

8. MAGNETISM AND MATTER

IMP DEFINITIONS & FORMULAS

1. **Coulomb's law** or inverse square law is

$$F = \frac{\mu_0}{4\pi} \frac{m_1 m_2}{d^2}; \quad m: \text{pole strength}$$

2. **Magnetic field** due to an isolated pole of

$$\text{strength } m \text{ is } B = \frac{\mu_0}{4\pi} \frac{m}{d^2}$$

3. **Axial field** of a small bar magnet is $B_A = \frac{\mu_0}{4\pi} \frac{2M}{r^3}$

$M = \text{Magnetic moment}$

4. **Equatorial field** of a small bar magnet is

$$B_E = \frac{\mu_0}{4\pi} \frac{M}{r^3}$$

5. **Intensity of magnetisation(I)** of a sample is the net magnetic moment per unit volume.

$$I = \frac{M}{V}. \quad \text{Its SI unit is } A \, m^{-1}.$$

6. **Magnetic moment** of a solenoid is

$$\bar{M} = Ni\bar{A}$$

7. **Magnetic induction** inside a solenoid is

$$B = \mu_0 n i$$

8. **Magnetic intensity** inside a solenoid is

$$H = n i$$

9. **Axial field** of a solenoid is $B = \frac{\mu_0}{4\pi} \frac{2M}{r^3}$

10. Relation between B and H is $B = \mu_0 H$

11. Relation between B, H, I is $B = \mu_0 (H + I)$

12. **Declination(D)**: At a given place, the angle between the geographical meridian and the magnetic meridian is called declination.

13. **Inclination(I)**: The angle between the earth's magnetic field and the horizontal axis is called **inclination or dip**.

BULLET MASTER'S

PHYSI BEATS!



8. MAGNETISM & MATTER [2 VSAQ]

This is an **M&M** Chapter.

M for **Magnetic Declination**

M for **Magnetic Inclination**

MM for **Magnetic Moment**.

ఈ ప్రపంచంలో ఒక అతి పెద్ద Magnet - Earth.

MAGNETIC MEMORY TIPS

Paramagnetic : Manganese, Oxygen [a,a Tip]

Diamagnetic : Bismuth, Copper [di-2, bi-2, pp-2 Tip]

Ferromagnetic : Cobalt, Nickel [o Tip]

IPE View

☞ **IMP VSAQ** : Compass needles at Earth's pole, Magnetic lines forming continuous loops, Magnetic declination, Magnetic Inclination, Units of magnetic moment, induction, field

