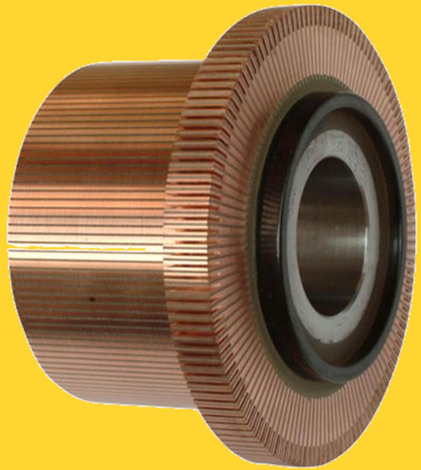
RECALL THE IMAGES











THANK YOU