type of ray < ordinary rays (the that reflected back)
Extraordinary ray (the ray that helps us to see)

ulator or good insulator retains heat.
the influence of field dielectric can conduct
e.m.f.
tor store charges.
is ~~and~~ a good conductor -
lectric retain heat but they don't give out.

PHY407

Di-Electric properties

Dielectric materials are basically insulators which ordinary donot contains any charge carrier for conduction they contain positive & negative charges which are tightly band together because of that they have very low electric conductivity.

Dielectric materials: Is an electrical insulator that can be polarized by an applied electric field.

~~An~~ Dielectric is an insulator but not all the insulator is dielectric.

An Insulator: Is a material which does not allows the flow of electric current under the influence of an electric field. While a dielectric is a material with insulation properties which polarizes under the effect of electric field.

Exam Insulators have a low dielectric constant while dielectric have relatively high dielectric constant. Hence, a dielectric can be defined as any insulator that can be polarized. Thus, all dielectric are insulators but all insulators are not dielectric.

A dielectric can hence or thus stored charges this characteristics make it useful in the form of c...

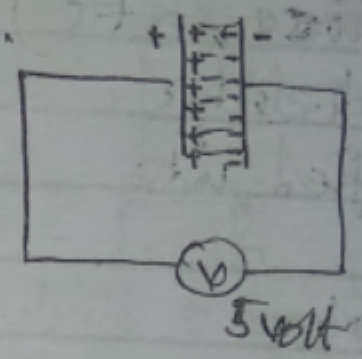
ples of a dielectric
uies – solid
ca
stic – solid
aper – solid
Air
ellium
istill water
ide or various metals

ELECTRIC CONSTANT: Is a measure of
w a material respond to an electric field
Acctually how much separation of charge
ELECTRIC FUNCTION: will describ the
lorization or assumptions properties of material
's a function of wavelength as materials ~~rep~~
spond differently depend on the energy of
light.

pacitor: Is an electrical device for
oring charge. It has the symbol (+||–)

sured by Ammeter or multimeter.
it is (Farad)

Capacitor always set up if (inflows) i.e.



"The capacitor is fully charge wh ~~the~~ it reaches (5v) then the source will become zero."

What capacitor does?
1) it store charges
2) it prevent sparking at the point
3) A capacitor smoothing ~~and rec~~tifier (i.e to reduce the noise) and to rectifier the A.C

Discharging of a capacitor (methods are:)
① **By Rapid method**: Is when the source remove and join two head of the wire together.
② **By gradual method**: Is when the system is connected to the resistor then gradual the will move out.

×3

Di-electric: Is a material in which all electrons are tightly bond to the nucleus of an atom i.e no free electron to carry current.
Hence, the electrical conductivity of dielectric materials is very low towards

ideal dielectric material is zero.

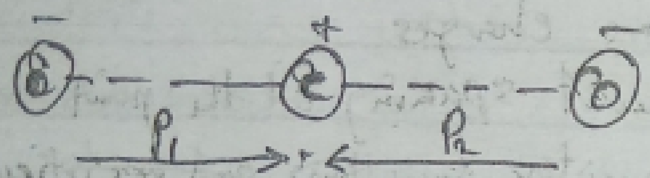
of dielectric materials (paper, air
ramies, mica, etc)

molecule in dielectric

ey are classified into

- Polar
- Non-polar.

n-polar: For non-polar



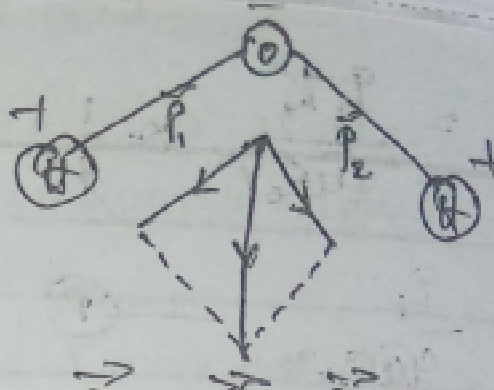
$\vec{P} = \vec{P_1} - \vec{P_2} = 0$

de C = carbon O = oxygen (twice) = CO_2

non-polar molecule is one in which the centre gravity of the +ve charges (protons) coincides with the center of the gravity of the -ve (electron) i.e non-polar molecule has symmetrical structure & zero electric dipole moment.

Examples of Non-polar.

- O_2
- Oxygen (O_2)
- Nitrogen (N_2)
- Hydrogen (H_2)
- Benzene (CH)



eg H_2O

$\vec{P} = \vec{P_1} - \vec{P_2}$.

A polar molecule is one in which the center of gravity of the +ve charges (protons) is separated from the Center of gravity of -ve charges (electrons) by a finite distance; i.e distance that you can not control (tend to infinity). A polar [illegible] molecule is the electric dipole and has an intrinsic dipole moment or intrinsic permanent dipole moment.

Example

① H_2O

② Carbon monoxide (CO)

③ HCl

④ N_2O

Total dipole moment

$\vec{P} = \sum q_n r_n$ —— ①

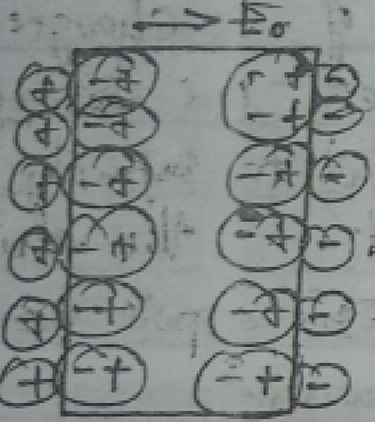
r_n is the position vector of the charge (q_i)

The electric field at the point of (r) from a dipole moment

$$E = \frac{F}{q} = \frac{q_1 q_2}{4\pi\varepsilon_0 r^2} \times \frac{1}{\cancel{q}}$$

$$E = \frac{F}{q} = \frac{q_1}{4\pi\varepsilon_0 r^2} \quad \text{—— ②}$$

Polarization



hen a dielectric is placed in an external electric eld (E_0) the +ve and -ve charges are displaced m their equilibrium position by very small distances ughout the volume of a dielectric.

These result in a formation of a large no of dipole each having some dipole moment in the direction of the field. The material [illegible] is said to be polarized. The polarization ($\hat{P}$) is defined as the dipole moment per volume average over the volume of the cell.

The effect of polarization is to reduce the effe of the external field (E_0).

Hence, the magnitude of the resultance field is less than the applied field. [$E < E_0$]

This implies that:

$$E = E_0 + E_1$$

where E_1 is called depolarization field. For within the body it tends to oppose the applied field.

For ordinary electric fields the polarization field is proportional to macroscopic fie (E). i.e $\hat{P} \propto E$.

By removing the proportion

$$\hat{P} = \varepsilon_0 \lambda_e E \quad \text{—— ③}$$

λ_e ~~electric susceptibility~~

E is the macroscopic field

λ_e is the electric susceptibility.

The electric displacement vector (D) for an isotropic or cubic medium is defined as:

$$D = \varepsilon_0 \varepsilon_r E = \varepsilon_0 E + \hat{P} \quad \text{—— ④}$$

ε_r is the

ε_r is related to dielectric susceptibility as

$$\varepsilon_r = 1 + \lambda_e \quad \text{—— ⑤}$$

– avoid any form of distraction

ect of primary interest ... we want every field vectors (E and D), and $\hat{P}$, χ, ϵ_r these Interest we must go to macroscopic electric field

Macroscopic electric field.

The contribution to electric field inside a body applied electric field. It's defined as;
E_0 = field produced by fixed external to the body
r contribution to the electric field is the sum of all charges that constitute the body.
ody is neutral the contributions to the ge field may be expressed in.

e macroscopic field is the volume age over a region large compared atomic dimensions, so the defines the field $E(r_0)$ as the average field the volume of the crystal cell it contained the lattice point (r_0),

$$E(r_0) = \frac{1}{V_c}\int dv\, e(r) \quad ⑧$$

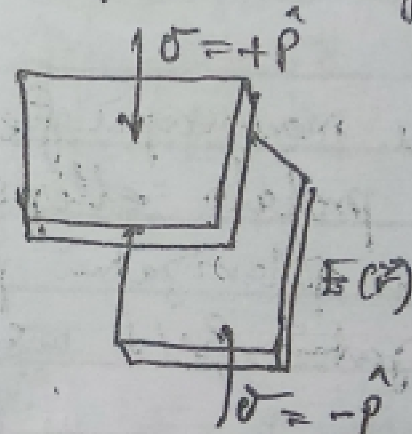
~~To find the contribution~~

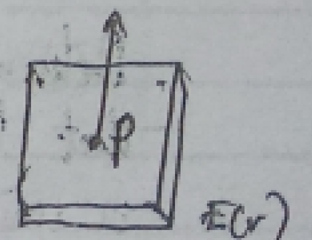
Here $e(r)$ is the microscopic electric field at the point (r_0) where (E) is the macroscopic electric field.

To find the contribution of the polarization to the microscopic field we can sum over all the dipole in a specimen. → Applying electrostatic theorem the macroscopic field caused by a uniform polarization (P) is equal to the electric ~~charg~~ field in vacuum of a fictitious surface charge density.

$\sigma = \hat{n}\cdot\hat{P}$ on the surface on the body.

unit normal to the surface.





Then, we now have

$\sigma = \hat{n}\cdot P$ on the surface of the slab.

$\sigma = \hat{n}\cdot P = \hat{P}$ per unit area

$\sigma = \hat{n}\cdot P = -P$ the lower boundary bears $-P$

By Gauss's law E_1 due to the charge σ given by

$$E_1 = \frac{P}{\epsilon_0}.$$

electric material

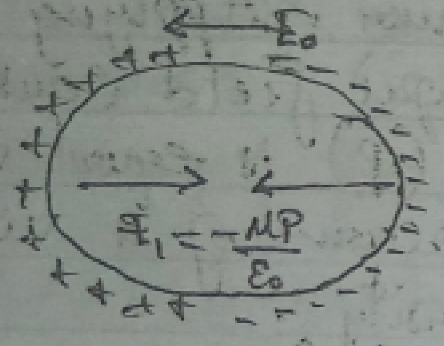
field inside a slab is

$E_0 + E_1 = E_0 - \frac{P}{\varepsilon_0}\hat{z}$.

is a unit vector normal to the plane of slab.

= field of the surface charge density ($n \cdot P$) the bounding

Depolarization field



$E = E_0 + E_1$

Determine macroscopic field within the dielectric that has prolate ellipsoidal form. In ellipsoid a uniform polarization produces a uniform depolarization field inside the body.

E_1 is a field due to polarization. The polarization $\hat{P}$ produces a surface distribution of charge whose polarity gives rise to a field within the dielectric that's directly opposite to the applied field (E_0) in the figure above.

Is called the depolarization field (E_1)

Let $P_x P_y P_z$ be the component of the polarization

$$E_{1x} = -\frac{N_x P_x}{\varepsilon_0}$$

$$E_{1y} = -\frac{N_y P_y}{\varepsilon_0}$$

$$E_{1z} = -\frac{N_z P_z}{\varepsilon_0}$$

We now have depolarization factors:

$N_x N_y N_z$ depolarization factors.

Their value depends on the ratio

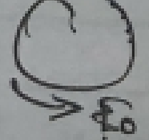
N_x, N_y, N_z have +ve values:

$N_x + N_y + N_z = 1$

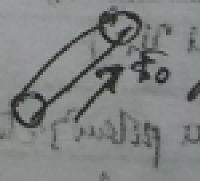
$$E_1 = \frac{-NP}{\varepsilon_0} \quad ⑧$$

Macroscopic field, $E = E_0 - \frac{NP}{\varepsilon_0}$ — ⑨

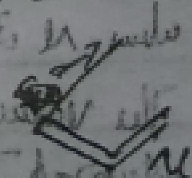
this eqn relates the



$N = \frac{1}{3}$



$N = 0$



$N = 1$

N = is the geometrical symmetrical polarization

- Come on the
- Come with cutting materials

⑦

Shape	Axis	N
Sphere	any	1/3
Thin slab	in plane	0
Thin slab	normal	1
ng Circular Cylinder	Longitudinal	0
ng Circular Cylinder	Transverse	1/2

$\vec{P}$ = polarization
P = dipole moment

Polarization ($\vec{P}$) is proportional to the macroscopic field ($\vec{E}$) and is given as:

$$\hat{P} = \varepsilon_0 \chi_e \vec{E} \quad ①$$

in isotropic medium, the displacement vector D is

$$\vec{D} = \varepsilon_0 \varepsilon_r \vec{E} = \varepsilon_0 \vec{E} + \vec{P} \quad ②$$

e can now say

$$\varepsilon_r = 1 + \chi \quad ③$$

$$\vec{P} = \frac{\varepsilon_0 \chi}{(1 - N\chi)} \vec{E}_0 \quad ④$$

where N is the polarization factor.
the value of polarization ($\vec{P}$) depends on the ($\vec{D}$) polarization field

The local field in an atom

- The local electric field denoted by (E_{loc}) that act at the site of an atom in a crystal is not the same as the macroscopic average ~~speed~~ field ($\vec{E}$)
To understand this let's consider the local field at ~~the~~ ion site with a cubic arrangement in a crystal (~~of~~ a spherical shape,

$$\bar{E} = \bar{E}_0 + \bar{E}_1 = \bar{E}_0 - \frac{1}{3\varepsilon_0}\bar{P} \quad ⑤$$

To consider ~~the field~~ the field that act on the atom at the center of the sphere, let all the dipoles be parallel to the z-axis and have magnitude (P), then the component of the field along the z-axis at the center due to other dipoles is given as:

$$E_{dipole} = \frac{P}{4\pi\varepsilon_0} \sum \frac{2z_i^2 - r_i^2}{r_i^5}$$

$$= \frac{P}{4\pi\varepsilon_0} \sum \frac{2z_i^2 - x_i^2 - y_i^2}{r_i^5} \quad ⑥$$

Because of the symmetry of the lattice and the sphere the x, y, ~~[illegible]~~ direction dimension are the same & equivalent

$$\therefore \sum \frac{z_i^2}{r_i^5} - \sum \frac{x_i^2}{r_i^5} = \sum \frac{y_i^2}{r_i^5} \quad ⑦$$

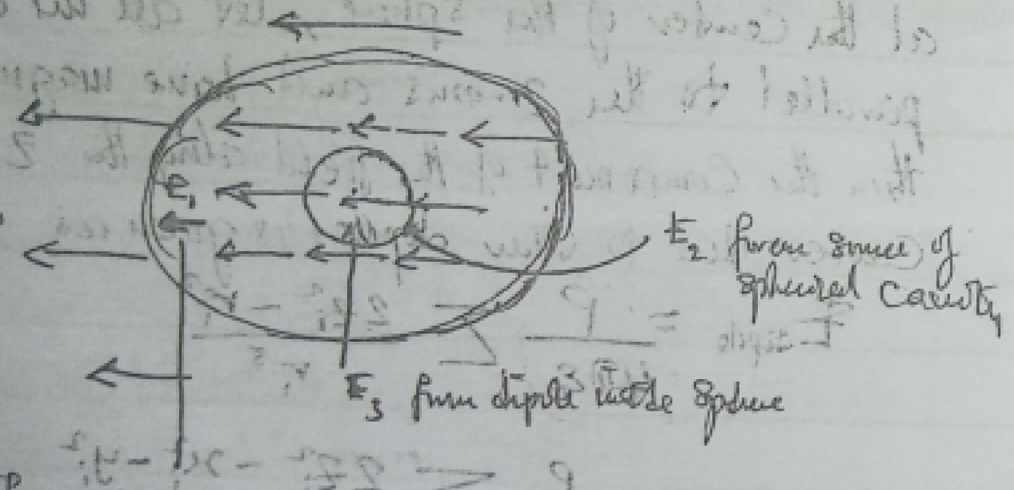
Then, the $E_{dipole} = 0$

$\bar{E}_{loc} = \bar{E}_0$

atom in a cubic environment in a spherical specimen.

a general lattice size i.e not necessary of cubic symmetry, the local field at an atom is the sum of the applied electric field given as $(\bar{E}_0)$, from external ~~[illegible]~~ sources, and the field from the dipole within the specimen, this is given as!

$$\bar{E}_{loc} = \bar{E}_0 + \bar{E}_1 + \bar{E}_2 + \bar{E}_3 \text{ ——— } ⑧$$



from outer boundary (E_1)

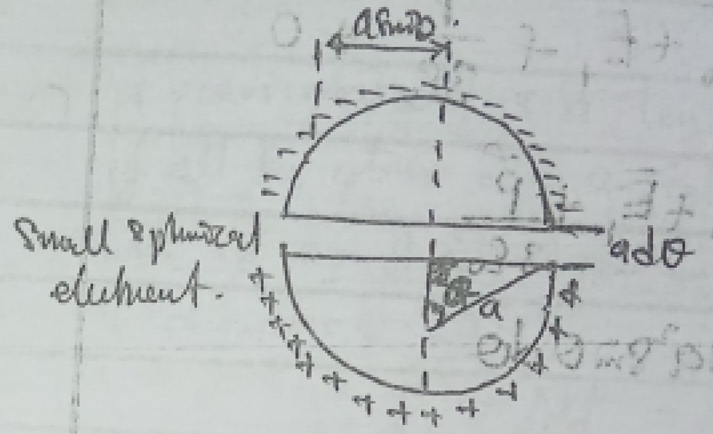
from fixed charges external to the body charges.

~~[illegible]~~ field from the surface charge density on the outer ~~[illegible]~~ the specimen dimensions ~~[illegible]~~

known as Lorentz cavity field (a field from polarization inside a spherical cavity cut out off the specimen reference atom as a center.

~~Note~~ E_1 is dependent on the geometrical shape

$$E_1 = -\frac{1 \cdot P}{3\varepsilon_0} \text{ ——— } ⑨$$



The Cavity.

The surface charge density on the surface of cavity $= -P\cos\theta$
The area of the ring shape element $ad\theta = 2\pi a^2 \sin\theta d\theta$
The charge on the ring ~~[illegible]~~ element $= P\cos\theta \cdot 2\pi a^2 \sin\theta d\theta$
Thus, the electric field at the centre of cavity or radius a is given as!

$$\vec{E}_2 = \int_0^{\pi} \frac{1}{4\pi\varepsilon_0} (a^{-2})(2\pi a^2 \sin\theta d\theta)(P\cos\theta)\cos\theta = \frac{P}{3\varepsilon_0} \text{ —⑩}$$

eqn⑩ is the one of the field in a polarized sphere.

(E_3) for a reference site with cubic surrounding in sphere $(E_3 = 0)$. It depends on the structure of the atoms are replaced by its point dipoles to each other then the total local fields

eqn ⑨ & ⑩

$$E_{loc} = \bar{E}_0 + \bar{E}_1 + \frac{P}{3\varepsilon_0} + 0$$

$$= \bar{E}_0 + \bar{E}_1 + \frac{\vec{P}}{3\varepsilon_0}$$

$$= 2\pi a^2 \sin\theta \, d\theta$$

But $\bar{E} = \bar{E}_0 + \bar{E}_1$

$$\boxed{\bar{E}_{loc} = \bar{E} + \frac{\bar{P}}{3\varepsilon_0}} \text{ —⑪}$$

Lorentz relation

w did you generate field?

at are these field?

at are the steps?

Polarizability (α)

larizability (α) of an atom is defined as the polarization per unit local field of an atom

$$\boxed{P = \alpha E_{loc}} \text{ —①}$$

Polarizability is an atomic property but di-electric constant is the macroscopic property dependent on atoms within the crystal.

Exam Question: distinguished between polarizability & di-electric constant.

Polarizability is a tensor for non spherical atom if all the atoms in a crystals have the same polarizability with N no of atom per unit volume. The polarization can be express as:

$$\bar{P} = NP = N\alpha \vec{E}^{i}_{loc} \text{ —②}$$

For (n) numbers of atom in a crystal the polarization is express as

$$\bar{P} = \sum_{i}^{n} N_i P_i = \sum_{i}^{n} N_i \alpha_i \bar{E}_{loc} \text{ —③}$$

where N_i is the concentration

$\bar{E}^{i}_{loc}$ is the local field at the site

P_i is the dipole at the nth atom

α_i is the polarizability at the nth atom.

Substituting eqn ③ & ②

$$E_{loc} = \bar{E} + \frac{\bar{P}}{3\varepsilon_0}$$

$$P = (\sum N_i \alpha_i)\left\{\bar{E} + \frac{1}{3\varepsilon_0}\bar{P}\right\}$$

$$\left.\frac{\alpha_i}{3\varepsilon_0}\right] = E$$

$$\frac{}{\varepsilon_0 E} = \frac{\sum N_i\alpha_i}{\varepsilon_0\left[1-\frac{\sum N_i\alpha_i}{3\varepsilon_0}\right]} \longleftarrow ⑨$$

eqn ②

$$\chi = \frac{P}{\varepsilon_0 E_1}$$

$$\chi = \frac{P}{\varepsilon_0 E} = \frac{\sum N_i\alpha_i}{\varepsilon_0\left(1-\frac{\sum N_i\alpha_i}{3\varepsilon_0}\right)}$$

$$\varepsilon_r = 1+\chi$$

$$\Rightarrow \varepsilon_r = 1+\frac{\sum N_i\alpha_i}{\varepsilon_0\left[1-\frac{\sum N_i\alpha_i}{3\varepsilon_0}\right]}$$

$$= \frac{3\sum N_i\alpha_i}{3\varepsilon_0-\sum N_i\alpha_i}$$

$$\boxed{\frac{\varepsilon_r-1}{\varepsilon_r+2} = \frac{1}{3\varepsilon_0}\sum N_i\alpha_i} —⑤$$

Clausius – Mossotti Relation.

some textbooks

$$\frac{n^2-1}{n^2+2} = \frac{1}{3\varepsilon_0}\sum N_i\alpha_i$$

Note polarizability have the below form

$$\boxed{\alpha = \alpha_e + \alpha_i + \alpha_d}$$

α_e is electronic polarizability

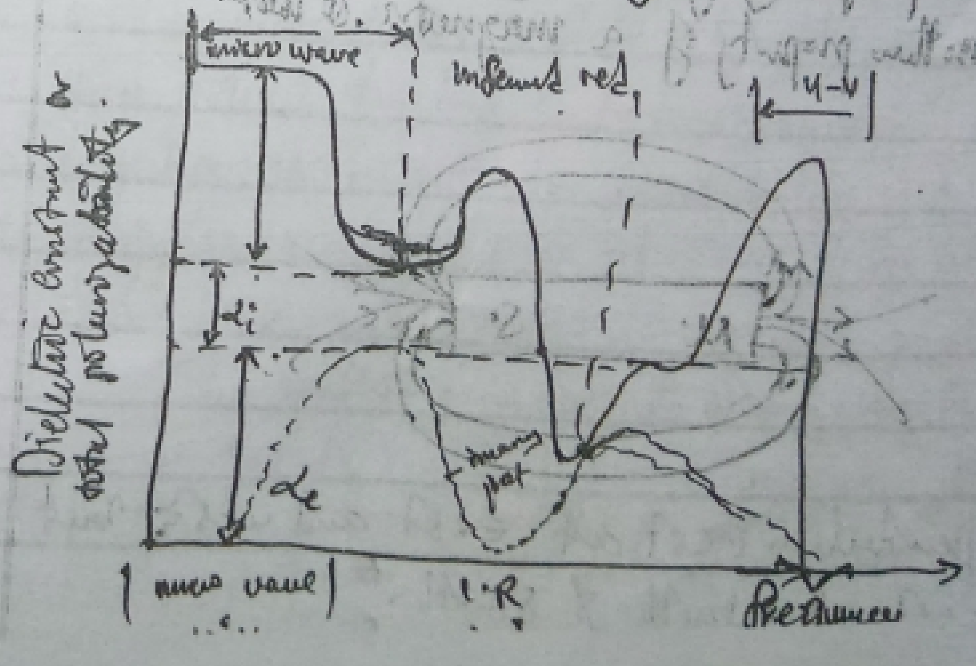
α_i ionic " "

α_d – dipolar " "

① ⇒ **Electronic polarizability (α_e)**: It involve the displacement of electrons in an atom relative to the nucleus under the influence of electric field.

② ⇒ **The ionic polarization**: The inducement of dipole by relative movement by (+ve) and (–ve) ions in ionic solid under the influence of an electric field is known as ionic polarizability (α_i)

③ **Dipole orientation or dipolar polarizability (α_d)**: This is due to allive all permanent dipole with the apply field is fluctuated by thermal vibration



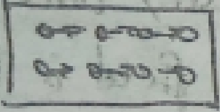
ability of ~~a~~ material to be induced influence of a magnetic field known as magnetism.

~~magnetic material that~~

magnetic materials are me those are being attracted by magnetic

Every material is a matter and it has molecules

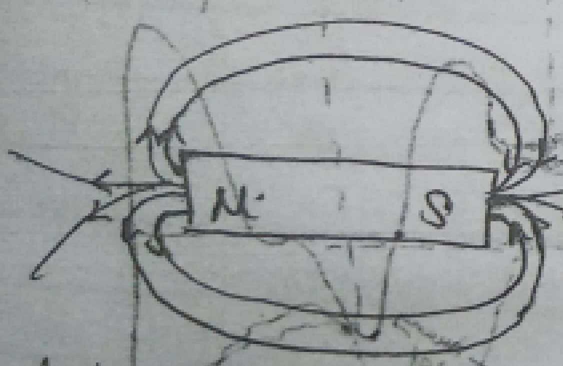
Note: The molecules in magnetic are called domains



Is that materials that has a field (3)

The property of a magnet is South & North pole

Another property of a magnet is that.



Which rest at east and west but magnet faces North & South.

1) Ferromagnetic (ready material) materials
2) Paramagnetic material
(3) Diamagnetic materials.

Ferromagnetic material: They have what we called relative permeability (ε_r)

They are materials that easily attracted field.

Because the domains are already parallel

Examples of ferromagnetic material
- i) irons
- ii) nickel
- iii) ~~Cobalt~~ Colbatt
- iv) ~~[illegible]~~ Prasonium

⇒

Characteristic of ferromagnetic

i Relative permeability is greater than one i.e $\boxed{>1}$ are dependent on a field strength

2 They attract the line of force strongly

3) They have high magnetic susceptibility

4 Magnetic properties exist even in the absence of applied magnetic field.

The spinning mean all the domains are in the same direction

↑↑↑↑

They are parallel to each other.

etic arises out of electronic structure
of atom

Di-magnetic materials). The atoms and the molecules of diamagnetic material ~~has~~ zero magnetic field in a absence of an external field.

With application of the external field a net dipole moment opposing the field (lenz law is induced)

Di-magnetic material arises from lenz law.

Examples of Di-magnetic materials

Silver

copper

Bismuth

hydrogen

table-~~gate~~ salt water crystal

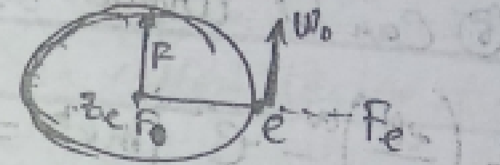
Characteristics of Diamagnetic material

In a diamagnetic ~~the~~ relative permeability is slightly less than one.

The magnetic susceptibility (χ) is very small and negative.

Susceptibility is determined by the electron structure of the system ~~the~~ doesnot depends on external condition like temperature.

4) Repels the line of force slightly.



Consider a circular orbital of radius (r) in which an electron ~~[illegible]~~ Revolves with an angular velocity (ω_0) around a nucleus (Ze)

Force of attraction b/w electron & nucleus ~~[illegible]~~ plays a roles of centre

$$F_c = m\omega_0^2 r^2 = \frac{e^2}{r^2} \text{ ——— } ①$$

$$\omega_0 = \left(\frac{e^2}{mr^3}\right)^{1/2} \text{ ——— } ②$$

In the presence of the magnetic field (H) there's additional force known as Lorentz force.

$$F_2 = -eV \times H \text{ ——— } ③$$

$$F_2 = er\omega H \text{ if } H \text{ is } (\perp) \text{ ——— } ④$$

$\frac{e^2}{r^2} + er\omega H$ — (5)

$m\omega^2 r = \frac{e^2}{r^2} - er\omega H$ — (6)

equation (5) can be written as

$$\omega^2 + \left(\frac{eH}{m}\right)\omega - e^2/mr^3 = 0 \quad \text{— (7)}$$

this for ω

$$\Rightarrow \omega = \frac{\left[-\frac{eH}{m} \pm \sqrt{\left(\frac{eH}{m}\right)^2 + 4e^2/mr^2}\right]}{2} \quad \text{— (8)}$$

$$= -\frac{eH}{2m} \pm \sqrt{\left(\frac{eH}{2m}\right)^2 + e^2/mr^3} \qquad e^2/mr^3 = \omega_0^2 \quad (9)$$

from eqn (9)

$$\omega = -eH/2m \pm \sqrt{\omega_0^2 + \left(\frac{eH}{2m}\right)^2} \quad \text{— (10)}$$

If $eH/2m << \omega_0$ then

$$\boxed{\omega = -eH/2m \pm \omega_0} \quad \text{— (11)}$$

~~$F_1 = m\omega_0 r^2 = \frac{e^2}{r^2}$ — (4)~~

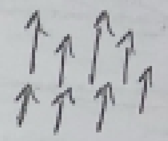
~~Larmor's theorem~~

Larmor

eqn (10) shows the apply field changes ω_0 to ω (±) on ω_0 implies electron with orbital moment parallel to the field are slowed down and those anti-parallel to the field are speeded up by amount $\left(-\frac{eH}{2m}\right)$ i.e is larmor theorem. and the term $\left(\frac{eH}{2m}\right)$ are called larmor frequency.

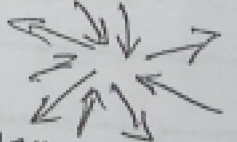
ω is the resonant frequency.

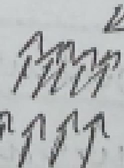
~~The~~ The change in frequency gives rise to an additional current and therefore change in orbital magnetic dipole moment or change in magnetization.



PARA MAGNETIC MATERIAL

Before the external magnetic force.





presence of the external magnetic force.

Paramagnetism :- This is a result of the orientation of already existing magnetic dipole due to the presence of external magnetic field. For a paramagnetic gas subjected to applied magnetic field it has a foreign Curie-characteristics:

slitty.

the line of freee weakly (±)

ive permeability slightly greater than one

thermal agitations that lead to destroy the

is stay produce

Weiss Law of ferromagnetism (curie) the Curie weiss law desecribes the magnetic susceptibility of a ferromagnetic in a paramagnetic region above the curie point.

The law predict a singularity in a susceptibility ~~at~~ $T = T_c$

~~The Singularity~~

$T = T_c$

Below this temp the ferromagnet has a ~~expotanus~~ spontanus magnetazation.

curie Weiss Law :- is an important law in an (e.m) that says that the magnetic susceptibility is above the curie temp point of ferromagnet in a paramagnetic medium.

Postulates

Domains are alline along the direction of applyed magnatic field

orientes domain.

i.e Those alline domains opposite in direction of reduced. (as you are making progress you are reduce you weak

2) Domains rotate and oriente them selves in a direction of magnetic field.

(alline = allign)

In each domains spontanus magnetazation result from a system of a moleculer field which allign the atomic dipole ~~moment~~ parallel the moleculer field is proportional to magnetazation.

Note:- moleculer field (H_m) plaue a crusial roles in keeping the magnetic dipole moment allign in one direction

$$H_m = \lambda M \quad \text{———} ①$$

M = Magnetazation

λ = ~~constant~~ is a weiss constant

The internal field of the atom given as (H_i) or ion is the sum of the applied field (H) as the molecular (H_m)

$$H_i = H + \lambda M \quad \text{———} ②$$

H = is the applied field

H_i = is the internal field.

For a ferromagnetic material with (N) atom per volume i.e N atom/cm^3 each having a total angular momentum (the magnetization in quantum mechanics is given as

$$M = N g J \mu_B B_J(x) \quad \text{———} ③$$

$$= \frac{2J+1}{2J} \coth\left(\frac{2J+1}{2J}\right)^{n} - \frac{1}{2J} \coth\left(\frac{x}{J}\right) \quad (4)$$

is Brillouin function

$$x = \frac{gJ\mu_B H_i}{k_B T} = \frac{gJ\mu_L}{k_B T}(H + \lambda M) \quad (5)$$

$H = 0$ in Spontaneous magnetization eqn (5)

$$X = \frac{gJ\mu_B}{k_B T} = \frac{gJ\mu_B \lambda M}{k_B T}$$

$$M(T) = \frac{X k_B T}{gJ\mu_B \lambda} \quad (7)$$

As $T \rightarrow 0$, $x \rightarrow \infty$ and $B_j(x) \rightarrow 1$

The magnetic moment thus aligns parallel to the field and M becomes saturation magnetization $M_s(0)$

eqn 5 becomes

$$M_s(0) = NgJ\mu_B \quad (8)$$

eqn (8) divide by eqn (7)

$$\frac{M(T)}{M_s(0)} = \frac{X k_B T}{N g^2 J^2 \mu_B^2 \lambda}$$

$$M(T) = NgJ\mu_B(x) = M_s(0) B_j(x)$$

Hence

$$\frac{M(T)}{M_s(0)} = B_j(x) \quad (10)$$

~~[illegible]~~ This is how we obtained it:

from $B = \mu_0 H$

$M = \chi_m H$

$B = \mu_0 (H + M)$

$B = \mu_0 (H + \chi_m H)$

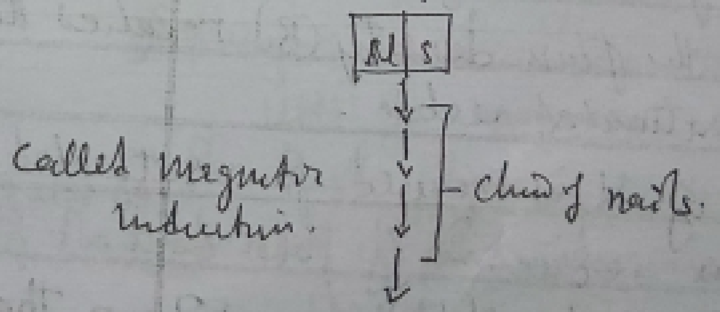
$B = \mu_0 H$

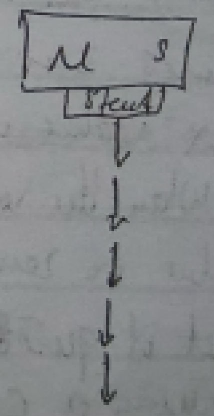
$\mu = \mu_0 (1 + \chi_m)$

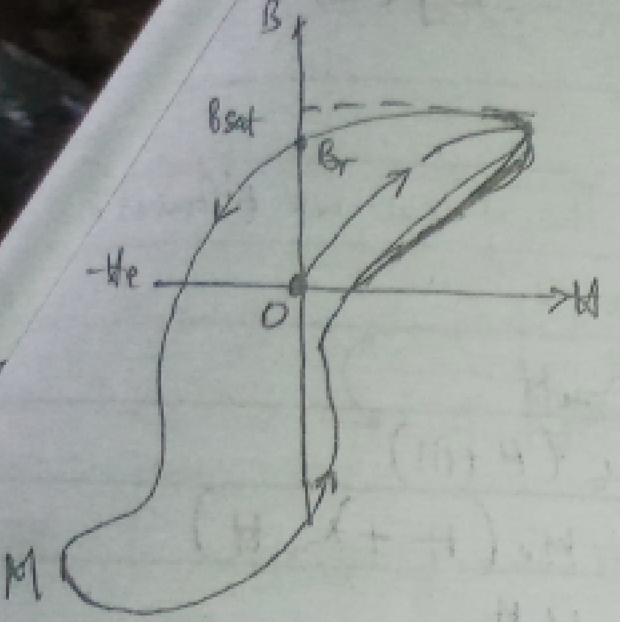
Iron

Susceptibility measures the case in which

Note: Iron easily looses it magnetic / But steel hardly loose it magnetic.







The B-H curve when the temp of ferromagnetic material is below θ_P it exhibit normal behavior & follow the ~~extensive curve~~ well known hysteresis curve as show above.

The flux ~~start~~ building up from the origin (O) at a value of magnetic value (H) in a range p is nearly proportional to (H) given raise to constant permeability of the material when H is further increase the rate of increase of (B) falls and fortunately becomes zero as the flux density (B) reaches the max value or saturated value,

When the value of H is reduced from saturated value to zero the reduction of flux does not follow the same path But it ~~quite~~ slow but as (H) become zero there remain a certain amount of flux in a material. ~~and~~ → Called remnant flux given as (B r)

~~entrances~~

Below curie temp (it's raising temp at which a given material ceases to be ferromagnetic or the falling temp at which it become ferromagnetic).

Exam ▷ All ferromagnetic materials exhibit phenomena called ~~entrances~~ which is defined as lacking of magnetization or induction flux density (B) behide the magnetization force (H) or it's that quality of a substance to which energy is dissipated of the reverser of the magnetism

Magnetic Resonance

Is the absorption of energy exhibited by particles (as atoms nuclei or electron) in a static magnetic field when the particle are expose to electromagnetic radiation to a certain frequency

Magnetostriction

1) When a ferromagnetic material magnetized small changes in dimension occurs

Uses of ~~magnetostriction~~ magnetostriction.

1) for high frequency oscillator
2) we use it for super sound

Defeats in Materials

Dislocation: it can come in two ways
(i) line dislocation
(ii) Screw dislocation
It's a result of deformation

force or pressure it too much in a material it can cause

ation.

islocation and fracture

Defect in material

There are two type of dislocation.

Line dislocation

Screw dislocation

Advantage

If one is dead the other crystal will contribute to fill that gap.

Causes - Two much force in a material it cause dislocate.