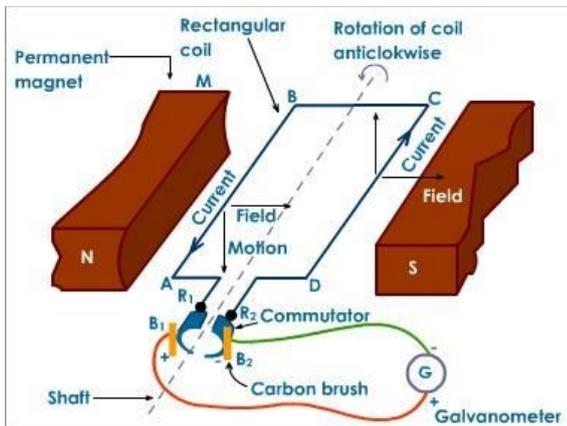


ELECTRIC GENERATOR

Electric Generator

1. An **electric generator** is a device where **mechanical energy** is used to rotate a conductor in a magnetic field to **produce electricity**.



2. An electric generator, consists of a rotating **rectangular coil ABCD** placed between the two poles of a **permanent magnet**. The two ends of this coil are connected to the **two rings** R_1 and R_2 . The two conducting **stationary brushes** B_1 and B_2 are kept pressed separately on the rings R_1 and R_2 , respectively. The two rings R_1 and R_2 are internally attached to an axle.
3. The **axle** is mechanically rotated from outside to **rotate the coil inside the magnetic field**. Outer ends of the two brushes are connected to the **galvanometer** to show the flow of current in the given external circuit.
4. When the axle is rotated such that the arm **CD moves up** (and the arm AB moves down) in the magnetic field produced by the permanent magnet. Coil **ABCD is rotated anti-clockwise** in the arrangement. By **applying Fleming's right-hand rule**, the **induced currents** are set up in these arms along the directions AB and CD. Induced current flows in the direction DCBA.
5. If there are larger numbers of turns in the coil, the current generated in each turn adds up to give a large current through the coil. This means that the current in the external circuit flows from B_1 to B_2 . After half a rotation, arm AB starts moving up and CD moving down. As a result, the directions of the induced currents in both the arms change, giving rise to the net induced current in the direction ABCD. The current in the external circuit now flows from B_2 to B_1 .
6. **After every half rotation, the polarity of the current in the respective arms changes**. Such a current, which changes direction after equal intervals of time, is called an alternating current (abbreviated as AC). This device is called an **AC generator**.
7. To get a **direct current** (DC, which does not change its direction with time), a **split-ring type commutator** must be used. With this arrangement, one brush is used at all times in contact with

the arm moving up in the field, while the other is in contact with the arm moving down. Thus, a unidirectional current is produced. The generator is thus called a **DC generator**.

Difference between DC and AC

8. The difference between the direct and alternating currents is that the direct current always flows in one direction, whereas the alternating current reverses its direction periodically.
9. An important **advantage** of AC over DC is that electric power can be transmitted over long distances without much loss of energy.

