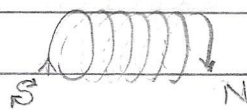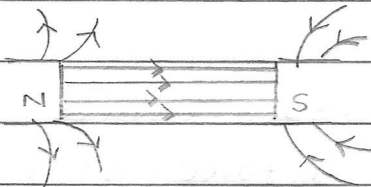## 26 - Magnetic Fields

Q-1) What is a magnetic field of force?

> It's the region of space where a magnetic pole experiences a force

current in solenoid determines the poles.

clockwise = South pole.

anti-clockwise = North pole.

Q-2) What is the motor effect?

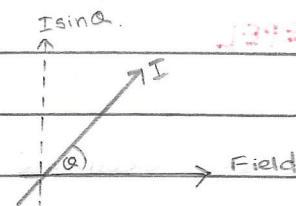> A current carrying wire placed in a magnetic field experiences a force

Fleming's Left Hand Rule.

Thumb: Motion / Force ; +ve charges.

First finger: Magnetic Field

Second finger: Current.

$$F = BI\ell \sin\theta.$$

Q-3) Define magnetic flux density.

> The magnetic flux density (magnetic field strength (B)) is the force experienced per unit length by a long straight conductor carrying a unit current and placed at right angles to the magnetic field at that point.

Q-4) Define the Tesla.

> The magnetic flux density is 1T when a wire carrying a current of 1A placed at right angles to the magnetic field experiences a force of 1N per metre of its length.

Q-5) Measuring B using a top-pan balance.

> If the wire experiences a force upwards, then according to Newton's third law, the magnet experiences a force downwards.
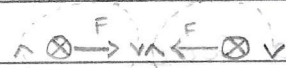
The force F is mg

$$\therefore mg = BI\ell.$$

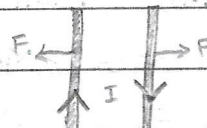Q-6) Force on current carrying conductors.

* current in ~~samed~~ same direction

  ATTRACT

* current in opposite direction.

  REPEL

These are example of action and reaction forces, ∴ according to Newton's third law, the forces are always equal and opposite.

$$F \propto \text{product of } I.$$

Q-7) Compare forces on mass, charge and current.

> Action at a distance forces

> decreasing strength with distance from source

> field lines.

Q-8) Newton's Law's

> First Law:

An object will remain at rest or continue travelling at same velocity unless acted upon by a resultant force.

> Second law:

The resultant force ~~acting~~ acting on an object is equal to the rate of change of momentum.

F & momentum are in same direction

$$F = \frac{\Delta p}{\Delta t} = \frac{m_1 v_1 - m_1 u_1}{t}$$

> Third law:

When 2 bodies interact, the forces they exert on each other are equal and opposite.