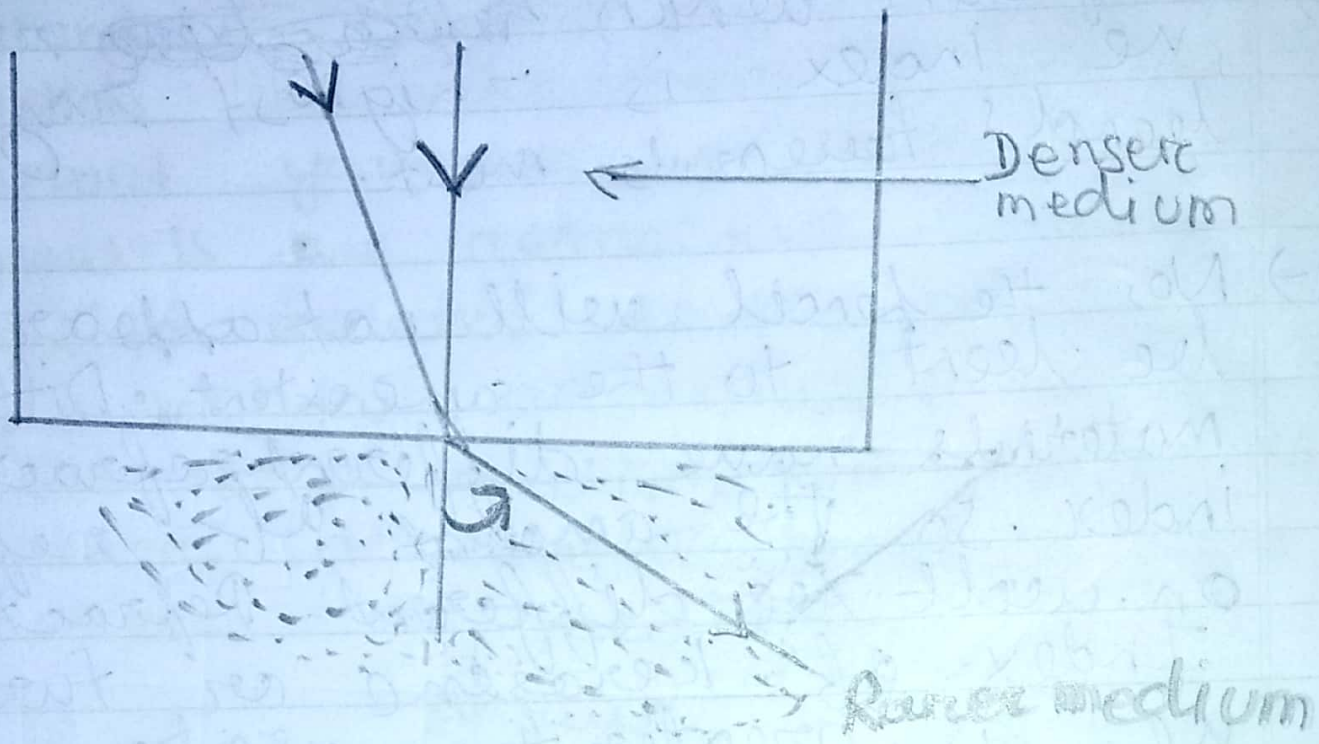
11-)



When a ray of light travels from a denser medium to rarer medium it bends away from the normal

12-) The refracted ray oa is shown in each case.

a) towards the normal as Angle of refraction < angle of Incidence

b → away from the normal as angle of refraction > angle of

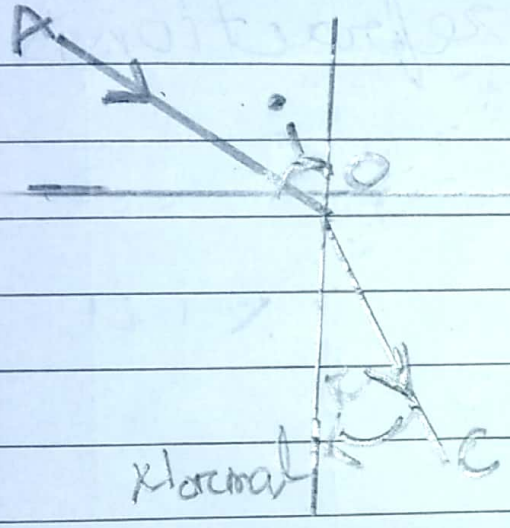
incidense.

c) Refracted ray goes undeviated or angle of incidence = 0

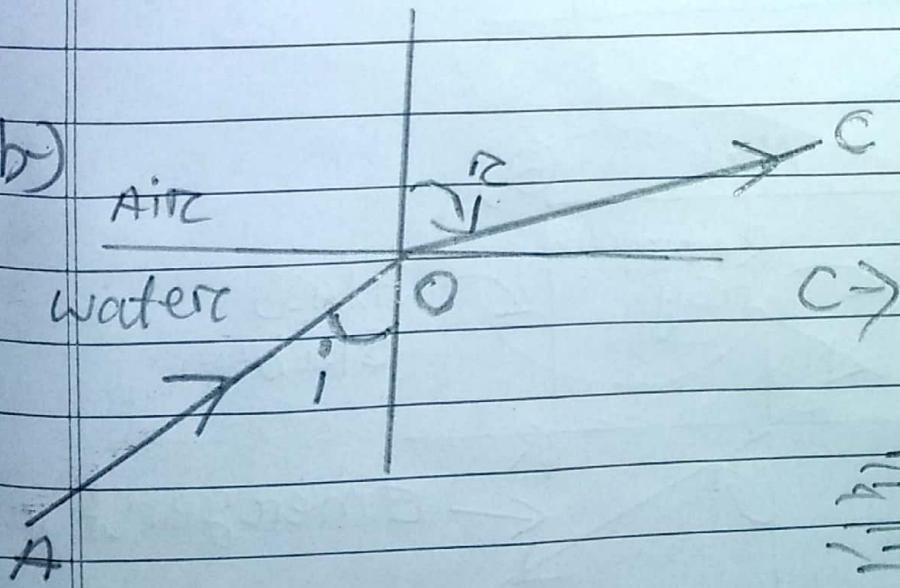
angle of refraction = 0

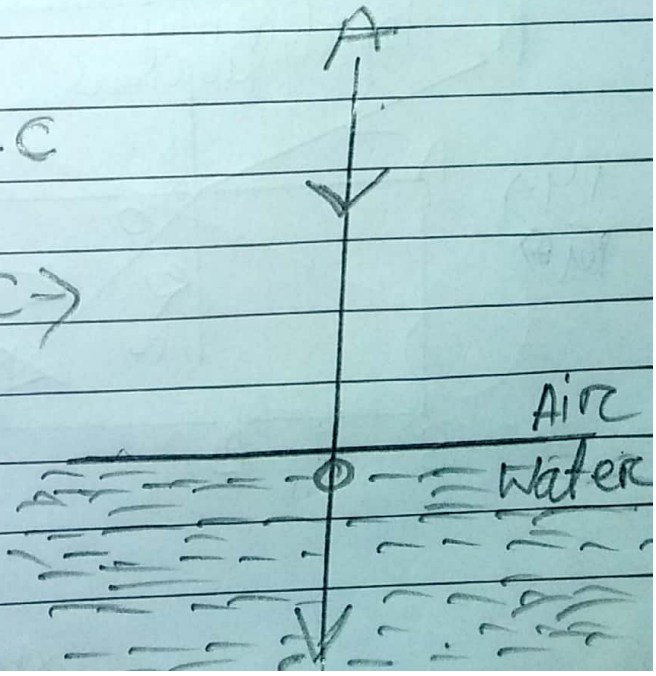
~~(3) water is~~

a)



b)



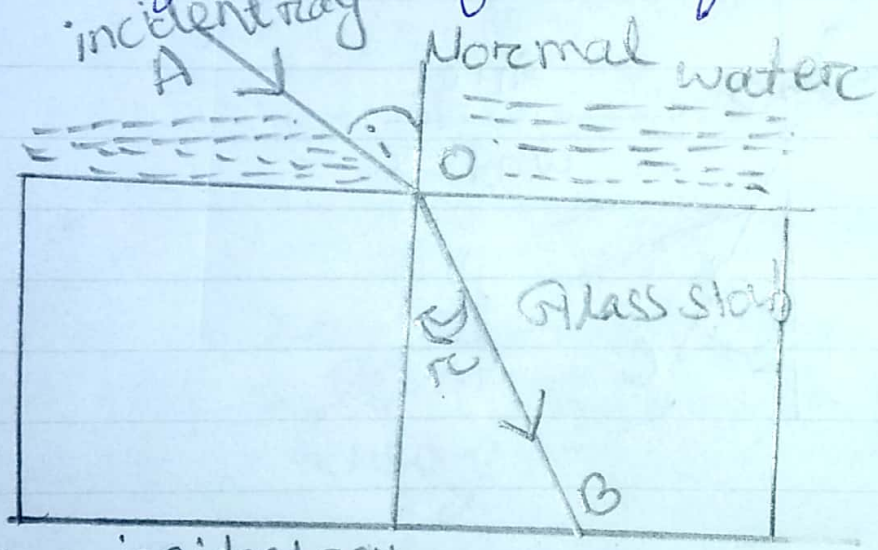


13) Water is rarer than glass. Light travels from water to glass, i.e from a rarer to denser medium.

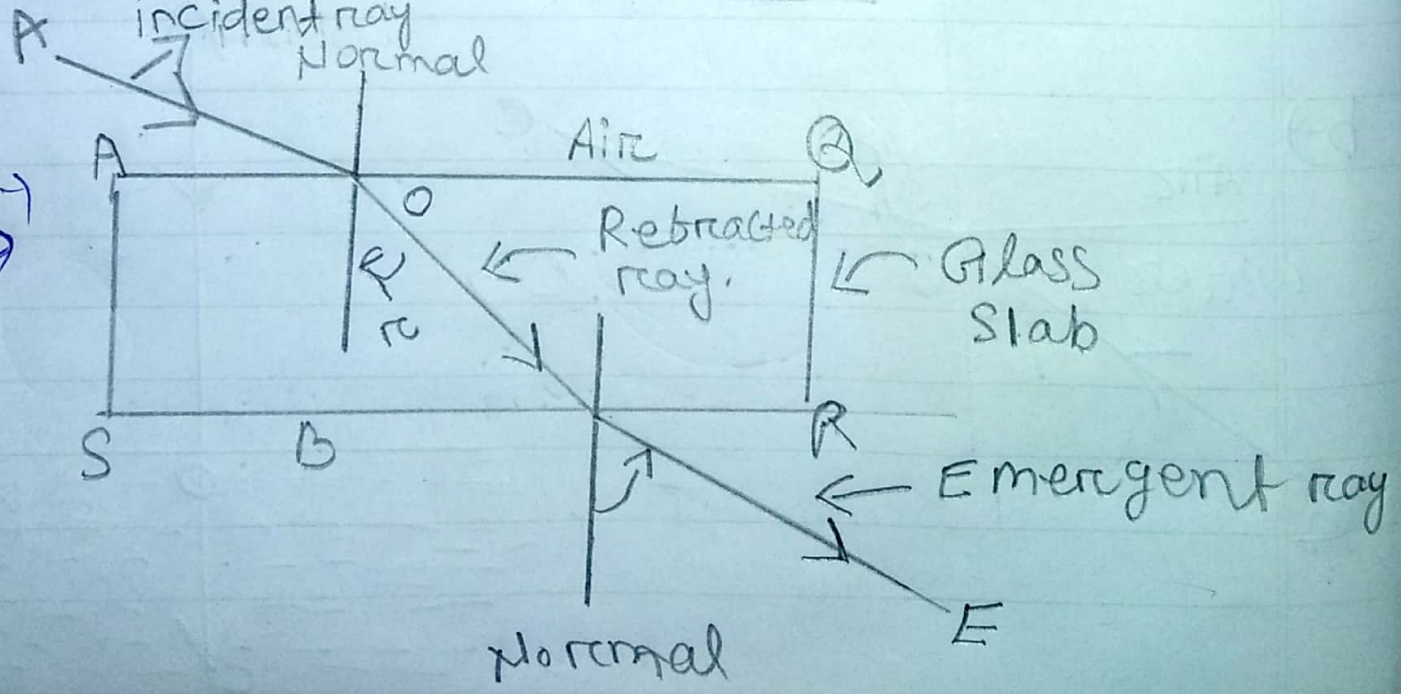
1) The incident ray is AO

2) Angle of Incidence is i.

3) Angle of refraction is r.



14)



1→ Incident ray OA

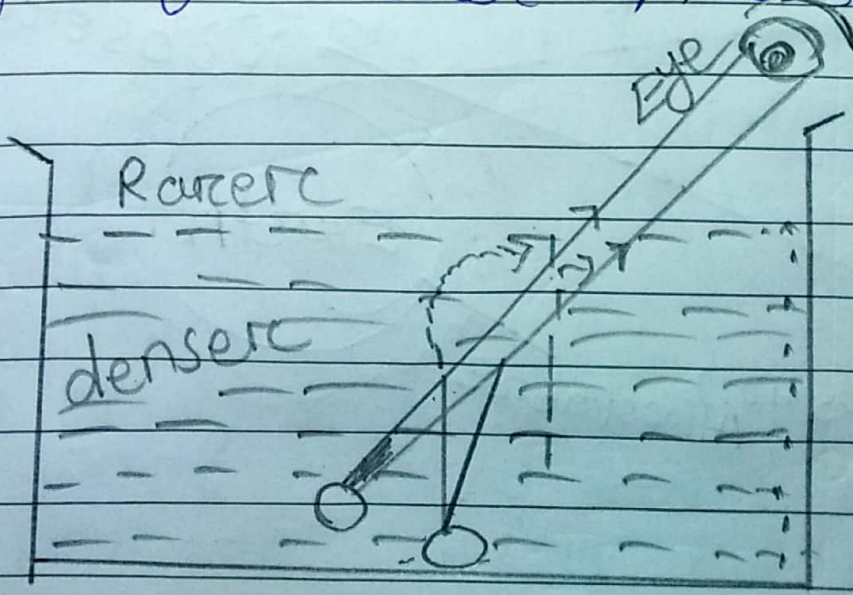
2→ Refracted ray OB

3→ Emarget ray BE

(5a→) A coin at A appears to be at B i.e. depth of coin is observed is less than the actual depth at A.

The ray of light starting from A medium bends away from the normal due to the refraction of light the coin appears at B at a lower depth Hence in the same way the depth of water appears to be less.

b→



b) When light passes from denser medium to rarer medium appears to come from a virtual image in site of a. This is due to refraction of light. that stick appears to be raised. raised or bend.

c) Horizon

Actual position of sun.

At sunrise, when the sun is just below the horizon, the light from the sun suffers refraction from rarer to denser medium and bend towards the normal at each refraction. As a result the sun is seen in advance before it rises above the horizon in the morning and similarly after the sunset above the horizon after the sunset

10) A mirage is naturally occuring optical phenomenon in which light rays bend via refraction near the surface due to heat to produce an image of distant objects, or the sky. Sand becomes very hot during noon and the air in contact becomes rarer medium. When light travels from denser to rarer medium the light rays are bent away from the normal when refracted fro

rarer to denser medium, the light rays bend towards the normal and the tree appears to be inverted.