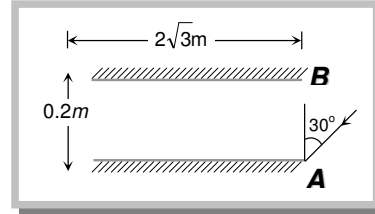


Reflection of Light Assignment

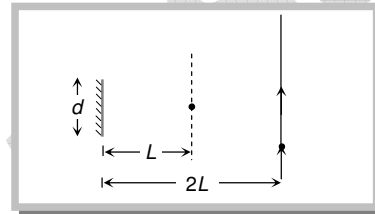
1. Two plane mirrors *A* and *B* are aligned parallel to each other, as shown in the figure. A light ray is incident at an angle of 30° at a point just inside one end of *A*. The plane of incidence coincides with the plane of the figure. The maximum number of times the ray undergoes reflections (including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

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



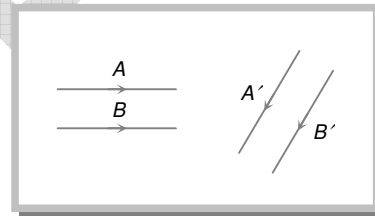
2. A point source of light *B* is placed at a distance *L* in front of the centre of a mirror of width *d* hung vertically on a wall. A man walks in front of the mirror along a line parallel to the mirror at a distance $2L$ from it as shown. The greatest distance over which he can see the image of the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

- (a) $d/2$
- (b) d
- (c) $2d$
- (d) $3d$



3. The figure shows two rays *A* and *B* being reflected by a mirror and going as *A'* and *B'*. The mirror is

- (a) Plane
- (b) Concave
- (c) Convex
- (d) May be any spherical mirror



4. An object is initially at a distance of 100 cm from a plane mirror. If the mirror approaches the object at a speed of 5 cm/s , then after 6 s the distance between the object and its image will be

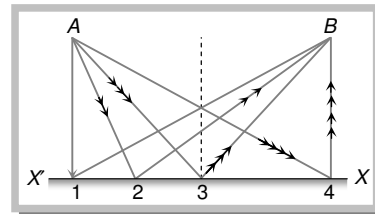
- (a) 60 cm
- (b) 140 cm
- (c) 170 cm
- (d) 150 cm

5. An object placed in front of a plane mirror is displaced by 0.4 m along a straight line at an angle of 30° to mirror plane. The change in the distance between the object and its image is

- (a) 0.20 m
- (b) 0.40 m
- (c) 0.25 m
- (d) 0.80 m

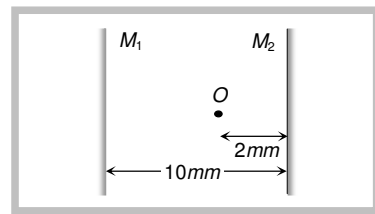
6. A ray of light travels from *A* to *B* with uniform speed. On its way it is reflected by the surface *XX'*. The path followed by the ray to take least time is

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

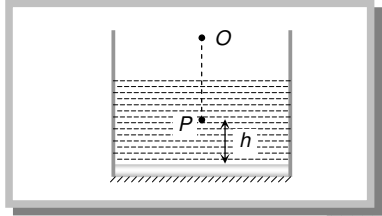
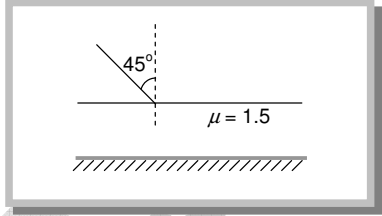
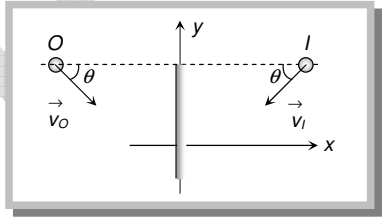
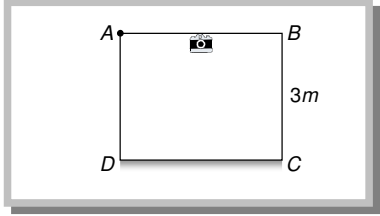


7. A point object *O* is placed between two plan mirrors as shown in fig. The distance of the first three images formed by mirror M_2 from it are

- (a) $2\text{ mm}, 8\text{ mm}, 18\text{ mm}$
- (b) $2\text{ mm}, 18\text{ mm}, 28\text{ mm}$
- (c) $2\text{ mm}, 18\text{ mm}, 22\text{ mm}$
- (d) $2\text{ mm}, 18\text{ mm}, 58\text{ mm}$



GRAVITY CLASSES

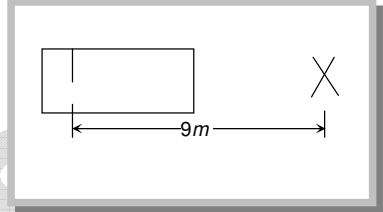
8. A plane mirror is placed at the bottom of the tank containing a liquid of refractive index μ . P is a small object at a height h above the mirror. An observer O -vertically above P outside the liquid see P and its image in the mirror. The apparent distance between these two will be
- $2\mu h$
 - $\frac{2h}{\mu}$
 - $\frac{2h}{\mu - 1}$
 - $h\left(1 + \frac{1}{\mu}\right)$
- 
9. One side of a glass slab is silvered as shown. A ray of light is incident on the other side at angle of incidence $i = 45^\circ$. Refractive index of glass is given as 1.5. The deviation of the ray of light from its initial path when it comes out of the slab is
- 90°
 - 180°
 - 120°
 - 45°
- 
10. If an object moves towards a plane mirror with a speed v at an angle θ to the perpendicular to the plane of the mirror, find the relative velocity between the object and the image
- v
 - $2v$
 - $2v \cos \theta$
 - $2v \sin \theta$
- 
11. Figure shows a cubical room $ABCD$ with the wall CD as a plane mirror. Each side of the room is $3m$. We place a camera at the midpoint of the wall AB . At what distance should the camera be focussed to photograph an object placed at A
- $1.5 m$
 - $3 m$
 - $6 m$
 - More than $6 m$
- 
12. A short linear object of length l lies along the axis of a concave mirror of focal length f at a distance u from the pole of the mirror. The size of the image is approximately equal to
- $l\left(\frac{u-f}{f}\right)^{1/2}$
 - $l\left(\frac{u-f}{f}\right)^2$
 - $l\left(\frac{f}{u-f}\right)^{1/2}$
 - $l\left(\frac{f}{u-f}\right)^2$
13. 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
- $5 cm/sec$ towards the mirror
 - $4 cm/sec$ towards the mirror
 - $4 cm/sec$ away from the mirror
 - $9 cm/sec$ away from the mirror
14. A convex mirror of focal length $10 cm$ forms an image which is half of the size of the object. The distance of the object from the mirror is
- $10 cm$
 - $20 cm$
 - $5 cm$
 - $15 cm$
15. A concave mirror is used to focus the image of a flower on a nearby well $120 cm$ from the flower. If a lateral magnification of 16 is desired, the distance of the flower from the mirror should be

GRAVITY CLASSES

- (a) 8 cm (b) 12 cm (c) 80 cm (d) 120 cm

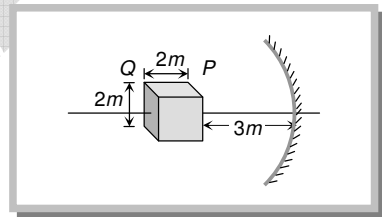
16. A thin rod of 5 cm length is kept along the axis of a concave mirror of 10 cm focal length such that its image is real and magnified and one end touches the rod. Its magnification will be
 (a) 1 (b) 2 (c) 3 (d) 4
17. A luminous object is placed 20 cm from surface of a convex mirror and a plane mirror is set so that virtual images formed in two mirrors coincide. If plane mirror is at a distance of 12 cm from object, then focal length of convex mirror, is
 (a) 5 cm (b) 10 cm (c) 20 cm (d) 40 cm
18. A rear mirror of a vehicle is cylindrical having radius of curvature 10 cm. The length of arc of curved surface is also 10 cm. If the eye of driver is assumed to be at large distance, from the mirror, then the field of view in radian is
 (a) 0.5 (b) 1 (c) 2 (d) 4
19. A vehicle has a driving mirror of focal length 30 cm. Another vehicle of dimension $2 \times 4 \times 1.75 \text{ m}^3$ is 9 m away from the mirror of first vehicle. Position of the second vehicle as seen in the mirror of first vehicle is

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



20. A cube of side 2 m is placed in front of a concave mirror focal length 1 m with its face P at a distance of 3 m and face Q at a distance of 5 m from the mirror. The distance between the images of face P and Q and height of images of P and Q are

- (a) 1 m, 0.5 m, 0.25 m
 (b) 0.5 m, 1 m, 0.25 m
 (c) 0.5 m, 0.25 m, 1 m
 (d) 0.25 m, 1 m, 0.5 m



21. A concave mirror of radius of curvature 60 cm is placed at the bottom of tank containing water upto a height of 20 cm. The mirror faces upwards with its axis vertical. Solar light falls normally on the surface of water and the image of the sun is formed. If ${}_a\mu_w = \frac{4}{3}$ then with the observer in air, the distance of the image from the surface of water is

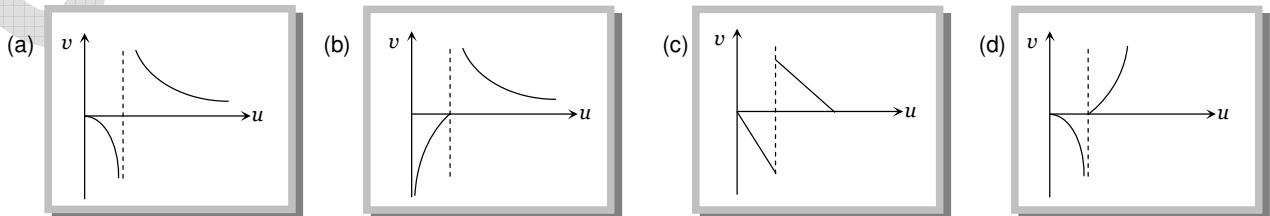
- (a) 30 cm (b) 10 cm (c) 7.5 cm above (d) 7.5 cm below

22. A concave mirror forms an image of the sun at a distance of 12 cm from it
 (a) The radius of curvature of this mirror is 6 cm
 (b) To use it as a shaving mirror, it must be held at a distance of 8-10 cm from the face
 (c) If an object is kept at a distance of 12 cm from it, the image formed will be of the same size as the object
 (d) All the above alternatives are correct

23. A small piece of wire bent into an L shape with upright and horizontal portions of equal lengths, is placed with the horizontal portion along the axis of the concave mirror whose radius of curvature is 10 cm. If the bend is 20 cm from the pole of the mirror, then the ratio of the lengths of the images of the upright and horizontal portions of the wire is

- (a) 1 : 2 (b) 3 : 1 (c) 1 : 3 (d) 2 : 1

24. As the position of an object (u) reflected from a concave mirror is varied, the position of the image (v) also varies. By letting the u changes from 0 to $+\infty$ the graph between v versus u will be

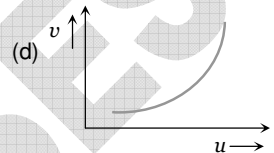
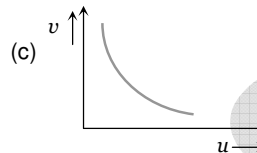
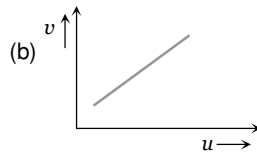
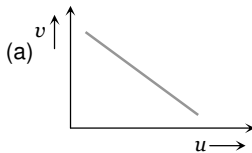


25. A concave mirror has a focal length 20 cm. The distance between the two positions of the object for which the image size is double of the object size is

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

GRAVITY CLASSES

26. A concave mirror of focal length 10 cm and a convex mirror of focal length 15 cm are placed facing each other 40 cm apart. A point object is placed between the mirrors, on their common axis and 15 cm from the concave mirror. Find the position and nature of the image produced by the successive reflections, first at concave mirror and then at convex mirror
 (a) 2 cm (b) 4 cm (c) 6 cm (d) 8 cm
27. A man having height 6 m , want to see full height in mirror. They observe image of 2 m height erect, then used mirror is
 (a) Concave (b) Convex (c) Plane (d) None of these
28. An object of length 6 cm is placed on the principal axis of a concave mirror of focal length f at a distance of $4f$. The length of the image will be
 (a) 2 cm (b) 12 cm (c) 4 cm (d) 1.2 cm
29. Convergence of concave mirror can be decreased by dipping in
 (a) Water (b) Oil (c) Both (d) None of these
30. In an experiment of find the focal length of a concave mirror a graph is drawn between the magnitudes of u and v . The graph looks like



31. 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
32. A diminished virtual image can be formed only in
 (a) Plane mirror (b) A concave mirror (c) A convex mirror (d) Concave-parabolic mirror
33. A point object is placed at a distance of 30 cm from a convex mirror of focal length 30 cm . The image will form at
 (a) Infinity (b) Focus (c) Pole (d) 15 cm behind the mirror
34. The focal length of a convex mirror is 20 cm its radius of curvature will be
 (a) 10 cm (b) 20 cm (c) 30 cm (d) 40 cm
35. 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) 30 cm (d) 45 cm
36. Under which of the following conditions will a convex mirror of focal length f produce an image that is erect, diminished and virtual
 (a) Only when $2f > u > f$ (b) Only when $u = f$ (c) Only when $u < f$ (d) Always
37. A concave mirror gives an image three times as large as the object placed at a distance of 20 cm from it. For the image to be real, the focal length should be
 (a) 10 cm (b) 15 cm (c) 20 cm (d) 30 cm
38. A point object is placed at a distance of 10 cm and its real image is formed at a distance of 20 cm from a concave mirror. If the object is moved by 0.1 cm towards the mirror, the image will shift by about
 (a) 0.4 cm away from the mirror (b) 0.4 cm towards the mirror
 (c) 0.8 cm away from the mirror (d) 0.8 cm towards the mirror
39. The minimum distance between the object and its real image for concave mirror is
 (a) f (b) $2f$ (c) $4f$ (d) Zero
40. An object is placed at 20 cm from a convex mirror of focal length 10 cm . The image formed by the mirror is
 (a) Real and at 20 cm from the mirror (b) Virtual and at 20 cm from the mirror
 (c) Virtual and at $20/3\text{ cm}$ from the mirror (d) Real and at $20/3\text{ cm}$ from the mirror
41. An object is placed 40 cm from a concave mirror of focal length 20 cm . The image formed is
 (a) Real, inverted and same in size (b) Real, inverted and smaller
 (c) Virtual, erect and larger (d) Virtual, erect and smaller
42. Match List I with List II and select the correct answer using the codes given below the lists
- | | |
|---|--------------------------------|
| List I | List II |
| (Position of the object) | (Magnification) |
| (I) An object is placed at focus before a convex mirror | (A) Magnification is $-\infty$ |
| (II) An object is placed at centre of curvature before a concave mirror | (B) Magnification is 0.5 |
| (III) An object is placed at focus before a concave mirror | (C) Magnification is $+1$ |
| (IV) An object is placed at centre of curvature before a convex mirror | (D) Magnification is -1 |
| | (E) Magnification is 0.33 |
- Codes :**
 (a) I-B, II-D, III-A, IV-E (b) I-A, II-D, III-C, IV-B (c) I-C, II-B, III-A, IV-E (d) I-B, II-E, III-D, IV-C

GRAVITY CLASSES

43. In a concave mirror experiment, an object is placed at a distance x_1 from the focus and the image is formed at a distance x_2 from the focus. The focal length of the mirror would be
- (a) $x_1 x_2$ (b) $\sqrt{x_1 x_2}$ (c) $\frac{x_1 + x_2}{2}$ (d) $\sqrt{\frac{x_1}{x_2}}$
44. 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) Concave mirror
45. A convex mirror has a focal length f . A real object is placed at a distance f in front of it from the pole produces an image at
- (a) Infinity (b) f (c) $f/2$ (d) $2f$
46. Radius of curvature of concave mirror is 40 cm and the size of image is twice as that of object, then the object distance is
- (a) 60 cm (b) 20 cm (c) 40 cm (d) 30 cm
47. All of the following statements 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
48. Radius of curvature of convex mirror is 40 cm and the size of object is twice as that of image, then the image distance is
- (a) 10 cm (b) 20 cm (c) 40 cm (d) 30 cm
49. If an object is placed 10 cm in front of a concave mirror of focal length 20 cm , the image will be
- (a) Diminished, upright, virtual (b) Enlarged, upright, virtual (c) Diminished, inverted, real (d) Enlarged, upright, real
50. 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