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LIGHT REFLECTION AND REFRACTION

CHAPTER NO.10

SUB: PHYSICS

LIGHT REFLECTION AND REFRACTION

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POINTS TO BE COVERED

- Laws of Refraction.
- Refractive Index.

LEARNING OUTCOMES

- Students will be able to
- State the laws of refraction.
- Explain about relative speed of light in different media.
- Solve problems related to refractive index..

RECAPITULATION OF PREVIOUS TOPIC

- Define refraction.
- What happens when a ray of light goes from a rarer medium to a denser medium?
- What happens when a ray of light travels from a denser medium to a rarer medium?

LAWS OF REFRACTION

https://youtu.be/4l2thi5_84o

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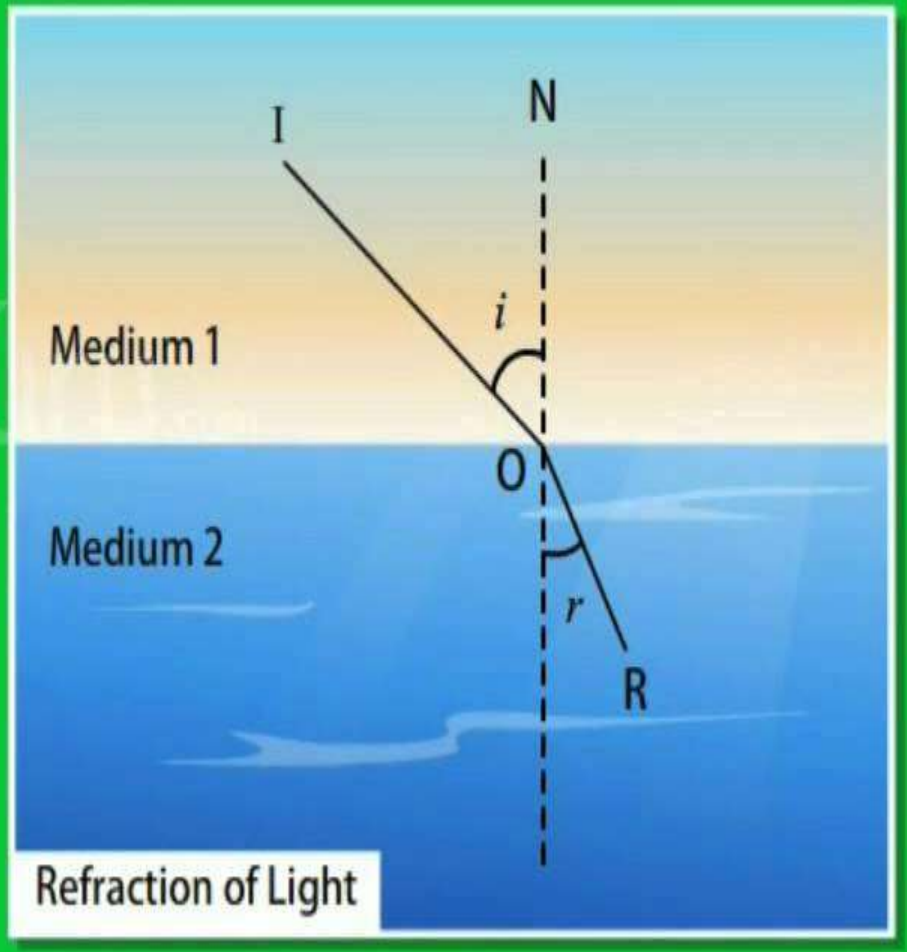
Laws of Refraction

First law:

The incident ray, the refracted ray and the normal to the surface separating the two media at the point of incidence, all lie on the same plane.

Second law:

The ratio of sine of angle of incidence to the sine of angle of refraction is a constant for a given pair of media. This law is also known as Snell's law.



REFRACTIVE INDEX

- The ratio of sine of angle of incidence to sine of angle of refraction is known as refractive index

$$\text{Refractive Index of medium 2 with respect to medium 1 } (n_{21}) = \frac{\text{Speed of light in medium 1}}{\text{Speed of light in medium 2}}$$

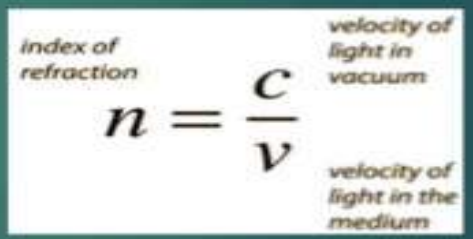
$$Or, n_{21} = \frac{v_1}{v_2}$$

$$\text{Therefore,} \quad n_{12} = \frac{\text{Speed of light in medium 2}}{\text{Speed of light in medium 1}} = \frac{v_2}{v_1}$$

ABSOLUTE REFRACTIVE INDEX

Refractive Index

- This is a measure of how much light slows down when it goes into a new medium.
- Symbol n
- n (vacuum) = 1



$$n\ (\text{medium}) = \frac{c\ (\text{speed of light in vacuum})}{v\ (\text{speed of light in medium})}$$

SOLVE

- The angle of incidence in medium A is 60^0 and the angle of refraction in medium B is45^0.Find the refractive index of the medium B with respect to medium A.
- Given refractive index of glass for light going from air to glass is 3/2. Find the refractive index of air for light going from glass to air.

SOLVE

- Light enters from air to glass having refractive index 1.50. What is the speed of light in glass? The speed of light in vacuum is 3×10^8 ms^{-1}.

HOME ASSIGNMENT

- The absolute refractive index if glass and water are 4/3 and 3/2, respectively. If the speed of light in glass is 2 x 10^8 m/s, calculate the speed of light in
- Vacuum
- Water
- 2. The refractive index of glass is 1.54 and the speed of light in air is 3x10 m/s. Calculate the speed of light in water?

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