

1. State Snell's laws of refraction.

1st Law: The incident ray, the refracted ray and the normal at the point of incidence, lie on the same plane.

2nd Law: The ratio of the sine of angle of incidence to the sine of angle of refraction is constant for a pair of media under constant physical conditions.

2. Define lateral displacement. Mention two factors which affecting lateral displacement by a rectangular glass slab.

The perpendicular distance between the original path of the light ray and the path of the emergent ray is called lateral displacement.

Factors:

- thickness of the refractive slab, and
- angle of incidence of the light ray

3. How are absolute refractive index and speed of light related for an optical medium?

Absolute refractive index of a medium is the ratio of speed of light in vacuum to the speed of light in that medium.

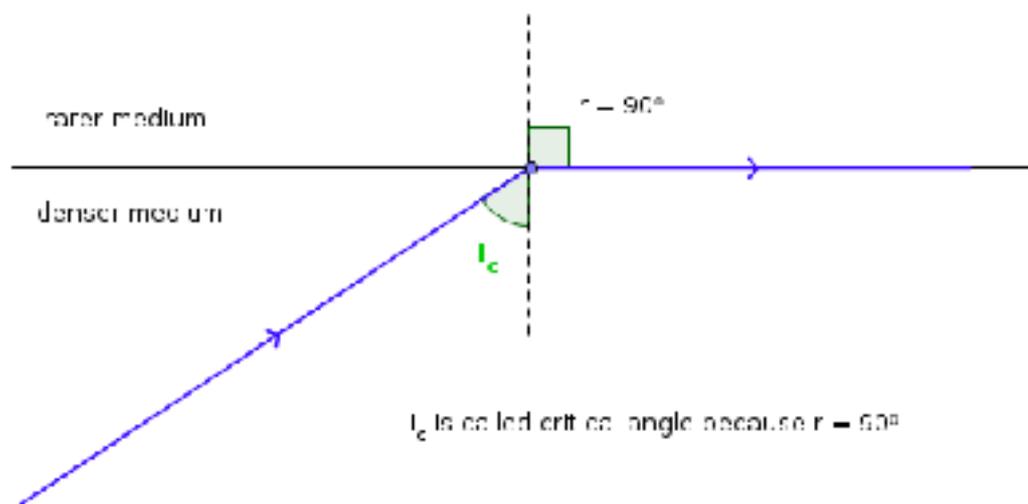
4. The refractive index of glass with respect to water is $\frac{9}{8}$. What is the refractive index of water with respect to glass?

$\frac{8}{9}$

5. Mention two necessary conditions for total internal reflection.

- The light should be travelling from an optically denser medium to an optically rarer medium.
- The angle of incidence should be more than the critical angle for that pair of media.

6. Define critical angle. Explain using a ray diagram.



Critical angle for a pair of media is that angle of incidence for which angle of refraction, for a light ray travelling from the optically denser to the rarer medium, is 90 degrees.

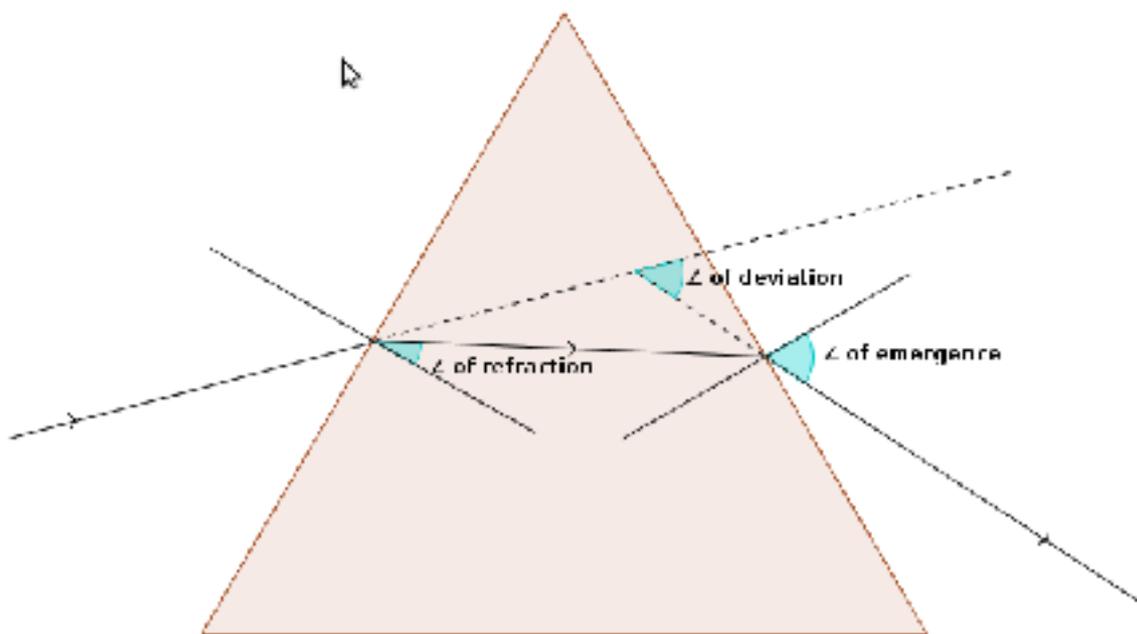
7. Define dispersion. Why doesn't sunlight get dispersed after passing through a rectangular glass slab?

Dispersion is the splitting of a polychromatic light beam as it passes through a prism, due to difference in the refractive indices of light of different colours.

The light rays of different colours do get separated inside the rectangular glass slab but they emerge parallel to each other from the other side. Since the gap between these light rays is very small, we do not see the individual colours.

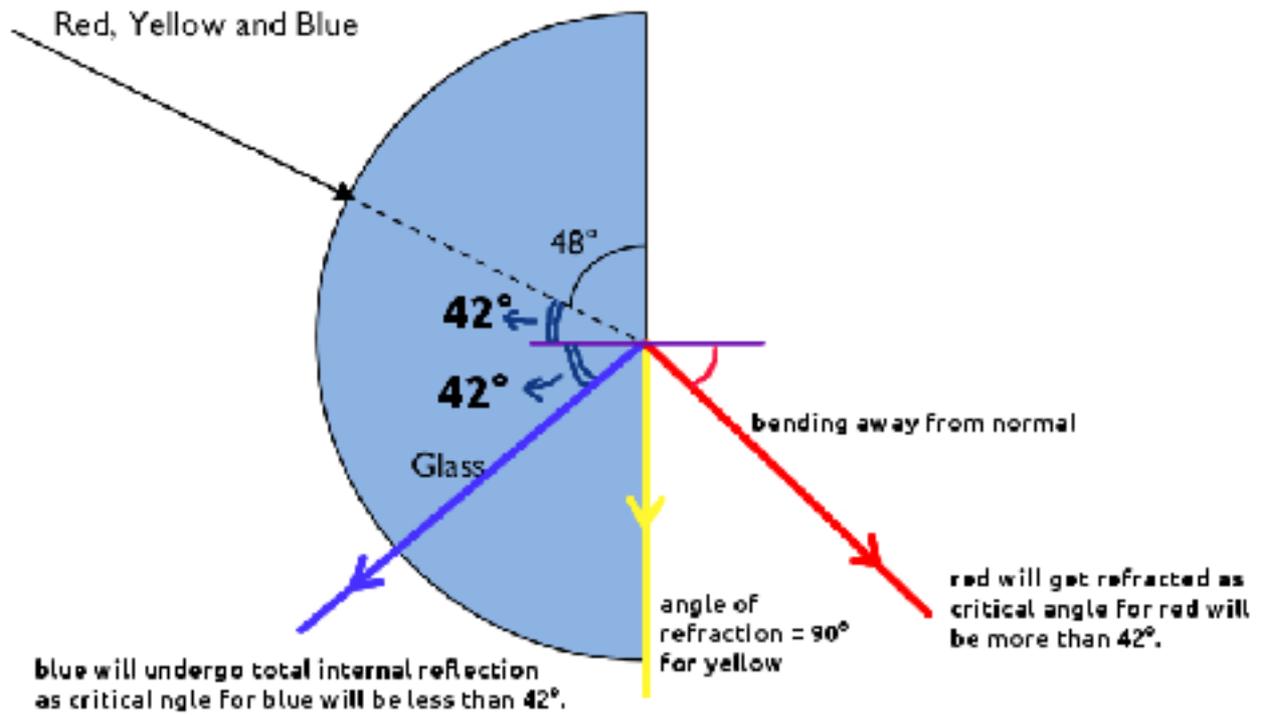
8. Complete the path of the light ray shown below in the diagram, as it passes through the triangular prism. Mark the following in the diagram:

- a. Angle of refraction
- b. Angle of emergence
- c. Angle of deviation



9. The critical angle of glass with respect to air for yellow light is 42° . Complete the path of the three light rays (red, yellow, blue) in the following diagram:

[see next page]



10. Mention two differences between real and virtual images.

Real Images

Virtual Images

- a. Are formed by actual meeting of the rays at the location of the image
- b. can be obtained/projected on a screen

- are formed when rays are traced backwards meet at a point
- cannot be projected on a screen