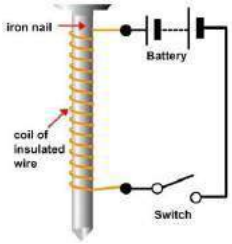
Electromagnet and Electromagnetic Induction

Electromagnet



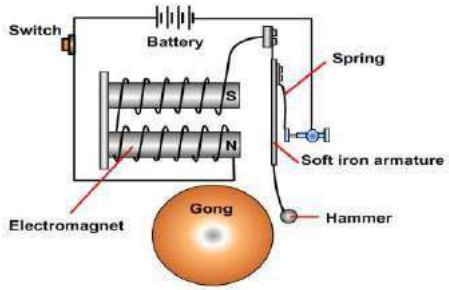
It is a temporary strong magnet made from a piece of soft iron when current flows in the coil wound around it.
It is an artificial magnet.
The polarity and magnetic field strength can be changed.
Demagnetized by switching off the current.

Strength depends on:

1. Number of turns in coil
2. Amount of current flowing

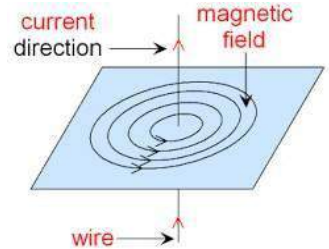
Uses: lifting and transporting huge mass of iron scrap, loading furnaces with iron, electric bell, electric fans, electric motors , etc.

Electric Bell:



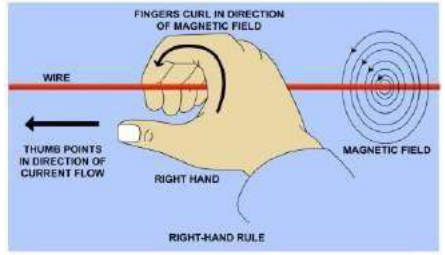
Permanent magnet	Electromagnet
Magnetic properties are retained permanently	It loses its magnetic properties when current is stopped
It is comparatively a weak magnet	It is a stronger magnet
Its strength cannot be changed	Its strength keeps on changing
North pole and south pole are fixed	The position of north and south poles can be changed
It cannot convert an ordinary piece of iron into a magnet	It can convert an ordinary piece of iron into a temporary magnet

Magnetic field associated with a straight current carrying conductor:

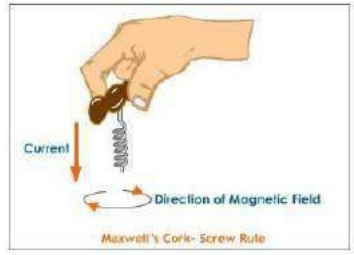


Methods to find the direction of magnetic field:

1. Right hand thumb rule

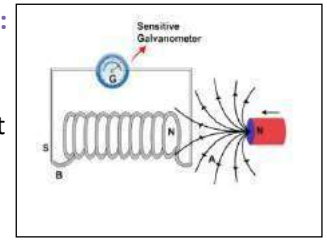


2. Right hand cork screw rule



Electricity from magnetism:

As long as there is relative motion between a closed coil and a magnet, a current is induced in the coil.



Electromagnetic Induction :

The property due to which the changing magnetic field within a closed conducting coil induces electric current in the coil is called electromagnetic induction.

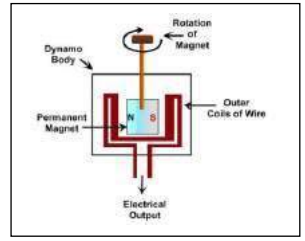
The current produced in a closed coil, when magnetic lines of force rapidly change within it, is called induced current.

To increase strength of induced current:

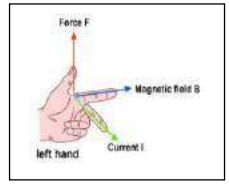
- By increasing number of turns in the coil
- By increasing the strength of magnet used
- By increasing the relative speed between magnet and closed coil.

Dynamo :

Converts mechanical energy into electrical energy
Principle : Based on Electromagnetic induction.

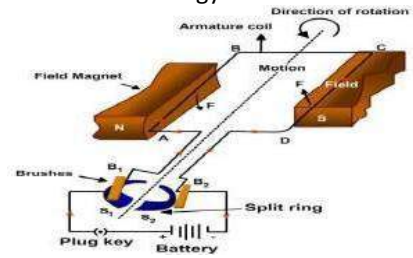


Force on a current carrying conductor in a magnetic field



Application : *Electric Motor*

- Converts electrical energy to mechanical energy



Transformer:

Devise used to increase or decrease the alternating voltage
Principle : Based on Electromagnetic induction.