1. The distance of an object from a spherical mirror is equal to the focal length of the mirror. Then the image:

(1) must be at infinity

(2) may be at infinity

(3) may be at the focus

(4) none

2. An object is placed in front of a spherical mirror whose 2 times magnified image is formed on screen. Then choose **CORRECT** option :-

(1) Mirror is concave m = +2

(2) Mirror is concave m = −2

(3) Mirror is convex m = +2

(4) Mirror is convex m = −2

3. When a ray of light of frequency 6×10^{14} Hz travels from water of refractive index 4/3 to the glass of refractive index 8/5, its :-

(1) frequency decreases to 5/6 of its initial value

(2) speed decreases to 5/6 of its initial value

(3) wavelength decreases to 6/5 of its initial value

(4) speed increases to 6/5 of its initial value

4. A ray of light is incident at the glass–water interface at an angle i, it emerges finally parallel to the surface of water, then the value of μ_g would be :−


(1) (4/3) sin i
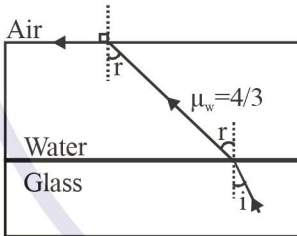
(2) 1/sin i

(3) 4/3

(4) 1

5. A ray of light is incident at 60° on a prism of refracting angle 30°. The emerging ray is at an angle 30° with the incident ray. The value of refractive index of the prism is :-

(1) $\dfrac{\sqrt{3}}{4}$ (2) $\dfrac{\sqrt{3}}{2}$ (3) $\sqrt{3}$ (4) $\dfrac{2}{\sqrt{3}}$

6. The refracting angle of the prism is 60° and minimum deviation of 30°, then the angle of incidence is:-

(1) 30°   (2) 45°

(3) 25°   (4) 60°

7. Figure shows graph of deviation δ versus angle of incidence for a light ray striking a prism. Angle of prism is :-

(1) 30º   (2) 45º

(3) 60º   (4) 75º
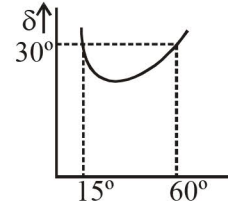
8. There is a prism with refractive index equal to $\sqrt{2}$ and the refracting angle equal to 30°. One of the refracting surface of the prism is polished. A beam of monochromatic light will retrace its path if its angle of incidence over the first refracting surface of the prism is :-

(1) 0°   (2) 30°

(3) 45°   (4) 60°

9. The refractive index for the material of a 60° prism is 1.50. Then the angle of incidence for minimum deviation is nearly.

$(\sin 42° \approx \dfrac{2}{3}$ and $\sin 49° \approx \dfrac{3}{4})$
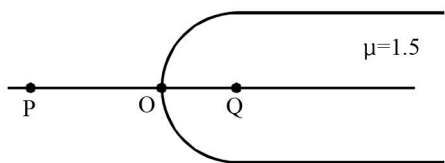
(1) 30°   (2) 49°

(3) 38°   (4) 28°

10. A ray of light is incident on an equilateral glass prism placed on a horizontal table. For minimum deviation which of the following is true ?

(1) PQ is horizontal

(2) QR is horizontal

(3) RS is horizontal

(4) Either PQ or RS is horizontal

11. One end of a glass rod of refractive index n = 1.5 is a spherical

surface of radius of curvature R. The centre of the spherical surface lies inside the glass. A point object placed in air on the axis of the rod at the point P has its real image inside glass at the point Q (see fig.). A line joining the points P and Q cuts the surface at O such that OP = 2OQ. The distance PO is :-

(1) 8 R (2) 7 R
(3) 2 R (4) None of these

12. A point object is placed at the centre of a glass sphere of radius 6 cm and refractive index 1.5. The distance of the virtual image from the surface of the sphere is :-

(1) 2 cm (2) 4 cm
(3) 6 cm (4) 12 cm

13. A concave lens of glass, 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 :-

(1) convergent lens of focal length 3.5R

(2) convergent lens of focal length 3.0 R.

(3) divergent lens of focal length 3.5 R

(4) divergent lens of focal length 3.0 R

14. An equiconvex lens of refractive index μ and radius of curvature R has its one surface silvered. A point source O is placed before the silvered lens so that its image is coincident with it, the distance of the object from the lens is :-
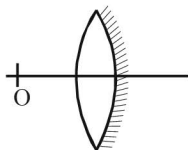
(1) $\dfrac{R}{(\mu-1)}$ (2) $\dfrac{2R}{(\mu-1)}$

(3) $\dfrac{R}{(2\mu-1)}$ (4) $\dfrac{2R}{(2\mu-1)}$

15. A ray gets succesively reflected from two mirrors inclined at an angle of 40°. If the angle of incidence on the first mirror is 30° then the net deviation of this ray is

(1) 40° (2) 280°
(3) 80° (4) 240°

16. A small object's 10 cm in front of a plane mirror. A man stands 30 cm from the mirror, behind the object and looks at the object's image. He should focus his eyes to see the image at a distance

(1) 25 cm (2) 35 cm
(3) 45 cm (4) 40 cm

17. An object 5 cm tall is placed 1 m from a concave spherical mirror which has a radius of curvature of 20 cm. The size of the image is :–

(1) 0.11 cm (2) 0.50 cm
(3) 0.55 cm (4) 0.60 cm

18. The focal length of a concave mirror is 12 cm. Where should an object of length 4 cm be placed, so that a real image of 1 cm length is formed ?

(1) 48 cm (2) 3 cm
(3) 60 cm (4) 15 cm

19. The wavelength of light in two liquids 'x' and 'y' is 3500 Å and 7000 Å. Then the critical angle of x relative to y will be

(1) 60° (2) 45°
(3) 30° (4) 15°

20. A bird in air looks a fish vertically below it and inside water ; h_1 is the height of the bird above the surface of water and h_2 the depth of the fish below the surface of water. If refractive index of water with respect to air be μ, then the distance of the fish as observed by the bird is

(1) $h_1 + h_2$ (2) $h_1 + \dfrac{h_2}{\mu}$

(3) $\mu h_1 + h_2$ (4) $\mu h_1 + \mu h_2$

21. An air bubble in a glass slab (μ = 1.5) is 6 cm deep as viewed from one face and 4 cm deep as viewed from the other face. The thickness of the glass slab is

(1) 6.67 cm (2) 10 cm
(3) 15 cm (4) Data is incomplete

22. The minimum distance between an object and its real image formed by a convex lens is

(2) 2f   (2) 4f
(3) f   (4) zero

23. A point object is placed at a distance of 20 cm form a thin plano-convex lens of focal length 15 cm. If the plane surface is silvered, the image will from at
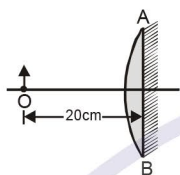
(1) 60 cm from left of AB
(2) 30 cm from left of AB
(3) 12 cm from left of AB
(4) 60 cm from right of AB

24. A convex lens is made up of three different materials as shown in the figure. For a point object placed on its axis, the number of images formed are

(1) 1   (2) 3   (3) 4   (4) 5

25. If tube length of astronomical telescope is 105 cm and magnifying power is 20 for normal setting. Calculate the focal length of objective :–

(1) 100 cm   (2) 10 cm
(3) 20 cm   (4) 25 cm

26. A point object is moving on the principal axis of a concave mirror of focal length 24 cm, towards the mirror. When it is at a distance of 60 cm from the mirror, its velocity is 9 cm/sec. What is the velocity of the image at that instant

(1) 5 cm/sec towards the mirror
(2) 4 cm/sec towards the mirror
(3) 4 cm/sec away from mirror
(4) 9 cm/sec away from mirror

27. A ray of light making an angle 10° with the horizontal is incident on a plane mirror an angle θ with the horizontal. What should be the value of θ so that the reflected ray goes vertically upwards ?

(1) 20°   (2) 30°
(3) 40°   (4) 45°

28. What should be the maximum acceptance angle at the air–core interface of an optical fibre if n_1 and n_2 are the refractive indices of the core and the cladding, respectively

(1) $\sin^{-1}(n_2/n_1)$ (2) $\sin^{-1}\sqrt{n_1^2-n_2^2}$

(3) $\left[\tan^{-1}\dfrac{n_2}{n_1}\right]$ (4) $\left[\tan^{-1}\dfrac{n_1}{n_2}\right]$

29. A telescope consisting of an objective of focal length 60 cm and an eyepiece of focal length 5 cm is focussed to a distant object in such a way that parallel rays emerge from the eye piece. If the object subtends an angle of 2° at the objective, then find the angular width of the image.

(1) 24°   (2) 26°
(3) 21°   (4) 20°

30. A prism having an apex angle of 4° and refractive index of 1.50 is located in front of a vertical plane mirror as shown. A horizontal ray of light is incident on the prism. The total angle through which the ray is deviated is :-
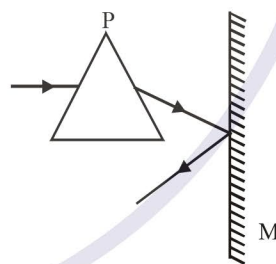
(1) 4° clockwise   (2) 178° clockwise
(3) 2° clockwise   (4) 8° clockwise

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	2	2	2	2	3	2	2	3	2	2
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	1	3	1	3	2	4	3	3	3	2
Que.	21	22	23	24	25	26	27	28	29	30
Ans.	3	2	3	2	1	3	3	2	1	2