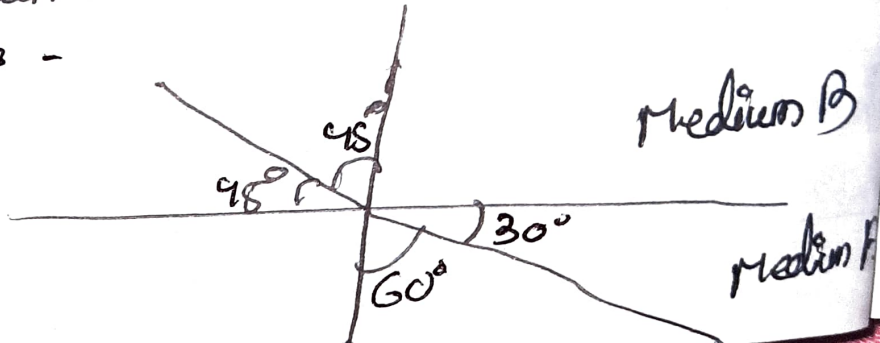
H.W
16/11/21

① Fig. 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 -

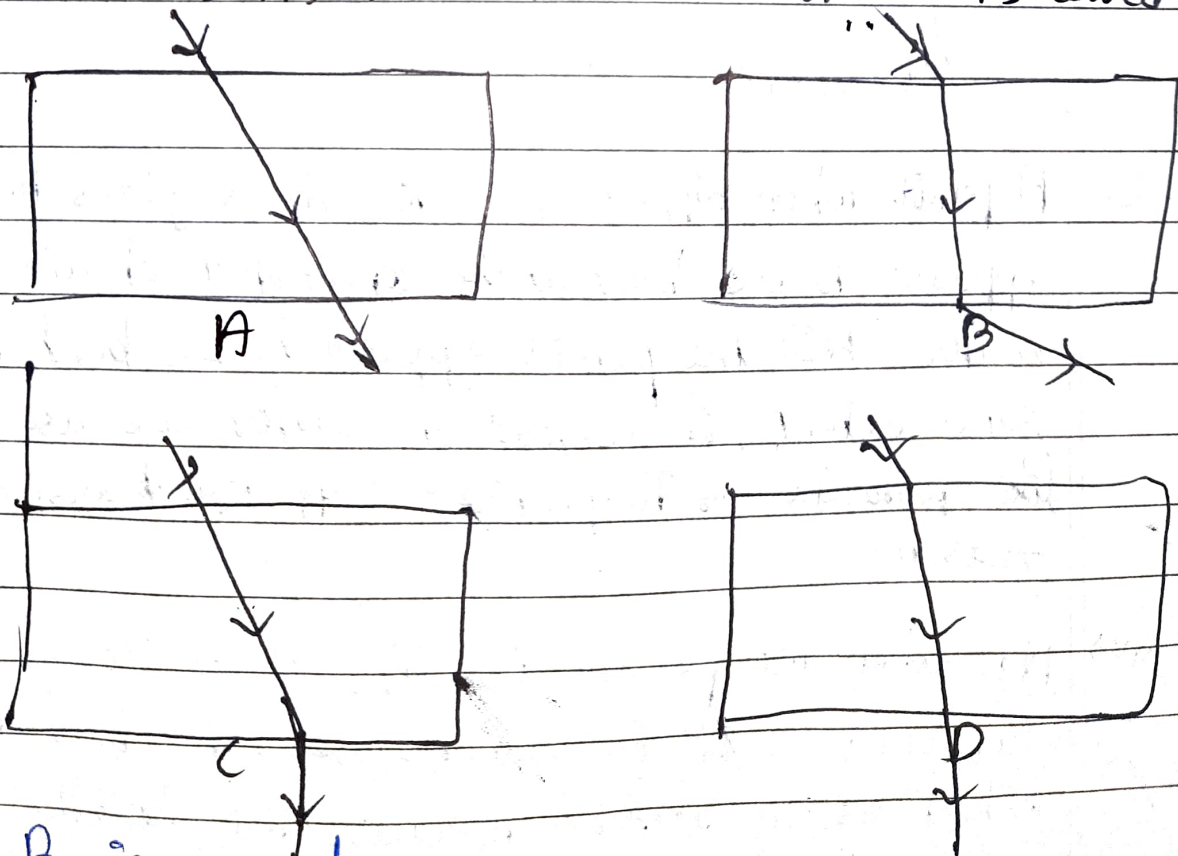


Sol: Here, Medium B is denser and Medium A is rarer. Therefore, the refracted ray is moving away from the normal when it passes from medium B to medium A.

= ~~Ans~~ Refractive index = $\frac{\sin i}{\sin r}$

$= \frac{\sin 60}{\sin 45} = \frac{3}{2}$

(2) The path of a ray of light coming from air passing through a rectangular glass slab traced by 4 students are shown as A, B, C and D. Which of them is correct?



ans> B is correct.

(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?

ans> Among these 4 media, glycerine is the most dense media, therefore, glycerine's refractive ray would bend the most towards the normal

NOTE:

$\mu_{water} = 1.33$

$\mu_{mustard\ oil} = 1.47$

$\mu_{glycerine} = 1.473$

$\mu_{kerosene} = 1.44$

(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> No, when the pencil is dipped in kerosene or Turpentine, it is not be seen to bent to same extent as in water. Because the density of water is less than kerosene and Turpentine.

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(5) How is refractive index of a medium related to speed of light ? Obtain an expression for refractive index of a medium w.r.t another in terms of speed of light in these two media ?

ans → The refractive index is a constant value for Speed of light in ~~first~~ second medium w.r.t first medium.

→ Let two mediums be air and water respectively. Then we can say that refractive index of water with respect to air is -

$$\mu = \frac{\text{Speed of light in air}}{\text{Speed of light in water}}$$

$$= \frac{3 \times 10^8 \text{ m/s}}{2.25 \times 10^8 \text{ m/s}} = \frac{3}{2.25} = 1.33$$