SHORT QUESTION:-
LECTURE 23—34

Q1) D/b Electric and magnetic flux?

Ans) The number of electric field lines passing through a certain element of area perpendicularly.

Mathematically:- $\Phi_E = E \cdot A_1 = EA\cos\theta$

Unit: Nm^2/C **Nature:** Scaler quantity.

Magnetic flux:-

The number of magnetic field lines passing through a surface or area perpendicularly.

Mathematically:- $\Phi_B = B \cdot A_2 = BA\cos\theta$

Unit: Weber , Nature: Scaler quantity.

Q2) D/b electric and magnetic field?

Ans) The electric field always exerts an electric force on a charged particle, whether it is stationary or moving.

Formula: $E = F/q \rightarrow F_E = qE$

Unit: V/m or N/C

Magnetic field:-

It can exert a magnetic force only on a moving charged particles moving perpendicular to the field.

Formula: $B = \frac{F}{qv\sin\theta}$:- Unit: Tesla

1 Tesla = 1 weber/m^2

Q3) D/b gravitational P.E and electric P.E?

Ans) The energy stored in an object due to its position above earth's surface.

Formula: $E_p = mgh$:- Unit: Joules

Electric P.E:-

The energy stored b/w the system of charge due to its position.

Formula: $U = \frac{KQq}{x}$, $V = J/C$, $1V = 1J/1C$

Q4) Define charge density and types?

Ans) The amount of electric charge

per unit length, surface, area and volume is known as charge density.

Types:

1) Linear charge density.

The amount of electric charge per unit length. $\lambda = dq/ds$

2) Surface charge density.

The amount of electric charge per unit area - $\sigma = dq/dA$

3) Volume charge density.

The amount of electric charge per unit volume - $P = dq/dV$

Q5) State Gauss's law?

Ans) The net electric flux a close surface is $1/\varepsilon$ time net charge enclosed by that surface-

Mathmatically:- $\phi_{net} = 1/\varepsilon \times Q$

Q6) What are characteristics of flux?

Ans) The flux is independant in size

and shape of object or surface.
Depend only on ~~surface~~ charge enclosed by the surface.

Q7) Define electric dipole?

Ans) Pair of equal and opposite point charge $-q$ and $+q$ separated by a distance "d" is known electric dipole.

Formula = $P = qd$, Unit = Columb/metre

Q8) Define dielectric and why we use it in capacitor?

Ans) It is an insulating material b/w the plates of capacitor.

Why we use:-

To increase capacitance of capacitor.
To keep conducting plates from coming in contact.

Q9) Define capacitance of capacitor?

1 nanoampere = 1nA = 10^{-9}A

1 picoampere = 1PA = 10^{-12}A

Q12) D/b EMF and potential difference?

Ans) Maximum potential difference b/w the two electrodes of cell when no current is flowing from cell

- Independant of resistance of the circuit.
- Term emf used for source of current.
- This is cause.

P.D

Difference of potentials b/w any two points in a closed circuit.

- It is proposional to resistance b/w the given points.
- It is measured b/w any two points of circuit.
- It is an effect.

Q13) Define Drift velocity and its cause?

Ans) When electric field is applied to a conductor electrons accelerate and attain average velocity which is in direction opposite of the electric field known as drift velocity.

$$V_d = \frac{i}{nAe}$$

Drift velocity is due to electrons collision with metal atoms in the conductor.

Q14) Define current density?

Ans) Electric current per unit cross sectional area of conductor.

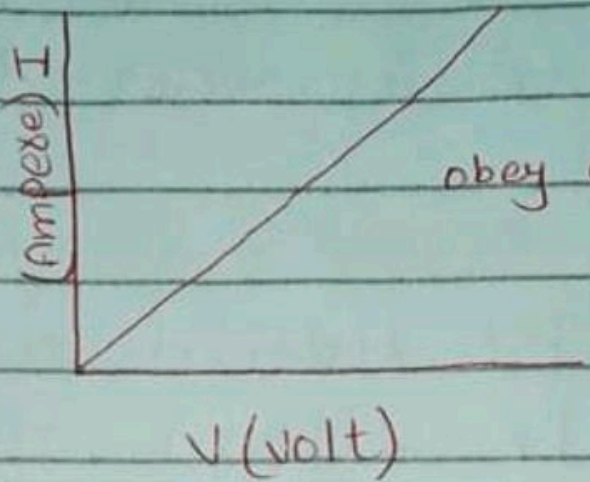
$j = i/A$, Unit Am^{-2}

Dimension:- IL^{-2}

Q15) Dfb ohmic and non ohmic material and graph?

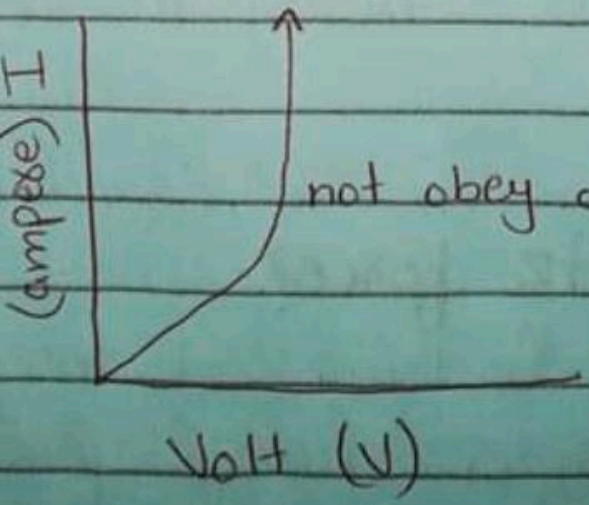
Ans) Material that follow ohm's law are called ohmic materials.

e.g resistors and wire.
Current voltage graph is straight line through origin.



Non ohmic

Materials that dont fallow ohm's law known as non ohmic materials.
Current voltage graph is not straight line.



Q16) D/b series or parallel circuit?

One path for current.
Current is same in every point.
Voltage drops at each resistors.
Break in circuit stop all current.
Adding resistance in series decrease total current.

P.C:-

Multiple path for current.
Current can be different in each branch.
Voltage same across each resistance.
Break in circuit does not affect other bulbs.
Adding resistance in parallel increase total current.
Convert electrical energy to light, heat, sound etc.

Q17) Define Lorentz force?

Ans) The sum of electric and magnetic force acting on a charge particle is known as lorentz force.

$r = mv/qB$

Q20) What information we get from mass spectroscopy?

Ans) • Molecular weight.
• Molecular formula.
• Structure from (fragmentation fingerprint).

Q21) Types of spectroscopy?

Ans) • Infared spectroscopy.
• Mass spectroscopy.
• Nuclear magnetic resonance.
• Ultraviolet spectroscopy.

Q22) Def magnetic moment and How it produced?

Ans) It is defined as magnetic strength and orientation of a magnet or other object that produced magnetic field.

Unit = JT^{-1}

In the definition for ~~con~~ current loop The product of current flowing and the area :- M = IA : Unit = Am^2

- It is measured by magnetometer.

How it produced

By two method

- The motion of electric charge.
- spin Angular momentum.

nature:- Magnetic moment is vector quantity.

Q23) Diff b/w electric and magnetic dipole moment?

Ans) It is a vector quantity and whoose magnitude is equal to the product of charge and distance b/w them.

P = qd Unit - C.m

Direction from -q to +q

M.D.M:-

A magnetic dipole moment comprises two unlike poles of

equivalent strength and pasted by small distance.

OR

The product of poles strength and distance amidst the two poles.

$\tau = M \times B$ Unit = Bohr magneton.

Q24) Define electromagnetic induction?

Ans) The generation of an electric current by passing a metal wire through a magnetic field.
- Induced current is produced because of voltage production (E.M.F) due to a changing magnetic field. called . E.I.

Q25) characteristics of E.I?

Ans) For movement b/w magnetic bar and conductor there will be deflection in Galvanometer.
- If bar magnetic field and conductor is steady no deflection

in galvanometer.
If pole of bar magnet change, the direction of induced current change.

Q26) State Faraday's Law for induced emf?

Ans) The rate of change of magnetic flux produced emf.

$$\mathcal{E} = -\frac{d\phi_B}{dt}$$

Q27) How does flux through a coil change?

Ans) Consider a coil and magnet.
a) move the magnet.
b) move the coil.
c) change size and shape of coil by squeezing it.

Q28) Define resistance?

Ans) There are less turns on secondary coil than primary coil-
- Used to convert High AC voltage into a low AC voltage-
- Current in primary coil is less than in secondary coil-

Step up-

The number of turns in primary coil is less than the secondary coil-
- Used to convert low AC voltage into High AC voltage-
- Convert in primary coil is more than secondary coil-

Q32) Maxwell four equation?

Ans) Gauss Law of electricity:

$$\oint \vec{E} \cdot d\vec{A} = q/\epsilon$$

b) Gauss law of magnetism:

$$\oint \vec{B} \cdot d\vec{A} = 0$$

c) Faraday's law induction:

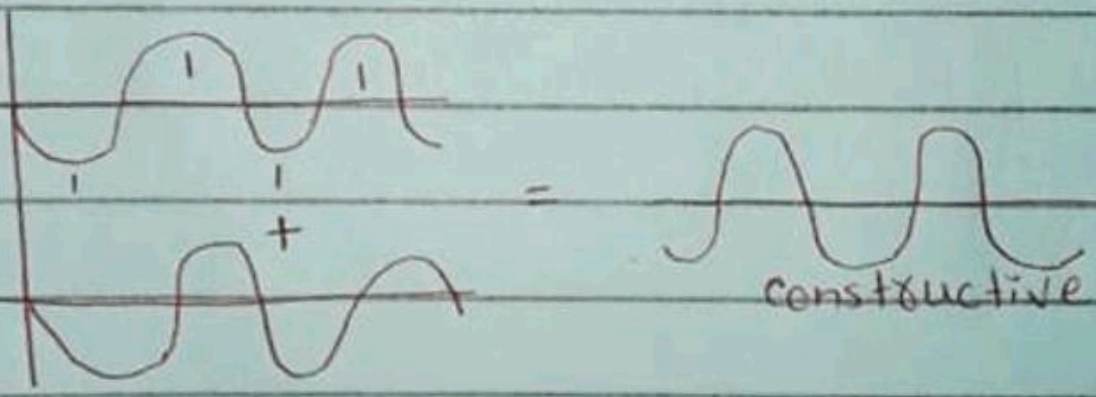
$$\oint \vec{E} \cdot ds = -\frac{d\Phi_B}{dt}$$

Ans) This law states that the power radiated per unit area of a hot body.

$$P = \sigma T^4$$

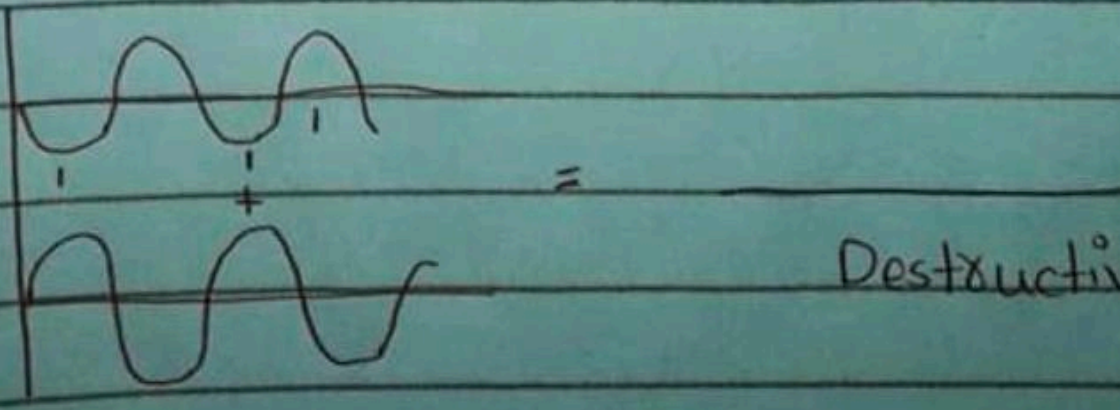
Q38) D/b constructive and distructive interference?

Ans) It occurs when two interfering waves are in phase.



Destructive interference.

It occurs when two interfering waves are out of phase.



Q35) Define total internal reflection?

Ans) When light travel from denser medium to lighter medium - if angle of incident is greater than critical angle the ray return to denser medium - known as total internal reflection -

Condition -

1) Angle of incident greater than critical angle -
2) Light must travel denser to lighter medium -

Q36) When can you use wein's law?

Ans) Only for subject that emit light not reflect - It allows astronomers to determine the temperature of stars because wavelength at which a star brightest related to temperature -

Q37) Stefan - Boltzman law?

d) Ampere's law

$$\oint \vec{B} \cdot d\vec{s} = \mu_0 I$$

(Q33) Properties of electromagnetic waves?

Ans) a) Absolutely no medium is required - Travel through vaccum-
b) Travel with speed of light c-
c) There is no limit to amplitude or frequency-
d) A wave is characterized by amplitude and frequency-

(Q34) Define refractive index?

Ans) It is ratio of speed of light in vaccum or in medium-

$$n = c/v \qquad n > 1$$

value of n depend upon for f or λ of light called dispertion-
Dispersion mean diffrent colours travel at diffrent speed inside a medium-

It frequencies are 50 Hz to 60 Hz
In AC circuit have resistance will capacitor and inductor-
~~Its waves~~ More efficiency. Higher voltage / source generator-
Power consumption less-
Can travell longer distance and safe- No power loses-

D.C.

Electrons move only in one direction that is forward-
• DC has no frequency-
Can't travel longer distance- If does loses electrons power-
Power consumption more-
Less efficiency. Low voltage
• DC circuit have only resistance-
Source battery or cell-

Q31) D/b step up and step down transformer?

Ans) The opposition in flow of current known as resistance.

$$V = IR \rightarrow R = V/I$$

Unit = ohm (Ω)

Q29) State lenz's law?

Ans) The current from induced emf will produced a magnetic field, will always oppose the original change in magnetic flux.

$$\mathcal{E} = -N \frac{d\phi_B}{dt}$$

-ve sign show induced emf always oppose the changes knows as lenz's law. if you try to increase flux through loop the induced field will oppose that increase or vise versa.

Q30) D/b AC and DC?

Ans) Electrons in AC keep changing its directions backward and forward.