PHYSICS

CLASS NOTES FOR CBSE

Chapter 10. Refraction of Light

01. Reflection of Light

The change in direction of light when it passes form one medium to another obliquely, is called refraction of light. The bending of light when it goes from one medium to another obliquely is called refraction of light. The refraction of light place when light rays enter from *air* into *glass;* or from *glass* into *air.*

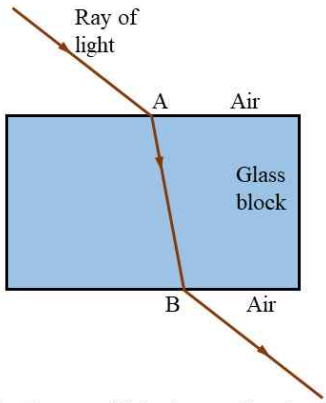

Fig. The ray of light changes direction (or refracts) at point *A* when it goes from air into glass. The ray of light changes direction (or refracts) again at point *B* when it goes from glass into air.

The optical instruments like camera, microscope, and telescope work on the refraction of light through glass lenses. The refraction (or bending) of light takes place at the boundary between the two media.

The angle between incident ray and normal (at the point of incidence) is called the angle of incidence. The angle between the refracted ray and the normal (at the point of incidence) is called the angle of refraction.

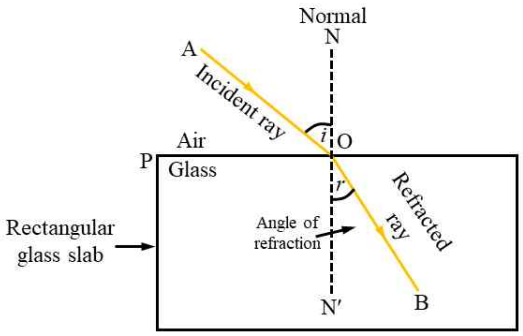

Fig. Diagram to show the refraction of light when it passes from air into glass. In this diagram, the light ray going along *AO* in air bends in the direction *OB* on entering the glass.

In the refraction of light, the angle of refraction is usually not equal to the angle of incidence.
The refraction of light is due to the change in the speed of light on going from one medium to another. Greater the difference in the speeds of light in the two media. greater will be the amount of refraction (or bending) of light.
The fact that the speed of light waves on one side of a beam of light changes a little before the change in speed of light waves on its other side, causes a change in the direction of light.
Light waves travel faster in air but slower in glass. Since the speed of left side of the beam of light is reduced a little before its right side, therefore, the direction of light changes (or bending of light occurs) on entering the glass slab.
Since the speed of left side of the beam of light increases a little before its right side, therefore, the direction of light changes (or bending of light occurs) on coming out of glass slab into air.
A medium in which the speed of light is more is known as optically rarer medium. A medium in which the speed of light is less, is known as optically denser medium. two rules which give the direction of bending of a ray of light.
When a ray of light goes from a rarer medium to a denser medium, it bends towards the normal when a ray of light goes from a denser medium to a rarer medium, it bends away from the normal.
When a ray of light goes from air into glass, it bends towards the normal.
When a ray of light goes from air into water, it bends towards the normal.
When a ray of light goes from glass into air, it bends away from normal.
When a beam of light travelling in water enters into air, it bends away from the normal.
A parallel-sided glass slab is also called rectangular glass block.
If the incident ray falls normally (or perpendicularly) to the surface of a glass slab, then there is not bending of the ray of light, and it goes straight.

02. Effects of Refraction of Light

(i) A stick (or pencil) held obliquely and partly immersed in water appears to be bent at the water surface.
(ii) an object placed under water appears to be raised.
(iii) A pool of water appears to be less deep than it actually is.
(iv) when a thick glass slab is placed over some printed matter, the letters appear raised when viewed from the top.
(v) A lemon kept in water in a glass tumbler appears to be bigger than its actual size, when viewed from the sides.
(vi) The stars appear to twinkle on a clear night.