Origin of Magnetism. M^{sm}

Name :
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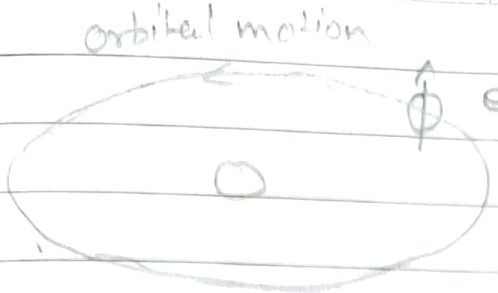

① M^{sm} originates 4m spin & orbital moment of an electron.

② Orbital motion of e around nucleus = current in loop of wire.

③ Every circulating e^- produces it orbital magnetic moment (μ_B) measured as Bohr magneton

④ These is also spin magnetic moment associated wit e^- as it spins around itself.

⑤ Inside nucleus, e^- move in specific orbit.

⑥ Each e^- orbit is tiny current loop which has magnetic moment associted with it.

⑦ Bohr magneton is elementary e^- magnetic moment & no e^- can have Mag Mom below it.

⑧ Sum of orbital Mag Mom of individual e^- generates total orbital Mag Mom M of atom

⑨ Magnetism also arises due to e^- spin about itself and nuclear spin.

Magneto Optical Recording

Name :
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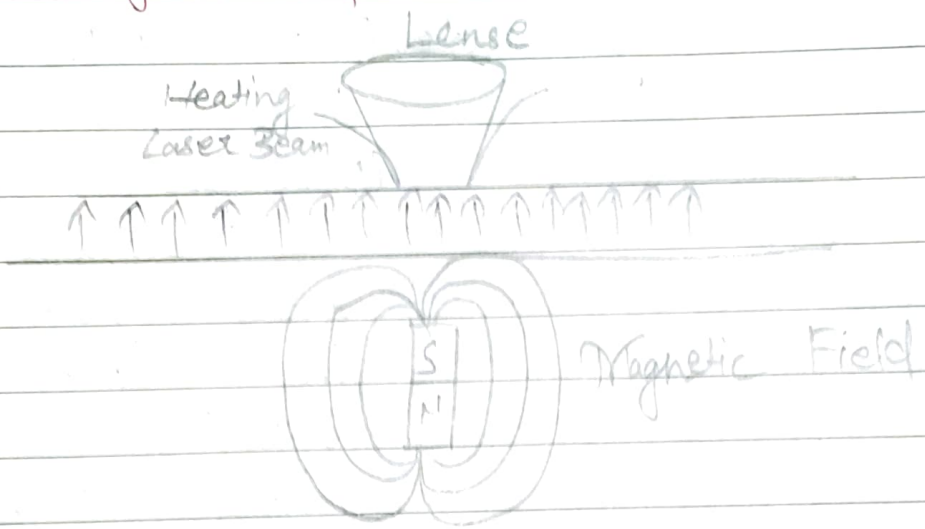
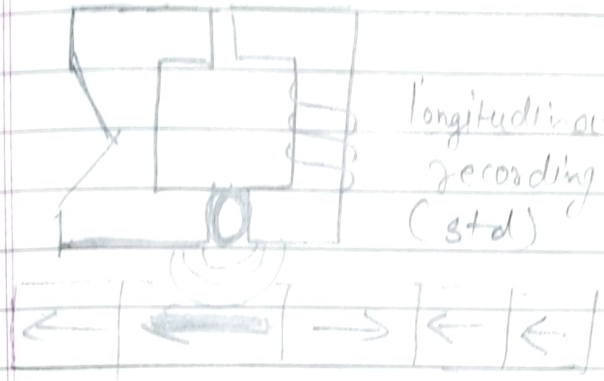
→ Magnetic optical Drive



(1) MOD is way to back up files
(2) MOD use both Magnetic Field & Laser source
(3) MOD can store from 100 MB - GB/TB.
(4) Laser source heats up the surface hence it can get easily magnetised.
(5) It helps 2 locate the region precisely defined + confined.
(6) A less intense laser source is used to read data 4m disk.
(7) Disc is scanned by Polarised light of laser beam + light get ↗ from surface
(8) Head moves relative 2 surface change in M^n from R 2 R r detected & recorded as 0s & 1s.

Magnetic Storage device M.S



① Magnetic Storage is storage of data on magnetised medium in a form of non-volatile memory.

② Read-write head moves very close to mag surface

③ As the head moves relative 2 surface changes in magnetization 4m region to region r detected and recordes as 0s & 1s

④ Head is able 2 detect + modify M^n of material

⑤ Information is accessed using 1 or more R-W Head

⑥ The magnetic surface is divided into small regions.

⑦ These region are of uniform magnetisation (M^n)

⑧ Storage cap of M.S is very large ∴ used 2 store large amount of data.

L=1A

5.d) Define with unit
i) Magnetic field strength (H)
ii) Magnetization (M)

i) Magnetic field strength (H) :-
→ Magnitude of force experienced by unit pole in magnetic field.
Unit is Ampere-turn/m or AT/m.

ii) Magnetization (M) :-
→ Magnetisation is defined as magnetic moment per unit volume.

$$M = \frac{\text{Magnetic moment}}{\text{Volume}}$$

Unit is

5. Distinguish between diamagnetism, paramagnetism, and ferromagnetism

Diagmagnetic Substance	Paramagnetic Substance	Ferromagnetic Substance
① Diamagnetic substances get weakly magnetized in direction opposite to that of external magnetic field.	① Paramagnetic substances get weakly magnetized in direction of external magnetic field.	① Ferromagnetic substances get strongly magnetized even in the presence of weak magnetic field.
② Magnetic Susceptibility of diamagnetic substance is independant of T.	② Magnetic susceptibility of paramagnetic is inversely proportional to temperature $\chi_m \propto \frac{1}{T}$ i.e (curie law)	② Magnetic susceptibility is inversely proportional to T. Above certain T the ferromagnetic changes to paramagnetic at curie Temperature.
③ Tends to move from stronger to weaker part in non-uniform magnetic field.	③ Tends to move from weaker to stronger part in non-uniform magnetic field.	③ Tends to move strongly from weaker → stronger part in non-uniform magnetic field.
④ When bar of diamagnetic substance is placed in strong external magnetic field, total number of lines of induction is less than that in free space & magnetism is induced in opposite direction of external field	④ Total no. of lines of induction through substance is less than that in free space and magnetism is induced in direction of external field.	④ Total no. of lines is greater than that of in free space.

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Magnetic Field Strength : MFS / Magnetic Field Intensity is force experienced by unit pole at that point.

$H = A/m$

Magnetization : (M/I) is magnetic moment per Volume. $M \propto H$ $\Rightarrow M = \chi H \Rightarrow \chi = \frac{M}{H}$

$M = A/m$ unit

$= \frac{\text{Moment}}{\text{Vol}} = \frac{IA}{V}$

Susceptibility (χ) : Ratio of MFS to M/I.

χ = unitless

Ease with which mat can b magnetised.

Absolute Permeability : Ratio of the normal lines of force per unit area. / Ratio of $\frac{B}{H}$

Relative Permeability : Ratio of permeability of medium to permeability of free space.

Magnetic Induction (B) : The number of lines of magnetic field passing through a unit area of cross section is called B.

$B = wb/m^2$

$1\ Gauss = 10^{-4}\ Tesla$