10Th Class

➢ REFRACTION OF LIGHT

❖ INTRODUCTION:

Refraction is the bending of light as it passes from one medium to another, resulting in a change in its speed and direction. This phenomenon occurs due to the change in the optical density of the mediums.

❖ REFRACTION AND ITS CAUSES:

When light travels from one medium to another with a different optical density, such as air to water or air to glass, its speed changes. This change in speed causes the light rays to bend either towards or away from the normal line, depending on the relative optical densities of the mediums involved.

- **LAWS OF REFRACTION:** The behavior of light during refraction is governed by two main laws:

1. **Snell's Law:** Snell's Law relates the angles of incidence and refraction to the refractive indices of the mediums involved. It is expressed mathematically as $n_1 \cdot \sin(\theta_1) = n_2 \cdot \sin(\theta_2)$, where n_1 and n_2 are the refractive indices of the initial and final mediums, and θ_1 and θ_2 are the angles of incidence and refraction, respectively.

2. **Law of Refraction:** The law of refraction states that the incident ray, the refracted ray, and the normal line at the point of incidence all lie in the same plane.

❖ REFRACTIVE INDEX:

The refractive index of a medium is a measure of how much the speed of light is reduced when it enters the medium. It is defined as the ratio of the speed of light in vacuum to the speed of light in the medium and is denoted by the symbol n. The higher the refractive index of a medium, the slower light travels through it.

Applications of Refraction: Refraction of light has various practical applications in everyday life and technology, including:

- Lenses in optical devices such as cameras, microscopes, and telescopes.

- Prism for splitting white light into its component colors (dispersion).
- Corrective lenses for vision correction in eyeglasses and contact lenses.
- Optical fibers for transmitting light signals in telecommunications and medical imaging.

❖ Conclusion:

Understanding the refraction of light is crucial in optics and various technological applications. By studying the laws of refraction and the behavior of light as it passes through different mediums, we can manipulate and utilize light for a wide range of purposes, from imaging and communication to scientific research and healthcare.