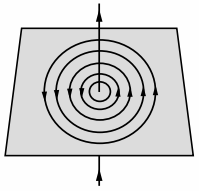
Magnetism

Magnetic field due to current in a straight wire



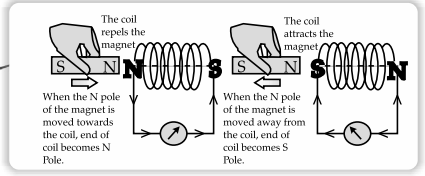
Magnetic field lines around a straight wire carrying current

Faraday's law of electromagnet induction

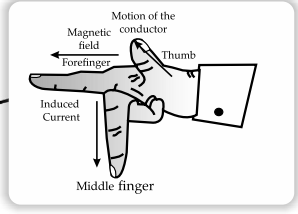
1) Whenever the magnetic flux linked with the coil changes, an emf is induced in the coil, which lasts as long as the change in magnetic flux associated with the coil continues
2) Induced emf = $\frac{\text{Change in flux}}{\text{Time interval}}$

Lenz's law

The direction of induced current is such that it always tends to oppose the cause that produces it



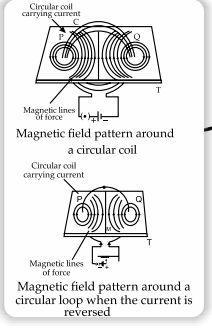
Fleming's right hand rule pictorial diagram



Electromagnetic induction

The phenomena of production of electric current by moving a conductor in a magnetic field is known as electromagnetic induction.

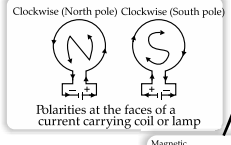
Magnetic field lines due to current in a circular coil



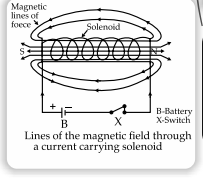
Properties of magnetic field lines

1) Magnetic field lines are nearly circular around the point where current enters and leaves the coil.
2) The direction of magnetic field lines are almost parallel and thus uniform near the centre of the coil.
3) The plane of magnetic lines of force is at right angle to the plane of the circular coil at its centre.
4) The number or density of magnetic field lines increases (a) if the strength of the current increases (b) the number of turns in the coil increases (c) the circular loop of smaller radius is taken

Direction of current determining polarity of the coil

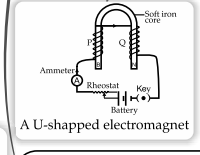


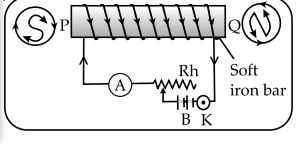
Magnetic field due to current in a cylindrical coil or a solenoid



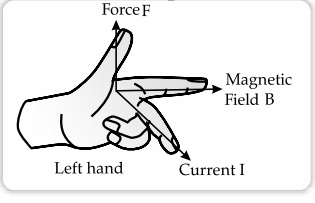
Electromagnet

I-shaped electromagnet





Fleming's left-hand rule Pictorial diagram



Trace the Mind Map

- First Level
- Second Level
- Third Level