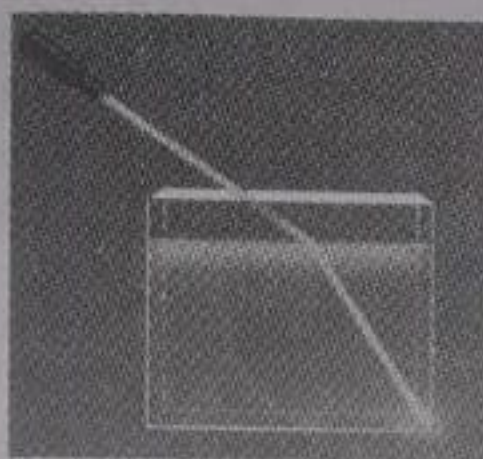


Activity

Fill three fourth of a transparent vessel with water as shown in the figure. Add one or two drops of milk into it. Fill the portion of the vessel above water with smoke. Close the vessel using an OHP glass sheet. Allow the light from a laser torch to pass through water as shown in the figure. Observe the path of light.



Observation: On the surface of water, the path of light deviates.

Qn. 1

Which are the media involved here?

Ans Air, water

Qn. 2

What happens to the path of the light?

Ans deviates

Qn. 3

Where does the deviation of the ray take place?

Ans On the surface of water

The ray of light entering water undergoes a deviation at the point on the surface where the media get separated.

Qn. 4

Why does the ray of light undergo a deviation here?

Ans Light travels with different speed in different media. Media differ in their optical density.


Speed of Light and Optical Density

Medium	Speed of light (m/s)
Vacuum/air	3×10^8 m/s
Water	2.25×10^8 m/s
Glass	2×10^8 m/s (approximately)
Diamond	1.25×10^8 m/s

The characteristics of each medium influence the speed of light that passes through the respective medium. Optical density is a measure that shows how a medium influences the speed of light passing through it.

Qn. 5


As the optical density of a medium increases, the speed of light through it decreases.

 As optical density decreases, the speed of light increases.

Qn. 6

Can the media given in the table be arranged in the increasing order of their optical densities?

Air <.....<.....<.....

 Air < water < glass < diamond

Refraction of Light

It is the difference in the optical densities that causes the deviation. When a ray of light entering obliquely from one transparent medium to another, its path undergoes a deviation at the surface of separation. This is refraction.