PHYSICS

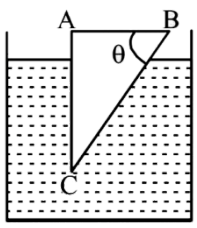
31. A ray of light is incident on the surface of a glass plate of thickness t. If the angle of incidence θ is small, the emerging ray would be displaced sideways by an amount
[Take n = refractive index of glass
(1) $\frac{t\theta n}{(n+1)}$ (2) $\frac{t\theta(n-1)}{n}$
(3) $\frac{t\theta n}{(n-1)}$ (4) $\frac{t\theta(n+1)}{n}$

32. In refraction, light waves are bent on passing from one medium to the second medium, because in the second medium
(1) the frequency is different
(2) the coefficient of elasticity is different
(3) the speed is different
(4) the amplitude is smaller

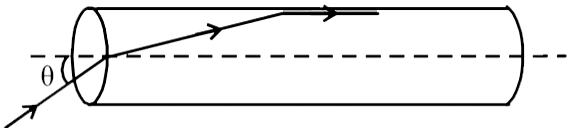
33. A fish at a depth of 12 cm in water is viewed by an observer on the bank of a lake. To what height the image of the fish is raised?
[Refractive index of lake water $= \frac{4}{3}$]
(1) 9 cm (2) 12 cm
(3) 3.8 cm (4) 3 cm

34. A plane parallel glass slab of thickness x and refractive index is placed in the path of a beam of light converging towards a point O on a screen. As a result, the point of convergence shifts by
(1) $x\left[1-\frac{1}{\mu}\right]$ nearer
(2) $x\left[1-\frac{1}{\mu}\right]$ away
(3) $x\left[1+\frac{1}{\mu}\right]$ nearer
(4) $x\left[1-\frac{1}{\mu}\right]$ away

35. A glass prism of refractive index 1.5 is immersed in water $\left(\mu=\frac{4}{3}\right)$. A light beam incident normally on the face AB is totally reflected to reach the face BC if
(1) $\sin\theta > \frac{8}{9}$
(2) $\frac{2}{3} < \sin\theta < \frac{8}{9}$
(3) $\sin\theta \le \frac{2}{3}$
(4) $\cos\theta \ge \frac{8}{9}$



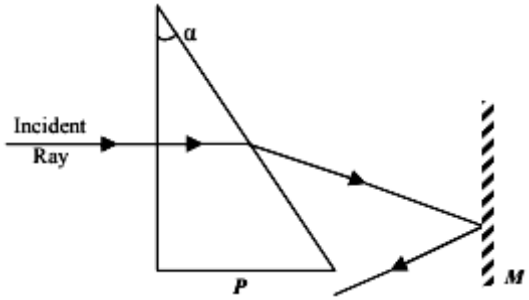
36. A transparent solid cylindrical rod has a refractive index of $\frac{2}{\sqrt{3}}$. It is surrounded by air. A light ray is incident at the mid-point (d) u = 1.50 of one end of the rod as shown in the figure



(1) $\sin^{-1}\left(\frac{2}{\sqrt{3}}\right)$ (2) $\sin^{-1}\left(\frac{1}{\sqrt{3}}\right)$
(3) $\sin^{-1}\left(\frac{1}{2}\right)$ (4) $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$

37. Which of the following is not due to total internal reflection?
(1) Working of optical fibre
(2) Difference between apparent and real depth of a pond
(3) Mirage on hot summer days
(4) Brilliance of diamond

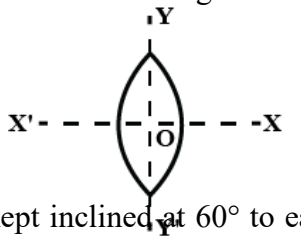
38. P is a small angled prism of angle 3° made of a material (μ = 1.5).A ray of light is incident as shown in figure, M is a plane mirror. The angle of deviation for the ray reflected from the mirror M with respect to the incident ray is



(1) 4.5° (2) 175.3°
(3) 177° (4) 178.5°

39. A equiconvex lens is cut into two halves along (i) XOX' and (ii) YOY' as shown in the figure. Let f, f ′, f ″ be the focal lengths of the complete lens, of each half in case (i) and of each half in case (ii), respectively. Choose the correct statement from the following

(1) f′ = f, f " = 2f
(2) f ′ = 2f, f " = f
(3) f ′ = f, f " = f
(4) f ′ = 2f, f " = 2f



40. If two mirrors are kept inclined at 60° to each other and a body is placed at the middle, then total number of images formed is

(1) six (2) five
(3) four (4) three