PHYSICS

BOOKS - HC VERMA

REFLECTION OF LIGHT

Question Bank

1. A concave mirror is made by cutting a portion of a hollow glass sphere of radius 24 cm. Find the focal length of the mirror.

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2. We want a concave mirror to form a virtual image of an object, See table 1.1 and find out where the object should be placed. Is the image erect or inverted ? Is the image smaller or larger than the object ?

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3. Sunlight is incident on a concave mirror, parallel to its principal axis. The image is formed at a distance of 12cm from the pole. Find the radius of curvature of the mirror.

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4. An object is placed at distance of 12 cm from a concave mirror of radius of curvature 16 cm. Find the position of the image.

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5. The image of an object placed 16 cm from a concave mirror is formed at a distance of 24 cm from the mirror. Calculate the possible focal lengths of the concave mirror from this information.

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6. Find the position, size and the nature of the image formed by a spherical mirror from the following data.

f= -12 cm,

u=-36 cm, h_0=2cm

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7. An object is placed 24 cm from a concave mirror. Its image is inverted and double the size of the object . Find the focal length of the mirror and the position where the image is formed.

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8. An object is placed at a distance of 12cm from a convex mirror of radius of curvature 12 cm. Find the position of the image .

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9. When a concave mirror is placed facing the sun, the sun's rays converge to a point 10 cm from the mirror. Now, an erect,2-cm-long pin is placed 15 cm away on the principal axis of the mirror. If you want to get the image of the pin on a card, where would you place the card ?

What would be the nature and height of the image ?

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10. A mirror forms a virtual image of a real object

A. It must be a convex mirror.

B. It must be a concave mirror.

C. It must be a plane mirror.

D. It may be any of the mirrors mentioned above.

Answer: D

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11. The angle of incidence is the angle between

A. the incident ray and the surface of the mirror

B. the reflected ray and the surface of the mirror

C. the normal to the surface and the incident ray

D. the normal to the surface and the reflected ray

Answer: C

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12. The angle of reflection is the angle between

A. the incident ray and the surface of the mirror

B. the reflected ray and the surface of the mirror

C. the normal to the surface and the incident ray

D. the normal to the surface and the reflected ray

Answer: D

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13. An object is placed at the centre of curvature of a concave mirror . The distance between its image and the pole is

A. equal to f

B. between f and 2f

C. equal to 2f

D. greater than 2f

Answer: C

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14. An object of size 2.0 cm is placed perpendicular to the principal axis of a concave mirror. The distance of the object from the mirror equals the radius of curvature. The size of the image will be

A. 0.5 cm

B. 1.0 cm

C. 1.5 cm

D. 2.0 cm

Answer: D

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15. The magnification m of an image formed by spherical mirror is negative. It means, the image is

A. smaller than the object

B. larger than the object

C. erect

D. inverted

Answer: D

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16. A point object is placed on the principal axis of a spherical mirror. The object -distance u is

A. definitely negative

B. definitely positive

C. positive if the object is to the left of the centre of curvature

D. positive if the object is to the right of the centre of curvature

Answer: A

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17. $f - \frac{r}{2}$ is valid

A. for convex mirrors but not for concave mirrors

B. for concave mirrors but not for convex mirrors

C. for both convex and concave mirrors

D. neither for convex mirrors nor for concave mirrors

Answer: C

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18. A ray of light is incident on a concave mirror. If it is parallel to the principal axis, the reflected ray will

A. pass through the focus

B. pass through the centre of curvature

C. pass through the pole

D. retrace its path

Answer: A

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19. If an incident ray passes through the centre of curvature of aspherical mirror, the reflected ray will

A. pass through the pole

B. pass through the focus

C. retrace its path

D. be parallel to the principal axis

Answer: C

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20. To get an image larger than the object, one can use

A. a convex mirror but not a concave mirror

B. a concave mirror but not a convex mirror

C. either a convex mirror or a concave mirror

D. a plane mirror

Answer: B

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21. Mark the statement True (T) or False(F).Light cannot travel in vacuum.

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22. Mark the statement True (T) or False(F).No particle can ever move at a speed greater than that of light in vacuum.

View Text Solution

23. Mark the statement True (T) or False(F).The angle of incidence is equal to the angle of reflection. This is true for reflection from plane mirrors, but is not true for reflection from spherical mirrors.

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24. Mark the statement True (T) or False(F).The focal length of a spherical mirror has a smaller magnitude than that of its radius of curvature.

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25. Mark the statement True (T) or False(F).A spherical mirror never forms an image whose size is the same as that of the object.

View Text Solution

26. Mark the statement True (T) or False(F).A ray starting from the focus of a concave mirror becomes parallel to the principal axis after reflection .

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27. Mark the statement True (T) or False(F).The mirror equation is valid only if the aperture of the mirror is small.

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28. Mark the statement True (T) or False(F).A real image of a point object can be formed only by a concave mirror.

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29. Mark the statement True (T) or False(F).A ray of light incident parallel to the principal axis of a spherical mirror retraces its path after reflection.

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30. A ray of light travelling in air falls on the surface of a transparent slab. The ray makes an angle of 45° with the normal to the surface. Find the angle made by the refracted ray with the normal within the slab. Refractive

index of the material of the slab $= \sqrt{2}$.

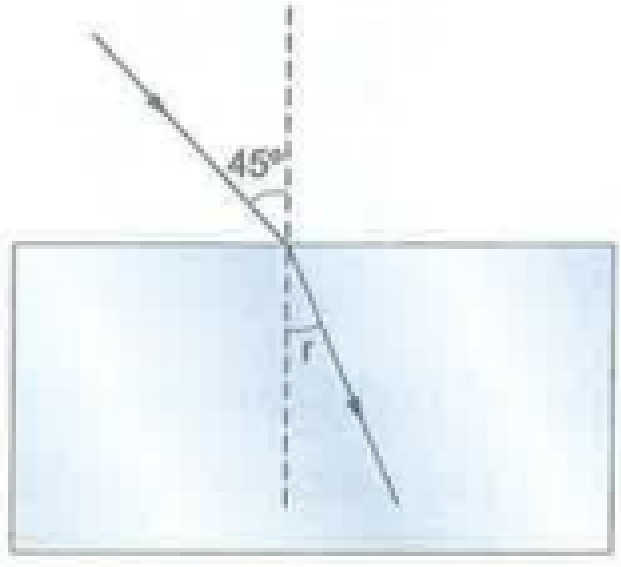

Fig. 2.3

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31. A convex lens forms a real and inverted image of an object. The size of the image is

the same as that of the object . Where is the object placed ?

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32. A ray of light travelling in air is incident on the plane surface of a transparent medium. The angle of incidence is 45° and the angle of refraction is 30° . Find the refractive index of the medium .

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33. A beam of light travelling parallel to the principal axis of a concave lens appears to diverge from a point 20 cm behind the lens after after passing through the lens. Find the power of the lens.

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34. A convex lens of focal length 20 cm is placed in contact with a concave lens of focal length 12.5 cm in such a way that they have

the same principal axis. Find the power of the combination .

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35. The refractive indices of water and glass are 4/3 and 3/2 respectively. Find the speed of light in each.

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36. An object is placed at a distance of 30 cm from a convex lens of focal length 20 cm.Find the position of the image .

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37. An object is placed at a distance of 30 cm from a convex lens of focal length 20 cm.Is the image erect or inverted ?

View Text Solution

38. A 1.0-cm-high object is placed at a distance of 12 cm from a convex lens of focal length 16 cm. Find the position of the image.

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39. A 2.0-cm-high object is placed 12 cm from a convex lens, perpendicular to its principal axis. The lens forms a real image, whose size is 1.5 cm. Find the power of the lens .

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40. An object is placed at a distance of 10 cm from a concave lens of focal length 20 cm. Find the position of the image and discuss its nature .

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41. A convex lens of focal length 18 cm and a concave lens of focal length 24 cm are placed in contact such that they have a common principal axis. Will the combination act as a

convex lens or a concave lens ? Find the focal length and power of the combination .

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42. The far point of a person suffering from myopia is 2 metres from the eye. Find the focal length and power of the corrective lens that will correct his vision.

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43. The near point of an elderly person is 50 cm from the eye. Find the focal length and power of the corrective lens that will correct his vision

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44. A ray of light travelling in air falls obliquely on the surface of a clam poun. It will

A. go into the water without deviating from its path

B. deviate away from the normal

C. deviate towards the normal

D. Turn back on its original path

Answer: C

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45. A ray of light goes from a medium of refractive index n_1 to a medium of refractive index n_2. The angle of incidence is I and the

angle of refraction is r. Then, sin i/sin r is equal to

A. n_1

B. n_2

C. $(n_1)/(n_2)$

D. $(n_2)/(n_1)$

Answer: D

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46. A thin lens and a spherical mirror have a focal length of +15 cm each.

A. Both are convex.

B. The lens is convex and the mirror is concave.

C. The lens is concave and the mirror is convex

D. Both are concave.

Answer: A

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47. A convex lens

A. Is thicker at the middle than at the edges

B. is thicker at the edges than at the middle

C. has uniform thickness everywhere

D. is called a diverging lens

Answer: A

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48. A convex lens forms a virtual image when an object is placed at a distance of 18cm from it. The focal length must be

A. greater than 36 cm

B. greater than 18 cm

C. less than 36 cm

D. less than 18 cm

Answer: B

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49. An object is placed before a convex lens. The image formed

A. is always real

B. may be real or virtual

C. is always virtual

D. is always erect

Answer: B

View Text Solution

50. An object is placed before a convex lens. The image formed

A. is always erect

B. may be erect or inverted

C. is always inverted

D. is always real

Answer: A

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51. A lens has a power of +0.5 D. It is

A. a concave lens of focal length 5 m

B. a convex lens of focal length 5 cm

C. a convex lens of focal length 2 m

D. a concave lens of focal length 2 m

Answer: C

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52. A parallel beam of light falling on the eye gets focused on the retina because of refractions at

A. the cornea

B. the crystalline lens

C. the vitreous humor

D. various surfaces in the eye

Answer: D

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53. The combination responsible for admitting different amounts of light in the eye is

A. ciliary muscles and crystalline lens

B. ciliary muscles and pupil

C. iris and pupil

D. rods and cones

Answer: C

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54. The muscles of the iris control the

A. focal length of the eye-lens

B. opening of the pupil

C. shape of the crystalline lens

D. optic nerve

Answer: B

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55. When the eye is focused on an object very far away, the focal length of the eye-lens is

A. maximum

B. minimum

C. equal to that to the crystalline lens

D. half its maximum focal length

Answer: A

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56. Other names for myopia are

A. hyperopia and hypermetropia

B. long-sightedness and hyperopia

C. nearsightedness and presbyopia

D. near-sightedness and short-sightedness

Answer: D

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57. The inability among the elderly to see nearby objects clearly because of the weakening of the ciliary muscles is called

A. farsightedness

B. nearsightedness

C. presbyopia

D. myopia

Answer: C

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58. Mark the statement True(T) or False (F).When a ray of light passes from an optically denser medium to a rarer medium, it slows down.

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59. Mark the statement True(T) or False (F).If a ray of light passes from vacuum to a transparent medium, it will bend away from the normal.

View Text Solution

60. Mark the statement True(T) or False (F).The central portion of a thin lens behaves like a rectangular slab.

View Text Solution

61. Mark the statement True(T) or False (F).The values of f and u for a concave lens are always negative by coention.

View Text Solution

62. Mark the statement True(T) or False (F).When two lenses are placed in contact, the focal length of the combination is equal to the sum of the focal of the lenses.

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63. Mark the statement True(T) or False (F).The number of cones in the human eye is more than the number or rods.

View Text Solution

64. Mark the statement True(T) or False (F).When light rays are incident on the eye, maximum deviation takes place at the cornea.

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65. Mark the statement True(T) or False (F).For the myopic eye, the far point is farther away than normal.

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