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Q1.

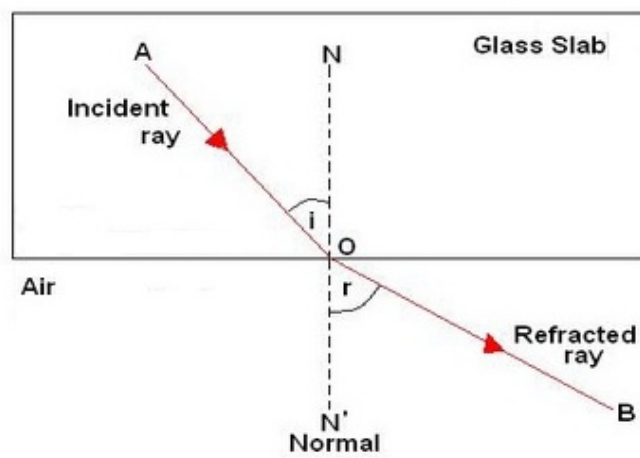
It will bend towards the normal.

Q2.

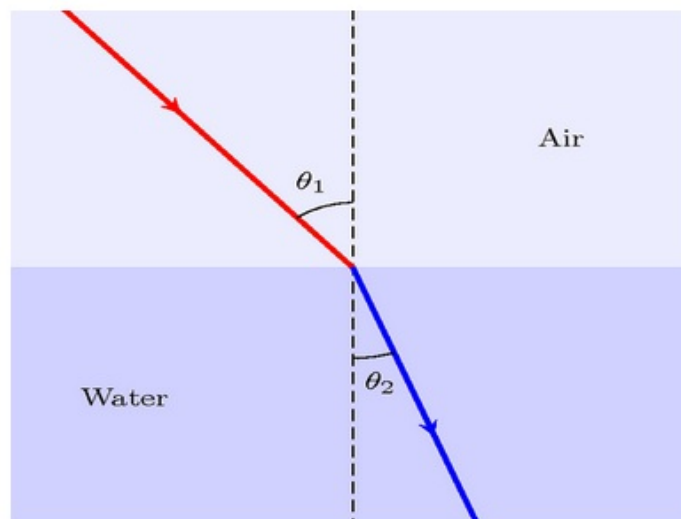
It will bend away from the normal.

Q3.

A ray of light travelling from the glass slabs and emerges into the air.

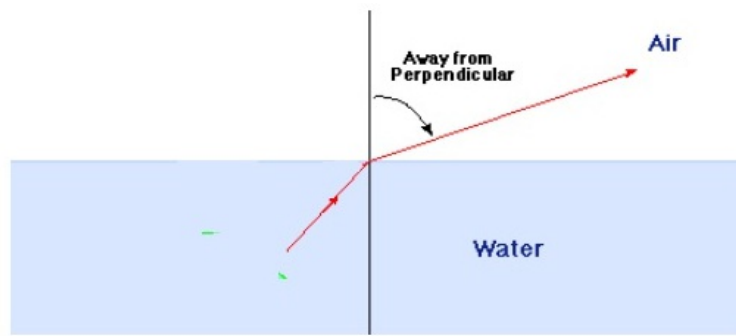


Q4.



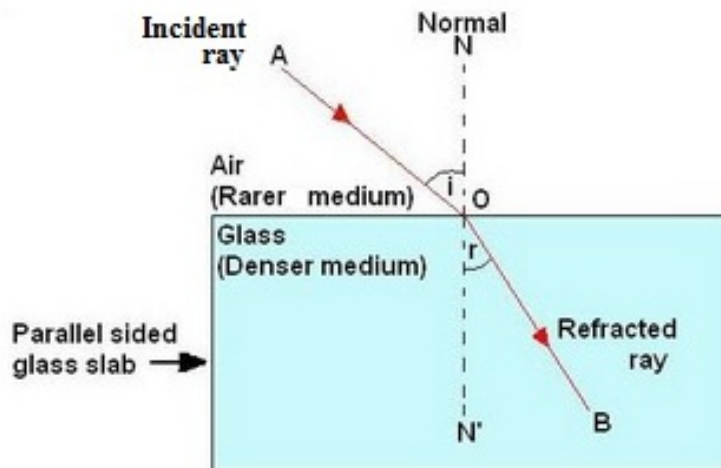
Q5.

A ray of light travelling through water to air.



Q6.

A ray of light incidence on parallel sided glass slab.



Q7.

The ray of light will bend away from the normal.

Q8.

The ray of light bends towards the normal. This is because water is an optically denser medium than air.

Q9.

It will bend away from the normal.

Q10.

Two effects caused by refraction of light are:
a pool of water appears to be less deep than it actually is.
an object placed under water appears to be raised.

Q11.

This is due to refraction of light.

Q12.

Angle of refraction is less than the angle of incidence.

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Q13.

A ray of light travelling from air to glass block, will bend towards the normal.

Q14.

A ray of light travelling from water into glass will bend towards the normal.

Q15.

Light rays travel faster in air.

Q16.

Refraction of light.

Q17.

True.

Q18.

A ray of light bends when it travels from one medium to another due to the change in the speed of light.

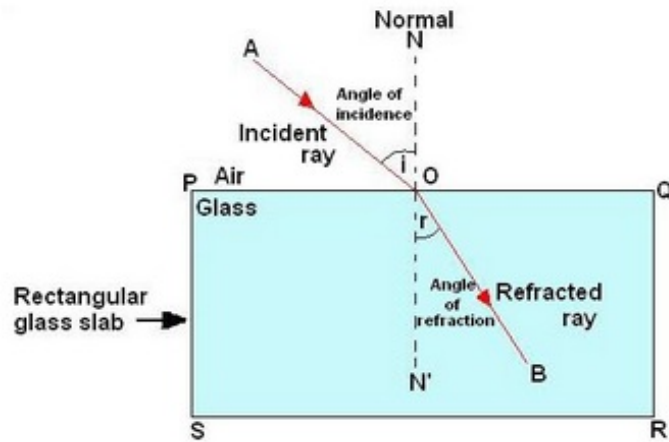
Q19.

(a) not.

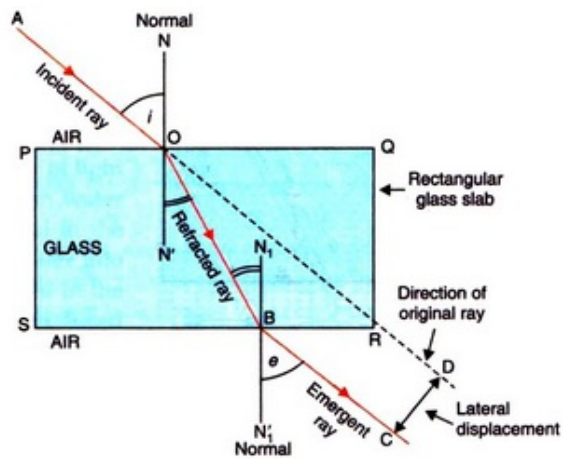
(b) refracted.

Q20.

The change in direction of light when it passes from one medium to another obliquely, is called refraction of light.



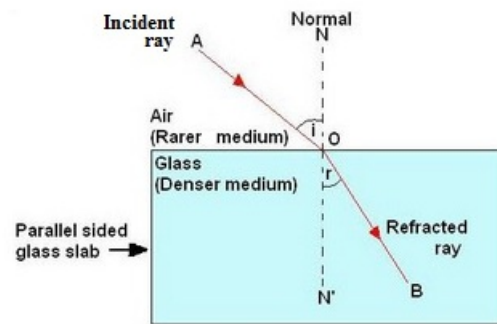
Q21.



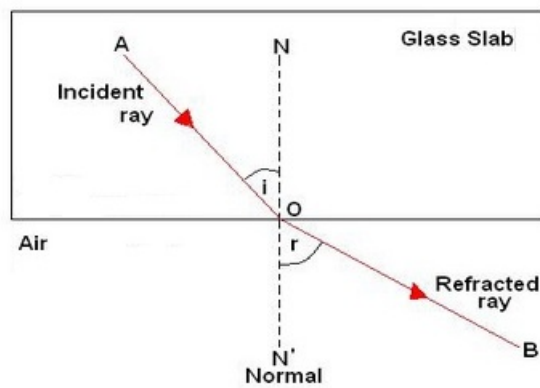
The final direction of the ray of light is same as the incident direction.

Q22.

(a) Ray of light travelling from air into an optically denser medium.

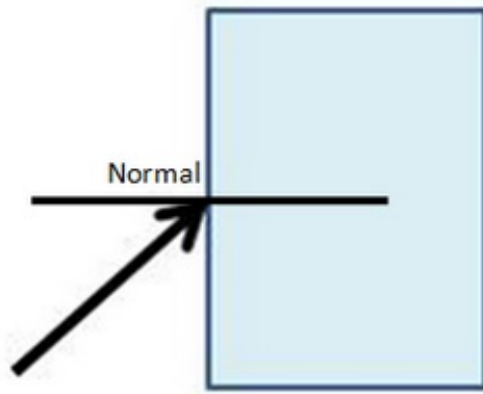


(b) Ray of light travelling from an optically denser medium into air.

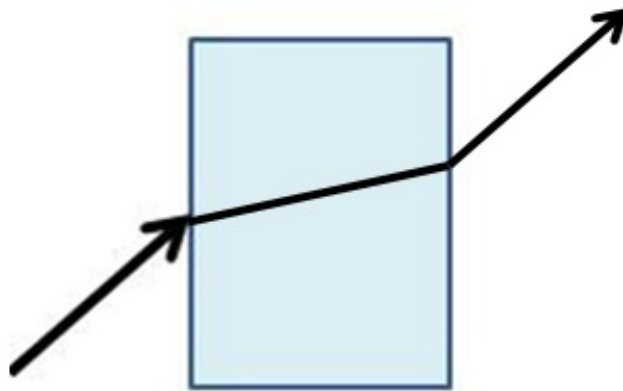


Q23.

(a)



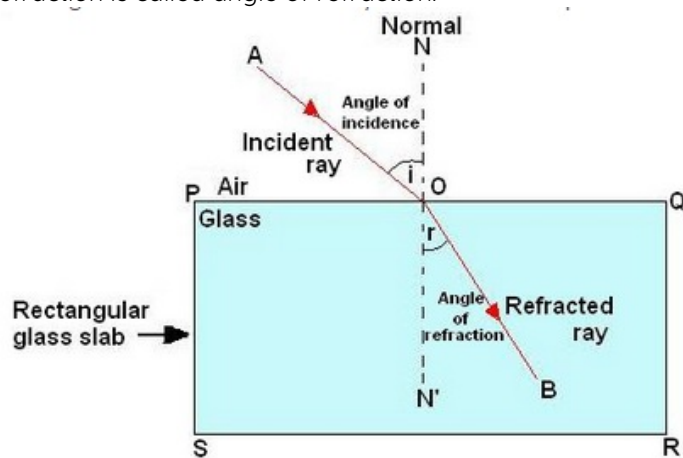
(b)



Q24.

The angle between the incident ray and normal at the point of incidence is called angle of incidence.

The angle between the refracted ray and normal at the point of refraction is called angle of refraction.



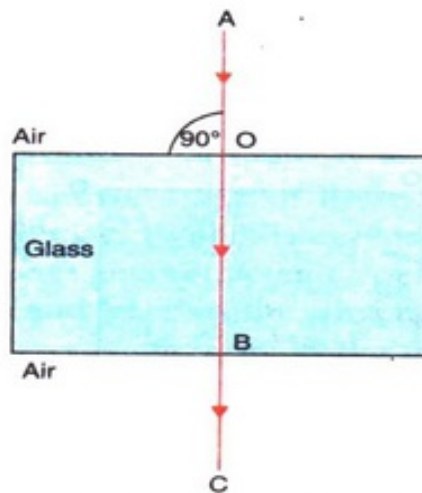
Q25.

(a) Glass is optically denser than the water.

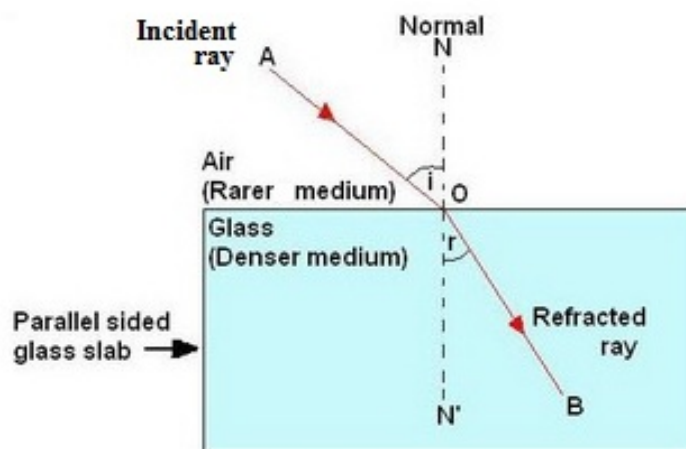
(b) The ray will bend away from the normal.

Q26.

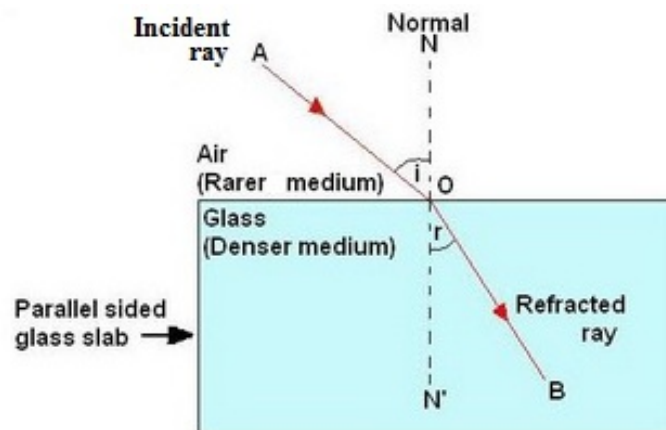
(a) If ray of light hits the block at 90°



(b) If ray of light hits the block other than the 90°



Q27.

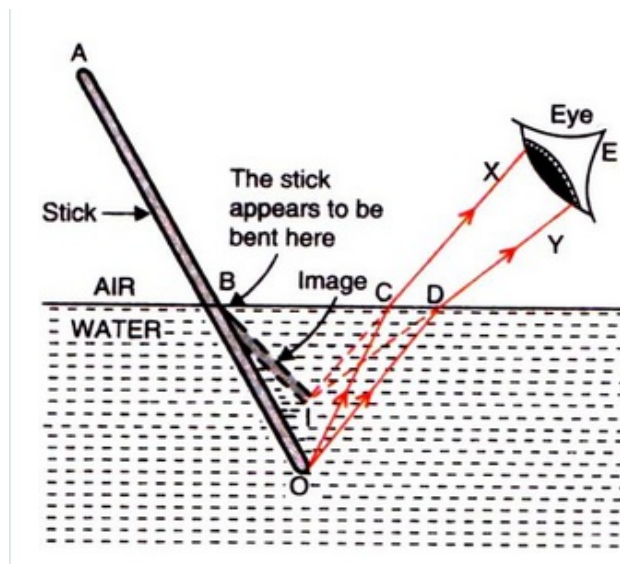


The ray of light bends towards the normal.

Q28.

(a) The apparent bending of the stick is due to the refraction of light when it passes from water into air.

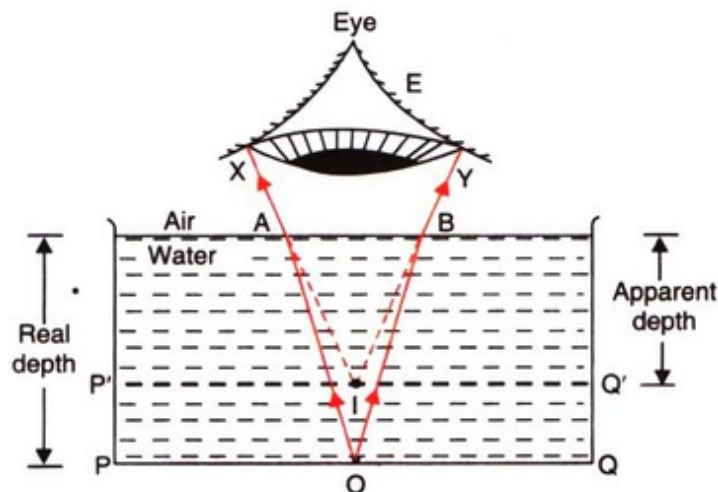
A ray of light OC coming from O passes from water into air and gets refracted away from normal (along CX). Another ray OD gets refracted along DY. The two refracted rays CX and DY, when produced backwards, appear to meet at point I. Thus, I is the virtual image of the end O of the stick. So, the stick appears to be bent as shown below.



(b) This phenomenon is due to the refraction of light as it comes out from water into air.

Q29.

(a) If we look into a tank of water, it appears to be less deep than it really is. This is due to the refraction of light which takes place when light rays pass from the tank of water into air. When we look into the tank, we do not see the actual bottom of the tank, we see a virtual image of the bottom of the pool which is formed by the refraction of light coming from the water into the air.



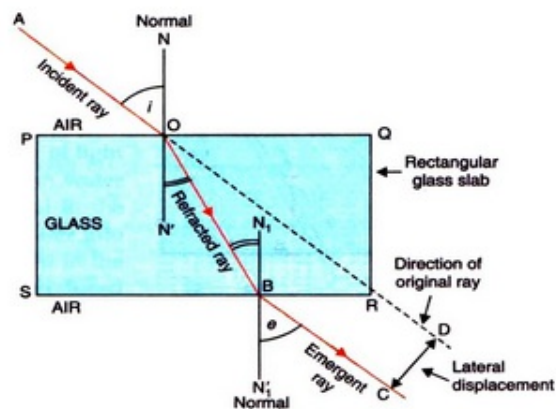
(b) Refraction of light

(b) Refraction of light.

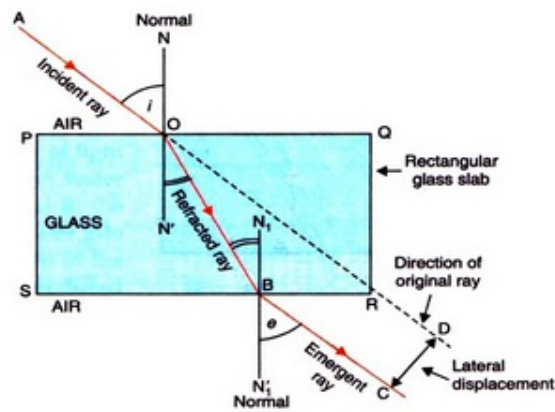
Q30.

(a)

(a)



(a)



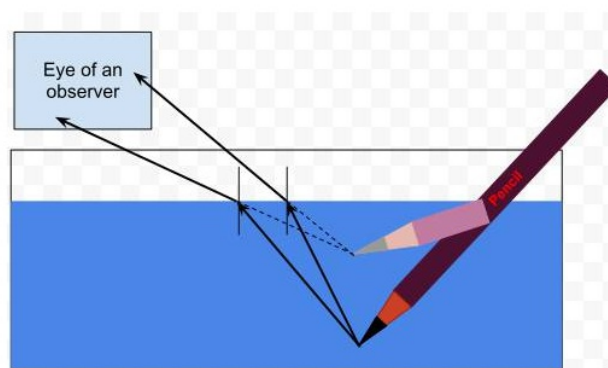
(b) The lateral displacement is shown in the above diagram.

(c) Factors on which the lateral displacement depends are:

- (i) Angle of incidence
- (ii) Thickness of glass slab
- (iii) Refractive index of glass slab

Q31.

A pencil placed in water appears to be bent because of refraction of light. The refraction causes an apparent shift in the position of the part of the pencil within the water.



If water is replaced by another liquid which is optically more dense than water, then the bending of the pencil will increase. This is because the optically denser medium will cause more refraction of light rays.

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Q39.

E.

Q40.

(a) 0°

(b) 0°

Q41.

The angle of reflection is equal to the angle of incidence but the angle of refraction is not equal to the angle of incidence.

Q42.

(a) Obliquely; making a large angle of incidence.

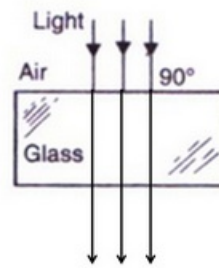
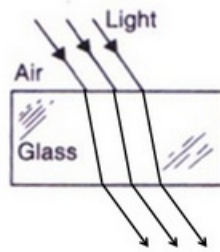
(b) Perpendicular to the glass surface.

Q43.

(a) By making the light enter from a denser medium to a rarer medium.

(b) Incidence should be at right angle to the surface of substance.

Q44.



Q45.

A beam of light bends when it enters glass at an angle. This is due to refraction of light. It does not bend if it enters the glass at right angles because no refraction will occur in this case, the angle of incidence in this case is zero and angle of refraction is also zero.

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