H/W 11/11/21

CH-5
LIGHT ENERGY
HOME ASSIGNMENT

[B] Short / Long Answer Questions:

(1) State the speed of light in
(a) air = $3 \times 10^8 ms^{-1}$
(b) water = $2.25 \times 10^8 ms^{-1}$
(c) glass = $2 ms^{-1}$

(5) How does the speed of light determine the optical density of medium?

Ans) Optical density is an important factor which influences the speed of the light and its direction in which the ray of light travels from one optically transparent medium to another. Thus, optical density is a factor of refraction of light. More is the optical density, less is the speed of light in that medium & vice-versa.

(3) Which is optically denser : water or air ? Give reason.

Ans> Water is optically denser than air because the speed of light is lesser in the water ($2.25 \times 10^8 m s^{-1}$) than the air ($3 \times 10^8 m s^{-1}$) and more is the optical density, less is the speed of light in that medium.

(4) Out of air and glass, which is optically rarer ? Give reason.

Ans> Air is optically rarer than the glass as the speed of light is more in air ($3 \times 10^8 m s^{-1}$) than the glass ($2 \times 10^8 m s^{-1}$) and less is the optical density, more is the speed of light in that medium.

(5) What do you understand by refraction of light?

Ans The change in direction of path of light when it passes from one optically transparent medium to another, is called refraction of light.

(6) Describe an experiment to show that a light ray bends when it passes from one transparent medium into another transparent medium.

Ans Aim of the Experiment -

A light ray bends when it passes from one transparent medium into another transparent medium.

Materials Reqd. -

A glass vessel, A coin, Water.

Procedure -

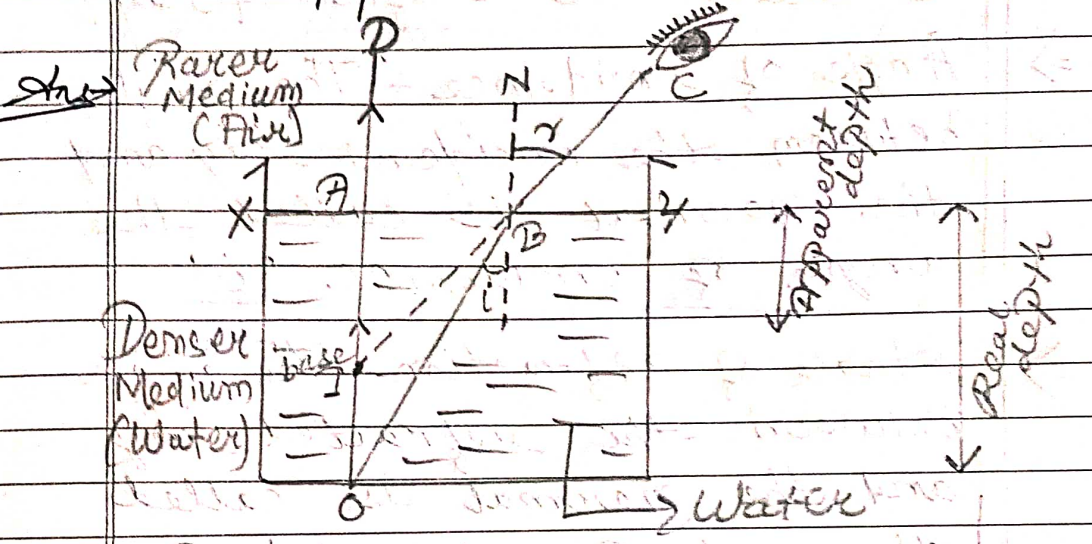
A coin, i.e. a glass vessel is taken and it is placed in the glass vessel. The vessel

is put on a table. The observer stepped back till the coin is just out of the view (oblique view). The observer's eye is kept in this position and water is poured (by other person) gradually in the vessel.

Observation -
It is found that when there is ~~sufficit~~ sufficient water in the vessel, the coin becomes visible and it appeared to be slightly raised from position.

Conclusion -
When ~~water is poured in the~~ Vessel when there is no water in the vessel, the coin is not visible because the ray of light from the coin travelling line does not reach the eye.
When water is poured in the vessel, the coin becomes visible because the ray of light from

(7) Draw a ray diagram to show that the depth of a vessel containing water when seen from above, appears to be less than its real depth.



Ray diagram to show that the depth of the vessel containing water when seen from above, appears to be less than its real depth.

(8) Define the following terms:

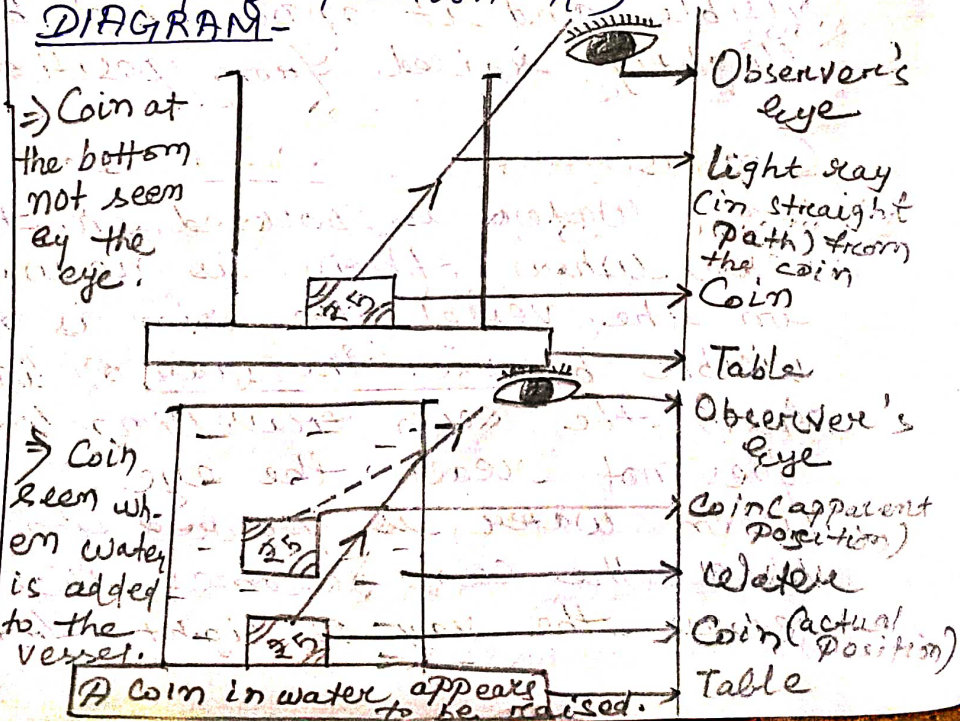
> Incident ray - The ray of light falling on the surface separating the two medias is

the point A of the coin, travelling in a straight line changes its direction at the surface of water & (it bends) and reaches the eye.

Thus, the light ray bends as it leaves water and enters air.

The ray appears to come from point B (instead of point B) or in a raised ~~Be~~ position - B (instead of position - A)

DIAGRAM -



called the incident ray.

⇒ Reflected ray :- The ray of light travelling in other medium in the changed direction, is called the reflected ray.

⇒ Angle of incidence - The angle between the incident ray and the normal is called the angle of incidence 'i'

⇒ Angle of refraction - The angle between the refracted ray and the normal is called the angle of refraction 'r'.

(9) A ray of light falls normally on a glass slab. What is the angle of incidence?

Ans⇒ Here, the angle of incidence (Normal Incidence) = $\angle i = 0°$.

(10) A ray of light from a rarer medium to a denser medium.

How will it bend?

Ans> When a ray of light travels from a rarer to a denser medium (like, from air to water or from air to glass), it bends towards the normal.