ST. LAWRENCE HIGH SCHOOL

A JESUIT CHRISTIAN MINORITY INSTITUTION

WORK SHEET: 41.

Subject : PHYSICS

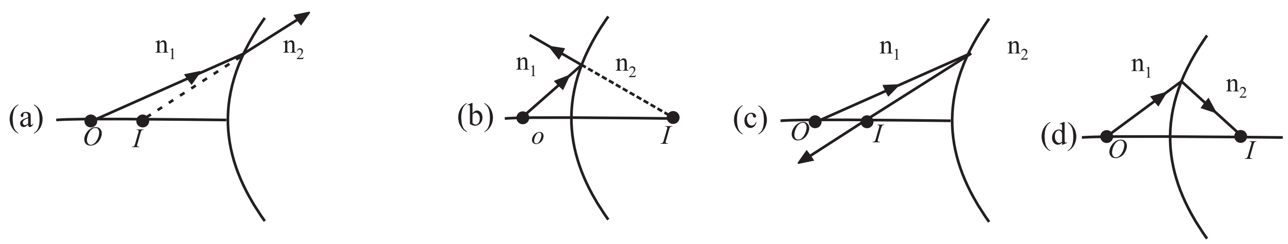
Date : 28.11.2020

CLASS : XII

Chapter: Refraction of light at Spherical surface

Topic: Convex Spherical surface, concave spherical surface.

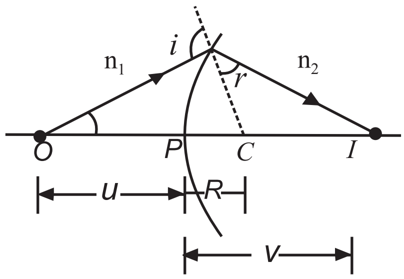
1: Consider a convex Surface separating two media of refractive indices n_1 and n_2 respectively, $n_2 > n_1$Which of these is a correct diagram?



2: For the refraction shown below the correct relation is,

(a) $\frac{n_2}{v} - \frac{n_1}{u} = \frac{n_2 - n_1}{R}$ (b) $\frac{n_1}{v} - \frac{n_2}{u} = \frac{n_2 - n_1}{R}$

(c) $\frac{n_1}{v} - \frac{n_2}{u} = \frac{n_1 - n_2}{R}$ (d) $\frac{n_2}{v} - \frac{n_1}{u} = \frac{n_1 - n_2}{R}$



3: Light from a point source in air falls on a spherical glass surface (n=1.5) and radius of curvature = 20 cm). The distance of the light source from the glass surface is 100 cm. Image distance from the glass surface is

(a) 20 cm (b) 50 cm (c) 100 cm (d) 75 cm

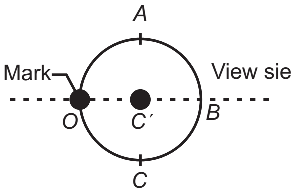
4: A magician during a show makes a glass lens with n =1.47 disappear in a trough of liquid. Refractive index of the liquid is

(a) 1.47 (b) 1.33 (c) 4/3 (d) 12/5

5: An object is placed in front of a sphere of radius R at distance x from the first surface. The value of x for which the light after refraction from the first surface becomes parallel to the axis is

(a) $\frac{R}{(\mu - 1)}$ (b) $\frac{R}{(\mu + 1)}$ (c) $\frac{2R}{(1 + \mu)}$ (b) $\frac{R\mu}{(\mu + 1)}$

6: A mark placed on the surface of a sphere is viewed through glass from a position directly opposite as shown in the figure. The diameter of the sphere is 30 cm and refractive index of glass is 1.5. The position of the image is



(a) at a distance of 60 cm from surface *ABC* in the direction of incident light
(b) at a distance of 60 cm from the surface *ABC* opposite to the direction of incident light
(c) at a distance of 30 cm from the surface *AOC* opposite to the direction of incident light on ABC
(d) Both (b) and (c)

7: A parallel beam of light is incident on a solid transparent sphere of a material of refractive index n. If a point image is produced at the back of the sphere, the refractive index of the material of sphere is

(a) 2.5 (b) 1.5 (c) 1.25 (d) 2.0

8: A point source of light at the surface of a sphere comes as a parallel beam of light and emerge from the opposite surface of the sphere. The refractive index of the material of the sphere is

(a) 1.5 (b) 5/3 (c) 2 (d) 2.5

9: A lens is made of flint glass ($\mu = 1.5$).When the lens is immersed in a liquid of refractive index 1.25, the focal length

(a) increases by a factor of 1.25
(b) increases by a factor of 2.5
(c) increases by a factor of 1.2
(d) decreases by a factor of 1.2

10: A concave lens of glass of refractive index 1.5 has both surfaces of same radius of curvature R. On immersion in a medium of refractive index 1.75, it will behave as a

(a) convergent lens of focal length 3.5 *R*
(b) convergent lens of focal length 3.0 *R*
(c) divergent lens of focal length 3.5 *R*
(d) divergent lens of focal length 3.0 *R*

11: A hollow double concave lens is made of very thin transparent material. It can be filled with air or either of two liquids L_1 or L_2 having refractive indices n_1 and n_2, respectively ($n_1 > n_2 > 1$). The lens will diverge a parallel beam of light if it is filled with

(a) air and placed in air

(b) air and immersed in L_1

(c) L_1 and immersed in L_2

(d) L_2 and immersed in L_1

12: A thin lens of glass (μ =1.5) of focal length ± 10 cm is immersed in water (μ = 1.33). The new focal length is

(a) 20 cm (b) 40 cm (c) 48 cm (d) 12 cm

13: Two identical thin plano-convex glass lenses (refractive index 1.5) each having radius of curvature of 20 cm are placed with their convex surfaces in contact at the centre. The intervening space is with oil of refractive index 1.7. The focal length of the combination is

(a) - 20 cm (b) - 25 cm (C) - 50 cm (d) 50 cm

14: A plano-convex lens fits exactly into a plano-concave lens. Their plane surfaces are parallel to each other. If lenses are made of different materials of refractive indices μ_1 and u_2 and R is the radius of curvature of the curved surface of the lenses, then the focal length of the combination is

(a) $\frac{R}{2(\mu_1 + \mu_2)}$ (b) $\frac{R}{2(\mu_1 - \mu_2)}$ (c) $\frac{R}{(\mu_1 - \mu_2)}$ (d) $\frac{2R}{(\mu_2 - \mu_1)}$

15: A double convex lens whose refractive index is 1.33 has both radii of curvature of magnitude 10 cm. If an object is placed at a distance of 5 cm from this lens, the position of the image formed is

(a) 7.46 same side of the object

(b) 7.46 opposite side of the object

(c) 14.45 same side of the object

(d) 14.45 opposite side of the object