SNS COLLEGE OF TECHNOLOGY

An Autonomous Institution

Coimbatore-35

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A++' Grade(III cycle)
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

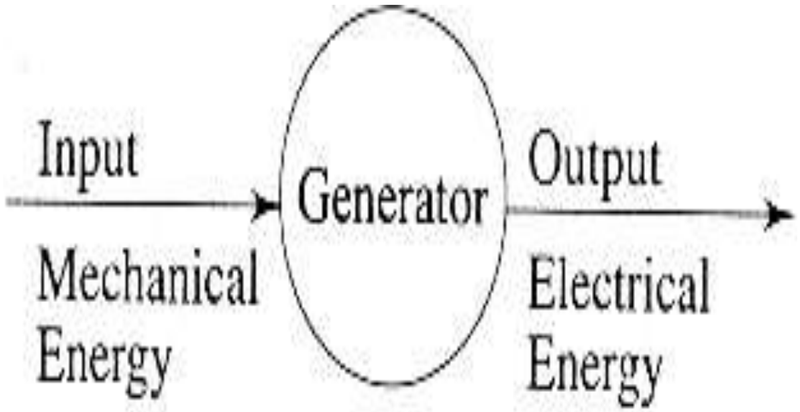
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

IYEAR/ II SEMESTER

20 ECT201 Basics of Electrical Engineering and Instrumentation

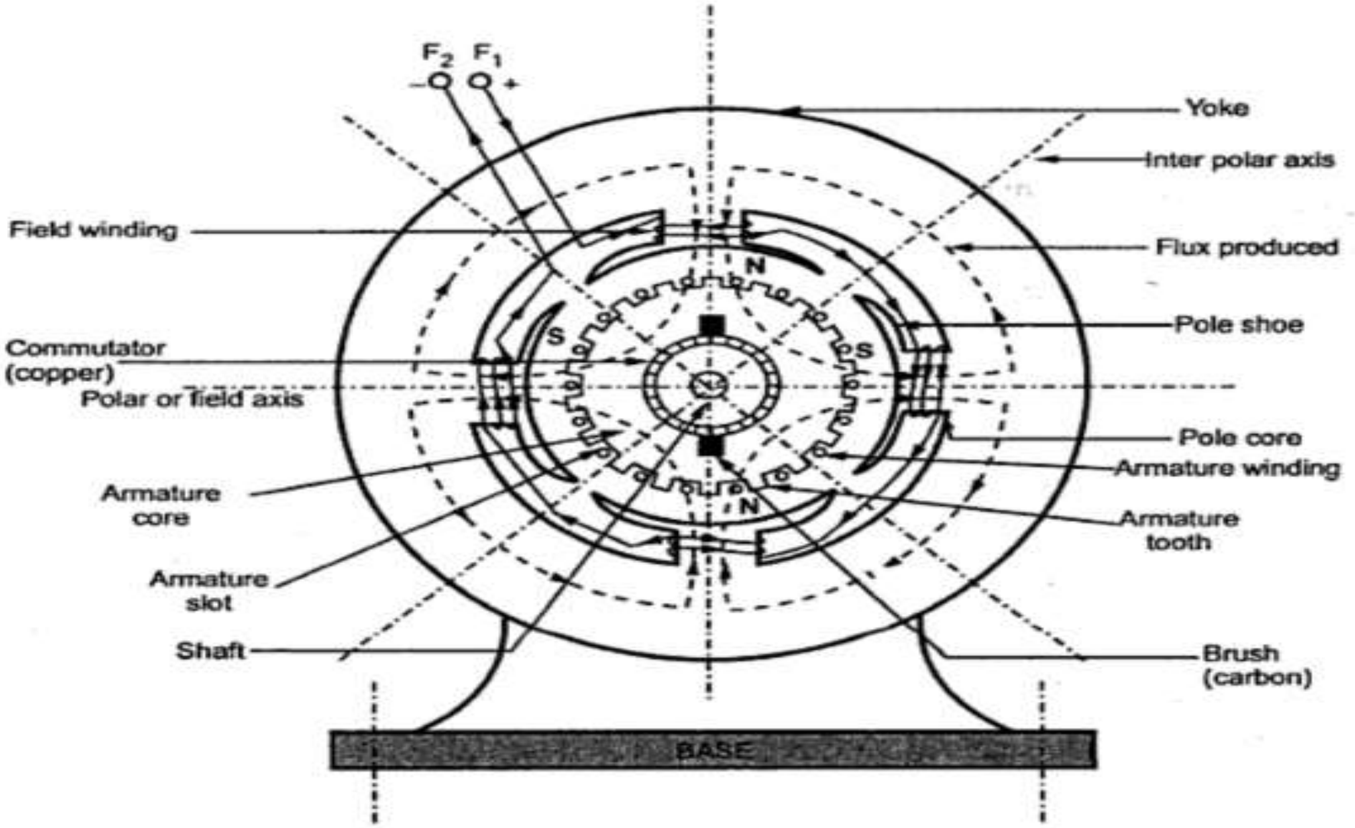
TOPIC– DC GENERATOR –Construction &working

DC GENERATOR



Constructional Details

- Yoke:
- Pole core and pole shoe:
- Field windings
- Armature:
- Commutator:
- Brushes

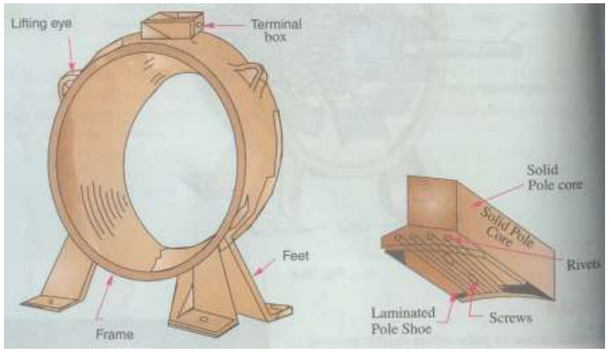

F2
F1
Yoke
Inter polar axis
Field winding
Flux produced
N
S
S
Pole shoe
Commutator
(copper)
Polar or field axis
Pole core
Armature winding
Armature
core
N
Armature
tooth
Armature
slot
Shaft
Brush
(carbon)
BASE

1)Yoke

1)Yoke:-

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

large DC machine



small
DC machine

2)Field Magnets:-

a) Pole core (Pole body) :- --Carry the field winding
--directs flux
-- Laminated to reduce heat losses
--Fitted to yoke through bolts

b) Pole shoe:- Acts as support to field poles and spreads out flux

materials: cast iron or steel

3. Field windings:

- wound on pole core
- carry current ,due to this pole behaves as electromagnet
- material :Aluminium or copper

4.Armature

- **Armature core**

cylindrical in shape mounted on shaft

slots and air ducts permits air flow for cooling purpose

house for armature winding

path for low reluctance to the magnetic flux produced by field winding

material:cast iron or steel

- **Armature winding**

Interconnection of armature conductors placed in slots

when armature is rotated magnetic flux gets cuts by armature conductor and e.m.f gets induced in them

material:copper

5.Commutator

It converts Alternating e.m.f generated in armature conductor to direct e.m.f

collects current from armature conductor convert to d.c

Material:copper

6.Brushes

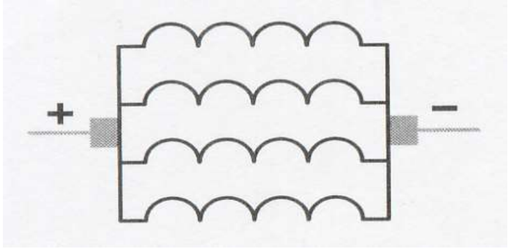
brushes are stationary, rest on surface of commutator
collect current from commutator and make it available to stationary external circuit
material:carbon

Armature Winding is classified into two types:

- Lap winding
- Wave windings

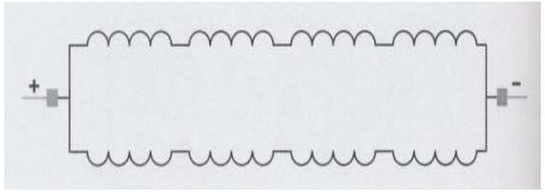
Lap Winding:

- are used in machines designed for low voltage and high current
- armatures are constructed with large wire because of high current
- Eg: - are used is in the starter motor of almost all automobiles
- The windings of a lap wound armature are 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:

- are 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
- are used is in the small generator.
- No of parallel path, A=2,



D.C. GENERATORS PRINCIPLE OF OPERATION

Principle: Faraday law of electromagnetic induction

• whenever number of magnetic lines of force (FLUX) linking with conductor or coil changes an EMF sets up in conductor or coil

• Magnitude is directly proportional to rate of change of flux

• Relative motion is achieved by rotating conductor w.r.t flux or vice versa

• voltage generated as long as relative motion exists

• induced e.m.f is called dynamically induced emf

•To have large voltage as output number of conductors connected together to form winding called armature winding placed on armature on machine

•prime movers: rotate conductors placed on armature.

• Field winding: current carrying winding, produce necessary magnetic flux

THANK YOU