

Refraction of Light at Plane Surfaces

Chapter 4: Refraction of Light at Plane Surfaces · Topic 1

Key Concept

Refraction occurs because light travels at different speeds in different media, bending towards or away from the normal depending on density.

Snell's law states that the ratio of sine of angle of incidence to sine of angle of refraction is constant (refractive index) for a given pair of media.

The refractive index of a medium indicates how much light bends and how much slower light travels compared to a vacuum.

Total internal reflection occurs when light travels from a denser to rarer medium at an angle greater than the critical angle, useful in optical fibres.

Quick Revision Notes

- Refraction: bending of light between media.
- Caused by different light speeds in each medium.
- Snell's law: $\sin(i)/\sin(r) = \text{constant (refractive index)}$.
- Refractive index shows bending amount and speed change.
- Total internal reflection: denser to rarer medium.
- Occurs beyond the critical angle.
- Used in optical fibres.
- Practice builds refraction concept understanding.

Practice Questions

- 1 Calculate the refractive index given angle of incidence and refraction.
- 2 Explain total internal reflection with a diagram.
- 3 Discuss why a pencil looks bent in water.
- 4 Research how optical fibres use total internal reflection.
- 5 Solve a Snell's law problem.
- 6 Explain refraction in your own words.