

CHAPTER 2. (MAGNETIC EFFECTS OF AN ELECTRIC CURRENT) (BASED ON NCERT PATTERN)

Question 1. Explain the underlying principle and working of an electric generator by drawing a labelled diagram. What is the function of brushes ?

Answer:

Principle : The electric generator is based on the principle of electromagnetic induction. When a coil is rotated with respect to a magnetic field, the number of magnetic field lines through the coil changes. Due to this a current is induced in the coil whose direction can be found by Fleming's right hand rule.

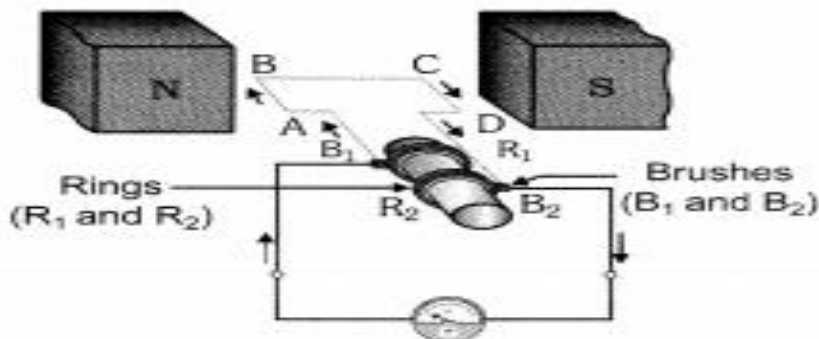


Illustration of the principle of electric generator

Working : When the armature coil ABCD rotates in a magnetic field produced by the permanent magnets, it cuts through the magnetic lines of force.

Due to the rotation of armature coil, the associated magnetic field changes and an induced electromotive force is produced in it. The direction of this induced electromotive force or current can be determined by using Fleming's right hand rule.

In first half cycle the current flows in one direction by brush B₁ and in

second it flows in opposite direction by brush B_2 . This process continues. So the current produced is alternating in nature.

Functions of Brushes : Brushes in contact with rings provide the current for external use.

Question 2. When does an electric short circuit occur ?

Answer: In a domestic circuit, short-circuit occurs when live and neutral wire come in direct contact with each other without any resistance. The resistance of the circuit becomes zero and excessive current starts to flow through it.

Question 3. What is the function of an earth wire ? Why is it necessary to earth metallic appliances ?

Answer: Earth wire is a safety measure that provides a low resistance conducting path to the current. Sometimes due to excess heat or wear and tear, the live wire comes in direct contact with the metallic cover of the appliances, which can give an electric shock on touching them. To prevent from the shock the metallic part is connected to the earth through a three-pin plug due to which the current flows to the earth at the instant there is a short circuit.

It is necessary to earth metallic appliances because it ensures that if there is any current leakage in the metallic cover, the potential of the appliance becomes equal to that of the earth. The potential of the earth is zero. As a result, the person handling the appliance will not get an electric shock.