



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 MOTOR –Construction &working



DC motor

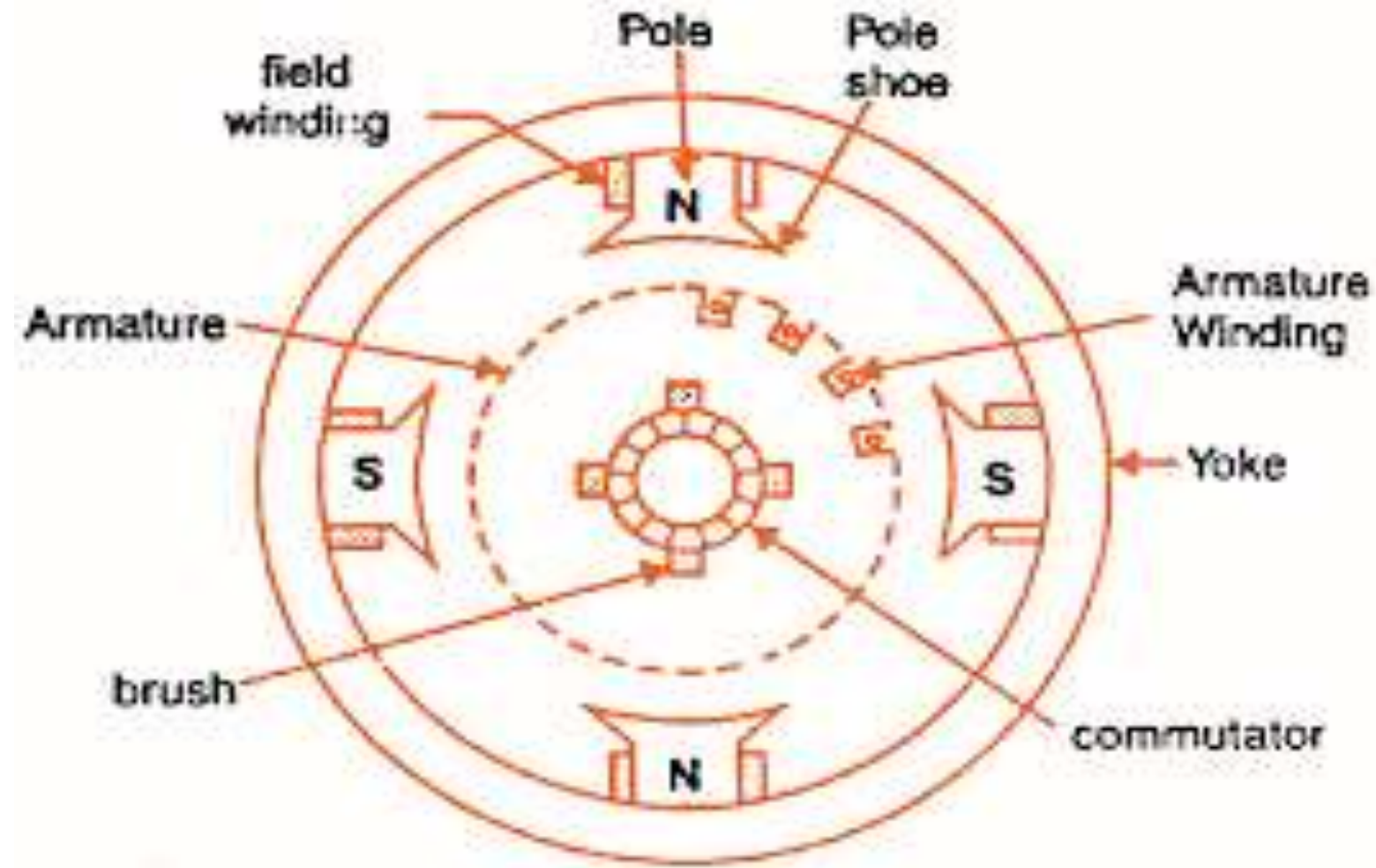


The DC machines are of two types namely DC generators and DC motors.

A DC generator converts mechanical energy into electrical energy whereas a DC motor converts the electrical energy into mechanical energy.



Constructional Details



Important parts of DC motor:

1. Yoke
2. Field winding
3. poles
4. Armature
5. Commutator, brushes & gear

1. Yoke:

- It acts as the outer support of a DC motor.
- It provides mechanical support for the poles.



2. Poles:

- pole of a dc motor is an electromagnet.
- The field winding is wound over the poles.
- Poles produces magnetic flux when the filed winding is excited.

3. Field winding:

- The coils wound around the pole are called field coils and they are connected in series with each other to form field winding.
- When current passing through the field winding, magnetic flux produced in the air gap between pole and armature



4. Armature:

- Armature is a cylindrical drum mounted on shaft in which number of slots are provided.
- Armature conductors are placed in these slots.
- These armature conductors are interconnected to form the armature winding.

5. Commutator:

- A commutator is a cylindrical drum mounted on the shaft along with the armature core.
- It collects the current from the armature conductors and passed it to the external load via brushes.

6. Brushes:

- Commutator is rotating. So it is not possible to connect the load directly to it.
- Hence current is conducted from the armature to the external load by the carbon brushes which are held against the surface of commutator by springs.



WORKING PRINCIPLE OF DC MOTOR



The basic working principle of the DC motor is that whenever a current carrying conductor is placed in the magnetic field, it experiences a mechanical force.

Fleming's left-hand rule and its magnitude decide the direction of this force.

Fleming's Left Hand Rule:

If we stretch the first finger, second finger and thumb of our left hand to be perpendicular to each other

first finger represents the direction of the magnetic field, the second finger represents the direction of the current, then the thumb represents the direction of the force experienced by the current carrying



WORKING PRINCIPLE OF DC MOTOR



$F = BIL$ Newtons

Where,

B = magnetic flux density,

I = current and

L = length of the conductor within the magnetic field.

When armature winding is connected to a DC supply, an electric current sets up in the winding. Permanent magnets or field winding (electromagnetism) provides the magnetic field.

current carrying armature conductors experience a force due to the magnetic field

The commutator is made segmented to achieve unidirectional torque.

Otherwise, the direction of force would have reversed every time when the direction of movement of the conductor is reversed in the magnetic field.



THANK YOU