



SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35

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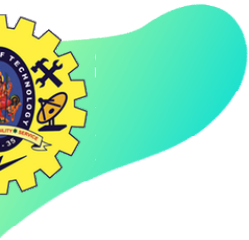
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23EET101 / BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING I YEAR / I SEMESTER

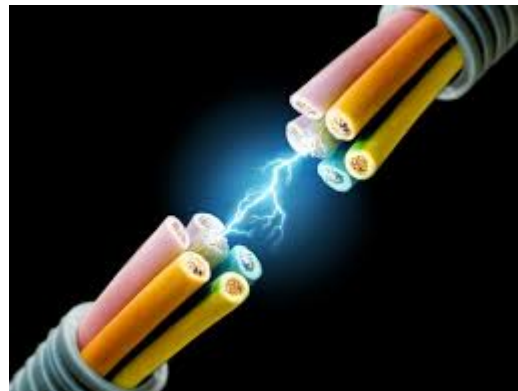
UNIT-II: ELECTRICAL MACHINES

CONSTRUCTION OF DC GENERATOR



TOPIC OUTLINE

- ✓ Classification of Electrical Machine
- ✓ Types of Machines
- ✓ Construction of DC Machine
- ✓ Major components

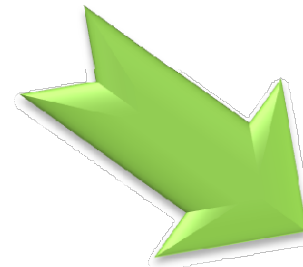




Identify the various forms of Natural Energy sources available

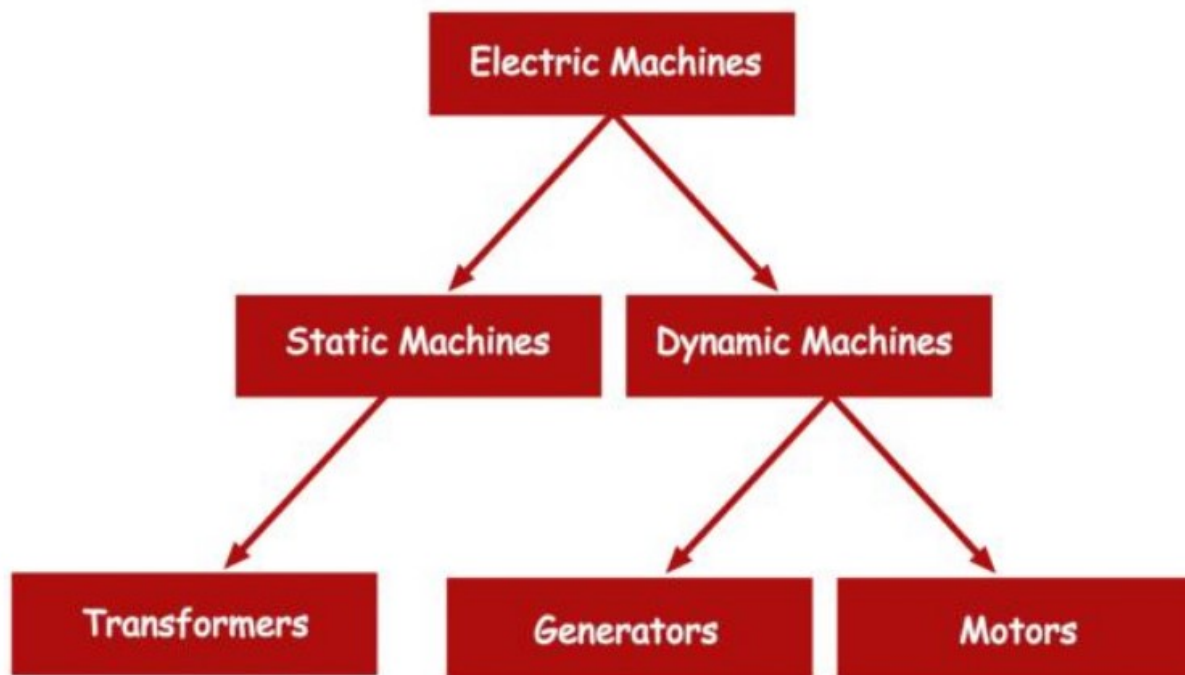


How to convert all these forms of Energy into

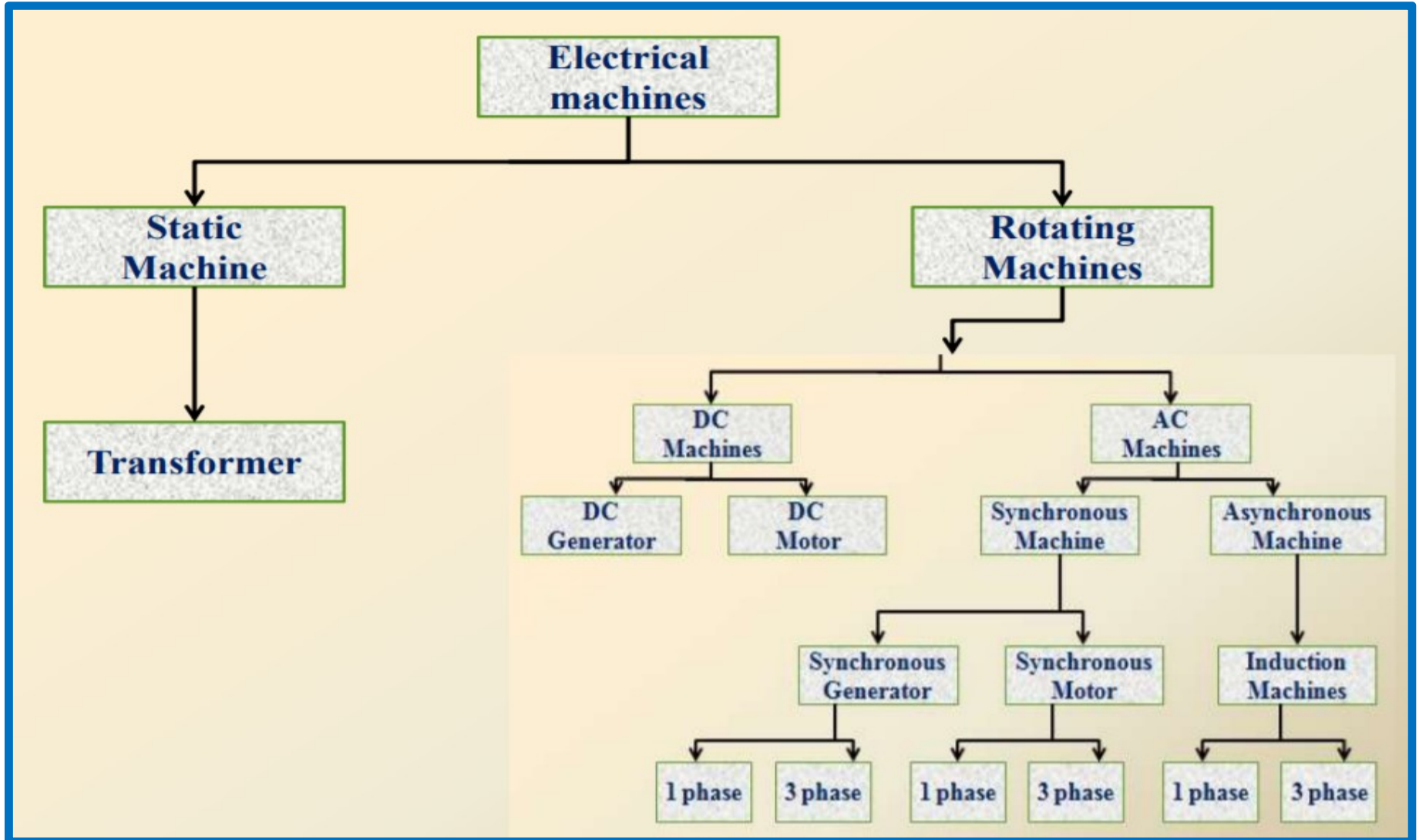




CLASSIFICATION OF ELECTRICAL MACHINES



CLASSIFICATION OF ELECTRICAL MACHINES





Types of Electrical Machines

- The electric machines are of three main types, transformer, generator, and motor.
- **Electrical Transformer:** In the transformer, both input and output are electrical power.
- **Electrical Generator:** In a generator, the input is mechanical power and the output is electrical power.
- **Electrical Motor:** In a motor, the input is electrical power and output is mechanical power.



CONSTRUCTION OF DC MACHINE

Video



<https://www.youtube.com/watch?v=ol-O9FCDqmg>



Major Components

Stator:

- Yoke or frame(acts as protecting cover for machine, provides mechanical support for the poles)
- Pole Core & Pole shoes
- Field Poles(Field winding) & Inter poles

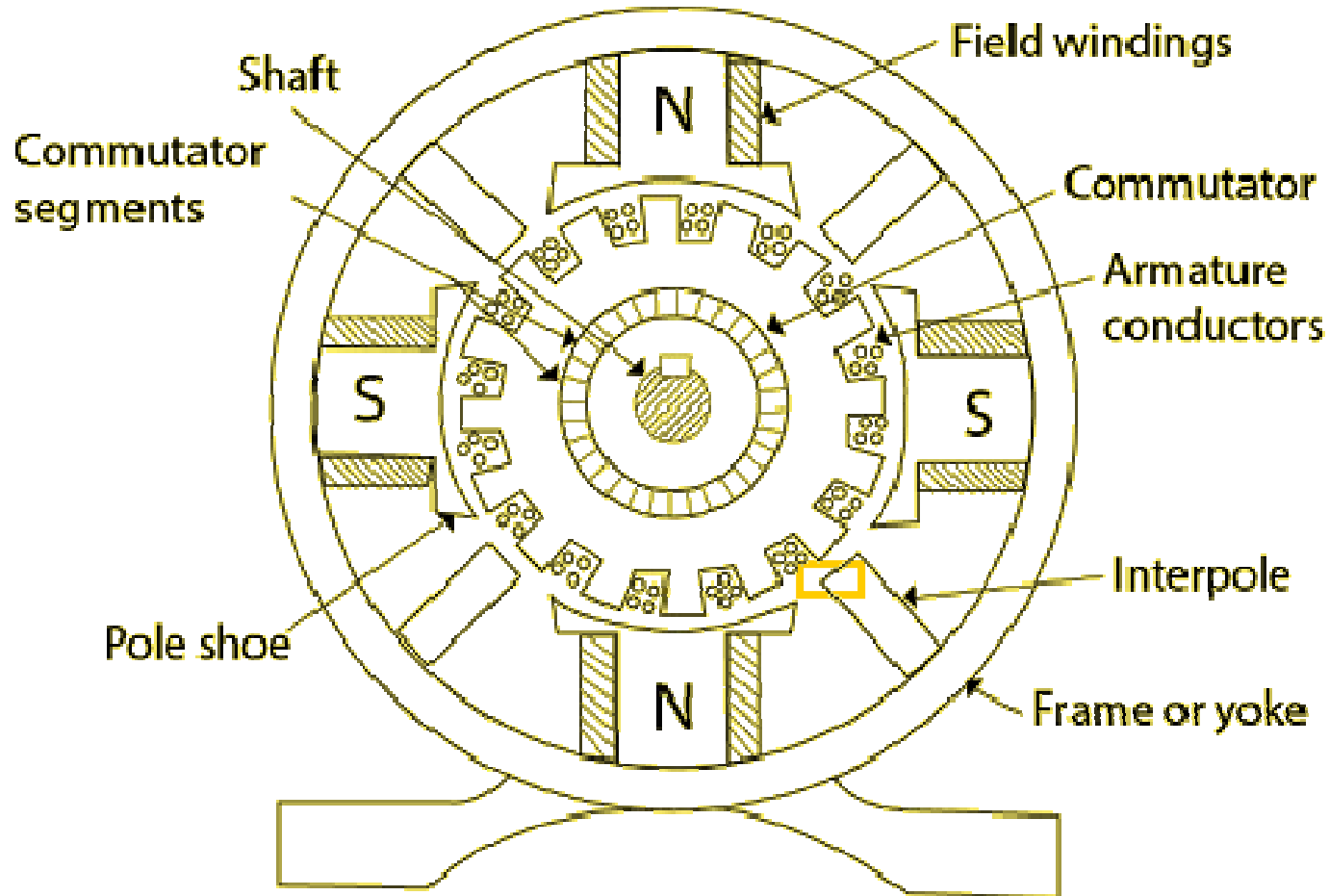
Rotor:

- Armature core & Armature Winding
- Commutator
- Brushes



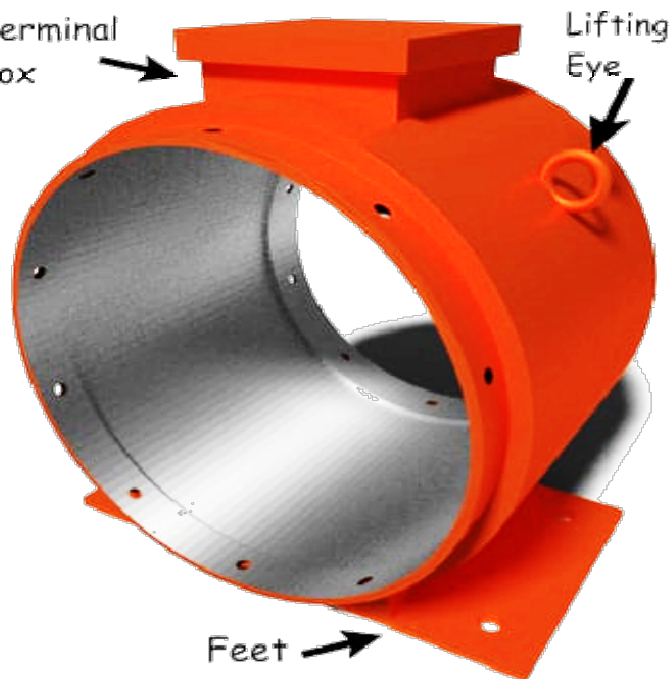


CONSTRUCTION OF DC GENERATOR





Various Parts of DC Machine



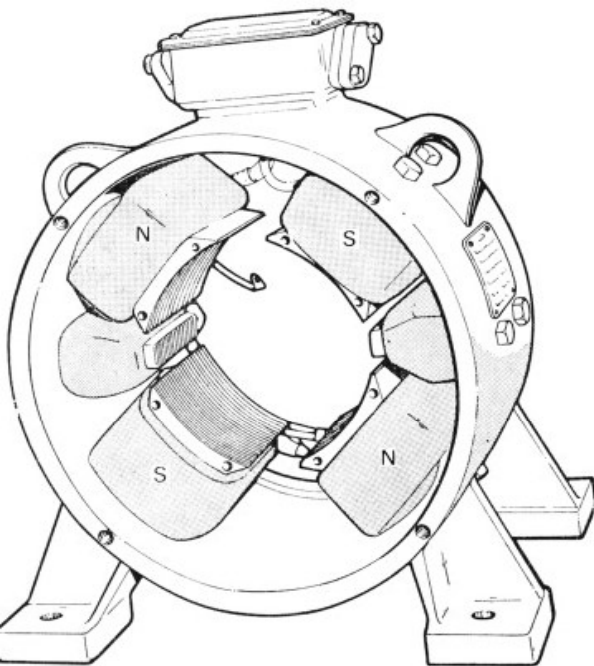
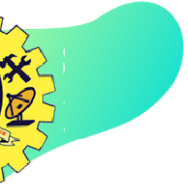
Yoke

- Acts as frame of the machine
 - Mechanical support
 - low reluctance for magnetic flux
 - High Permeability

It carries magnetic flux produced by the poles

- For Small machines -- Cast iron—low cost
- For Large Machines -- Cast Steel

Pole core & shoes

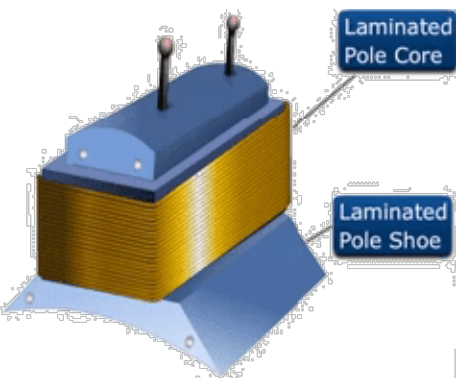


- a) Pole core (Pole body) :-
- Carry the field coils
 - Rectangle Cross sections
 - Laminated to reduce heat loss
 - Fitted to yoke through bolts

- b) Pole shoe:- Acts as support to field poles and spreads out the flux. It is 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 made up of copper wire.

- d) Interpoles -are provided to improve commutation.



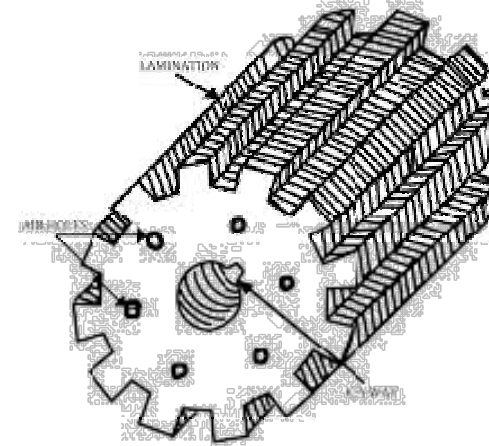


Armature core

a) Armature core (Armature):-

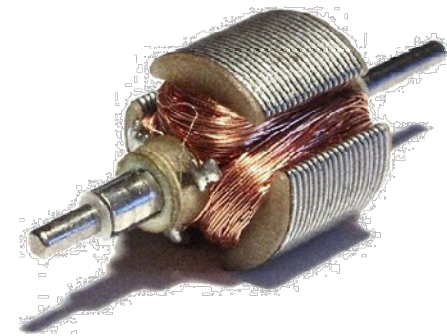
- To rotate conductors in a magnetic field
- it is cylindrical or drum shaped is built
- Laminated to reduce eddy current losses
- High grade silicon steel used to reduce

- i) Hysteresis loss ii) Eddy current loss



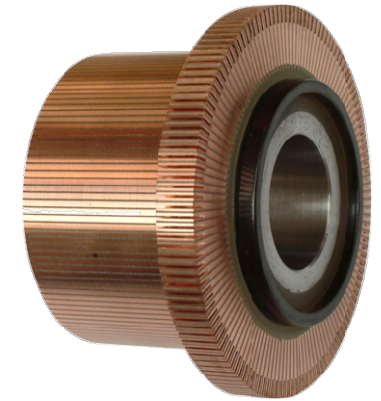
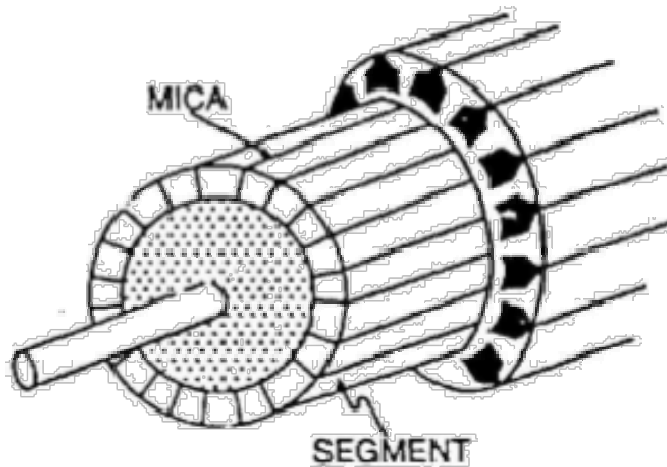
b) Armature Winding:-

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





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)





Bearings and Brushes

Brushes and brush gear:-

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



Shaft and bearings:-

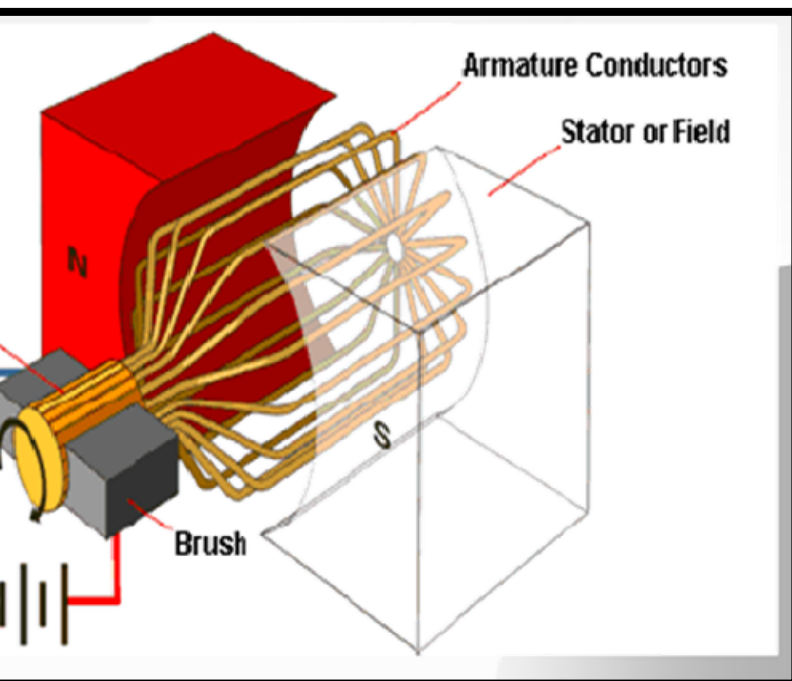
Shaft-- Mechanical link between prime over and armature

Bearings– For free rotation





Armature Winding



LAP WINDING

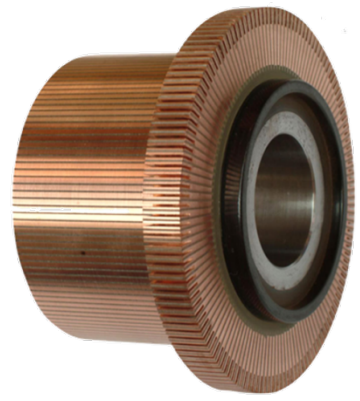
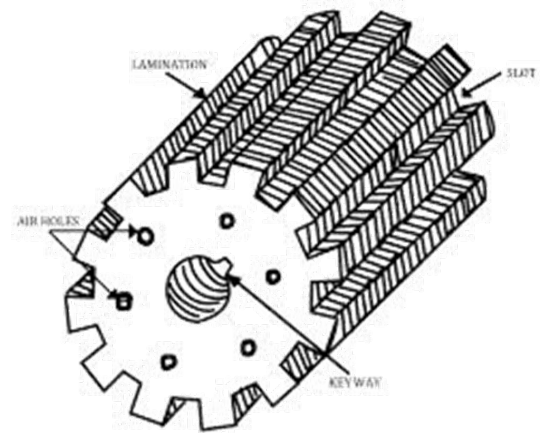
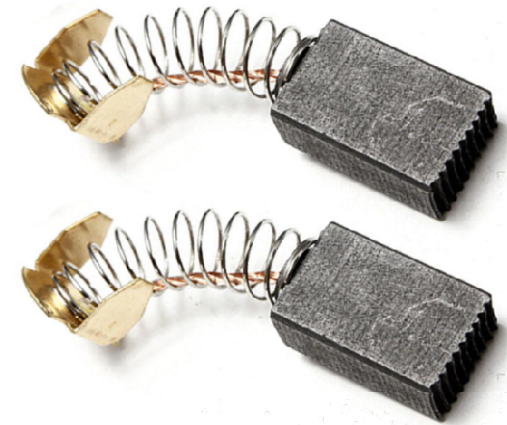
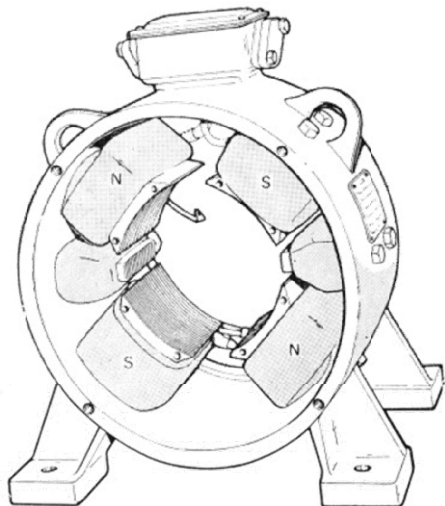
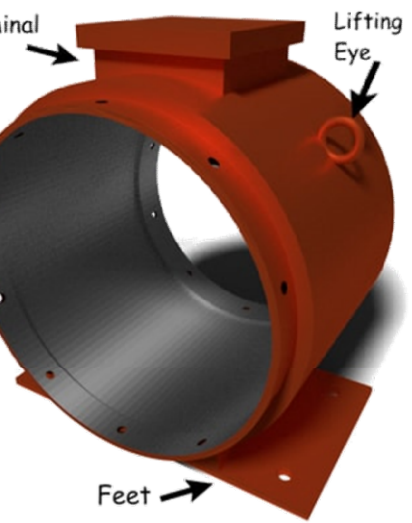
- Used in machines designed for low voltage and high current
- Armatures are constructed with large wire because of high current
- Their windings connected in Parallel

WAVE WINDING

- Used in machines designed for high voltage and low current
- Their windings connected in series

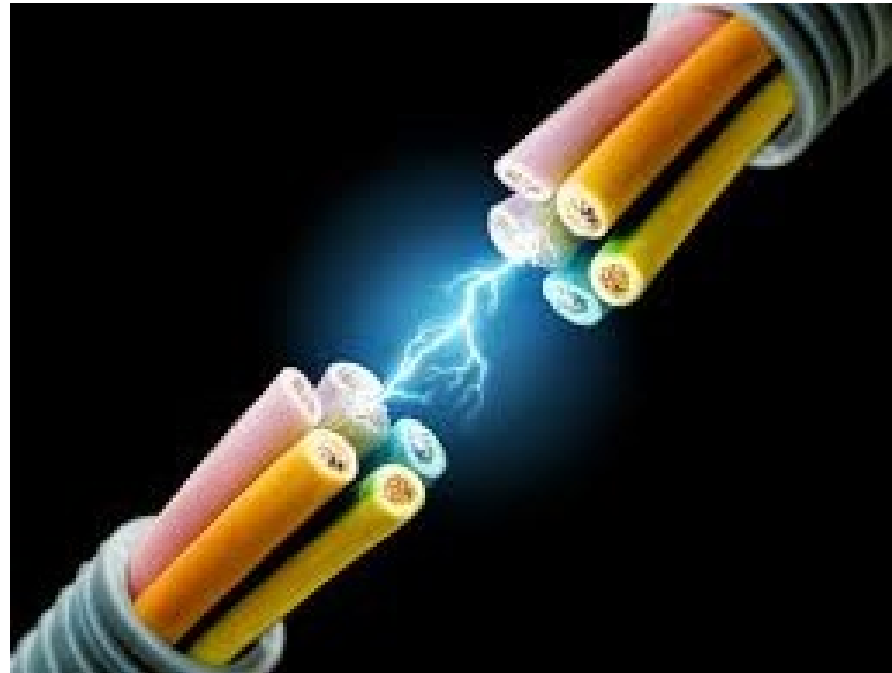


RECALL THE IMAGES





RECAP...



...THANK YOU

