H.w
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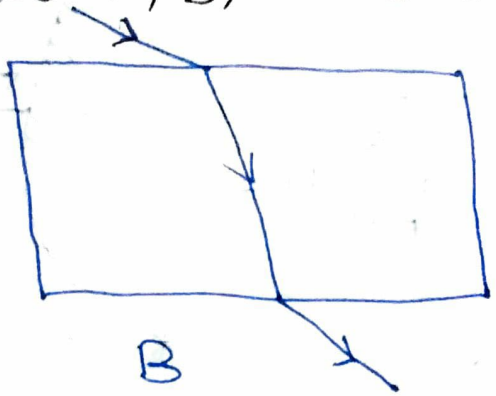
Home Assignment

1) Figure shows a ray of light as it travels from medium A to medium B. Refractive index of the medium B relative to medium A is

a. 3/2

2) The path of a ray of light coming from air passing through a rectangular glass slab traced by four students are shown as A, B, C and D in figure. Correct.

B.



3) You are given water, mustard oil, glycerine and Kerosene. In which of these media a ray of light incident obliquely at same angle would bend the most?

d) Glycerine

4) A pencil when dipped in water in a glass tumbler appears to be bent at the interface of air and water. Will

the pencil appear to be bent to the same extent, if instead of water we use liquids like, Kerosene or turpentine. Support your answer with reason.

Ans- The pencil appears to be bent when it is kept in a glass tumbler with water due to refraction of light. The refraction of light occurs when the speed of light changes due to change in medium. But when the pencil is dipped in Kerosene or in oil, the bending is not the same because they are optically denser than water.

5) How is the refractive index of a medium related to the speed of light? Obtain an expression for refractive index of a medium with respect to another in terms of speed of light in these two media?

Ans- The refractive index of the medium is given by

$$\mu = \frac{\text{Speed of light in first medium}}{\text{Speed of light in second medium}}$$

* The ratio of the sine of the angle of incidence to the sine of the angle of refraction is a constant, for the light of a given colour and for the given pair of media.

* Refractive Index can be seen as the factor by which the speed and the wavelength of the radiation are reduced with respect to their vacuum values.

$$n = \frac{C}{V}$$

* Refractive index of one medium in relation to a second medium is given by the ratio of the speed of light in the second medium to speed of light in the first medium.