#Applied_Physics-Assignment_Electromagnetic ism

Submitted to

Respected Sir:-

IFTIKHAR

AHMED

BHUTTO

Submitted by:-

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Accept for required condition -!

Signature

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1: Electromagnetism

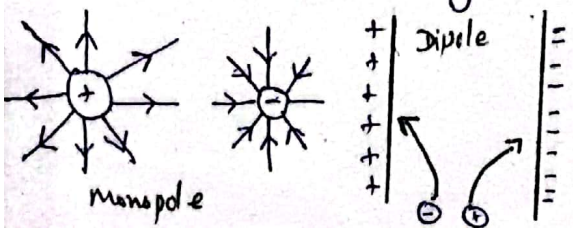
- It is a branch of physics that deals with the study of interactions between electrically charged particles and electromagnetic fields. It is a non-contact force.
- Electromagnetism is based on principles of electric fields and magnetic fields. Electric fields are created by electric charges and magnetic fields are generated by moving electric charges or current.

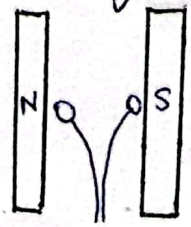
▸ Electric field: The force on a charged particle from nearby charges

▸ Magnetic field: The force on a moving charged particle or current-carrying wire from other magnetic fields.

▸ Field: An abstract area or region (a specific region) not a specific geometric shape.

Electric Field (vector) $E = \frac{F}{q}$	Magnetic Field (vector)
• Stationary charge, a charge in the rest mode.	• produced by moving charges i.e., current.
• S.I unit: volts per meter	
Direction: Monopole or Dipole.	• Direction: Dipole
• works directly (i.e., in parallel). let's consider, if two charges are of Category they can move in same Direction.	• works indirectly (i.e., in conjuction) Two charges are of Different Category i.e., positive and negative and are Dipole. They can't work Directly
• Can be applied on objects that are in rest.	• Only applied on moving charges
• Can change the both magnitude and Direction of velocity.	• Can change only Direction of velocity.





→ Doesn't attract or Repell.
Bar magnet.
MRI

2. Electro Magnetic Force:

: A Non-contact force between Charged particle. Electromagnetic Force arises from the interaction of virtual photons. It is described by the Mathematical equation and Feynman diagrams in quantum electrodynamics.

- Electric fields are inter connected and Magnetic fields are Interdependent, as Changes in electric fields can create magnetic fields and changes in in magnetic fields can create Electric fields, leading to the result of electro magnetic force.

- Limitations: Electromagnetic force is described by classical electromagnetism, has limitations in explaining certain phenomena at extreme scales. Quantum electrodynamics provides a more accurate description at such scales.

Mathematically Formulation: Michael Faraday, James clerk maxwell and Richard.

Presence: Electromagnetic force is present when there are electric charges or electric current.

- Involved in the generation of electricity through the interaction of magnetic fields and conductive materials in devices like generators and transformers

▶ Properties

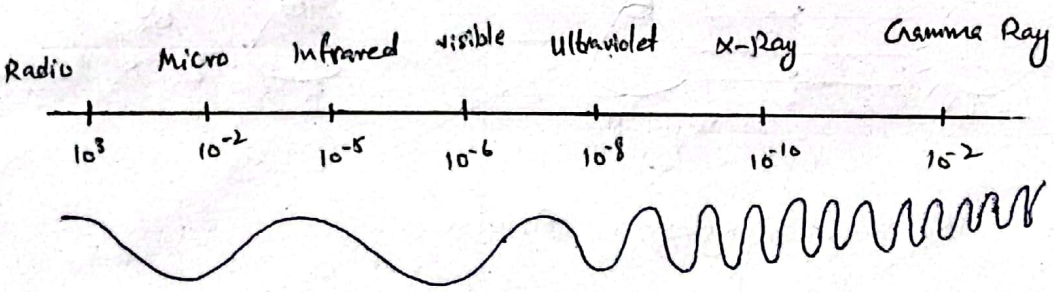
1) Long Range Force
2) It is a Central Force
3) It is 10^{36} times stronger than the gravitational Force.

3. Light :

- Light is a source of energy. It is the part of electro-magnetic waves. Electromagnetic waves are genelated by the Electric field and magnetic field.
- Light is a part of electromagnetic spectrum which transfers energy and it produces visual sensation or Sight Sensation. And because of this energy humans eyes are able to see. we can see a lot of things in day time but the same things can not be seen by us in night time. it is due to light because It produces visual sensation.

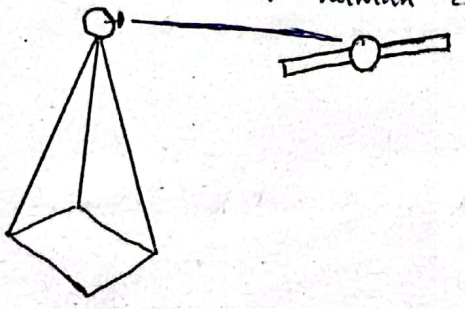
▸ Electro magnetic Spectrum (Radiation)

It is the range of all types of electro magnetic radiation including radio waves, infrad radiation, visible light, Ultra violet radiation, x-Rays and Gamma Rays.



Radio waves : Mobile to tower. ∿∿∿∿ Continuous
Tower to Router ∿∿∿∿ Continuous
: Doesn't affect humans and can't be disconnected.

Micro waves : Tower to Satelite. ——— Straight
Can affect human a little bit.

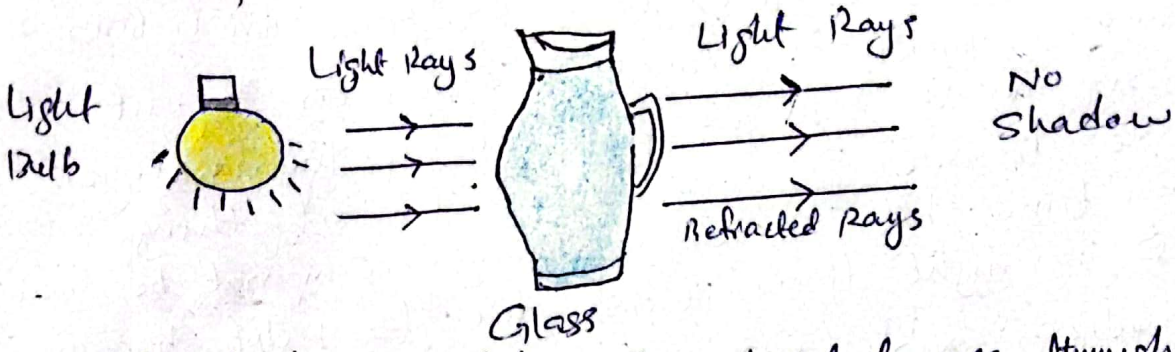


X-Ray : Commonly used in Medical Science to examine the body's Internal parts

4. Reflection of Light + Refraction of Light

First of all we should get knowledge about some objects
Ex:- Transparent Objects, opaque objects, Translucent.

a) Transparent Objects

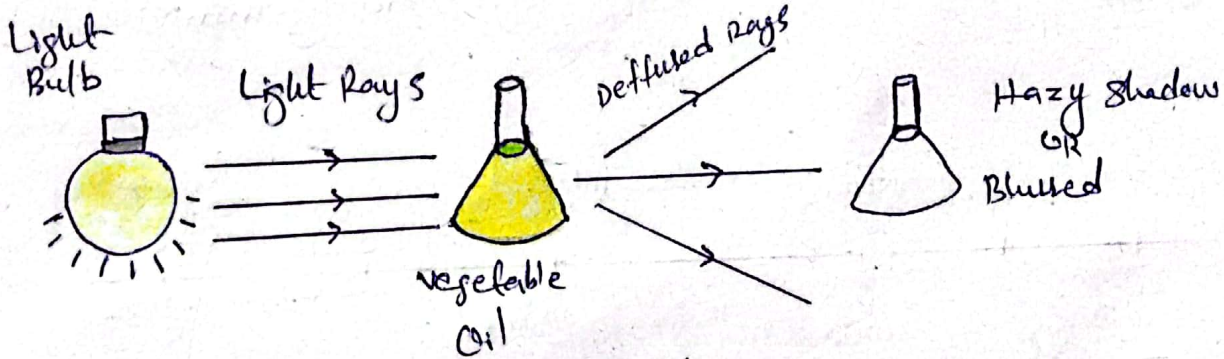


- Objects which completely allow light to pass through them.

Ex:- Air, water, Glass, Non-Coloured plastic, lenses Diamonds etc.

b) Translucent Objects

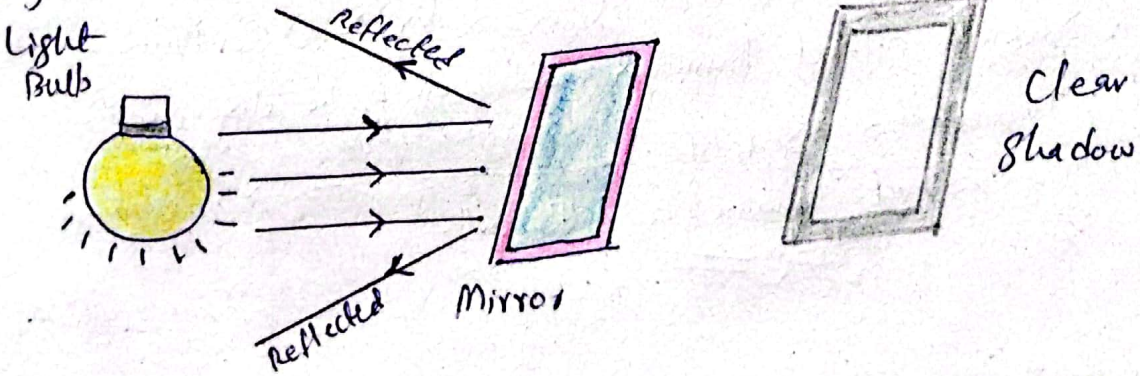
objects which allow only some light to pass through them.



Ex:- Tissue, Sunglasses, Smoke

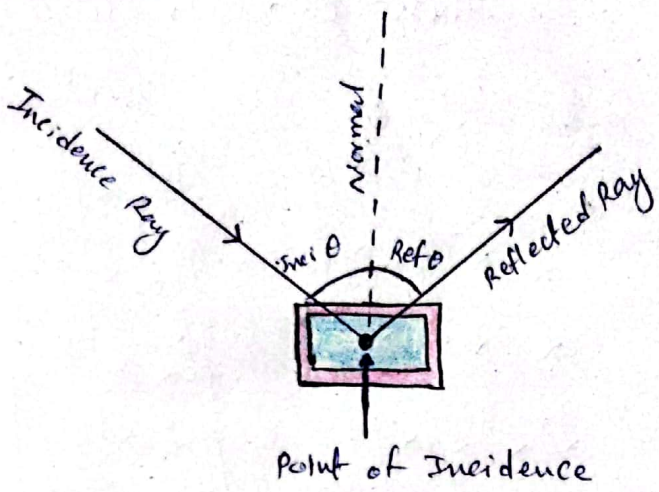
c) Opaque Objects

Objects which do not allow light to pass through them.

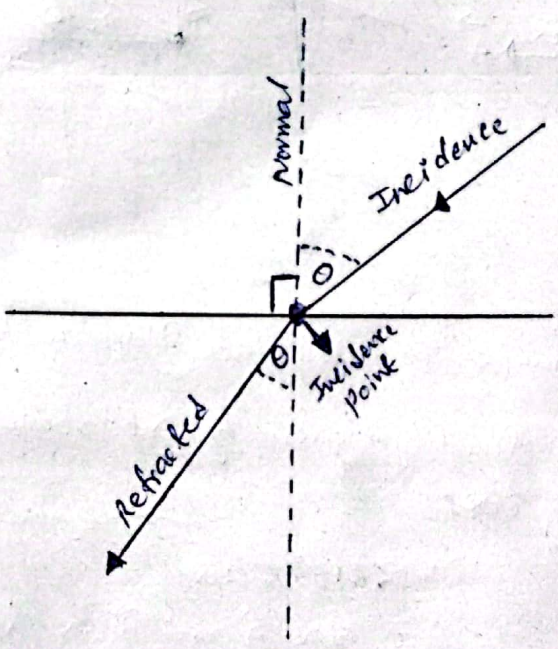


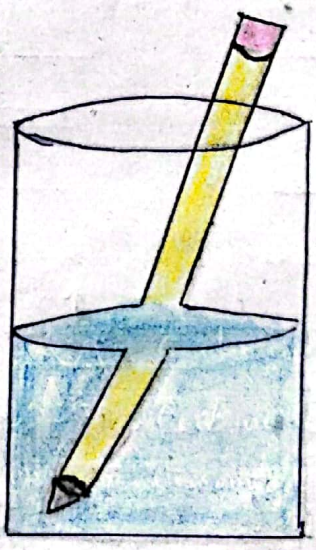
Ex:- wood, Metal, Stone, Cardboard, Black sheet, wall

) Reflection is the bouncing back of light when it touches with opaque objects, changing its direction without Absorption.



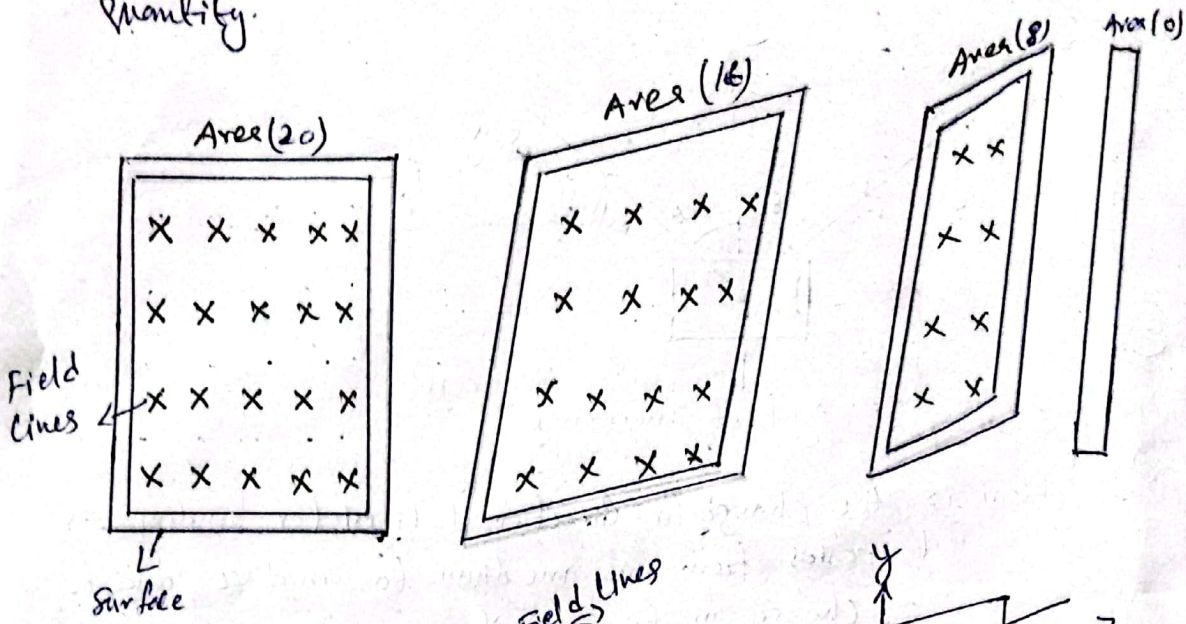
) Refraction is the change in direction of light (or bending) as it passes from one medium to another due to a change in its speed

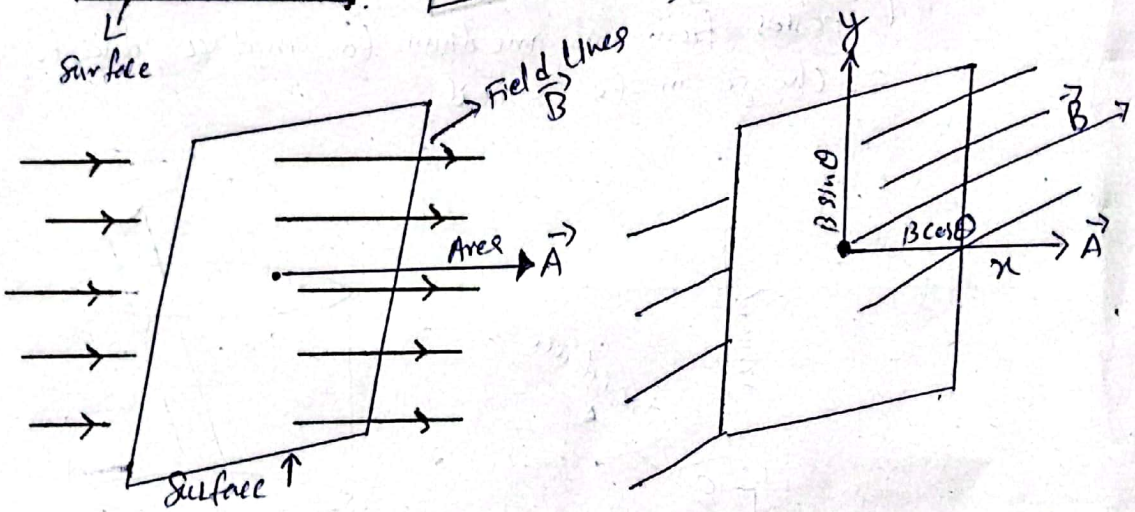




5. Magnetic Flux:

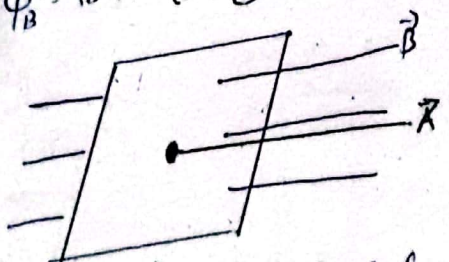
- Magnetic Flux is a measure of total magnetic field passing through a given area.
- Magnetic Flux depends on two quantities – Magnetic Field and Magnetic Area. Both of these components are vector quantity.





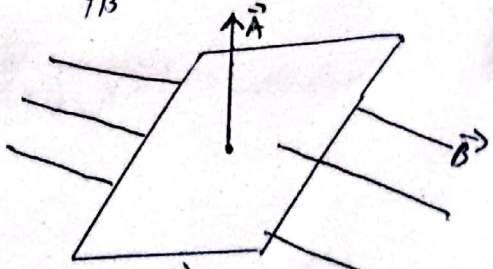
$$\phi_B = A \cdot B \cos\theta$$ → Formula To Calculate Magnetic Flux

- Magnetic Flux is a Scalar Quantity given by Dot product of Area and magnetic field lines.
  S.I Unit = weber (wb)
- Max Flux
  θ b/w $\vec{A}$ and $\vec{B}$ is 0°
  $\phi_B = BA\cos 0^\circ$



$\vec{B}$ ∥ to $\vec{A}$ and ⊥ to Surface

- Zero Flux
  θ b/w $\vec{A}$ and $\vec{B}$ is 90°
  $\phi_B = BA\cos 90^\circ$



$\vec{B}$ ⊥ to $\vec{A}$ and ∥ to surface