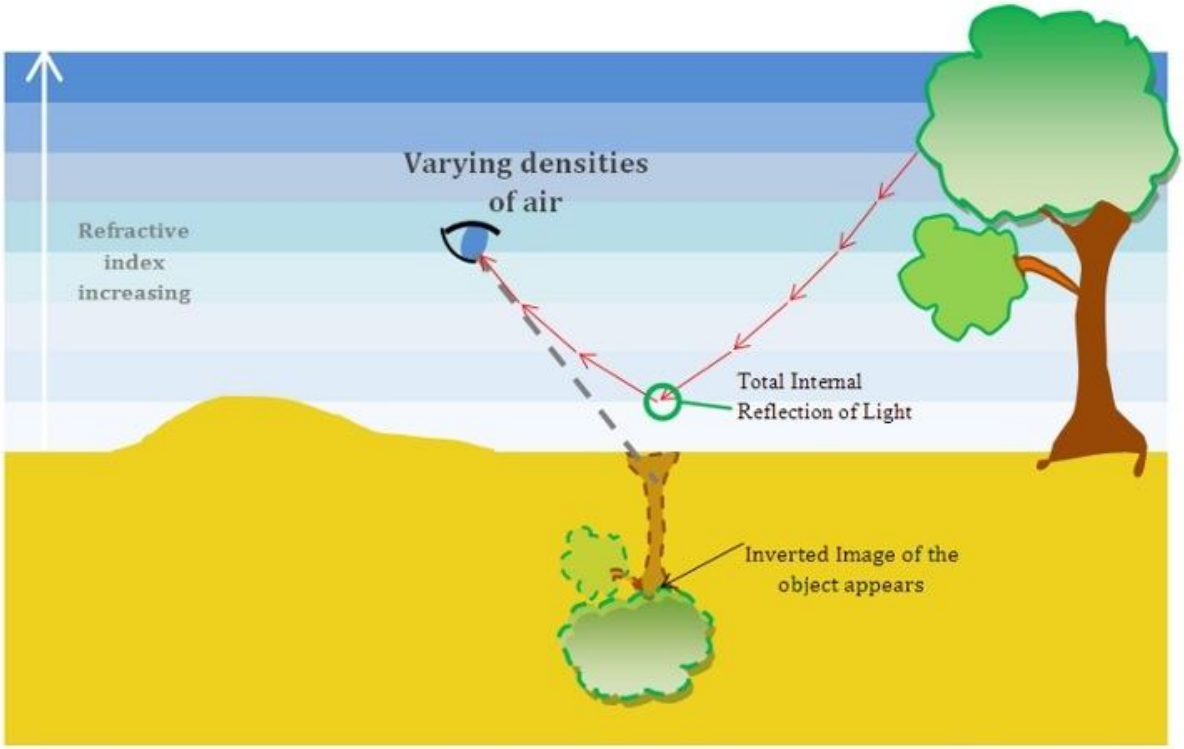
# CASE STUDY QUESTION 15

**Read the following and answer any four questions from (i) to (v)**

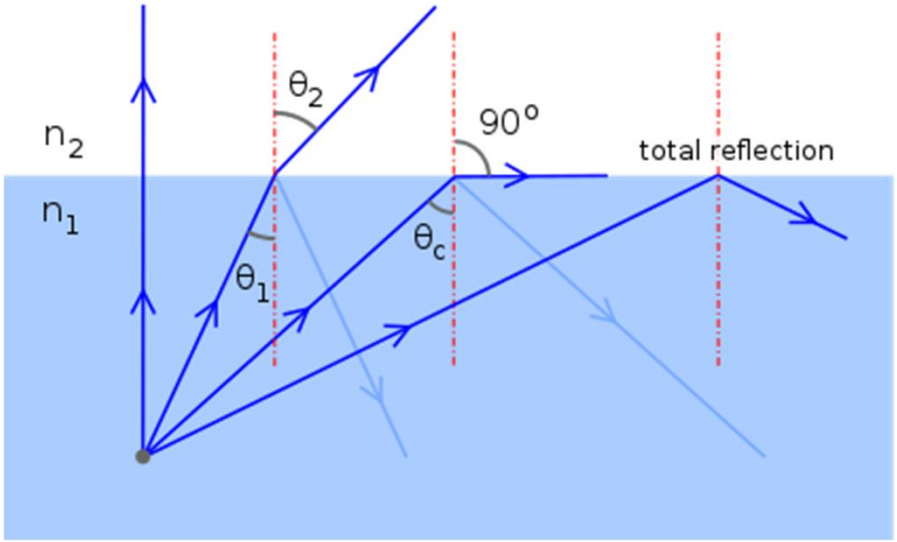
Light is a form of energy that produces in us the sensation of sight. Reflection of light is the phenomenon of bouncing back of light in the same medium on striking the surface of any object. The two laws of reflection are the incident ray, the reflected ray and the normal (at the point of incidence), all lie in the same plane and the angle of reflection ($r$) is always equal to the angle of incidence ($i$). Refraction of light is the phenomenon of change in the path of light in going from one medium to another.

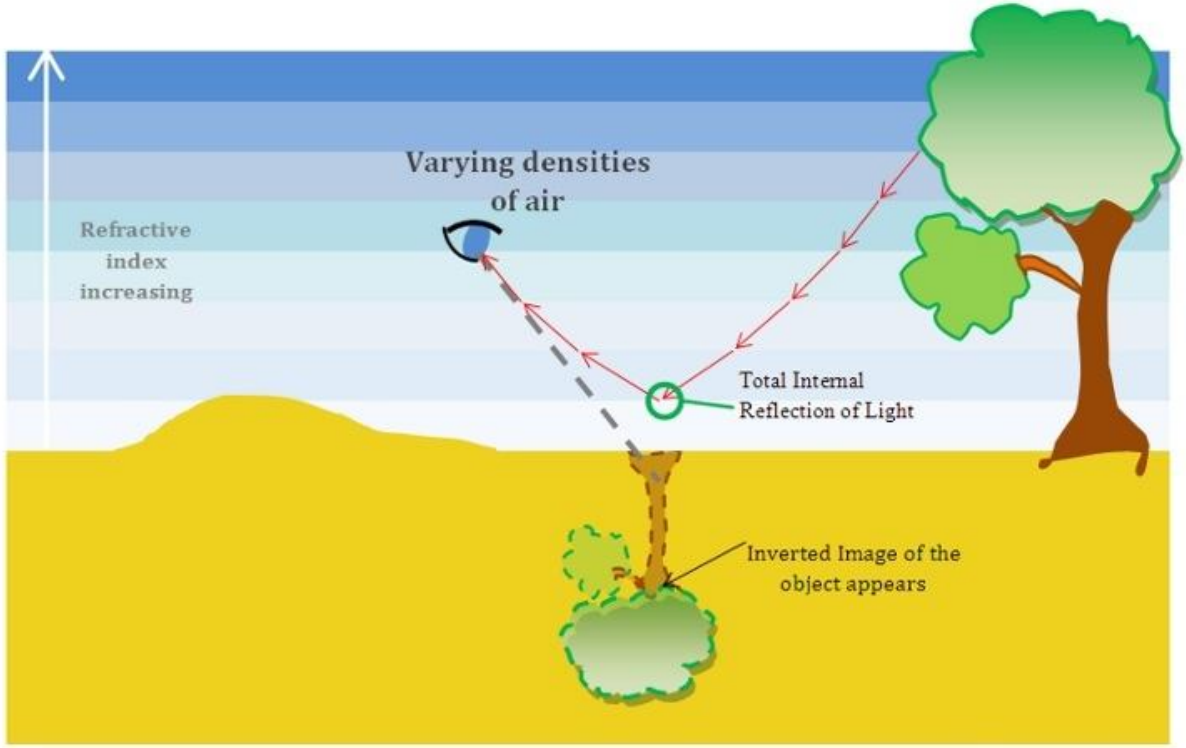


A ray of light passes from a medium of water to that of air. Light ray will be refracted at the junction separating the two media. Since it passes from a medium of a higher refractive index to that having a lower refractive index, the refracted light ray bends away from the normal.

At a specific angle of incidence, the incident ray of light is refracted in such a way that it passes along the surface of the water. This particular angle of incidence is called the **critical angle**. Here the angle of refraction is 90 degrees.

When the angle of incidence is greater than the critical angle, the incident ray is reflected back to the medium. We call this phenomenon **total internal reflection.**






Mirage is an optical illusion which is responsible for the appearance of the water layer at short distances in a desert or on the road. Mirage is an example of total internal reflection which occurs due to atmospheric refraction.

(i) Mirage is caused due to
(a) total Internal Reflection of light by the various layers of air
(b) illusion of the presence of water
(c) result of refraction of light from a non-uniform medium
(d) during sunny days when driving on a roadway

**Ans:** (a) total Internal Reflection of light by the various layers of air

(ii) What is mirage?
(a) Depends on the position of object
(b) Mirror is concave and the lens is convex
(c) Goes straight into the second medium
(d) Optical illusion caused due to total Internal Reflection

**Ans:** (d) Optical illusion caused due to total Internal Reflection

(iii) What is the condition for total internal reflection?
(a) Angle of incidence is less than to critical angle
(b) Angle of incidence is equal to critical angle
(c) Angle of incidence is greater than to critical angle
(d) None of these

**Ans:** (c) Angle of incidence is greater than to critical angle

(iv) Mirage is observed mainly during _____ days.
(a) Sunny (b) Winter (c) Spring (d) Hot

**Ans:** (a) Sunny

(v) How a mirage is formed?

(a) Between focus and centre of curvature

(b) Is formed away from the normal

(c) Illusion of the presence of water and is a result of refraction of light from a non-uniform medium

(d) Is reflected along the same path

(c) Illusion of the presence of water and is a result of refraction of light from a non-uniform medium