Magnetic Effect of Electric Current

Part 1

Domstic Electric Circuit

Earth wire :- Safety measure to take care of leakages

Neutral wire :- } Supply electricity to circuits within home.

Live wire :- }

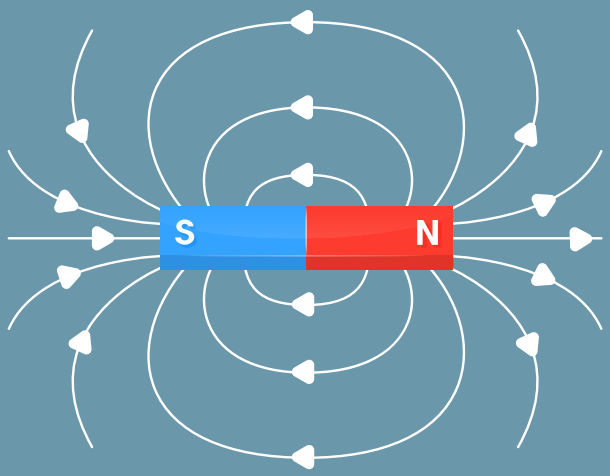
* Voltage and frequency are 220v and 50Hz respectively

Field

Surrounding region where force of magnet can be detected

* Field strength depends on the closeness of the field lines
* It is a **vector quantity**

Field Lines



Field Lines

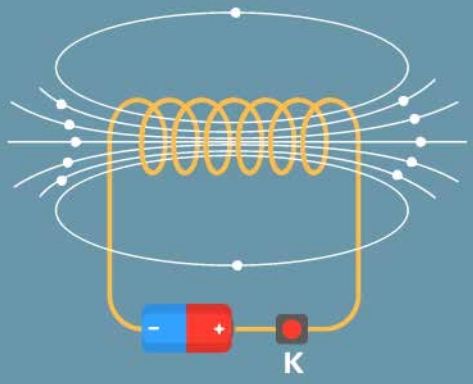
* Field strength $\propto$ current

$$\propto \frac{1}{\text{Distance between magnet and conductor}}$$

Field due to current carrying conductor

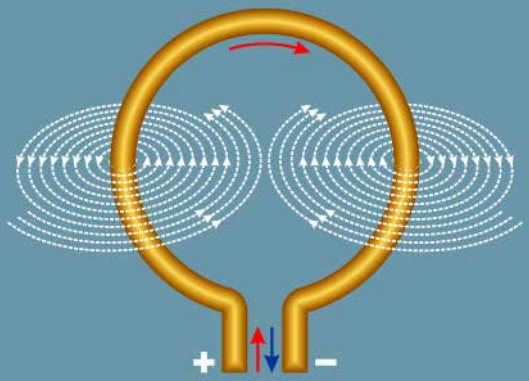
SOLENOID

* Coil of many circular turns



* Field is similar to that of a bar magnet

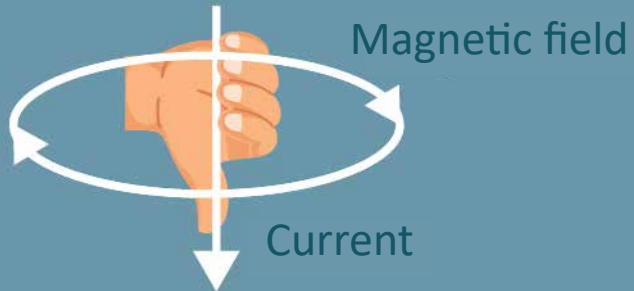
CIRCULAR LOOP



* If n loops - n times that for single loop

STRAIGHT CONDUCTOR

* Direction of the field



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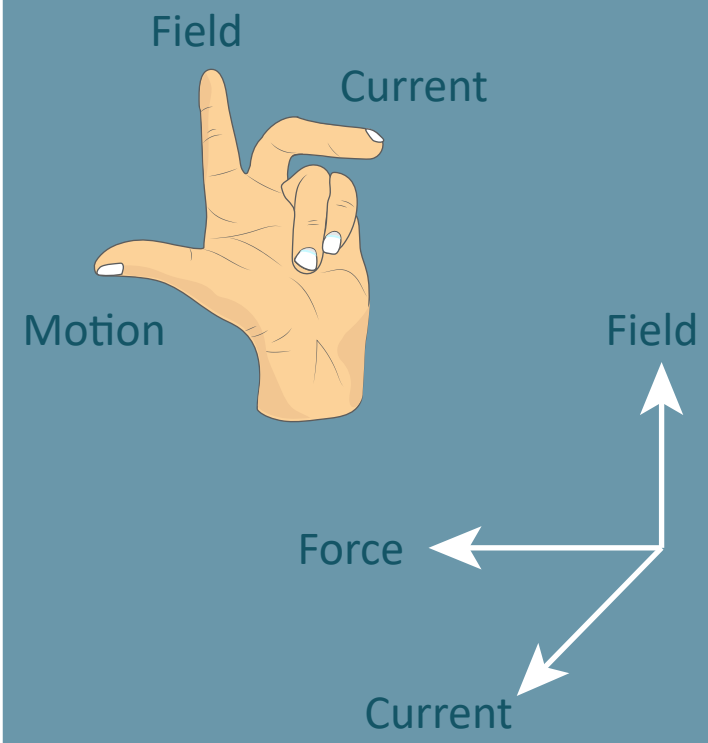
Part 2

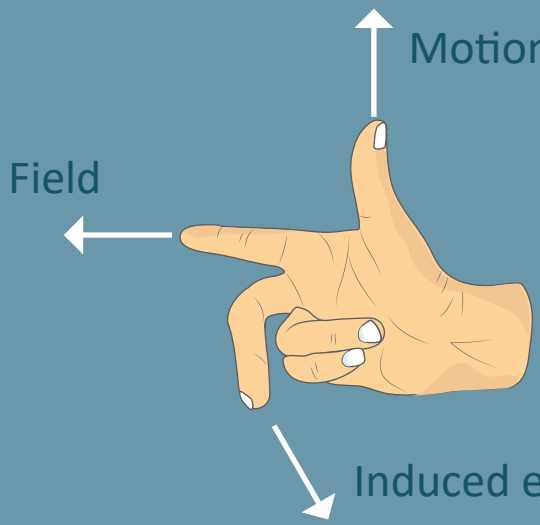
Force on current carrying conductor in Magnetic field

Direction of force - **Fleming's Left hand rule**



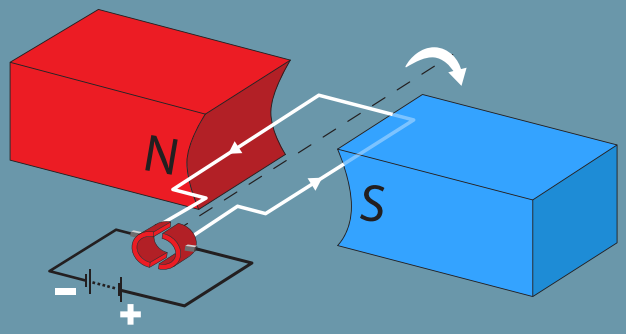
Electromagnetic Induction

* Change in the magnetic field induces current.
* Direction of current :- **Fleming's right hand rule**



Electric Motor

* Convert electrical energy into mechanical energy
* As current passes through the coil in a magnetic field, force acting on the coil turns the coil.



Electric Generator

* Converts Mechanical energy into electrical energy.
* Electrical current is produced because of rotation of coil inside the field.