# POLARISATION||

CHAPTER13||
SAMPLE QUESTIONS||

1. A.Define polarisation.

   Ans:: **Polarisation is a property applied to transverse waves that specifies the geometrical orientation of oscillation.**

   B. Show that the light waves are transverse waves.
   Ans:: **When light waves are allowed to pass through a polaroid only half of the initial intensity is observed, which means only vertical or parallel components of the electric field vector are transmitted through the polaroid. This indicates that the light wave is a transverse wave**.
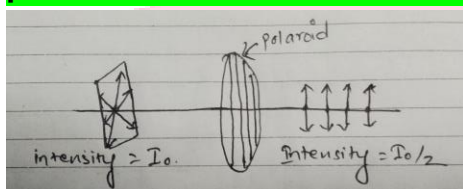
   C.The critical angle of light in a certain substance is 45º. What is a polarising angle?

2. A. Define polarising angle.
   Ans:: **It is the angle at which the unpolarised light falls on a non-metallic surface producing completely plane polarised reflected light beams.**

   B. Does polarising angle depend upon the wavelength of light?
   Ans:: **We know that polarising angle depends upon the refractive index of the medium as, $\tan\theta_p = \mathcal{M}$**
   Again the refractive index is inversely proportional to the square of the wavelength. Hence , polarising angle depends upon wavelength inversely.

   C. The refractive index of glass is 1.55. Calculate the polarising angle of a ray of light going from air to glass.

3. A. State and explain Brewster's law.

   Ans:: According to Brewster's law, "when an unpolarised light falls on an interface between the rarer and denser medium,, the reflected light beam is completely polarised for a certain angle of incident such that $\tan\theta_p = \mathcal{M}$ Where θ_p is polarising angle which is angle of incident and $\mathcal{M}$ is refractive index of the medium.

B. The refractive index of a certain medium glass is 1.55. Find the angle of incident at which the reflected light becomes completely polarised if the glass is immersed in i)air ii)water

4. A. Define polaroid and explain its application.

Ans:: **Polaroid is a device which is used to produce plane polarised light. Application: It is used to make window glass in trains , aeroplanes etc.**

B. Derive the relation between polarising angle and angle of refraction in a medium.

C. Two polaroids are kept, first crossed and one of them is rotated through 60º. Calculate the percentage of the incident light transmitted.

5. A. Write the function of polariser and analyser.

**ANS:: Polariser> It is used to produce plane polarised light beams.
        Analyser> It is used to check whether the light is polarised or not.**

B. How will you verify that the light coming from the sky is partially polarised?

Ans:: **We can verify it with the help of sunglasses having a polaroid on it. When we rotate the glass taking it in front of our eyes, we can notice a change in intensity of light. At a certain orientation of glass we can observe a dark band suggesting the light is being strongly polarised.**

C. The polarising angle for glass is 57.5º, what is the refractive index ? Also, find the angle of refraction.

6. A. Define plane of vibration and plane of polarisation.

Ans:: **Plane of vibration : When an unpolarised light passes through a polariser , light waves vibrate in a plane parallel to the polariser called plane of vibration.
        Plane of polarisation: It is the plane perpendicular to the plane of vibration.**

B. The critical angle for sodium light in a certain medium is 41.80º. At what angle of incident must sodium light strike the material in order that the reflected light will be completely polarised?

7. A. Can sound waves be polarised? Explain.

Ans:: **Sound waves cannot be polarised because it is a longitudinal wave, only transverse waves can be polarised.**

B. How can you distinguish between an unpolarised light and a linearly polarised light using a polaroid?

Ans:: **When polaroid is placed in the path of unpolarised light and rotated through some angles, intensity of transmitted light remains unchanged but when it is kept in the path of linearly polarised light and rotated through some angles , intensity of light through the polaroid changes from maximum to a minimum value.**

C. The polarising angle for a medium is 60º. Calculate the velocity of light in the medium.