

Principle of A.C. Generator

It is based on the **principle of electro magnetic induction**, i.e., whenever amount of magnetic flux linked with a coil changes, an e.m.f. is induced in the coil. The direction of current induced is given by Fleming's right hand rule.

Construction of A.C. generator

The A.C. Generator is consist of four main parts :

(1) THE COIL (ARMATURE) :

A rectangular coil ABCD consist of a large number of turns of copper bound over a soft iron core is called armature. The soft iron core is used to increase the magnetic flux.

(2) MAGNETIC FIELD :

It is usually a permanent sponge magnet having concave poles. The armature is rotated of a magnet so that axis of the armature is perpendicular to magnetic field lines.

(3) SLIP RINGS :

Slip rings are the magnetic rings which are connected in the terminal of the armature. These rings are rotated with the coil and these are use to draw the current from the generator.

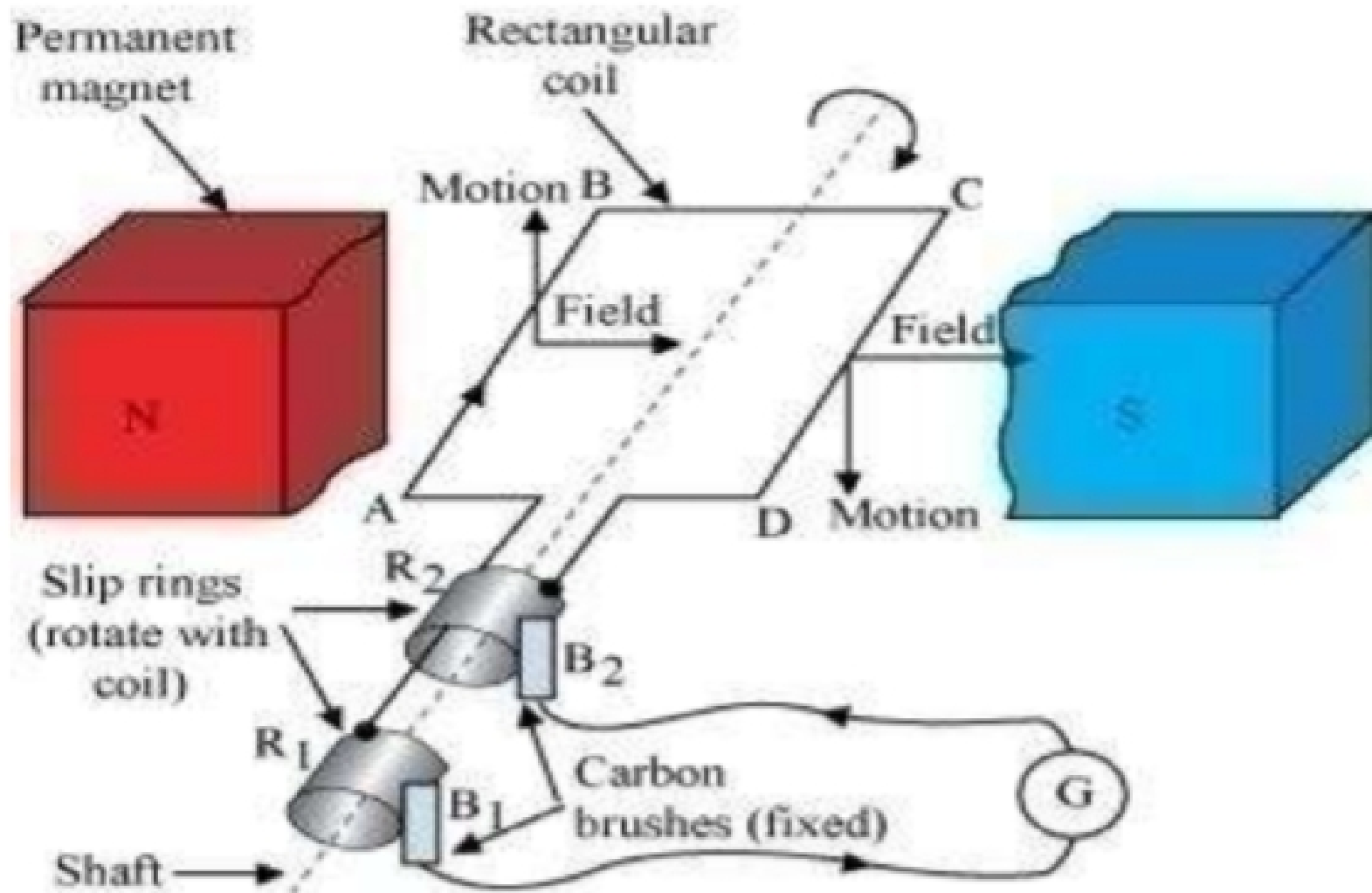
(4) BRUSHES :

The brushes B_1 & B_2 are just touch the slip rings. They are not rotating with the coil and these brushes leads to the output of load resistance.

Theory

1. The strong magnetic field is produced by a current flow through the field coil of the rotor.
2. The field coil in the rotor receives excitation through the use of slip rings and brushes.
3. Two brushes are spring-held in contact with the slip rings to provide the continuous connection between the field coil and external circuit.
4. The armature is contained within the windings of the stator and is connected to the output.
5. Each time the rotor makes one complete revolution, one complete cycle of AC is developed.
6. A generator has many turns of wire wound into the slots of the rotor.
7. The magnitude of AC voltage generated by an AC generator is dependent on the field strength and speed of the rotor.
8. Most generators are operated at a constant speed; therefore, the generated voltage depends on field excitation, or strength.

Circuit Diagram



Working of an A.C. Generator

The coil is rotated in anti-clock wise direction. In the first half rotation the arm AB is moving outward and CD is moving inward. So the e.m.f. is induced in the arm AB from A to B. And in the arm CD from C to D. After half rotation (in the second half). The arm CD is moving outward and AB is moving inward. In this time current is induced in arm CD from D to C. And in arm AB from B to A. In the second half rotation the current direction is changing so in this generator AC is produced.