

22/10/2024

BASIC terms

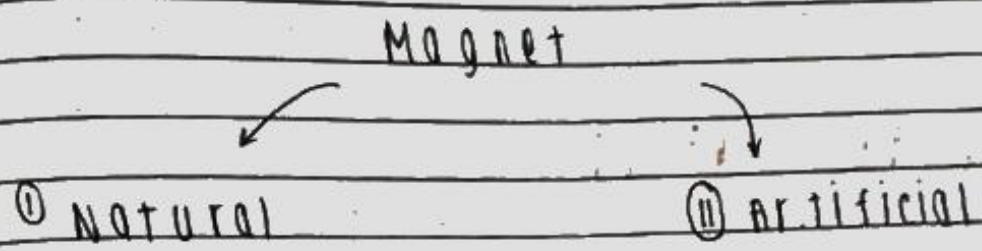
(in magnetic ckt / Electromagnetism)

1. Magnet

↳ substance that attracts or repels magnetic materials

↳ Fe, Ni, Co

This property of the material is known as magnetism.



• Natural magnet

↳ extracted from mines

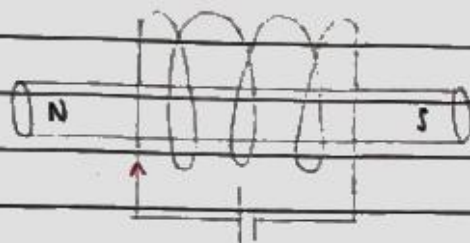
Natural form is called magnetite (lodestone)

• Artificial magnet

↳ can be prepared by:

(a) rubbing an iron bar (magnetic material) with a magnet.

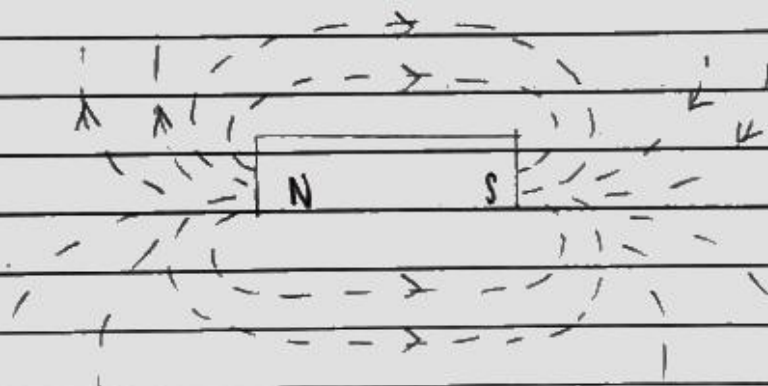
(b) passing electric current through a coil wound on an iron bar (mm).



2) Magnetic Field

↳ space around the magnet upto which the magnetic force can be experienced

→ made up of magnetic lines of force.



• Properties of magnetic lines of force

i) Always travels from

north pole $\xrightarrow{\text{to}}$ south pole

ii) forms a closed path — \rightarrow bar magnet

bar magnet S \rightarrow N

iii) Never intersects each other

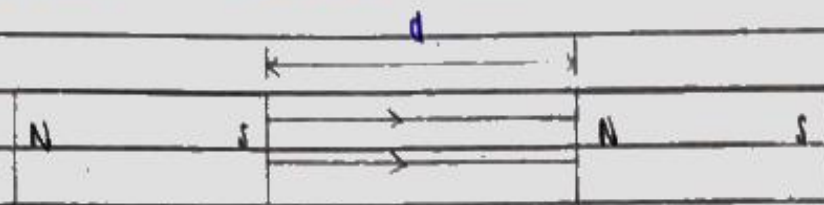
iv) Repels

side wise

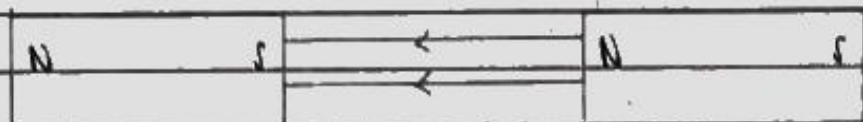
but contracts

length wise (longitudinally)

3) Magnetic Force



FORCE OF REPULSION



FORCE OF ATTRACTION

• **Note:** Yesma Epsilon (permittivity) ~~adding~~
but only μ (permeability)



$$F = \frac{1}{4\pi\mu_0\mu_r} \left(\frac{m_1 m_2}{d^2} \right)$$

m = magnetic pole strength
(unit : Am)

where,

μ_0 = absolute permeability

↳ $4\pi \times 10^{-7} \text{ H/m}$

μ_r = relative permeability

4) **Magnetic field Intensity (H)**

↳ Force explained by unit north pole placed at that point.

↳ $m_2 = 1$

$$H/F = \frac{1}{4\pi\mu_0\mu_r} \left(\frac{m_1 \cdot 1}{d^2} \right)$$

Force exerted by one magnet on another magnet (mm) either of
attraction or repulsion

• Coulomb's 1st law

- ↳ unlike poles attract each other
- & like poles repel each other

• Coulomb's 2nd law

- ↳ Magnetic force betⁿ 2 poles is directly proportional to product of their pole strength
- & inversely proportional to square of distance betⁿ them

Mathematically,

$$F \propto \frac{m_1 m_2}{d^2}$$

pole strength of 1st magnet

pole strength of 2nd magnet