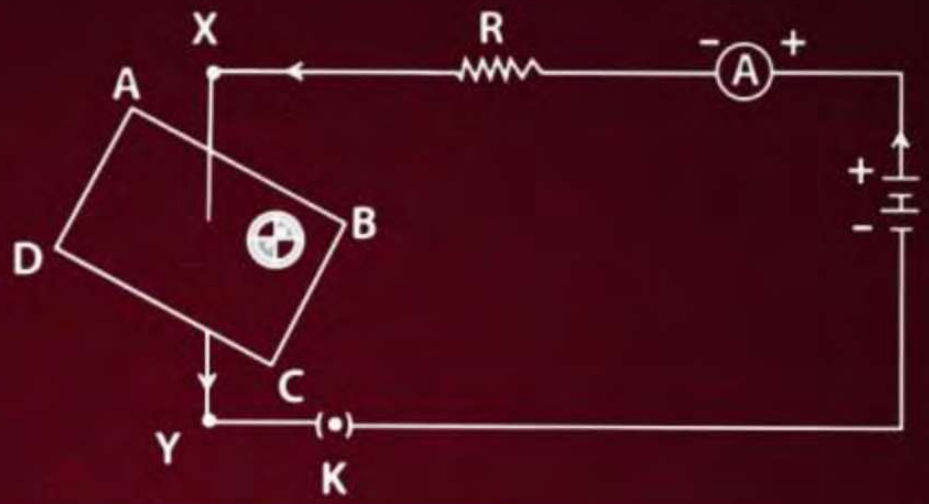
Activity

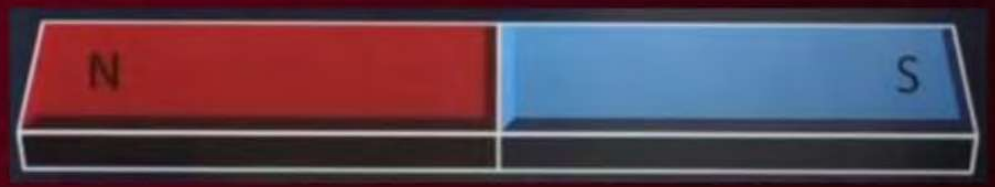


Observation

- The needle gets deflected.
- It means that the electric current through the copper wire has produced a magnetic effect.
- Electricity and magnetism are linked to each other.

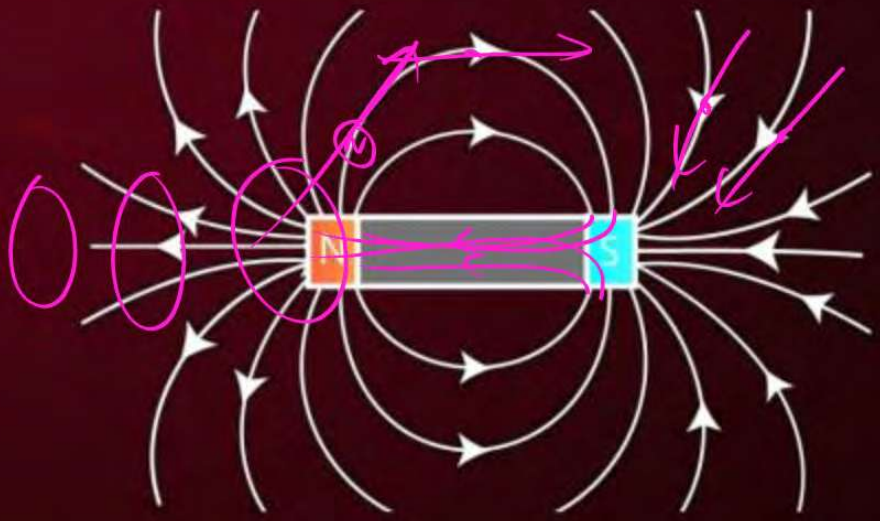
Magnetic Field

- The area around a magnet in which other magnet feels force of attraction or repulsion.
- Likes poles repel each other.
- Unlike poles attract each other.



Magnetic Field Lines

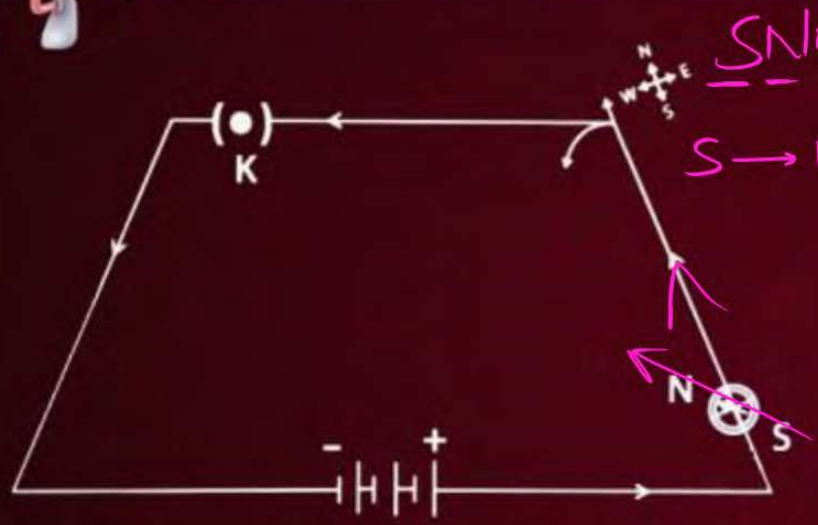
- The closed curved imaginary lines in the magnetic field which indicate the direction of motion of north pole in the magnetic field.

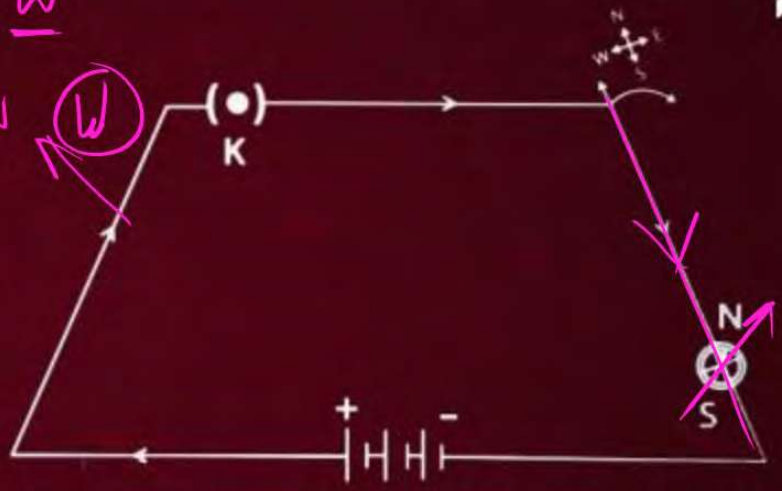


Magnetic Field Lines

- Lines originate from north pole and end at south pole of the magnet.
- Lines are closed curve.
- They never intersect each other
- They are crowded near the poles where the magnetic field is strong.
- The tangent at any point on the magnetic line gives the direction of the magnetic field at the point.

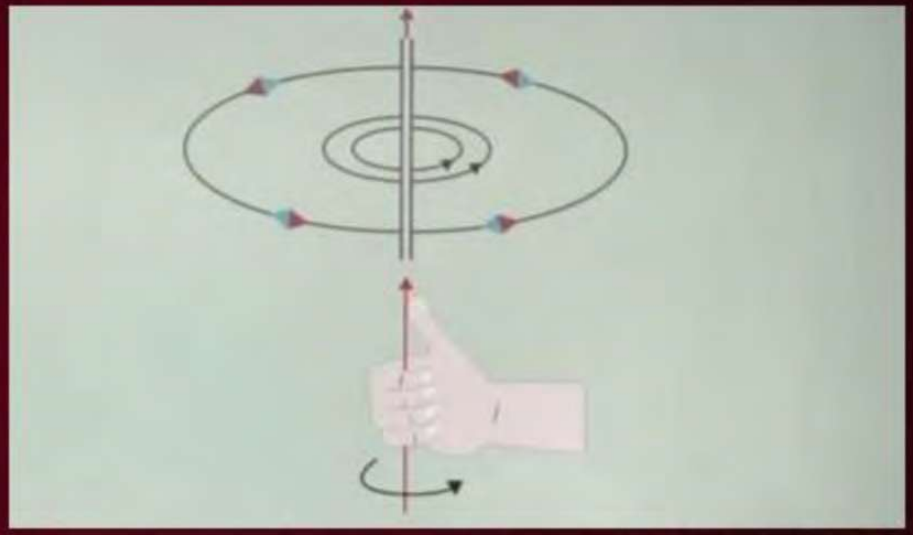
Current-Carrying Conductor





- If current flows from SOUTH to NORTH. The north pole of the compass needle would move towards the WEST (SNOW rule).
- If current flows from NORTH to SOUTH. The north pole of the compass needle would move towards the EAST.

Right Hand Thumb Rule



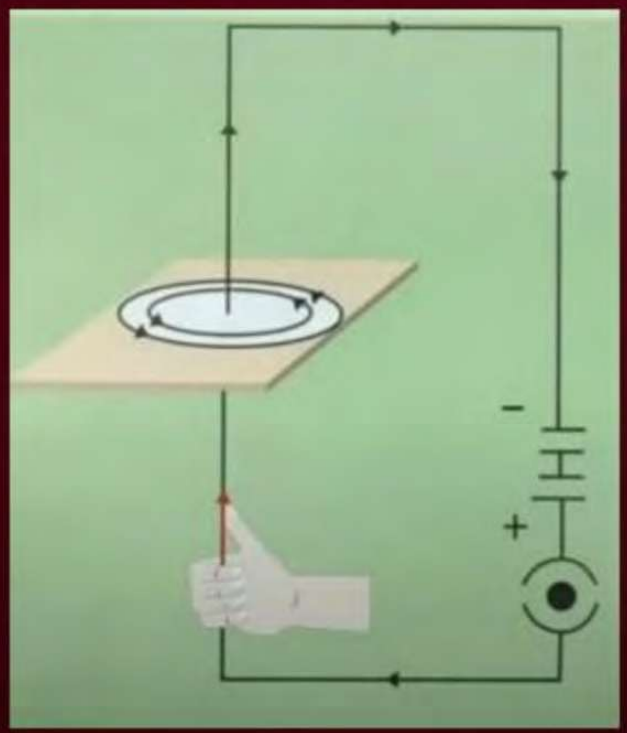
- If a current carrying conductor is imagined to be held in your right hand such that the thumb points along the direction current, then the direction of the wrapped fingers will give the direction of magnetic field lines.

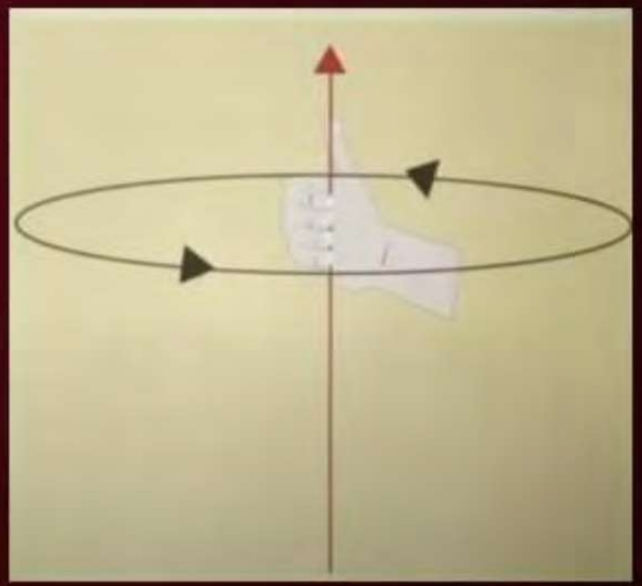
Magnetic Field Created due to Current

- Straight conductor
- Circular loop
- Solenoid

Straight Current-Carrying Conductor

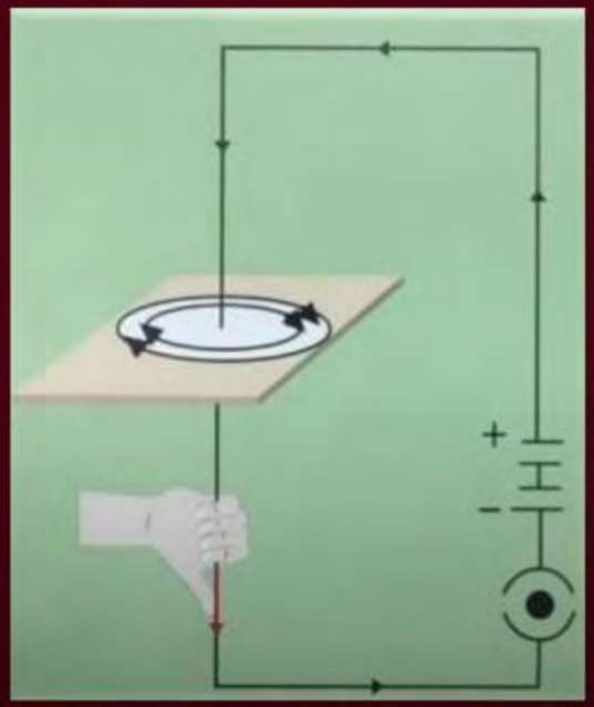
Direction of magnetic field is anti-clockwise

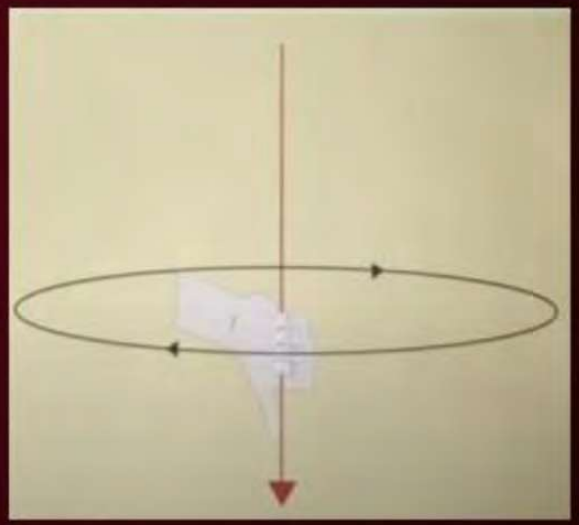




Straight Current-Carrying Conductor

Direction of magnetic field is clockwise

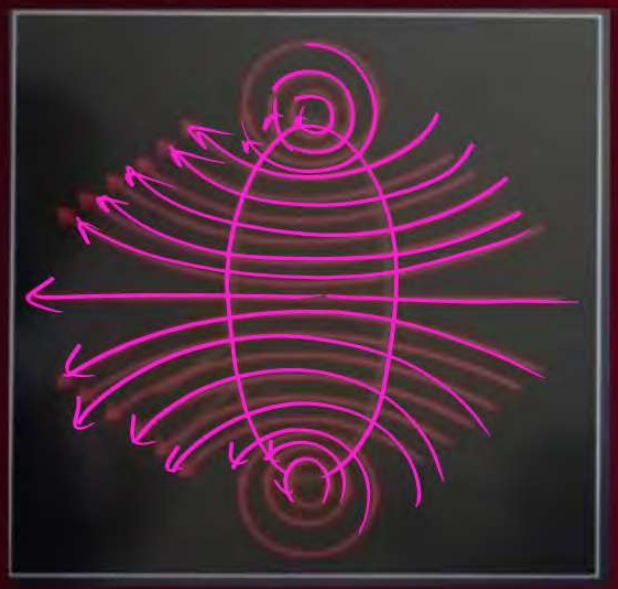




Straight Current-Carrying Conductor

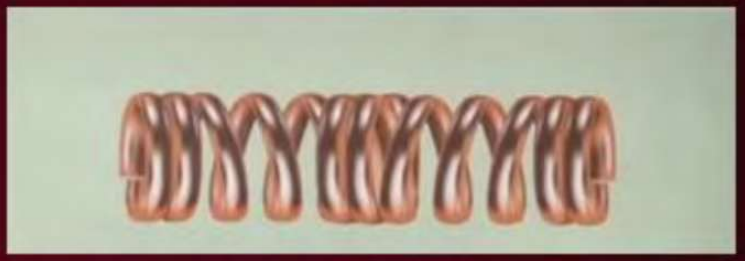
- Magnetic field lines are concentrated circles around the centre of the wire.
- Direction can be given by Right hand thumb rule.
- Circles are closer to conductor.
- Magnitude of the magnetic field increases current is increased.
- Magnitude of the magnetic field decreases if current is decreases.

Circular Current-Carrying Conductor



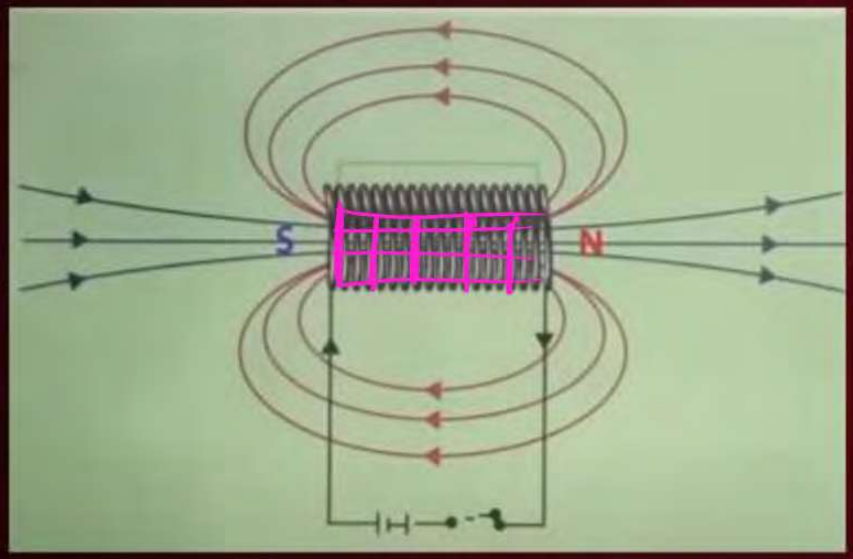
- Magnetic field lines are concentrated circles at every point of the wire.
- Circles become larger and larger as move away.
- It appears as a straight line at the centre of the loop.
- The direction of magnetic current inside the loop is same.

Solenoid



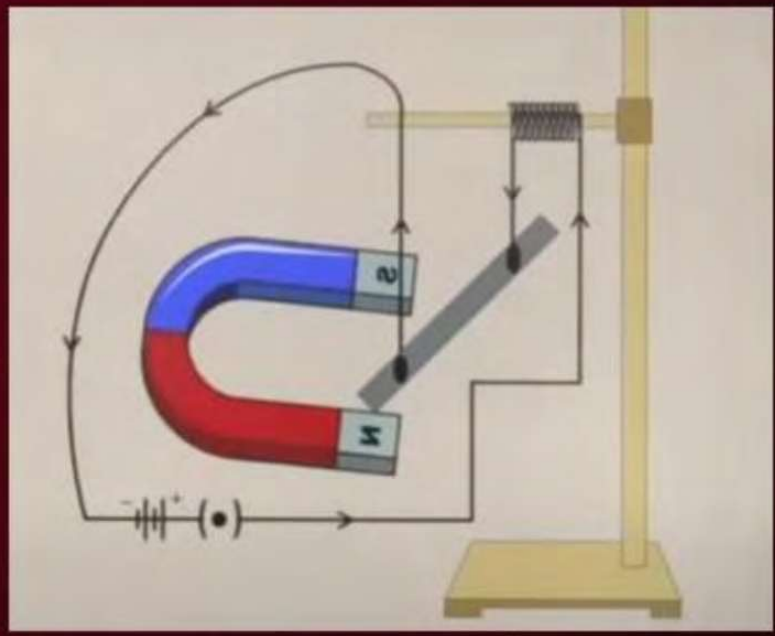
- A coil of many circular turns of insulated copper wire wrapped closely in the shape of cylinder is called solenoid.

Current-Carrying Solenoid

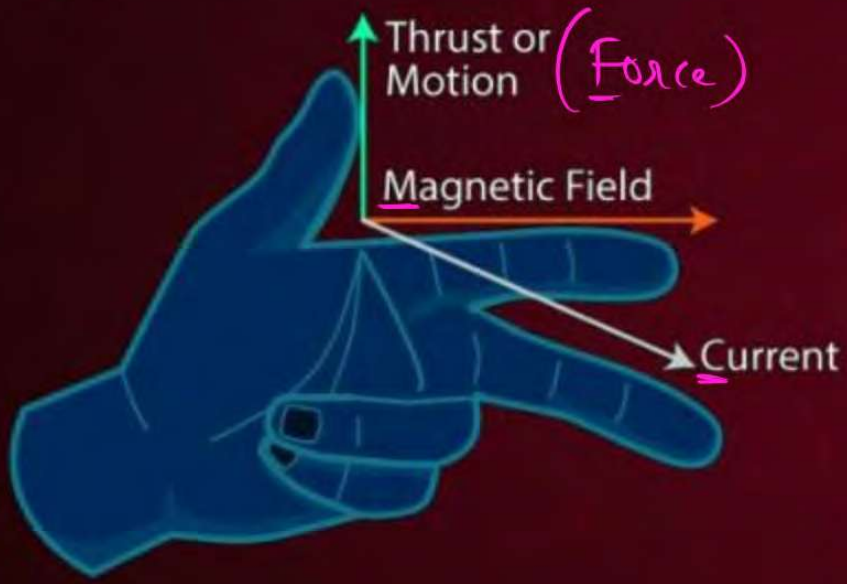


- When electric current flows through solenoid then magnetic field around the solenoid is similar to bar magnet.
- One end of solenoid act as a north pole and other acts south pole.
- Field lines inside the solenoid are parallel to each other.
- The strength of magnetic field inside the solenoid is same.
- Current carrying solenoid is called an electromagnet.

Force on a current-carrying conductor



Flemings's Left Hand Rule



- It stated as stretching the forefinger, middle finger, and thumb of the left hand such that they are mutually perpendicular to each other.
- Here, the forefigner indicates the direction of the magnetic field.
- The middle finger indicates the direction of current in the conductor.
- The thumb indicates the direction of force.

Difference between AC and DC

Alternating Current

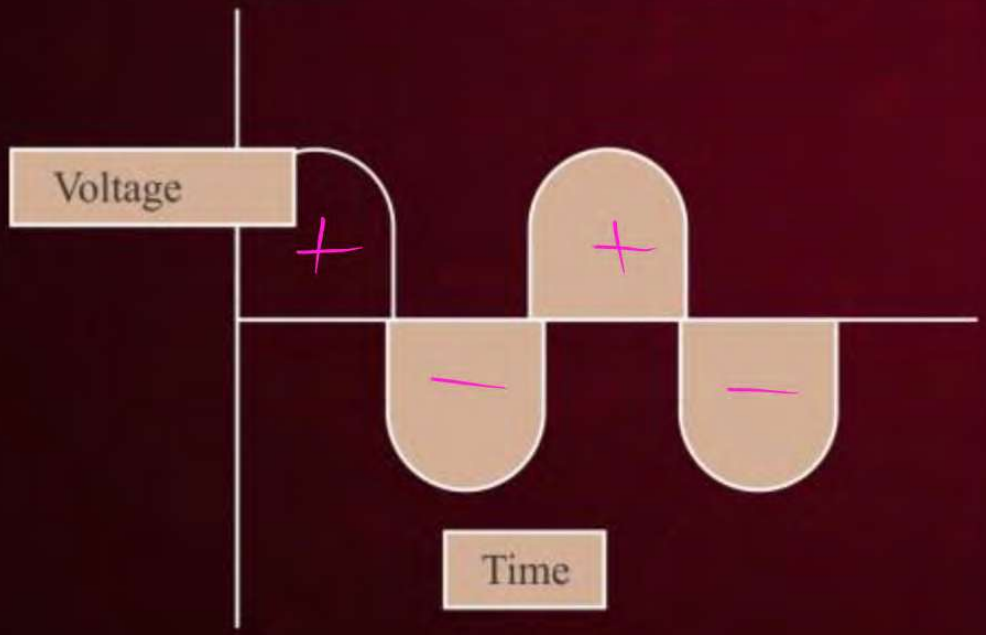
- It is safe to transfer longer distance even between two cities and maintain the electric power.
- The frequency of AC is depended upon the country but, the generally frequency is 50 Hz or 60 Hz.
- The flow of current changes its direction background periodically.
- Electrons keep on changing its directions.
- AC is less expensive.

Direct Current

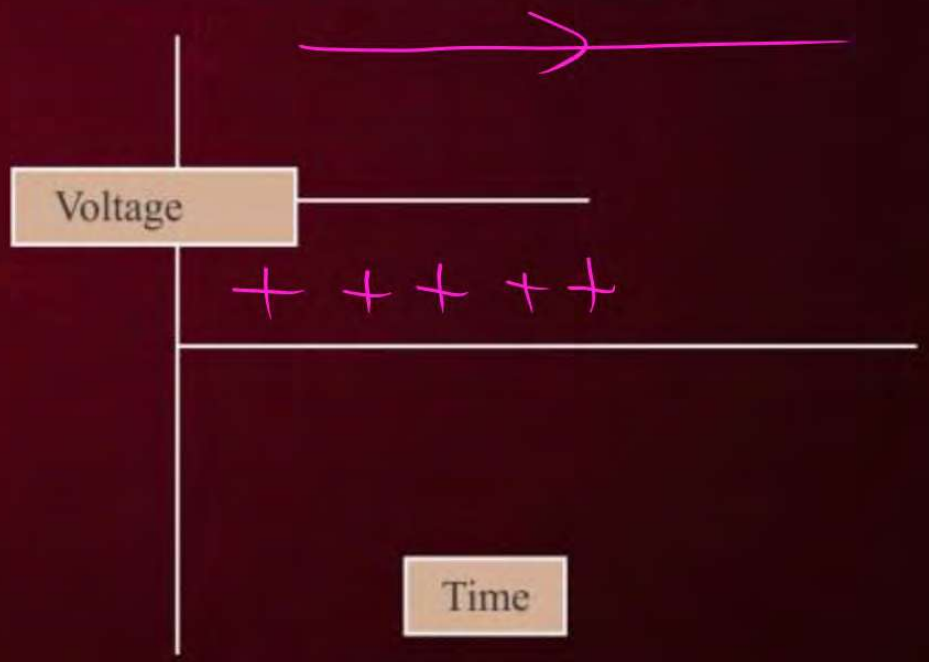
- It cannot travel for a very long distance.
- It has no frequency or zero frequency.
- The flow of current moves in single direction
- Electrons only move in one direction.
- DC is expensive.

Difference between AC and DC

Alternating Current



Direct Current



Wires used in domestic circuits

POSITIVE LIVE WIRE

- The RED cable is known as the live wire.
- It delivers electricity from the power supply to your appliance

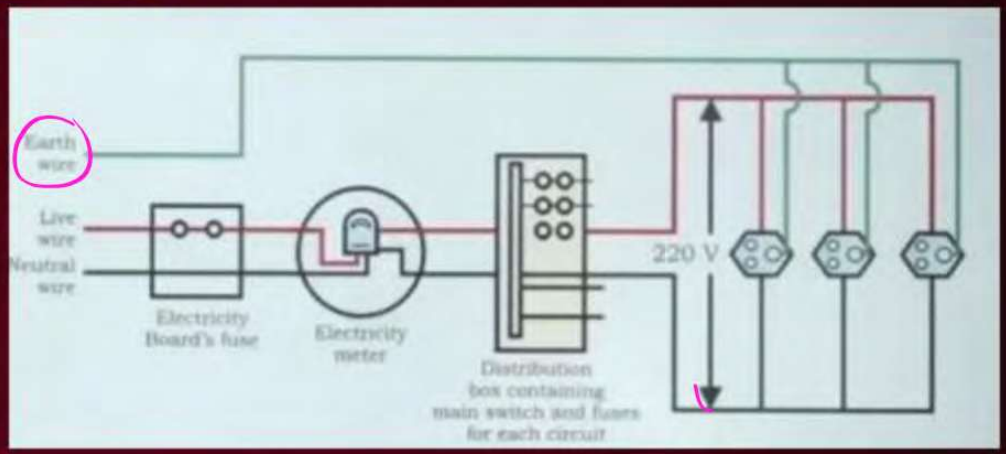
EARTH WIRE

- The green wires are the grounding/earthing wires in the circuit.

NEGATIVE NEUTRAL

- The Black wire is known as the neutral wire.
- Its job is to take electricity away from an appliance

Domestic Electric Circuits



- Electricity is supplied to our houses at 220 v. @ 50 Hz
- The electric line is connected to the meter-box in a house through a fuse of high rating (company fuse).

Mains Have 2 Circuits

- 5A FOR LOWER POWER CONSUMPTION: bulbs, fans.
- 15A FOR HIGHER POWER CONSUMPTION: geysers, air coolers

Hazards of Domestic Circuits

OVERLOADING

- The excessive flow current due to overuse of appliances.
- It can occur due to an accidental hike in the supply voltage.

SHORT CIRCUIT

- Flow of high current in the circuit when live and neutral wires come in direct contact.

FUSE

Used for protecting the circuits due to short circuiting or overloading of the circuits.