QB365 Question Bank Software Study Materials

Ray Optics 49 Important 1 Marks Questions With Answers (Book Back and Creative)

12th Standard

Physics

Total Marks : 49

Multiple Choice Question

49 x 1 = 49

1) The speed of light in an isotropic medium depends on, _____.

(a) its intensity **(b) its wavelength** (c) the nature of propagation (d) the motion of the source w.r.t medium

2) A rod of length 10 cm lies along the principal axis of a concave mirror of focal length 10 cm in such a way that its end closer to the pole is 20 cm away from the mirror. The length of the image is, _____.

(a) 2.5 cm **(b) 5cm** (c) 10 cm (d) 15cm

3) An object is placed in front of a convex mirror of focal length off and the maximum and minimum distance of an object from the mirror such that the image formed is real and magnified.

(a) 2f and c (b) c and ∞ (c) f and O **(d) None of these**

4) For light incident from air on a slab of refractive index 2, the maximum possible angle of refraction is, _____.

(a) 30° (b) 45° (c) 60° (d) 90°

5) If the velocity and wavelength of light in air is V_a and λ_a and that in water is V_w and λ_w, then the refractive index of water is_____.

(a) $\frac{V_W}{V_a}$ **(b)** $\frac{V_a}{V_W}$ (c) $\frac{\lambda_W}{\lambda_a}$ (d) $\frac{V_a\lambda_a}{V_W\lambda_W}$

6) Stars twinkle due to, _____.

(a) reflection (b) total internal reflection **(c) refraction** (d) polarisation

7) When a biconvex lens of glass having refractive index 1.47 is dipped in a liquid, it acts as plane sheet of glass. This implies that the liquid must have refractive index, _____.

(a) less than one (b) less than that of glass (c) greater than that of glass **(d) equal to that of glass**

8) The radius of curvature of curved surface at a thin planoconvex lens is 10 cm and the refractive index is 1.5. If the plane surface is silvered, then the focal length will be, _____.

(a) 5 cm **(b) 10 cm** (c) 15 cm (d) 20 cm

9) An air bubble in glass slab of refractive index 1.5 (near normal incidence) is 5 cm deep when viewed from one surface and 3 cm deep when viewed from the opposite face. The thickness of the slab is _____.

(a) 8 cm (b) 10 cm **(c) 12 cm** (d) 16 cm

10) A ray of light travelling in a transparent medium of refractive index n falls, on a surface separating the medium from air at an angle of incidents of 45° . The ray can undergo total internal reflection for the following n, _____.

(a) n = 1.25 (b) n = 1.33 (c) n = 1.4 **(d) n = 1.5**

11) A light bulb is placed between two mirrors (plane) inclined at an angle of 60°. Number of images formed are _____.

(a) 2 (b) 4 **(c) 5** (d) 6

12) Two plane mirrors are inclined at an angle of no. The number of images of a point object placed between them will be _____.

(a) 2 (b) 3 **(c) 4** (d) 5

To get three images of a single object, one should have two plane mirror at an angle of _____.

13) (a) 30° (b) 60o **(c) 90°** (d) 120°

14) The light reflected by plane mirror may form a real images _____.

(a) If the rays incident on the mirror are diverging **(b) If the rays incident on the mirror are converging**

(c) If the object is placed very close to mirror (d) Under no circumstance

15) A man is 180 cm tall and his eyes are 10 cm below the top of his head. In order to see his entire height right from toe to head, he uses a plane mirror kept at a distance of 1m from him. The minimum length of the plane mirror required is _____.

(a) 180 cm (b) 90 cm (c) 85 cm (d) 170 cm

16) A small object is placed 10 cm in front of a plane mirror. If you stand behind the object 30 cm from the object and look at its image, the distance forced for your eye will be _____.

(a) 60 cm (b) 20 cm **(c) 40 cm** (d) 80 cm

17) When a plane mirror is rotated through an angle θ , then the reflected ray turns through the angle 2θ, then the size of the image _____.

(a) Is doubled infinite (b) Is halved **(c) Remains the same** (d) Becomes infinite

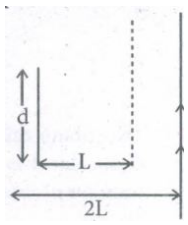
18) What should be the angle between two plane mirror so that whatever be the angle of incidence, the incident ray and the reflected ray from the two mirrors be parallel to each other _____.

(a) 60° **(b) 90°** (c) 120° (d) 175°

19) Two plane mirrors A and B are aligned parallel to each other, as shown in the figure. A light ray is an incident at an angle of 30° at a point just inside one end of A. The plane of incidence coincides with the plane of the figure. The maximum number of times the ray undergoes reflections (including the first one) before it emerges out is_____.

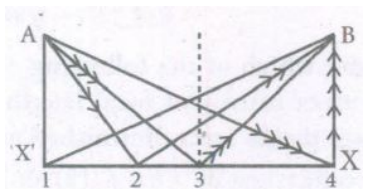
(a) 28 **(b) 30** (c) 32 (d) 34

20) A point source of light B is placed at a distance L in front of the center of a mirror of width d hung vertically on a wall. A man walks in front of the mirror along a line parallel to the mirror at a distance of 2 L front it as shown. The greatest distance over which he can see the image of the light source in the mirror is _____.



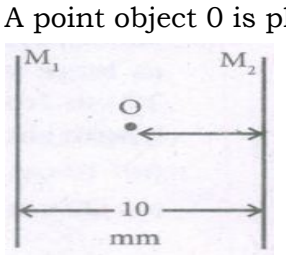
(a) d/2 (b) d (c) 2d **(d) 3d**

21) A ray of light travels from A to B with uniform speed. On its way, it is reflected by the surface XX'. The path followed by the ray to take least time is _____.



(a) 1 (b) 2 **(c) 3** (d) 4

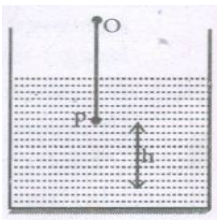
22) A point object 0 is placed between two plane mirrors as shown in figure. The distance by mirror M_2 from it are _____.



(a) 2 mm, 8 mm, 18 mm (b) 2 mm, 18 mm, 28 mm **(c) 2 mm, 18 mm, 22 mm** (d) 2 mm, 18 mm, 58 mm

23) A plane mirror is placed at the bottom of the tank containing a liquid of refractive index J.1.P is a small object at a height h above the mirror, an observer O-vertically above P outside the liquid. See p and its image in the mirror. The apparent distance between

these two will be _____.



(a) $2\mu h$ **(b)** $\frac{2h}{\mu}$ (c) $\frac{2h}{\mu - 1}$ (d) $h\left(1 + \frac{1}{\mu}\right)$

24) An object 2.5 cm high is placed at a distance of 10 cm from a concave mirror of radius of curvature 30 cm. The size of the image is _____.

(a) 9.2 cm (b) 10.5 cm (c) 5.6 cm **(d) 7.5 cm**

25) A concave mirror of focal length 15 cm forms an image having twice the linear dimensions of the object. The position of the object when the image is virtual will be _____.

(a) 22.5 cm (b) 7.5 cm (c) 7.5 cm **(d) 45 cm**

26) The minimum distance between the object and its real image for concave mirror is _____.

(a) f (b) 2f (c) 4f **(d) Zero**

27) Which of the following forms a virtual and erect image for all positions of the object?

(a) Convex lens (b) Concave lens (c) Convex mirror **(d) both b & c**

28) The radius of curvature of a concave mirror is 40 cm and the size of the image is twice as that of an object, then the object distance is _____.

(a) 60 cm (b) 20 cm (c) 40 cm **(d) 30 cm**

29) All of the following statement are correct except _____.

(a) The magnification produced by a convex mirror is always less than one

(b) A virtual, erect same sized image can be obtained using a plane mirror

(c) A virtual, erect magnified image can be formed using a concave mirror

(d) A real, inverted, same-sized image can be formed using a convex mirror

30) An object 1 cm tall is placed 4 cm in front of a mirror. In order to produce an upright image of 3 cm height one needs a _____.

(a) Convex mirror of radius of curvature 12 cm **(b) Concave mirror of radius of curvature 12 cm**

(c) Concave mirror of radius of curvature 4 cm (d) Plane mirror of height 12 cm

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

(a) 0.11 cm (b) 0.50 cm **(c) 0.55 cm** (d) 0.60 cm

32) A virtual image three times the size of the object is obtained with a concave mirror of radius of curvature 36 cm, The distance of the object from the mirror is _____.

(a) 5 cm **(b) 12 cm** (c) 10 cm (d) 20 cm

33) Given a point source of light, which of the following can produce a parallel beam of light _____.

(a) Convex mirror **(b) Concave mirror** (c) Concave lens (d) Two plane mirrors inclined at an angle of 90°

34) A convex mirror is used 'to form the image of an object. Then which of the following statement is wrong?

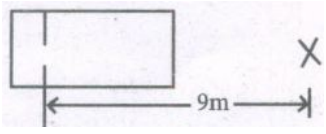
(a) The images lies between the pole and the focus (b) The image is diminished in size (c) The image is erect

(d) The image is real

35) A convex mirror of focal length 10 cm forms an image that is half of the size of the object. The distance of the object from the mirror is _____.

(a) 10 cm (b) 20 cm (c) 5 cm (d) 15 cm

36) A vehicle has a driving mirror of a focal length of 30 cm. Another vehicle of dimension 2 x 4 x 1.75 m^3 is 9 m away from the mirror of the first vehicle. The position of the second vehicle as seen in the mirror of the first vehicle is _____.

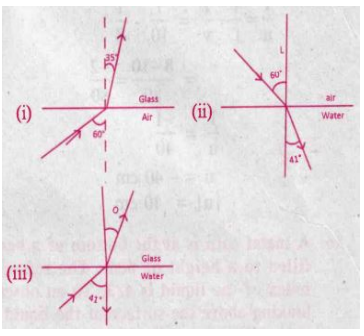


(a) 30 cm (b) 60 cm (c) 90 cm (d) 9 cm

37) A concave mirror of radius of curvature 60 cm is placed at the bottom and height of 20 cm, The mirror faces upwards with its axis vertical. Solar light fall normally on the surface of water and the image of the sun is formed. If a $\mu_\omega = \frac{4}{3}$ then will the observer in air, the distance of the image from the surface of the water is _____.

(a) 30 cm (b) 10 cm **(c) 7.5 cm above** (d) 7.5 cm below

38) Refraction of light from air to glass and from air to water shown in figures (i) & (ii) below. The value of the angle θ in the case of refraction in fig (iii) will be _____.



(a) 30° **(b) 35°** (c) 60° (d) 41°

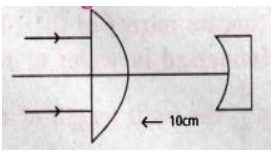
39) An object is placed in front of a convex mirror of radius of curvature 20 cm. its image is formed 8 cm behind the mirror. The object distance is _____.

(a) 20 cm **(b) 40 cm** (c) 60 cm (d) 80 cm

40) A ray incident at a point at an angle of incidence of 60° enters a glass sphere of refractive index $\sqrt{3}$ and is reflected and refracted at the farther surface of the sphere. The angle between the reflected and refracted ray at the surface is _____.

(a) 50° (b) 60° **(c) 90°** (d) 40°

41) In the given figure, the radius of curvature surface for both the Plano-convex and Plano - the concave lens is 10 cm and the refractive index for both is 1 .5. The Location of the final image after all the refractions through Lenses is _____.



(a) 15 cm **(b) 20 cm** (c) 25 cm (d) 40 cm

42) A Person can see clearly objects only when they lie between 50 cm and 400 cm from his eyes. In order to increase the maximum distance of distinct vision to infinity the type and power of the correcting lens, the person has to use will be _____.

(a) Convex +2.25 diopter **(b) Concave -0.25 diopter** (c) Concave -0.2 diopter (d) Convex +0.15 diopter

43) At what distance (two possible distances) from a concave mirror of focal length 10 cm must an object be placed in order that an image double its size may be obtained?

(a) 5cm only (b) 15 cm only **(c) either 5 cm or 15 cm** (d) 10 cm

44) A concave mirror of focal length f (in the air) is immersed in water of refractive index $\mu = \frac{4}{3}$ the focal length of the mirror in water 3 will be _____.

(a) f (b) $\frac{4}{3}$f (c) $\frac{3}{4}$f (d) $\frac{4f}{3}$

45) The unit of focal power of a lens is _____.

(a) Watt (b) Horse Power **(c) Dioptre** (d) Lux

46) For the same incident light when a reflecting surface is tilted by an angle θ, the reflected light will be tilted by an angle

(a) θ **(b) 2θ** (c) 3θ (d) 4θ

47) When a light wave goes from air into water medium, the quantity that remains unchanged

(a) speed (b) amplitude **(c) frequency** (d) wavelength

48) An object of size 3 cm is placed 14 cm in front of a concave lens of focal length 21 cm. Find the height the image

(a) 8.4 cm (b) 1.8 cm (c) 3 cm (d) 4 cm

49) Sun is visible a little before the actual sunrise and until a little after the actual sunset this is due to

(a) total internal reflection (b) reflection **(c) refraction** (d) polarisation