PHYSICS

BOOKS - UNIVERSAL BOOK DEPOT 1960 PHYSICS (HINGLISH)

RAY OPTICS

Exercise

1. Two vertical plane mirrors are inclined at an angle of 60° with each other. A ray of light travelling horizontally is reflected first from one mirror and then from the other. The resultant deviation is

A. 60°

B. 120°

C. 180°

D. 240°

Answer: D

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2. A plane mirror reflects a pencil of light to form a real image. Then the pencil of light incident on the mirror is

A. Parallel

B. Convergent

C. Divergent

D. None of the above

Answer: B

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3. What should be the angle between two plane mirrorrs so that whatever be the angle of incidence, the incident ray and the reflected ray from the two mirrorrs be parallel to each other

A. 60°

B. 90°

C. 120°

D. 175°

Answer: B

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4. A plane mirror reflecting a ray of incident light is rotated through an angle q about an axis through the point of incidence in the plane of the mirror perpendicular to the plane of incidence, then

(1) The reflected ray rotates through an angle 2q

(2) The incident ray is fixed

(3) The reflected ray does not rotate

(4) The reflected ray rotates through an angle q

A. The reflected ray does not rotate

B. The reflected ray rotates through an angle θ

C. The reflected ray rotates through an angle 2θ

D. The incident ray is fixed

Answer: c, d

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5. A plane mirrorr is approaching you at a speed of $10cm/\sec$.You can see your image in it. At what speed will your image approach you

A. 10 cm /sec

B. 5 cm /sec

C. 20 cm /sec

D. 15 cm /sec

Answer: C

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6. The number of images formed by two plane mirrors inclined at 60° of an object placed symmetrically between mirror is

A. 6

B. 2

C. 5

D. 4

Answer: C

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7. It is desired to photograph the image of an object placed at a distance of 3 m from the plane mirror. The camera which is at a distance of 4.5 m from the mirror should be focussed for a distance of

A. 3 m

B. 4.5 m

C. 6 m

D. 7.5 m

Answer: d

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8. A thick plane mirror shows a number of images of the filament of an electric bulb. Of these, the brightest image is the

A. First

B. Second

C. Fourth

D. Last

Answer: B

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9. 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 tow to head, he uses a plane mirror kept at a distance of 1 m from him. The minimum height of the plane mirror required is

A. 180 cm

B. 90 cm

C. 85 cm

D. 170 cm

Answer: B

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10. A person is in a room whose ceiling and two adjacent walls are mirrors. How many images are formed

A. 5

B. 6

C. 7

D. 8

Answer: C

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11. When a plane mirror is placed horizontally on level ground at a distance of 60 m from the foot of a tower, the top of the tower and its image in the mirror subtend and angle of 90° at the eye. The height of the tower is

A. 30 m

B. 60 m

C. 90 m

D. 120 m

Answer: b

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12. A ray of light is incident on a plane mirror at an angle of incidence of 30°. The deviation produced by the mirror is

A. 30°

B. 60°

C. 90°

D. 120°

Answer: D

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13. A ray of light is incident normally on a plane mirrorr. The angle of reflection will be

A. 0°

B. 90°

C. Will not be reflected

D. None of these

Answer: A

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14. A wave is reflected from a rigid support. The change in phase on reflection will be

A. 0

B. $\frac{\pi}{2}$

C. π

D. 2π

Answer: C

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15. A ray is reflected in turn by three plain mirrors mutually at right angles to each other. The angle between the incident and the reflected rays is

A. 90°

B. 60°

C. 180°

D. None of these

Answer: c

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16. Two plane mirrors are at right angles to each other. A man stands between them and combs his hair with his right hand. In how many of the images will he be seen using his right hand

A. None

B. 1

C. 2

D. 3

Answer: b

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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

B. Is halved

C. Remins the same

D. Becomes infinite

Answer: C

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18. A plane mirror produces a magnification of

A. -1

B. $+1$

C. Zero

D. Between 0 ans $+\infty$

Answer: B

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19. The plane of a mirror makes an angle of 30 with horizontal. If a vertical ray is incident on a mirror, then what is the angle between mirror and reflected ray ?

A. 30°

B. 45°

C. 60°

D. 90°

Answer: C

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20. A watch shows time as $3:25$ when seen through a mirror, time appeared will be

A. $8:35$

B. $9:35$

C. $7:35$

D. $8:25$

Answer: A

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21. If an observer is walking away from the plane mirrorr with $6m/\sec$. Then the velocity of the image with respect to observer will be

A. 6m / sec

B. -$6m/\sec$

C. 12 m/sec

D. 3m/sec

Answer: C

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22. A man runs towards a mirrorr at a speed $15 m/s$. The speed of the image relative to the man is

A. 7.5 m/s

B. 15 m/s

C. 30 m/s

D. 45 m/s

Answer: B

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23. A small object is placed $10 cm$ in front of a plane mirrorr. If you stand behind the object $30 cm$ from the mirrorr and look at its image, the distance focused for your eye will be

A. 60 cm

B. 20 cm

C. 40 cm

D. 80 cm

Answer: c

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24. An object is at a distance of $0.5m$ in front of a plane mirrorr. Distance between the object and image is

A. 0.5 m

B. 1 m

C. 0.25m

D. 1.5 m

Answer: B

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25. A man runs towards a mirrorr at a speed $15 m / s$. The speed of the image relative to the man is

A. $15 ms^{-1}$

B. $30 ms^{-1}$

C. $35 ms^{-1}$

D. $20 ms^{-1}$

Answer: b

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26. The light reflected by a plane mirrorr may form a real image

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 the mirror

D. Under no circumstances

Answer: b

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27. Two plane mirrors are inclined at an angle of 72°. The number of images of a point object placed between them will be

A. 2

B. 3

C. 4

D. 5

Answer: c

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

A. 30°

B. 60°

C. 90°

D. 150°

Answer: C

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29. A man of length h requires a mirror, to see his own complete image of length at least equal to

A. $\frac{h}{4}$

B. $\frac{h}{3}$

C. $\frac{h}{2}$

D. h

Answer: C

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30. Two plane mirrors are at 45° to each other. If an object is placed between them, then the number of images will be

A. 5

B. 9

C. 7

D. 8

Answer: C

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31. A man having height 6 m . He observes image of 2 m height erect, then mirror used is

A. Concave

B. convex

C. Plane

D. None of these

Answer: B

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32. A light beam is being reflected by using two mirrors, as in a periscope used in submarines. If one of the mirrors rotates by an angle θ, the reflected light will deviate from its original path by the angle

A. 2θ

B. 0°

C. θ

D. 4θ

Answer: A

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33. Focal length of a plane mirror is

A. Zero

B. Infinite

C. Very less

D. Indefinite

Answer: B

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34. A ray of light is incident at 50° on the middle of one of the two mirrorrs arranged at an angle of 60° between them . The ray then touches the second mirrorr, get reflected back to the first mirrorr, making an angle of incidence of

A. 50°

B. 60°

C. 70°

D. 80°

Answer: c

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35. A convex mirror of focal length f produced an image $(1/n)^{th}$ of the size of the object. The distance of the object from the mirror is

A. $(n - 1)f$

B. $\left(\frac{n - 1}{n}\right)f$

C. $\left(\frac{n + 1}{n}\right)f$

D. $(n + 1)f$

Answer: A

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36. A diminished virtual image can be formed only in

A. Plane mirror

B. A concave mirror

C. A convex mirror

D. Concave-parabolic mirror

Answer: C

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37. Which of the following could not produce a virtual image

A. Plane mirror

B. Convex mirror

C. Concave mirror

D. All the above can produce a virtual image

Answer: D

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38. 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

A. 0.11 cm

B. 0.50 cm

C. 0.55 cm

D. 0.60 cm

Answer: c

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39. The focal length of a concave mirror is 50cm. Where an object be placed so that its image is two times and inverted

A. 75 cm

B. 72 cm

C. 63 cm

D. 50 cm

Answer: A

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40. An object of size 7.5 cm is placed in front of a convex mirror of radius of curvature 25 cm at a distance of 40 cm. The size of the image should be

A. 2.3 cm

B. 1.78 cm

C. 1 cm

D. 0.8 cm

Answer: B

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41. The field of view is maximum for

A. Plane mirror

B. Concave mirror

C. Convex mirror

D. Cylindrical mirror

Answer: c

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42. The focal length of convex tens is f and the distance of an object from the principal focus is x. The ratio of the size of the real image to the size of the object is

A. $\frac{f+x}{f}$

B. $\frac{f}{x}$

C. $\sqrt{\frac{f}{x}}$

D. $\frac{f^2}{x^2}$

Answer: B

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43. Image formed by a convex mirror is

A. Virtual

B. Real

C. Enlarged

D. Inverted

Answer: A

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44. In a concave mirrorr 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 focus length of the mirrorr would be

A. $x_1 x_2$

B. $\sqrt{x_1 x_2}$

C. $\frac{x_1 + x_2}{2}$

D. $\sqrt{\frac{x_1}{x_2}}$

Answer: b

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45. A convex mirror is used to form the image of an object. Which of the following statements is wrong ?

A. The image lies between the pole and the focus

B. The image is diminished in size

C. The image is erect

D. The image is real

Answer: D

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46. 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

Answer: B

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47. The image formed by a convex mirror of focal length $30cm$. is a quarter of the object. What is the distance of the object from the mirror ?

A. 30 cm

B. 90 cm

C. 120 cm

D. 60 cm

Answer: B

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48. A girl stands at a distance 30 cm from the mirror. She is able to see her erect image but of 1/5 height of actual height. The mirror will be :

A. Plane mirror

B. Convex mirror

C. Concave mirror

D. Plano-convex mirror

Answer: B

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49. A person sees his virtual image by holding a mirrorr very close to the face. When he moves the mirrorr away from his face, the image becomes inverted. What type of mirrorr he is using ?

A. Plane mirror

B. Convex mirror

C. Concave mirror

D. None of these

Answer: C

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50. Which one of the following statements is true?

A. An object situated at the principle focus of a concave lens will have its image formed at infinity

B. Concave mirror can give diminished virtual image

C. Given a point source of light, a convex mirror can produce a parallel beam of light

D. The virtual image formed in a plane mirror can be photographed

Answer: d

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51. The relation between the linear magification m, the object distance u and the focal length f is

A. $m = \frac{f - u}{f}$

B. $m = \frac{f}{f - u}$

C. $m = \frac{f + u}{f}$

D. $m = \frac{f}{f + u}$

Answer: b

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52. While using an electric bulb, the reflection for street lighting should be from

A. Concave mirror

B. Convex mirror

C. Cylindrical mirror

D. Parabolic mirror

Answer: b

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53. 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

A. 8 cm

B. 12 cm

C. 80 cm

D. 120 cm

Answer: a

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54. A virtual image larger than the object can be obtained by

A. Concave mirror

B. Convex mirror

C. Plane mirror

D. Concave lens

Answer: A

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55. 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

Answer: A

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

A. 5 cm

B. 12 cm

C. 10 cm

D. 20 cm

Answer: b

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57. Radius of curvature of concave mirrorr is $40cm$ and the size of image is twice as that of object, then the object distance is

A. 60 cm

B. 20 cm

C. 10 cm

D. 30 cm

Answer: D

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58. 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

Answer: D

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59. If an object is placed 10 cm in front of a concave mirror of focal length 20cm, the image will be

A. Diminished, upright, virtual

B. Enlarged, upright, virtual

C. Diminished, inverted, real

D. Enlarged, upright, real

Answer: B

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60. Which of the following form(s) a virtual and erect image for all positions of the object

A. Convex lens

B. Concave lens

C. Convex mirror

D. both B and C

Answer: D

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61. 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. $2f$

Answer: C

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62. An object cm 1 tall is placed cm 4 infront of a mirror. In order to produce an upright image of cm 3 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

Answer: b

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63. Match List I with List II and select the correct answer using the codes given below the lists :

List I (Position of the object)	List II (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

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

Answer: A

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64. A concave mirror produces three times magnified real image of an object placed at 10 cm in front of it. Where is the image located ?

A. 10 cm

B. 15 cm

C. 20 cm

D. 30 cm

Answer: B

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65. The minimum distance between the object and its real image for concave mirror is

A. f

B. $2f$

C. $4f$

D. Zero

Answer: D

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66. 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 $20cm$ from the mirror

B. Virtual and at 20 cm from the mirror

C. Virtual and at $20/3cm$ from the mirror

D. Real and at $20/3$ cm from the mirror

Answer: C

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67. 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

Answer: a

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68. 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

Answer: d

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69. 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

Answer: D

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70. 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

Answer: b

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71. 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

Answer: d

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72. 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

Answer: d

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73. For a real object, which of the following can produced a real image

A. Plane mirror

B. Concave lens

C. Convex mirror

D. Concave mirror

Answer: d

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74. An object of length 6 cm is placed on the principle axis of a concave mirror of focal length f at a distance of 4 f . The length of the image will be

A. 2 cm

B. 12 cm

C. 4 cm

D. 1.2 cm

Answer: a

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75. Convergence of concave mirror can be decreased by dipping in

A. Water

B. Oil

C. Both

D. None of these

Answer: D

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76. What will be the height of image when an object of 2 mm is placed on the axis of a convex mirror at a distance 20 cm of radius of curvature 40 cm

A. 20 mm

B. 10 mm

C. 6 mm

D. 1 mm

Answer: d

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77. Image formed by a concave mirror of focal length 6 cm , is 3 times of the object, then the distance of object from mirror is

A. $-4cm$

B. $8cm$

C. $6cm$

D. $12cm$

Answer: A

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78. A concave mirror of focal length f (in air) is immersed in water $(\mu = 4/3)$. The focal length of the mirror in water will be

A. f

B. $\frac{4}{3}f$

C. $\frac{3}{4}f$

D. $\frac{7}{3}f$

Answer: a

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79. To an observer on the earth the stars appear to twinkle. This can be ascribed to

A. The fact that stars do not emit light continuously

B. Frequent absorption of star light by their own atmosphere

C. Frequent absorption of star light by the earth's atmosphere

D. The refractive index fluctuations in the earth's atmosphere

Answer: d

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80. The ratio of the refractive index of red light to blue light in air is

A. Less than unity

B. Equal to unity

C. Greater than unity

D. Less as well as greater than unity depending upon the experimental

arrangemen

Answer: a

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81. The refractive index of a piece of transparent quartz is the greatest for

A. Red light

B. Violet light

C. Green light

D. Yellow light

Answer: b

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82. The refractive index of a certain glass is 1.5 for light whose wavelength in vacuum is 6000 Å. The wavelength of this light when it passes through glass is

A. 4000 Å

B. 6000 Å

C. 9000 Å

D. 15000 Å

Answer: a

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83. When light travels from one medium to the other of which the refractive index is different, then which of the following will change

A. Frequency, wavelength and velocity

B. Frequency and wavelength

C. Frequency and velocity

D. Wavelength and velocity

Answer: d

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84. A light wave has a frequency of $4 \times 10^{14} Hz$ and a wavelength of 5×10^{-7} meters in a medium. The refractive index of the medium is

A. 1.5

B. 1.33

C. 1.0

D. 0.66

Answer: A

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85. How much water should be filled in a container of height $21cm$, so that it appears half filled to the observer when viewed from the top of the container ($\mu = 4/3$).

A. 8.0 cm

B. 10.5 cm

C. 12.0 cm

D. None of these

Answer: c

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86. Light of different colours propagates through air

A. With the velocity of air

B. With different velocities

C. With the velocity of sound

D. Having the equal velocities

Answer: D

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87. Monochromatic light is refracted from air into the glass of refractive index μ . The ratio of the wavelength of incident and refracted waves is

A. $1:\mu$

B. $1:\mu^2$

C. $\mu:1$

D. $1:1$

Answer: c

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88. A monochromatic beam of light passes from a denser medium into a rarer medium. As a result

A. Its velocity increases

B. Its velocity decreases

C. Its frequency decreases

D. Its wavelength decreases

Answer: a

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89. Refractive index for a material for infrared light is

A. Equal to that of ultraviolet light

B. Less than for ultraviolet light

C. Equal to that for red colour of light

D. Greater than that for ultraviolet light

Answer: B

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90. The index of refraction of diamond is 2.0, velocity of light in diamond in cm/second is approximately

A. 6×10^{10}

B. 3.0×10^{10}

C. 2×10^{10}

D. 1.5×10^{10}

Answer: D

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91. A beam of light propagating in medium A with index of refraction n (A) passes across an interface into medium B with index of refraction n (B).

The angle of incidence is greater than the angle of refraction, v (A) and v (B) denotes the speed of light in A and B . Then which of the following is true

A. $v(A) > v(B)$ and $n(A) > n(B)$

B. $v(A) > v(B)$ and $n(A) < n(B)$

C. $v(A) < v(B)$ and $n(A) > n(B)$

D. $v(A) < v(B)$ and $n(A) < n(B)$

Answer: b

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92. A rectangular tank of depth 8 meter is full of water $(\mu = 4/3)$, the bottom is seen at the depth

A. 6 m

B. 8/3 m

C. 8 cm

D. 10 cm

Answer: a

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93. A vessel of depth 2d cm is half filled with a liquid of refractive index μ_1 and the upper half with a liquid of refractive index μ_2. The apparent depth of the vessel seen perpendicularly is

A. $d\left(\frac{\mu_1\mu_2}{\mu_1+\mu_2}\right)$

B. $d\left(\frac{1}{\mu_1}+\frac{1}{\mu_2}\right)$

C. $2d\left(\frac{1}{\mu_1}+\frac{1}{\mu_2}\right)$

D. $2d\left(\frac{1}{\mu_1\mu_2}\right)$

Answer: b

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94. A beam of light is converging towards a point I on a screen. A plane glass plate whose thickness in the direction of the beam $= t$, refractive index $= \mu$, is introduced in the path of the beam. The convergence point is shifted by

A. $t\left(1 - \frac{1}{\mu}\right)$ away

B. $t\left(1 + \frac{1}{\mu}\right)$ away

C. $t\left(1 - \frac{1}{\mu}\right)$ nearer

D. $t\left(1 + \frac{1}{\mu}\right)$ nearer

Answer: a

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95. Light travels through a glass plate of thickness t and having refractive index n . If c is the velocity of light in vacuum, the time taken by the light to travel this thickness of glass is

A. $\frac{t}{nc}$

B. tnc

C. $\frac{nt}{c}$

D. $\frac{tc}{n}$

Answer: C

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96. When a light wave goes from air into water, the quality that remains unchanged is its

A. Speed

B. Amplitude

C. Frequency

D. Wavelength

Answer: C

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97. Light takes 8 min 20 sec to reach from sun on the earth. If the whole atmosphere is filled with water, the light will take the time $\left(\cdot_{a}\mu_{w} = 4/3\right)$

A. 8 min 20 sec

B. 8 min

C. 6 min 11 sec

D. 11 min 6 sec

Answer: d

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98. The length of the optical path of two media in contact of length d_1 and d_2 of refractive indices μ_1 and μ_2 respectively, is

A. $\mu_1 d_1 + \mu_2 d_2$

B. $\mu_1 d_2 + \mu_2 d_1$

C. $\dfrac{d_1 d_2}{\mu_1 \mu_2}$

D. $\dfrac{d_1 + d_2}{\mu_1 \mu_2}$

Answer: a

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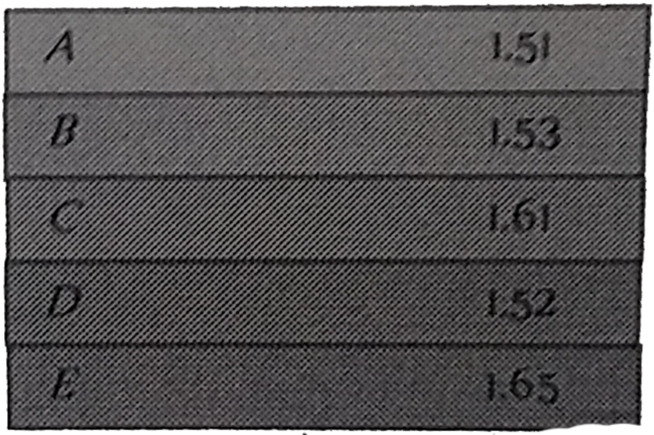
99. Immiscible transparent liquids A, B, C, D and E are placed in a rectangular container of glass with the liquids making layers according to their densities. The refractive index of the liquids are shown in the adjoining diagram. The container is illuminated from the side and a small piece of glass having refractive index 1.61 is gently dropped into the liquid layer. The glass piece as it descends downwards will not be visible in



A. Liquid A and B only

B. Liquid C only

C. Liquid D and E only

D. Liquid A , B , D and E

Answer: B

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100. If refractive indices of glass and water with respect to air are $3/2$ and $4/3$ respectively, what is the refractive index of glass with respect to water ?

A. $8/9$

B. $9/8$

C. $7/6$

D. None of these

Answer: b

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101. If $._{i}\mu_{j}$ represents refractive index when a light ray goes from mefium i to medium j, then the product $._{2}\mu_{1}\times ._{3}\mu_{2}\times ._{4}\mu_{3}$ is equal to

A. $._{3}\mu_{1}$

B. $._{3}\mu_{2}$

C. $\frac{1}{\cdot_1\mu_4}$

D. $\cdot_4\mu_2$

Answer: c

Watch Video Solution

102. The wavelength of light diminishes μ times ($\mu = 1.33$ for water) in a medium. A diver from inside water looks at an object whose natural colour is green. He sees the object as

A. Green

B. Bule

C. Yellow

D. Red

Answer: a

Watch Video Solution

103. Ray optics fails when

A. The size of the obstacle is 5 cm

B. The size of the obstacle is 3 cm

C. The size of the obstacle is less than the wavelength of light

D. (a) and (b) both

Answer: c

Watch Video Solution

104. When light travels from air to water and from water to glass, again from glass to CO_2 gas and finally through air. The relation between their refractive indices will be given by

A. $._{a}n_{w}\times ._{w}n_{gl}\times ._{gl}n_{\text{gas}}\times ._{\text{gas}}n_{a}=1$

B. $._{a}n_{w}\times {}_{w}n_{gl}\times ._{\text{gas}}n_{gl}\times ._{gl}n_{a}=1$

C. $._{a}n_{w} \times ._{w}n_{gl} \times ._{gl}n_{\text{gas}} = 1$

D. There is no such relation

Answer: a

Watch Video Solution

105. For a colour of light the wavelength for air is 6000 Å and in water the wavelength is 4500 Å . Then the speed of light in water will be

A. $5. \times 10^{14} m/s$

B. $2.25 \times 10^{8} m/s$

C. $4.0 \times 10^{8} m/s$

D. Zero

Answer: b

Watch Video Solution

106. A ray of light travelling inside a rectangular glass block of refractive index $\sqrt{2}$ is incident on the glass–air surface at an angle of incidence of 45°. The refractive index of air is 1. Under these conditions the ray

A. Will emerge into the air without any deviation

B. Will be reflected back into the glass

C. Will be absorbed

D. Will emerge into the air with an angle of refraction equal to 90°

Answer: d

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107. If ε_0 and μ_0 are respectively, the electric permittivity and the magnetic permeability of free space, ε and μ the corresponding quantities in a medium, the refractive index of the medium is

A. $\sqrt{\dfrac{\mu\varepsilon}{\mu_0\varepsilon_0}}$

B. $\dfrac{\mu\varepsilon}{\mu_0\varepsilon_0}$

C. $\sqrt{\dfrac{\mu_0\varepsilon_0}{\mu\varepsilon}}$

D. $\sqrt{\dfrac{\mu\mu_0}{\varepsilon\varepsilon_0}}$

Answer: a

Watch Video Solution

108. If μ_0 be the permeability and k_0 , the dielectric constant of a medium, its refractive index is given by

A. $\dfrac{1}{\sqrt{\mu_0 K_0}}$

B. $\dfrac{1}{\mu_0 K_0}$

C. $\sqrt{\mu_0 K_0}$

D. $\mu_0 K_0$

Answer: c

Watch Video Solution

109. If the speed of light in vacuum is C m/ sec then the velocity of light in a medium of refractive index 1.5

A. Is $1.5 \times C$

B. Is C

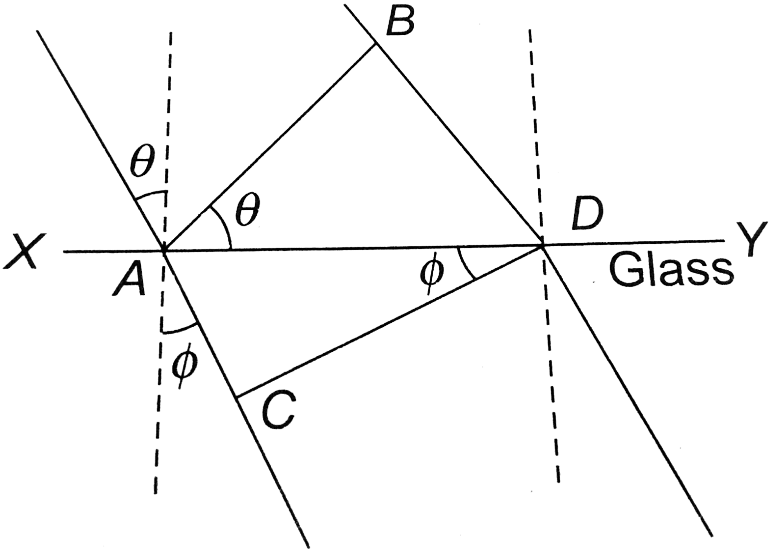
C. Is $\frac{C}{1.5}$

D. Can have any velocity

Answer: C

Watch Video Solution

110. In the adjoining figure, a wavefront AB moving in air is incident on a plane glass surface XY. Its position CD, after refraction through a glass slab is shown also along with the normals drawn at A and D. The refractive index of glass with respect to air will be equal to



A. $\dfrac{\sin\theta}{\sin\theta'}$

B. $\dfrac{\sin\theta}{\sin\phi'}$

C. $\dfrac{\sin\phi'}{\sin\theta}$

D. $\dfrac{AB}{CD}$

Answer: b

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111. When light enters from air to water, then its

A. Frequency increases and speed decreases

B. Frequency is same but the wavelength is smaller in water than in air

C. Frequency is same but the wavelength in water is greater than in air

D. Frequency decreases and wavelength is smaller in water than in air

Answer: b

Watch Video Solution

112. Monochromatic light of frequency $5 \times 10^{14} Hz$ travelling in vacuum enters a medium of refractive index 1.5. Its wavelength in the medium is

A. 4000 Å

B. 5000 Å

C. 6000 Å

D. 5500 Å

Answer: a

Watch Video Solution

113. A mark at the bottom of a liquid appears to rise by $0.1m$. The depth of the liquid is $1m$. The refractive index of the liquid is

A. 1.33

B. $\frac{9}{10}$

C. $\frac{10}{9}$

D. 1.5

Answer: c

Watch Video Solution

114. A man standing in a swimming pool looks at a stone lying at the bottom. The depth of the swimming pool is h. At what distance from the surface of water is the image of the stone formed -

A. h/n

B. n/h

C. h

D. hn

Answer: a

Watch Video Solution

115. On heating a liquid, the refractive index generally

A. Decreases

B. Increases or decreases depending on the rate of heating

C. Does not change

D. Increases

Answer: a

Watch Video Solution

116. If $\hat{i}$ denotes a unit vector along incident light ray, $\hat{r}$a unit vector along refracted ray into a medium of refraction index μ and $\hat{n}$ unit vector normal to boundary of medium directed towards incident medium, then law of refraction is

A. $\hat{i}.\hat{n} = \mu(\hat{r}.\hat{n})$

B. $\hat{i} \times \hat{n} = \mu(\hat{n} \times \hat{r})$

C. $\hat{i} \times \hat{n} = \mu(\hat{r} \times \hat{n})$

D. $\mu(\hat{i} \times \hat{n}) = \hat{r} \times \hat{n}$

Answer: c

Watch Video Solution

117. The bottom of a container filled with liquid appears slightly raised because of

A. Refraction

B. Interference

C. Diffraction

D. Reflection

Answer: A

Watch Video Solution

118. The speed of light in air is $3 \times 10^8 m/s$. What will be its speed in diamond whose refractive index is 2.4

A. $3 \times 10^8 m/s$

B. $332 m/s$

C. $1.25 \times 10^8 m/s$

D. $7.2 \times 10^{8} m/s$

Answer: c

Watch Video Solution

119. Time taken by sunlight to pass through a window of thickness $4mm$ whose refraactive index is $\frac{3}{2}$, is

A. 2×10^{-8}sec

B. 2×10^{8}sec

C. 2×10^{-11}sec

D. 2×10^{11}sec

Answer: C

Watch Video Solution

120. Ray optics is valid when characteristic dimensions are

A. Of the same order as the wavelength of light

B. Much smaller than the wavelength of light

C. Of the order of one millimetre

D. Much larger than the wavelength of light

Answer: d

Watch Video Solution

121. The refractive index of water is 1.33. What will be the speed of light in water

A. $3 \times 10^8 m/s$

B. $2.25 \times 10^8 m/s$

C. $4 \times 10^8 m/s$

D. $1.33 \times 10^8 m/s$

Answer: B

Watch Video Solution

122. The time required to pass the light through a glass slab of 2 mm thick is $\left(\mu_{\text{glass}} = 1.5\right)$

A. $10^{-5}s$

B. $10^{-11}s$

C. $10^{-9}s$

D. $10^{-13}s$

Answer: b

Watch Video Solution

123. The refractive index of glass with respect to air is $\frac{3}{2}$ and the refraction index of water with respect to air is $\frac{4}{3}$. The refractive index of glass with respect to water will be:

A. $\frac{9}{8}$

B. $\frac{8}{9}$

C. $\frac{1}{2}$

D. 2

Answer: b

Watch Video Solution

124. Electromagnetic radiation of frequency n, wavelength λ, travelling with velocity v in air, enters a glass slab of refractive index μ. The frequency, wavelength and velocity of light in the glass slab will be respectively

A. $\frac{n}{\mu}, \frac{\lambda}{\mu}, \frac{v}{\mu}$

B. $n, \frac{\lambda}{\mu}, \frac{v}{\mu}$

C. $n, \lambda, \frac{v}{\mu}$

D. $\frac{n}{\mu}, \frac{\lambda}{\mu}, v$

Answer: b

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125. What is the time taken (in seconds) to cross a glass of thickness 4 mm and $\mu = 3$ by light

A. 4×10^{-11}

B. 2×10^{-11}

C. 16×10^{-11}

D. 8×10^{-10}

Answer: A

Watch Video Solution

126. A plane glass slab is placed over various coloured letters. The letter which appears to be raised the least is

A. Blue

B. Violet

C. Green

D. Red

Answer: d

Watch Video Solution

127. A ray of light is incident at an angle of incidence 45° on an equilateral prism and emerge at an angle 45° then the refractive index of the medium of the prism is:

A. $1.96 \times 10^{8} m/s$

B. $2.12 \times 10^{8} m/s$

C. $3.18 \times 10^8 m/s$

D. $3.33 \times 18^8 m/s$

Answer: b

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128. Absolute refractive indices of glass and water are $3/2$ and $4/3$. The ratio of velocity of light in glass and water will be

A. $4:3$

B. $8:7$

C. $8:9$

D. $3:4$

Answer: c

Watch Video Solution

129. The ratio of thickness of plates of two transparent medium A and B is 6 : 4. If light takes equal time in passing through them, then refractive index of A with respect to B will be

A. 1.4

B. 1.5

C. 1.75

D. 1.33

Answer: b

Watch Video Solution

130. The refractive indices of water and glass with respect to air are 1.2 and 1.5 respectively. The refractive index of glass with respect to water is

A. $\frac{2.6}{1.5}$

B. $\frac{1.5}{2.6}$

C. $\frac{1.3}{1.5}$

D. $\frac{1.5}{1.3}$

Answer: d

Watch Video Solution

131. A tank is filled with water to a height of $12.5cm$ The apparent depth of a needle lying at the bottom of the tank is measured by a microscope to be $9.4cm$. What is the refractive index of water ? If water is replaced by a liquid of refractive index 1.63 upto the same height, by what distance would the microscope have to be moved to focus on the needle again ?

A. 1.5

B. 2.5

C. 3.5

D. 4.5

Answer: a

Watch Video Solution

132. Each quarter of a vessel of depth H is filled with liquids of the refractive indices n_1, n_2, n_3 and n_4 from the bottom respectively. The apparent depth of the vessel when looked normally is

A. $\dfrac{H(n_1 + n_2 + n_3 + n_4)}{4}$

B. $\dfrac{H\left(\frac{1}{n_1} + \frac{1}{n_2} + \frac{1}{n_3} + \frac{1}{n_4}\right)}{4}$

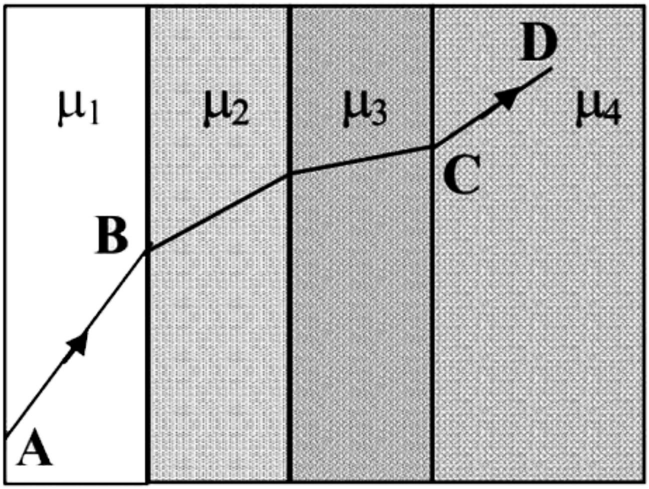
C. $\dfrac{(n_1 + n_2 + n_3 + n_4)}{4H}$

D. $\dfrac{H\left(\frac{1}{n_1} + \frac{1}{n_2} + \frac{1}{n_3} + \frac{1}{n_4}\right)}{2}$

Answer: b

Watch Video Solution

133. A ray of light passes through four transparent media with refractive indices μ_1, μ_2, μ_3 and μ_4 as shown in the figure. The surfaces of all media are parallel. If the emergent ray CD is parallel to the incident ray AB, we must have



A. $\mu_1 = \mu_2$

B. $\mu_2 = \mu_3$

C. $\mu_3 = \mu_4$

D. $\mu_4 = \mu_1$

Answer: d

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134. the reason of seeing the sun a little before the sunrise is

A. Reflection of the light

B. Refraction of the light

C. Scattering of the light

D. Dispersion of the light

Answer: b

Watch Video Solution

135. An under water swimmer is at a depth of 12 m below the surface of water. A bird is at a height of 18 m from the surface of water, directly above his eyes. For the swimmer the bird appears to be at a distance from the surface of water equal to (Refractive Index of water is 4/3)

A. 24 m

B. 12 m

C. 18 m

D. 9 m

Answer: a

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136. The optical path of a monochromatic light is same if it goes through 4.0 cm of glass or 4.5 cm of water. If the refractive index of glass is 1.53, the refractive index of the water is

A. 1.30

B. 1.36

C. 1.42

D. 1.46

Answer: b

Watch Video Solution

137. Which of the following statement is true

A. Velocity of light is constant in all media

B. Velocity of light in vacuum is maximum

C. Velocity of light is same in all reference frames

D. Laws of nature have identical form in all reference frames

Answer: b

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138. A ray of light falls on a transparent glass slab of refractive index 1.62. If the reflected ray and the refracted rays are mutually perpendicular, what is the angle of refraction ?

A. 58.3

B. 50

C. 35

D. 30

Answer: a

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139. A microscope is focussed on a coin lying at the bottom of a beaker. The microscope is now raised up by $1cm$. To what depth should the water be poured into the beaker so that coin is again in focus ? (Refration index of water is $4/3$)

A. 1 cm

B. $\frac{4}{3}$ cm

C. 3 cm

D. 4 cm

Answer: d

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140. Velocity of light in glass whose refractive index with respect to air is 1.5 is $2 \times 10^8 m/s$ and in certain liquid the velocity of light found to be $2.5 \times 10^8 m/s$. The refractive index of the liquid with respect to air is

A. 0.64

B. 0.80

C. 1.20

D. 1.44

Answer: c

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141. Stars are twinkling due to

A. Diffraction

B. Reflection

C. Refraction

D. Scattering

Answer: c

Watch Video Solution

142. A thin oil layer floats on water. A ray of light making an angle of incidence of 40° shines on oil layer. The angle of refraction of light ray in water is $\left(\mu_{oil} = 1.45, \mu_{\text{water}} = 1.33\right)$

A. 36.1°

B. 44.5°

C. 26.8°

D. 28.9°

Answer: d

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143. An object is immersed in a fluid. In order that the object becomes invisible, it should

A. Behave as a perfect reflector

B. Absorb all light falling on it

C. Have refractive index one

D. Have refractive index exactly matching with that of the surrounding fluid

Answer: D

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144. When light travels from glass to air, the incident angle is θ_1 and the refracted angle is θ_2. The true relation is

A. $\theta_1 = \theta(2)$

B. $\theta_1 < \theta_2$

C. $\theta_1 > \theta_2$

D. Not predictable

Answer: b

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145. Velocity of light in a medium is $1.5 \times 10^8 m/s$. Its refractive index will be

A. 8

B. 6

C. 4

D. 2

Answer: d

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146. The frequency of a light ray is $6 \times 10^{14} Hz$. Its frequency when it propagates in a medium of refractive index 1.5, will be

A. $1.67 \times 10^{14} Hz$

B. $9.10 \times 10^{14} Hz$

C. $6 \times 10^{14} Hz$

D. $4 \times 10^{14} Hz$

Answer: C

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147. The refractive indices of water and glass with respect to air are 1.2 and 1.5 respectively. The refractive index of glass with respect to water is

A. 0.6

B. 0.8

C. 1.25

D. 1.75

Answer: c

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148. The wavelength of sodium light in air is 5890 Å . The velocity of light in air is $3 \times 10^8 ms^{-1}$. The wavelength of light in a glass of refractive index 1.6 would be close to

A. 5890 Å

B. 3681 Å

C. 9424 Å

D. 15078 Å

Answer: b

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149. The mean distance of sun from the earth is $1.5 \times 10^8 km$. The time taken by light to reach earth from the sun is

A. 0.12 min

B. 8.33 min

C. 12.5 min

D. 6.25 min

Answer: b

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150. Refractive index of air is 1.0003. The correct thickness of air column which will have one more wavelength of yellow light (6000Å) than in the same thickness in vacuum is

A. 2 mm

B. 2 cm

C. 2m

D. 2 km

Answer: a

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151. The wavelength of light in air and some other medium are respectively λ_a and λ_m. The refractive index of medium is

A. λ_a/λ_m

B. λ_m/λ_a

C. $\lambda_a \times \lambda_m$

D. None of these

Answer: a

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152. An astronaut in a spsceship sees the outer space as

A. White

B. Black

C. Blue

D. Red

Answer: b

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153. Speed of light is maximum in

A. Water

B. Air

C. Glass

D. Diamond

Answer: b

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154. Which one of the following statements is correct

A. In vacuum, the speed of light depends upon frequency

B. In vacuum, the speed of light does not depend upon frequency

C. In vacuum, the speed of light is independent of frequency and wavelength

D. In vacuum, the speed of light depends upon wavelength

Answer: c

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155. If the wavelength of light in vacuum be λ, the wavelength in a medium of refractive index n will be

A. $n\lambda$

B. $\frac{\lambda}{n}$

C. $\frac{\lambda}{n^2}$

D. $n\lambda$

Answer: B

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156. In vacuum the speed of light depends upon

A. Frequency

B. Wave length

C. Velocity of the source of light

D. None of these

Answer: d

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157. A transparent cube of $15cm$ edge contains a small air bubble. Its apparent depth when viewed through one face is $6cm$ and when viewed through the opposite face is $4cm$. Then the refractive index of the material of the cube is

A. 2.0

B. 2.5

C. 1.6

D. 1.5

Answer: d

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158. A glass slab of thickness $3cm$ and refractive index $3/2$ is placed on ink mark on a piece of paper. For a person looking at the mark at a distance $5.0cm$ above it, the distance of the mark will appear to be

A. 3.0 cm

B. 4.0 cm

C. 4.5 cm

D. 5.0 cm

Answer: b

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159. A fish at a depth of $12cm$ in water is viewed by an observer on the bank of a lake. To what height the images of the fish is raised ?

A. 9 cm

B. 12 cm

C. 3.8 cm

D. 3 cm

Answer: d

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160. A cut diamond sparkles because of its

A. Hardness

B. High refractive index

C. Emission of light by the diamond

D. Absorption of light by the diamond

Answer: d

Watch Video Solution

161. A diver in a swimming poole wants to signal his distress to a person lying on the edge of the pool by flashing his water proof flash light

A. He must direct the beam vertically upwards

B. He has to direct the beam horizontally

C. He has to direct the beam at an angle to the vertical which is slightly less than the critical angle of incidence for total internal reflection

D. He has to direct the beam at an angle to the vertical which is slightly more than the critical angle of incidence for the total internal reflection

Answer: C

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162. Finger prints on a piece of paper may be detected by sprinkling flourescent powder on the paper and then looking it into

A. Mercury light

B. Sunlight

C. Infrared light

D. Ultraviolet light

Answer: d

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163. Critical angle of light passing from glass to air is minimum for

A. Red

B. Green

C. Yellow

D. Violet

Answer: D

Watch Video Solution

164. 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

A. 60°

B. 45°

C. 30°

D. 15°

Answer: c

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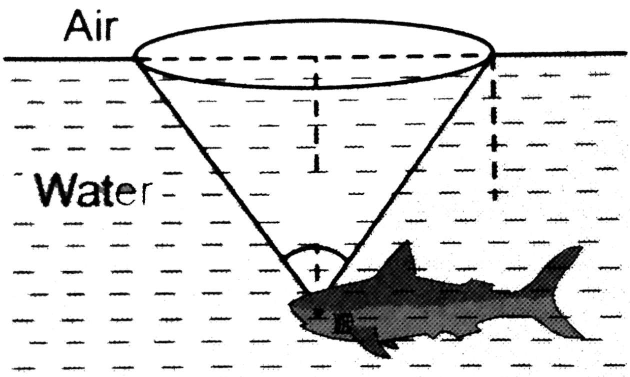
165. A fish is a little away below the surface of a lake. If the critical angle is 49°, then the fish could see things above the water surface withing an angular range of θ° where



A. $\theta = 49^{\circ}$

B. $\theta = 90^{\circ}$

C. $\theta = 98^{\circ}$

D. $\theta = 24\frac{1}{2}^{\circ}$

Answer: C

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166. If the critical angle for total internal reflection from a medium to vacuum is 30°, the velocity of light in the medium is

A. $3 \times 10^8 m/s$

B. $1.5 \times 10^8 m/s$

C. $6 \times 10^8 m/s$

D. $\sqrt{3} \times 10^8 m/s$

Answer: B

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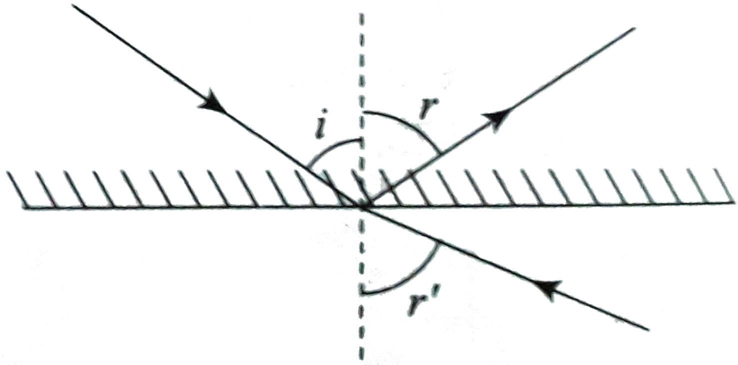
167. A ray of light from a denser medium strikes a rarer medium at an angle of incidence I (see figure). The reflected and refracted rays make an angle of 90° with each other. The angles of reflection and refraction are r and r'. The critical angle is



A. $\sin^{-1}(\sin r)$

B. $\sin^{-1}(\tan r')$

C. $\sin^{-1}(\tan i)$

D. $\tan^{-1}(\sin i)$

Answer: c

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168. For total internal reflection to take place, the angle of incidence i and the refractive index μ of the medium must satisfy the inequality

A. $\frac{1}{\sin i} < \mu$

B. $\frac{1}{\sin i} > \mu$

C. $\sin I < \mu$

D. $\sin I > \mu$

Answer: a

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169. Total internal reflection of light is possible when light enters from

A. Air to glass

B. Vacuum to air

C. Air to water

D. Water to air

Answer: D

Watch Video Solution

170. Total internal reflection of a ray of light is possible when the (i_c = critical angle, i = angle of incidence)

A. Ray goes from denser medium to rarer medium and $i < i_c$

B. Ray goes from denser medium to rarer medium and $i > i_c$

C. Ray goes from rarer medium to denser medium and $i > i_c$

D. Ray goes from rarer medium to denser medium and $i < i_c$

Answer: b

Watch Video Solution

171. A diver at a depth of 12 m in water ($\mu = 4/3$) sees the sky in a cone of semi-vertical angle

A. $\sin^{-1}(4/3)$

B. $\tan^{-1}(4/3)$

C. $\sin^{-1}(3/4)$

D. 90°

Answer: c

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172. Critical angle is that angle of incidence in the denser medium for which the angle of refraction in rarer medium is

A. 0°

B. 57°

C. 90°

D. 180°

Answer: c

Watch Video Solution

173. The critical angle for diamond (refractive index = 2) is

A. About 20°

B. 60°

C. 45°

D. 30°

Answer: D

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174. The reason for shining of air bubble in water is

A. Diffraction of light

B. Dispersion of light

C. Scattering of light

D. Total internal reflection of light

Answer: D

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175. With respect to air critical angle in a medium for light of red colour $\left[\lambda_1\right]$ is θ. Other facts remaining same, critical angle for light of yellow colour $\left[\lambda_2\right]$ will be

A. θ

B. More than θ

C. Less than θ

D. $\dfrac{\theta\lambda_1}{\lambda_2}$

Answer: c

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176. Mirage' is a phenomenon due to

A. Reflection of light

B. Refraction of light

C. Total internal reflection of light

D. Diffraction of light

Answer: C

Watch Video Solution

177. A ray of light travelling in a transparant medium falls on a surface separating the medium from air at an angle of incidence of $45 degree$. The ray undergoes total internal reflection. If n is the refractive in index of the medium with respect to air, select the possible value (s) of n from the following:

A. 1.3

B. 1.4

C. 1.5

D. 1.6

Answer: cd

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178. When a ray of light emerges from a block of glass, the critical angle is

A. Equal to the angle of reflection

B. The angle between the refracted ray and the normal

C. The angle of incidence for which the refracted ray travels along the glass-air boundary

D. The angle of incidence

Answer: c

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179. The phenomenon utilised in an optical fibre is

A. Refraction

B. Interference

C. Polarization

D. Total internal reflection

Answer: D

Watch Video Solution

180. The refractive index of water is 4 / 3 and that of glass is 5/3. What will be the critical angle for the ray of light entering water from the glass

A. $\sin^{-1}\frac{4}{5}$

B. $\sin^{-1}\frac{5}{4}$

C. $\sin^{-1}\frac{1}{2}$

D. $\sin^{-1}\frac{2}{1}$

Answer: A

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181. Total internal reflection is possible when light rays travel

A. Air to water

B. Air to glass

C. Glass to water

D. Water to glass

Answer: C

Watch Video Solution

182. The velocity of light in a medium is half its velocity in air. If ray of light emerges from such a medium into air, the angle of incidence, at which it will be totally internally reflected, is

A. 15°

B. 30°

C. 45°

D. 60°

Answer: b

Watch Video Solution

183. A light wave travels from glass to water. The refractive index for glass and water are $\frac{3}{2}$ and $\frac{4}{3}$ respectively. The value of the critical angle will be:

A. $\sin^{-1}(1/2)$

B. $\sin^{-1}\left(\frac{\sqrt{8}}{9}\right)$

C. $\sin^{-1}(8/9)$

D. $\sin^{-1}(5/7)$

Answer: c

Watch Video Solution

184. Relation between critical angles of water and glass is

A. $C_w > C_g$

B. $C_w < C_g$

C. $C_w = C_g$

D. $C_w = C_g = 0$

Answer: a

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185. If critical angle for a material to air is 30°, the refractive index of the material will be

A. 1.0

B. 1.5

C. 2.0

D. 2.5

Answer: c

Watch Video Solution

186. The refractive index of water is 1.33. The direction in which a man under water should look to see the setting sun is

A. 49 to the horizantal

B. 90 with the vertical

C. 49 to the vertical

D. Along the horizontal

Answer: c

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187. Optical fibres are related with

A. Communication

B. Light

C. Computer

D. None of these

Answer: a

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188. Brilliance of diamond is due to

A. Shape

B. Cutting

C. Reflection

D. Total internal reflection

Answer: D

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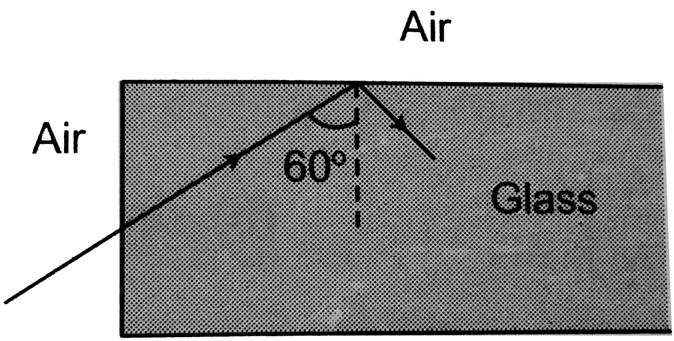
189. A light ray from air is incident (as shown in figure) at one end of a glass fiber (refractive index $\mu = 1.5$) making an incidence angle of 60° on the lateral surface, so that it undergoes a total internal reflection. How much time would it take to traverse the straight fiber of length $1km$?



A. $3.33\mu\text{sec}$

B. $6.67\mu\text{sec}$

C. $5.77\mu\text{sec}$

D. $3.85\mu\text{sec}$

Answer: d

Watch Video Solution

190. Light wave enters from medium 1 to medium 2. Its velocity in 2^{nd} medium is double from 1^{st}. For total internal reflection the angle of incidence must be greater than

A. 30°

B. 60°

C. 45°

D. 90°

Answer: a

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191. Consider telecommunication through optical fibres. Which of the following statements is not true?

A. Optical fibres may have homogeneous core with a suitable cladding

B. Optical fibres can be of graded refractive index

C. Optical fibres are subject to electromagnetic interference from outside

D. Optical fibres have extremely low transmission loss

Answer: c

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192. The critical angle for a medium is 60°. The refractive index of the medium is

A. $\frac{2}{\sqrt{3}}$

B. $\frac{\sqrt{2}}{3}$

C. $\sqrt{3}$

D. $\frac{\sqrt{3}}{2}$

Answer: a

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193. Glass has refractive index μ with respect to air and the critical angle for a ray of light going from glass to air is θ. If a ray of light is incident from air on the glass with angle of incidence θ, the corresponding angle of refraction is

A. $\sin^{-1}\left(\frac{1}{\sqrt{\mu}}\right)$

B. 90°

C. $\sin^{-1}\left(\frac{1}{\mu^2}\right)$

D. $\sin^{-1}\left(\frac{1}{\mu}\right)$

Answer: c

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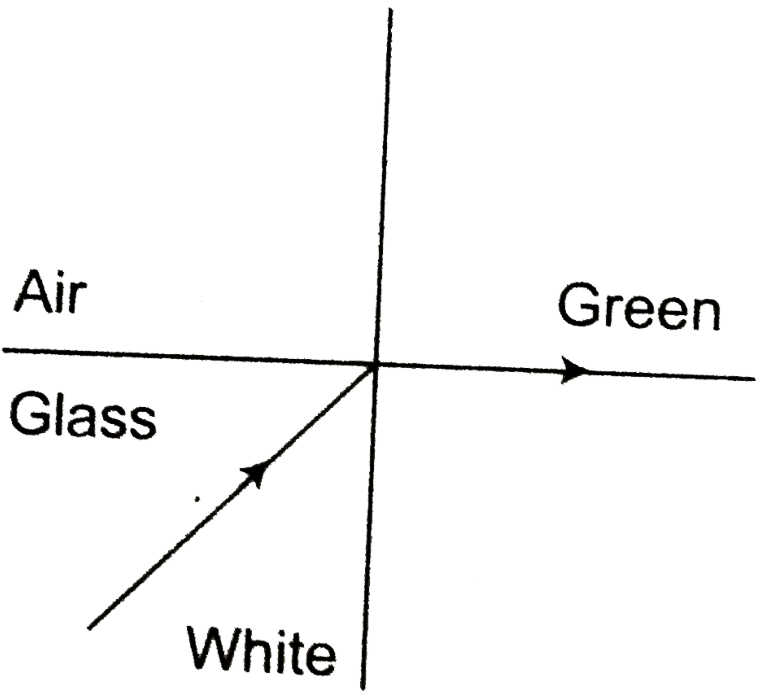
194. White light is incident on the interface of glass and air as shown in figure. If green ligth is just totally internally reflected then the emerging ray in air contains



A. Yellow, orange, red

B. Violet, indigo, blue

C. All colours

D. All colours except green

Answer: A

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195. Material A has critical angle i_A, and material B has critical angle $i_B\left(i_B > i_A\right)$. Then which of the following is true

(i) Light can be totally internally reflected when it passes from B to A

(ii) Light can be totally internally reflected when it passes from A to B

(iii) Critical angle for total internal reflection is $i_B - i_A$

(iv) Critical angle between A and B is $\sin^{-1}\left(\frac{\sin i_A}{\sin i_B}\right)$

A. (i) and (iii)

B. (i) and (iv)

C. (ii) and (iii)

D. (ii) and (iv)

Answer: D

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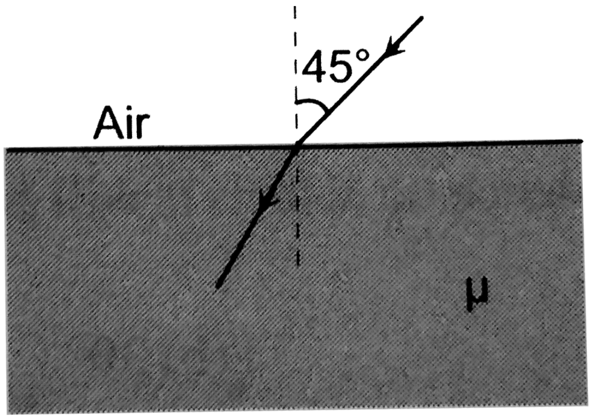
196. In the figure shown , for an angle of incidence 45°, at the top surface , what is the minimum refractive index needed for the internal reflection at vertical face ?



A. $\frac{\sqrt{2}+1}{2}$

B. $\sqrt{\frac{3}{2}}$

C. $\sqrt{\frac{1}{2}}$

D. $\sqrt{2} + 1$

Answer: B

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197. Critical angle for light going from medium (i) to (ii) is θ . The speed of light in medium (i) is v then speed in medium (ii) is

A. $v(1 - \cos\theta)$

B. $v/\sin\theta$

C. $v/\cos\theta$

D. $v(1 - \sin\theta)$

Answer: b

Watch Video Solution

198. If light travels a distance x in t_1 sec in air and $10x$ distance in t_2 sec in a medium, the critical angle of the medium will be

A. $\tan^{-1}\left(\frac{t_1}{t_2}\right)$

B. $\sin^{-1}\left(\frac{t_1}{t_2}\right)$

C. $\sin^{-1}\left(\frac{10t_1}{t_2}\right)$

D. $\tan^{-1}\left(\frac{10t_1}{t_2}\right)$

Answer: c

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199. The critical angle of a medium with respect to air is 45°. The refractive index of medium is

A. 1.41

B. 1.2

C. 1.5

D. 2

Answer: a

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200. An endoscope is employed by a physician to view the internal parts of body organ. It is based on the principle of

A. Refraction

B. Reflection

C. Total internal reflection

D. Dispersion

Answer: c

Watch Video Solution

201. A normally incident ray reflected at an angle of 90°. The value of critical angle is

A. 45°

B. 90°

C. 65°

D. 43.2°

Answer: b

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202. The phenomena of total internal reflection is seen when angle of incidence is

A. 90°

B. Greater than critical angle

C. Equal to critical angle

D. 0°

Answer: b

Watch Video Solution

203. A fish looking up through the water sees the outside world contained in a circular horizon. If the refractive index of water is $\frac{4}{3}$ and the fish is 12 cm below the surface, the radius of this circle is cm is

A. $36\sqrt{5}$

B. $4\sqrt{5}$

C. $36\sqrt{7}$

D. $36/\sqrt{7}$

Answer: d

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204. A point source of light is placed 4 m below the surface of water of refractive index $\frac{5}{3}$. The minimum diameter of a disc, which should be placed over the source, on the surface of water to cut off light coming out of water is

A. 2 m

B. 6 m

C. 4 m

D. 3 m

Answer: b

Watch Video Solution

205. A fist looking from within water sees the outside world through a circular horizon. If the fish $\sqrt{7}$ cm below the surface of water, what will be the radius of the circular horizon

A. 3.0 cm

B. 4.0 cm

C. 4.5 cm

D. 5.0 cm

Answer: a

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206. The radius of curvature for a convex lens is 40 cm , for each surface. Its refractive index is 1.5. The focal length will be

A. 40 cm

B. 20 cm

C. 80 cm

D. 30 cm

Answer: A

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207. A convex lens of focal length f is placed somewhere in between an object and a screen. The distance between the object and the screen is x. If the numerical value of the magnification produced by the lens is m, then the focal lnegth oof the lens is .

A. $\dfrac{mx}{(m+1)^2}$

B. $\dfrac{mx}{(m-1)^2}$

C. $\dfrac{(m+1)^2}{m}x$

D. $\dfrac{(m-1)^2}{m}x$

Answer: A

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208. A thin lens focal length f_1 and its aperture has diameter d. It forms an image of intensity I. Now the central part of the aperture up to diameter $\frac{d}{2}$ is blocked by an opaque paper. The focal length and image intensity will change to

A. $\frac{f}{2}$ and $\frac{I}{2}$

B. f and $\frac{1}{4}$

C. $\frac{3f}{4}$ and $\frac{I}{2}$

D. f and $\frac{3I}{4}$

Answer: d

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209. A lens of power $+2$ dioptres is placed in contact with a lens of power -1 dioptre. The combination will behave like

A. A convergent lens of focal length 50 cm

B. A divergent lens of focal length 100 cm

C. A convergent lens of focal length 100 cm

D. A convergent lens of focal length 200 cm

Answer: C

Watch Video Solution

210. A convex lens of focal length 40 cm is in contact with a concave lens of focal length 25 cm. The power of the combination is

A. $-1.5D$

B. $-6.5D$

C. $+6.5D$

D. $+6.67D$

Answer: A

Watch Video Solution

211. Two lenses are placed in contact with each other and the focal length of combination is $80cm$. If the focal length of one is $20cm$, then the power of the other will be

A. $1.66D$

B. $4.00D$

C. - $1.00D$

D. - $3.75D$

Answer: D

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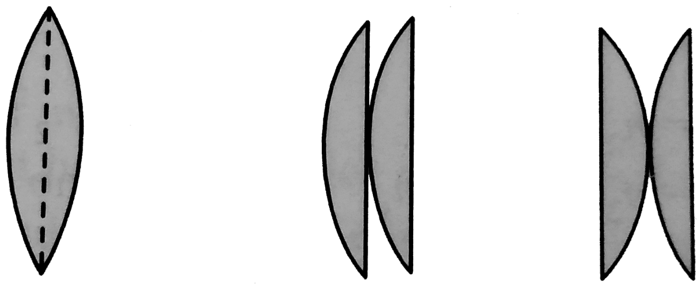
212. Two similar planoconvex lenses are combined together in three different ways as shown in the adjoining figure. The ratio of the focal lengths in three cases will be



A. $2:2:1$

B. $1:1:1$

C. $1:2:2$

D. $2:1:1$

Answer: b

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213. Two lenses of power $+12$ and -2 dioptres are placed in contact. The combined focal length of the combination will be

A. 10 cm

B. 12.5 cm

C. 16.6 cm

D. 8.33 cm

Answer: A

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214. If in a plano-convex lens, the radius of curvature of the convex surface is 10 cm and the focal length of the lens is 30 cm , then the refractive index of the material of lens will be

A. 1.5

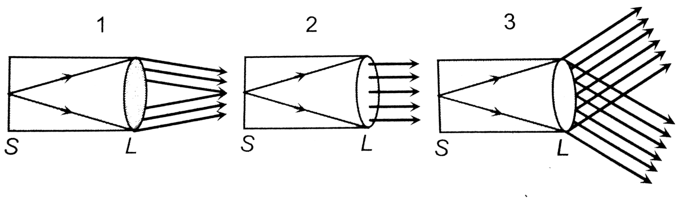
B. 1.66

C. 1.33

D. 3

Answer: C

215. The slit of a collimator is illuminated by a source as shown in the adjoining figures. The distance between the slit S and the collimating lengs L is equal to the focal length of the lens. The correct direction of the emergent beam will be as shown in figure.



A. 1

B. 3

C. 2

D. None of the figures

Answer: c

216. A converging lens is used to form an image on a screen. When the upper half of the lens is covered by an opaque screen

A. Half the image will disappear

B. Complete image will be formed of same intensity

C. Half image will be formed of same intensity

D. Complete image will be formed of decreased intensity

Answer: D

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217. A thin convex lens of focal length 10 cm is placed in contact with a concave lens of same material and of same focal length. The focal length of combination will be

A. Zero

B. Infinity

C. 10 cm

D. 20 cm

Answer: B

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218. A convex lens of focal length 84 cm is in contact with a concave lens of focal length 12 cm . The power of combination (in diopters) is

A. $25/24$

B. $25/18$

C. $-50/7$

D. $+50/7$

Answer: C

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219. A convex lens makes a real image 4 cm long on a screen. When the lens is shifted to a new position without disturbing the object, we again get a real image on the screen which is 16 cm tall. The length of the object must be

A. $1/4cm$

B. $8cm$

C. $12cm$

D. $20cm$

Answer: b

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220. Assertion : A double convex lens $(\mu = 1.5)$ has focal length $10cm$. When the lens is immersed in water $(\mu = 4/3)$ its focal length becomes $40cm$.

Reason : $\frac{1}{f} = \frac{\mu_1 - \mu_m}{\mu_m}\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$

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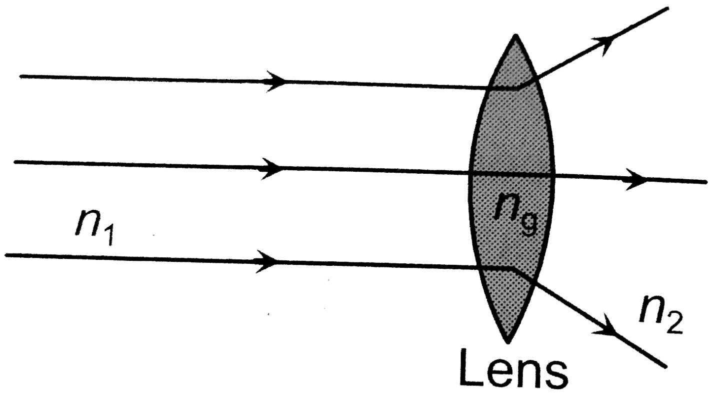
221. The ray diagram could be correct



A. If $n_1 = n_2 = n_g$

B. If $n_1 = n_2$ and $n_1 < n_g$

C. If $n_1 = n_2$ and $n_1 > n_g$

D. Under no circumstances

Answer: C

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222. A thin lens of refractive index 1.5 has focal length of $15cm$ in air. When the lens is placed is a medium of refractive index (4)/(3), its focal length will become .....cm.

A. 15 cm

B. 10 cm

C. 30 cm

D. 60 cm

Answer: D

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223. A glass lens is placed in a medium in which it is found to behave like a glass plate. Refractive index of the medium will be

A. Greater than the refractive index of glass

B. Smaller than the refractive index of glass

C. Equal to refractive index of glass

D. No case will be possible from above

Answer: c

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224. If I_1 and I_2 be the size of the images respectively for the two positions of lens in the displacement method, then the size of the object is given by

A. I_1/I_2

B. $I_1 \times I_2$

C. $\sqrt{I_1 \times I_2}$

D. $\sqrt{I_1/I_2}$

Answer: c

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225. A convex lens of crown glass (n =1.525) will behave as a divergent lens if immersed in

A. Water (n=1.33)

B. In a medium of $n = 1.525$

C. Carbon disulphide n=1.66

D. It cannot act as a divergent lens

Answer: C

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226. A divergent lens will produce

A. Always a virtual image

B. Always real image

C. Sometimes real and sometimes virtual

D. None of the above

Answer: a

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

A. 1.5 f

B. 2 f

C. 2.5 f

D. 4 f

Answer: d

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228. An object is placed at a distance of 20 cm from a convex lens of focal length 10 cm . The image is formed on the other side of the lens at a distance

A. 20 cm

B. 10 cm

C. 40 cm

D. 30 cm

Answer: a

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229. Two thin lenses, one of focal length + 60 cm and the other of focal length – 20 cm are put in contact. The combined focal length is

A. $+15cm$

B. $-15cm$

C. $+30cm$

D. $-30cm$

Answer: d

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230. A double convex lens of focal length 20 cm is made of glass of refractive index 3 / 2. When placed completely in water $\left(._{a}\mu_{w} = 4/3\right)$, its focal length will be

A. 80 cm

B. 15 cm

C. 17.7 cm

D. 22.5 cm

Answer: A

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231. Two thin lenses of focal lengths 20cm and 25cm are placed in contact. The effective power of the combination is

A. 45 dioptres

B. 9 dioptres

C. 1/9 dioptre

D. 6 dioptres

Answer: B

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232. An object is placed at a distance of $f/2$ from a convex lens. The image will be

A. At one of the foci, virtual and double its size

B. At 3f / 2, real and inverted

C. At 2 f , virtual and erect

D. None of these

Answer: a

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233. A double convex thin lens made of glass (refractive index $\mu = 1.5$) has both radii of curvature of magnitude 20 cm . Incident light rays parallel to the axis of the lens will converge at a distance L such that

A. L=20 cm

B. L=10 cm

C. L=40 cm

D. L=20/3 cm

Answer: a

Watch Video Solution

234. A lense behaves as a converging lens is air and diverging lens in water. The refractive index of the lens material is -

A. Equal to unity

B. Equal to 1.33

C. Between unity and 1.33

D. Greater than 1.33

Answer: c

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235. A biconvex lens forms a real image of an object placed perpendicular to its principal axis. Suppose the radii of curvature of the lens tend to infinity. Then the image would

A. Disappear

B. Remain as real image still

C. Be virtual and of the same size as the object

D. Suffer from aberrations

Answer: c

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236. The radius of curvature of the convex surface of a thin plano-convex lens is 15 cm and the refractive index of its material is 1.6. The power of the lens is

A. $+1D$

B. $-2D$

C. $+3D$

D. $+4D$

Answer: d

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237. Focal length of convex lens will miximum for

A. Blue light

B. Yellow light

C. Green light

D. Red light

Answer: d

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238. A lens if placed between a source of light and a wall. It forms images of areaA_1 and A_2 on the wall for its two different positions. The area of the source or light is

A. $\frac{A_1 + A_2}{2}$

B. $\left[\frac{1}{A_1}+\frac{1}{A_2}\right]^{-1}$

C. $\sqrt{A_1 A_2}$

D. $\left[\frac{\sqrt{A_1}+\sqrt{A_2}}{2}\right]^2$

Answer: c

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239. Two lenses of power 6 D and – 2 D are combined to form a single lens. The focal length of this lens will be

A. $\frac{3}{2}m$

B. $\frac{1}{4}m$

C. $4m$

D. $\frac{1}{8}m$

Answer: b

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240. A combination of two thin lenses with focal lengths f_1 and f_2 respectively forms and image of distant object at distance $60cm$ when lenses are in contact. The position of this image shifts by $30cm$ towards the combination when two lenses are separated by $10cm$. The corresponding values of f_1 and f_2 are

A. 30 cm, -60 cm

B. 20 cm, -30 cm

C. 15 cm, -20 cm

D. 12 cm, -15 cm

Answer: B

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241. An achlromatic combination of lenses is formed by joining

A. 2 convex lenses

B. 2 concave lenses

C. 1 convex lens and 1 concave lens

D. Convex lens and plane mirror

Answer: c

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242. A plano convex lens has focal length $f = 20cm$. If its plane surface is silvered, then new focal length will be

A. 20 cm

B. 40 cm

C. 30 cm

D. 10 cm

Answer: d

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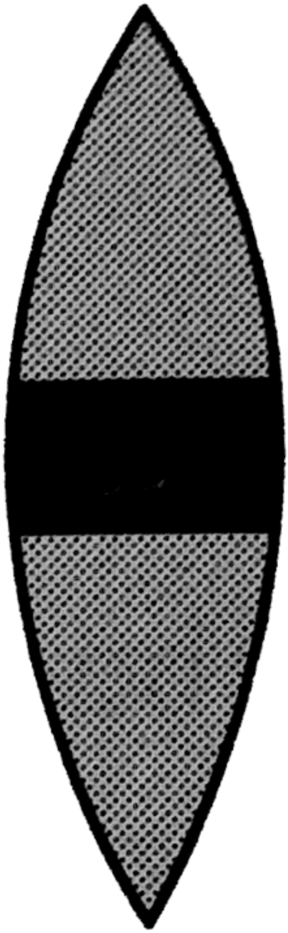
243. If the central portion of a convex lens is wrapped in black paper as shown in figure



A. No image will be formed by the remaining portion of the lens

B. The full image will be formed but it will be less bright

C. The central portion of the image will be missing

D. There will be two images each produced by one of the exposed portions of the lens

Answer: B

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244. A diminished image of an object is to be obtained on a screen 1.0 m from it. This can be achieved by appropriately placing

A. A convex mirror of suitable focal length

B. A concave mirror of suitable focal length

C. A concave lens of suitable focal length

D. A convex lens of suitable focal length less than 0.25 m

Answer: d

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245. The focal length of convex lens is 30 cm and the size of image is quarter of the object, then the object distance is

A. 150 cm

B. 60 cm

C. 30 cm

D. 40 cm

Answer: A

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246. A convex forms a real image of a poinnt object placed on its principal axis. If the upper half of the lens is painted black

A. Be shifted downwards

B. Be shifted upwards

C. Not be shifted

D. Shift on the principal axis

Answer: c

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247. In figure, an air lens of radius of curvature of each surface equal to $10cm$ is cut into a cylinder of glass of refractive index 1.5. The focal length and the nature of lens are

A. 15 cm, concave

B. 15 cm, convex

C. ∞, neither concave nor convex

D. 0, concave

Answer: a

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248. A lens (focal length $50cm$) forms the image of a distant object which subtends an angle of 2 milliradian at the lens. What is the size of the image ?

A. 5 mm

B. 1 mm

C. 0.5 mm

D. 0.1 mm

Answer: c

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249. A convex lens of focal length $12cm$ is made of glass of $\mu = \frac{3}{2}$. What will be its focal length when immersed in liquid of $\mu = \frac{5}{4}$?

A. 6 cm

B. 12 cm

C. 24 cm

D. 30 cm

Answer: d

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250. Two thin lenses of focal length f_1 and f_2 are in contact and coaxial. The power of the combination is

A. $f_1 + f_2$

B. $\frac{f_1 f_2}{f_1 + f_2}$

C. $\frac{1}{2}(f_1 + f_2)$

D. $\frac{f_1 + f_2}{f_1 f_2}$

Answer: d

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251. A plano convex lens is made of glass of refractive index 1.5. The radius of curvature of its convex surface is R. Its focal length is

A. R/2

B. R

C. 2R

D. 1.5 R

Answer: C

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252. Two lenses have focal lengths f_1 and f_2 and their dispersive powers are ω_1 and ω_2 respectively. They will together form an achromatic combination if

A. $\omega_1 f_1 = \omega_2 f_2$

B. $\omega_1 f_2 + \omega_2 f_1 = 0$

C. $\omega_1 + f_1 = \omega_2 + f_2$

D. $\omega_1 - f_1 = \omega_2 - f_2$

Answer: b

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253. The dispersive powers of glasses of lenses used in an achromatic pair are in the ratio 5 : 3. If the focal length of the concave lens is 15 cm , then the nature and focal length of the other lens would be

A. convex, 9 cm

B. concave, 9 cm

C. convex, 25 cm

D. Concave, 25 cm

Answer: a

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254. A thin double convex lens has radii of curvature each of magnitude 40 cm and is made of glass with refractive index 1.65. Its focal length is nearly

A. 20 cm

B. 31 cm

C. 35 cm

D. 50 cm

Answer: b

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255. The plane surface of a plano-convex lens of focal length f is silvered. It will behave as

A. Plane mirror

B. Convex mirror of focal length 2 f

C. Concave mirror of focal length $f/2$

D. None of the above

Answer: c

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256. An equiconvex lens of glass of focal length 0.1 metre is cut along a plane perpendicular to principle axis into two equal parts. The ratio of focal length of new lenses formes is

A. $1:1$

B. $1:2$

C. $2:1$

D. $2:\frac{1}{2}$

Answer: a

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257. A lens of refractive index n is put in a liquid of refractive index n'. If focal length of lens in air is f, its focal length in liquid will be.

A. $-\frac{fn'(n-1)}{n'-n}$

B. $-\frac{f(n'-n)}{n'(n-1)}$

C. $-\frac{n'(n-1)}{f(n'-n)}$

D. $\frac{fn'n}{n-n'}$

Answer: a

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258. An object of height 1.5 cm is placed on the axis of a convex lens of focal length 25 cm . A real image is formed at a distance of 75 cm from the lens. The size of the image will be

A. 4.5 cm

B. 3.0 cm

C. 0.75 cm

D. 0.5 cm

Answer: B

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259. A symmetric double convex lens is cut in two equal parts by a plane perpendicular to the principal axis. If the power of the original lens was 4D, the power of a cut lens will be

A. 2 D

B. 3 D

C. 4 D

D. 5 D

Answer: A

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260. A plano convex lens is made of material of refactive index 1.6 The radius of curvature of the curved surface is 60 cm. The focal length of the lens is

A. 50 cm

B. 100 cm

C. 200 cm

D. 400 cm

Answer: b

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261. 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

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

Answer: a

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262. A convex lens of focal length 0.5 m and concave lens of focal length 1 m are combined. The power of the resulting lens will be

A. 1 D

B. - $1D$

C. $0.5D$

D. - $0.5D$

Answer: A

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263. A double convex lens is made of glass of refractive index 1.5. If its focal length is 30 cm, then radius of curvature of each of its curved surface is

A. 10 cm

B. 15 cm

C. 18 cm

D. None of these

Answer: d

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264. A thin made of glass of refractive index 1.5 has a front surface $+11D$ power and back surface $-6D$. If this lens is submerged in a liquid of refractive index 1.6, the resulting power of the lens is

A. $-0.5D$

B. $+0.5D$

C. $-0.625D$

D. $+0.625D$

Answer: c

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265. An object is placed first at infinity and then at 20 cm from the object side focal plane of a convex lens. The two images thus formed are 5 cm apart the focal length of the lens is

A. 5 cm

B. 10 cm

C. 15 cm

D. 20 cm

Answer: b

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266. The distance between an object and the screen is 100cm. A lens produces an image on the screen when the lens is placed at either of the positions 40cm apart. The power of the lens is nearly

A. ≈ 3 dioptres

B. ≈ 5 dioptres

C. ≈ 7 dioptres

D. ≈ 9 dioptres

Answer: b

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267. The image distance of an object placed 10 cm in front of a thin lens of focal length $+5$ cm is

A. 6.5 cm

B. 8.0 cm

C. 9.5 cm

D. 10.0 cm

Answer: d

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268. A achromatic combination is made with a lens of focal length f and dispersive power ω with a lens having dispersive power of 2ω . The focal length of second will be

A. $2f$

B. $f/2$

C. $-f/2$

D. $-2f$

Answer: d

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269. the reason of seeing the sun a little before the sunrise is

A. Reflection of the light

B. Refraction of the light

C. Scattering of the light

D. Dispersion of the light

Answer: d

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270. An under water swimmer is at a depth of 12 m below the surface of water. A bird is at a height of 18 m from the surface of water, directly above his eyes. For the swimmer the bird appears to be at a distance from the surface of water equal to (Refractive Index of water is 4/3)

A. 24 m

B. 12 m

C. 18 m

D. 9 m

Answer: a

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271. The optical path of a monochromatic light is same if it goes through 4.0 cm of glass or 4.5 cm of water. If the refractive index of glass is 1.53, the refractive index of the water is

A. 1.3

B. 1.36

C. 1.42

D. 1.46

Answer: d

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272. Which of the following statement is true

A. Velocity of light is constant in all media

B. Velocity of light in vacuum is maximum

C. Velocity of light is same in all reference frames

D. Laws of nature have identical form in all reference frames

Answer: c

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273. A ray of light falls on a transparent glass slab of refractive index 1.62. If the reflected ray and the refracted rays are mutually perpendicular, what is the angle of refraction ?

A. 58.3

B. 50

C. 35

D. 30

Answer: c

Watch Video Solution

274. A microscope is focused on a coin lying at the bottom of a beaker. The microscope is now raised up by $1cm$. To what depth should the water be poured into the beaker so that coin is again in focus ? (Refraction index of water is $4/3$)

A. 1 cm

B. $\frac{4}{3}cm$

C. 3 cm

D. 4 cm

Answer: D

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275. Velocity of light in glass whose refractive index with respect to air is 1.5 is $2 \times 10^8 m/s$ and in certain liquid the velocity of light found to be

2.5×10^8 m/s . The refractive index of the liquid with respect to air is

A. 0.64

B. 0.8

C. 1.2

D. 1.44

Answer: d

Watch Video Solution

276. Stars are twinkling due to

A. Diffraction

B. Reflection

C. Refraction

D. Scattering

Answer: b

Watch Video Solution

277. A thin oil layer floats on water. A ray of light making an angle of incidence of 40° shines on oil layer. The angle of refraction of light ray in water is $\left(\mu_{oil} = 1.45, \mu_{\text{water}} = 1.33\right)$

A. 36.1°

B. 44.5°

C. 26.8°

D. 28.9°

Answer: a

Watch Video Solution

278. An object is immersed in a fluid. In order that the object becomes invisible, it should

A. Behave as a perfect reflector

B. Absorb all light falling on it

C. Have refractive index one

D. Have refractive index exactly matching with that of the surrounding fluid

Answer: c

Watch Video Solution

279. When light travels from glass to air, the incident angle is θ_1 and the refracted angle is θ_2. The true relation is

A. $\theta_1 = \theta_2$

B. $\theta_1 < \theta_2$

C. $\theta_1 > \theta_2$

D. Not predictable

Answer: a

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280. Velocity of light in a medium is $1.5 \times 10^8 m/s$. Its refractive index will be

A. 8

B. 6

C. 4

D. 2

Answer: c

Watch Video Solution

281. The frequency of a light ray is $6 \times 10^{14} Hz$. Its frequency when it propagates in a medium of refractive index 1.5, will be

A. $1.67 \times 10^{14} Hz$

B. $9.10 \times 10^{14} Hz$

C. $6 \times 10^{14} Hz$

D. $4 \times 10^{14} Hz$

Answer: a

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282. The refractive indices of water and glass with respect to air are 1.2 and 1.5 respectively. The refractive index of glass with respect to water is

A. 0.6

B. 0.8

C. 1.25

D. 1.75

Answer: b

Watch Video Solution

283. The wavelength of sodium light in air is 5890 Å. The velocity of light in air is $3 \times 10^8 ms^{-1}$. The wavelength of light in a glass of refractive index 1.6 would be close to

A. 5890 Å

B. 3681 Å

C. 9424 Å

D. 15078 Å

Answer: b

Watch Video Solution

284. The mean distance of sun from the earth is $1.5 \times 10^8 km$. The time taken by light to reach earth from the sun is

A. 0.12 min

B. 8.33 min

C. 12.5 min

D. 6.25 min

Answer: d

Watch Video Solution

285. Refractive index of air is 1.0003. The correct thickness of air column which will have one more wavelength of yellow light (6000Å) than in the same thickness in vacuum is

A. 2mm

B. 2 cm

C. 2m

D. 2 km

Answer: c

Watch Video Solution

286. The wavelength of light in air and some other medium are respectively λ_a and λ_m. The refractive index of medium is

A. λ_a / λ_m

B. λ_m / λ_a

C. $\lambda_a \times \lambda_m$

D. None of these

Answer: a

Watch Video Solution

287. A convex lens has 9 cm focal length and a concave lens has – 18 cm focal length. The focal length of the combination in contact will be

A. 9 cm

B. $-18cm$

C. $-9cm$

D. $18cm$

Answer: d

Watch Video Solution

288. A concavo-convex lens is made of glass of refractive index 1.5. The radii of curvature of its two surfaces are $30cm$ and $50cm$. Its focal length when placed in a liquid of refractive index 1.4 is

A. $-407cm$

B. $250cm$

C. $125cm$

D. $25cm$

Answer: a

Watch Video Solution

289. A lens of power $+2$ dioptres is placed in contact with a lens of power -1 dioptre. The combination will behave like

A. A divergent lens of focal length 50 cm

B. A convergent lens of focal length 50 cm

C. A convergent lens of focal length 100 cm

D. A divergent lens of focal length 100 cm

Answer: c

Watch Video Solution

290. Chromatic aberration of lens can be corrected by

A. Reducing its aperature

B. Proper polishing of its two surfaces

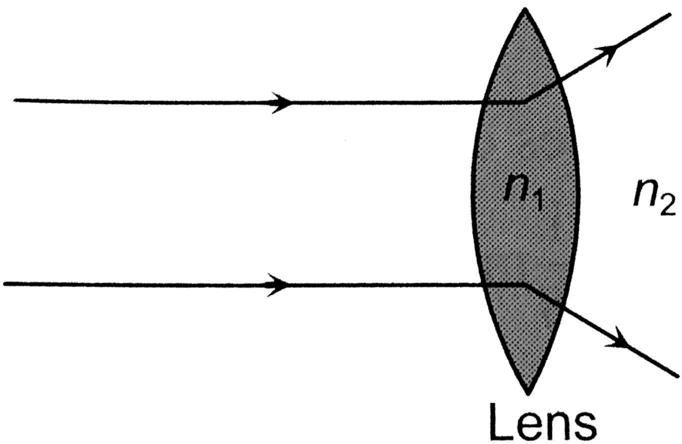
C. Suitably combining it with another lens

D. Providing different suitable curvature to its two surfaces

Answer: c

Watch Video Solution

291. The relation between n_1 and n_2, if behaviour of light rays is as shown in figure is



A. $n_1 > \; > n_2$

B. $n_2 > n_1$

C. $n_1 > n_2$

D. $n_1 = n_2$

Answer: b

Watch Video Solution

292. A candle placed 25 cm from a lens, forms an image on a screen placed 75 cm on the other end of the lens. The focal length and type of the lens should be

A. $+18.75cm$ and convex lens

B. $-18.75cm$ and concave lens

C. $+20.25cm$ and convex lens

D. $-20.25cm$ and concave lens

Answer: a

Watch Video Solution

293. We combined a convex lens of focal length f_1 and concave lens of focal lengths f_2 and their combined focal length was F . The combination of these lenses will behave like a concave lens, if

A. $f_1 > f_2$

B. $f_1 < f_2$

C. $f_1 = f_2$

D. $f_1 \leq f_2$

Answer: a

Watch Video Solution

294. The radius of curvature of curved surface of a thin plano-convex lens is $10cm$ and the refractive index is 1.5. If the plano surface is silvered, then the focal length will be.

A. 10.5 cm

B. 10 cm

C. 5.5 cm

D. 5 cm

Answer: b

Watch Video Solution

295. The focal length of a convex lens is 10 cm and its refractive index is 1.5. If the radius of curvature of one surface is 7.5 cm , the radius of curvature of the second surface will be

A. 7.5 cm

B. 15.0 cm

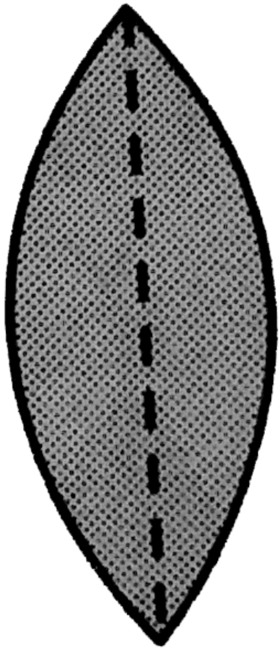
C. 75 cm

D. 5.0 cm

Answer: b

Watch Video Solution

296. A convex lens has a focal length f. It is cut into two parts along the dotted line as shown in figure. The focal length of each part will be



A. $\frac{f}{2}$

B. f

C. $\frac{3}{2}f$

D. $2f$

Answer: D

Watch Video Solution

297. An object has image thrice of its original size when kept at $8cm$ and $16cm$ from a convex lens. Focal length of the lens is

A. 8 cm

B. 16 cm

C. Between 8 cm and 16 cm

D. Less than 8 cm

Answer: C

Watch Video Solution

298. The combination of a convex lens (f = 18 cm) and a thin concave lens (f = 9 cm) is

A. A concave lens (f = 18 cm)

B. A convex lens (f = 18 cm)

C. A convex lens (f = 6 cm)

D. A concave lens (f = 6 cm)

Answer: a

Watch Video Solution

299. A convex lens forms a real image of an object for its two different positions on a screen. If height of the image in both the cases be 8 cm and 2 cm , then height of the object is

A. 16 cm

B. 8 cm

C. 4 cm

D. 2 cm

Answer: c

Watch Video Solution

300. A convex lens of focal length 25 cm and a concave lens of focal length 10 cm are joined together. The power of the combination will be

A. $-16D$

B. $+16D$

C. $-6D$

D. $+6D$

Answer: c

Watch Video Solution

301. The unit of focal power of a lens is

A. Watt

B. Horse power

C. Dioptre

D. Lux

Answer: c

Watch Video Solution

302. A thin lens made of glass of refractive index $\mu u = 1.5$ has a focal length equal to 12 cm in air. It is now immersed in water $(\mu = \frac{4}{3})$. Its new focal length is

A. 48 cm

B. 36 cm

C. 24 cm

D. 12 cm

Answer: a

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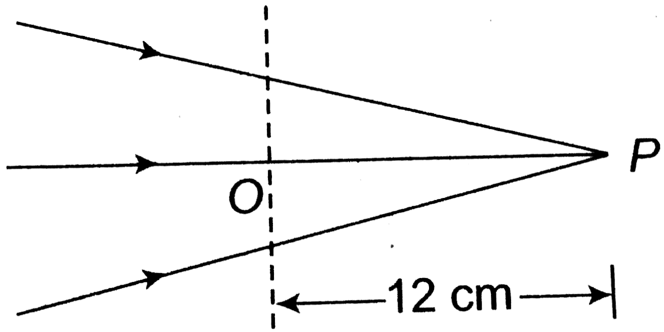
303. Figure given below shows a beam of light converging at point P. When a concave lens of focal length $16 cm$ is introduced in the path of the beam at a place O shown by dotted line such that OP becomes the axis of the lens, the beam converges at a distance x from the lens. The value x will be equal to



A. 12 cm

B. 24 cm

C. 36 cm

D. 48 cm

Answer: d

Watch Video Solution

304. If two lenses of $+5$ dioptres are mounted at some distance apart, the equivalent power will always be negative if the distance is

A. Greater than 40 cm

B. Equal to 40 cm

C. Equal to 10 cm

D. Less than 10 cm

Answer: a

Watch Video Solution

305. A convex lens produces a real image m times the size of the object. What will be the distance of the object from the lens ?

A. $\left(\frac{m+1}{m}\right)f$

B. $(m-1)f$

C. $\left(\frac{m-1}{m}\right)f$

D. $\frac{m+1}{f}$

Answer: a

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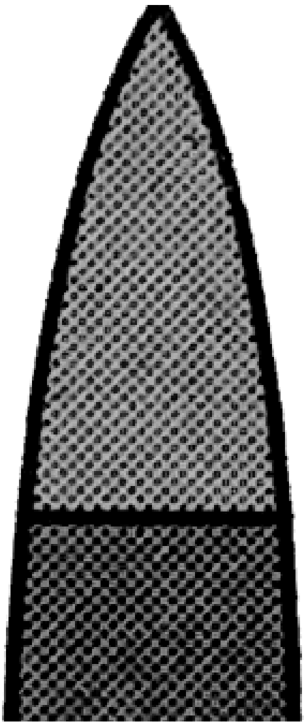
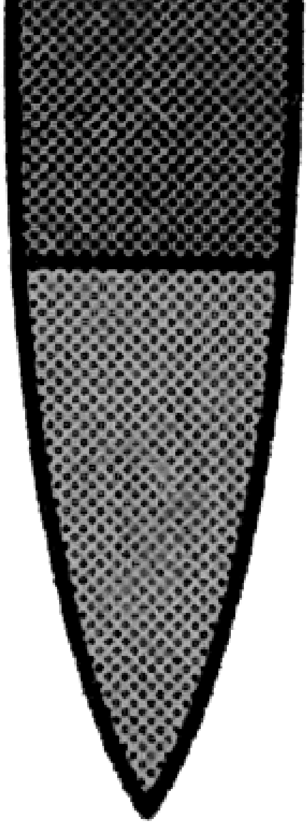
306. A convex lens is made up of three different materials as shown in the figure. For a point object placed on its axis, the number of images formed are





A. 1

B. 5

C. 4

D. 3

Answer: D

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307. An object is placed $12cm$ to the left of a converging lens of focal length $8cm$. Another converging lens of $6cm$ focal lengh is placed at a distance of $30cm$ to the right of the first lens. The second lens will produce

A. No image

B. A virtual enlarged image

C. A real enlarged image

D. A real smaller image

Answer: c

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308. A convex lens of focal length 80 cm and a concave lens of focal length 50 cm are combined toghether. What will be their resulting power

?

A. $+6.5D$

B. $-6.5D$

C. $+7.5D$

D. $-0.75D$

Answer: d

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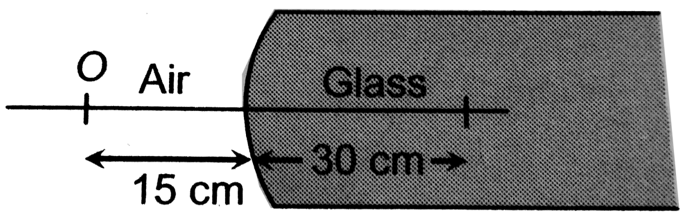
309. A poinit object O is placed in front of a glass rod having spherical end of radius of curvature $30cm$. The image would be formed at



A. $30cm$ left

B. Infinity

C. 1 cm to the right

D. 18 cm to the left

Answer: a

Watch Video Solution

310. The focal length of lens of refractive index 1.5 in air is $30cm$ When it is immersed in water of refractive index $\frac{4}{3}$,then its focal length will be

A. $30cm$

B. $60cm$

C. $120cm$

D. $240cm$

Answer: c

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311. Two thin lenses of focal lengths f_1 and f_2 are in contact. The focal length of this combination is

A. $\dfrac{f_1 f_2}{f_1 - f_2}$

B. $\dfrac{f_1 f_2}{f_1 + f_2}$

C. $\dfrac{2 f_1 f_2}{f_1 - f_2}$

D. $\dfrac{2 f_1 f_2}{f_1 + f_2}$

Answer: b

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312. A convex lens is dipped in a liquid whose refractive index is equal to the refractive of the lens. Then its focal length will

A. Become infinite

B. Become small, but non-zero

C. Remain unchanged

D. Become zero

Answer: A

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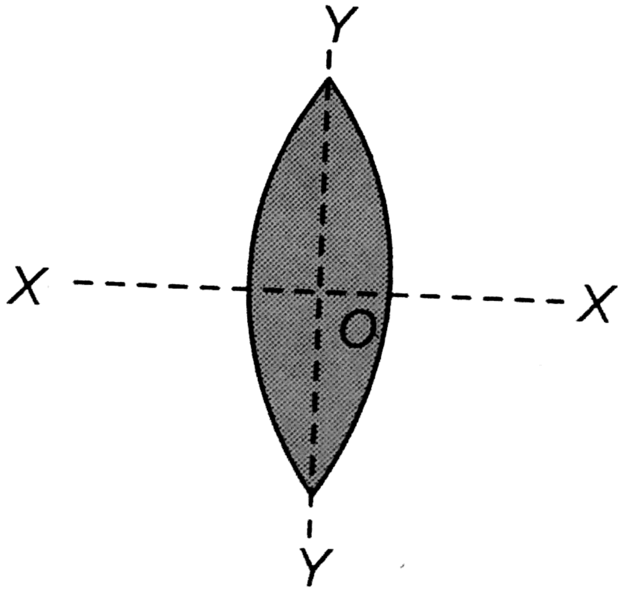
313. An equiconvex lens is cut into two halves along $(i) XOX'$ and $(ii) YOY'$ as shown in the figure. Let $f, f' f''$ be the focal lengths of the complete lens, of each half in case (i), and of each half in case (ii), respectively

Choose the correct statement from the following



A. $f' = 2f, f'' = f$

B. $f' = f, f'' = f$

C. $f' = 2f, f'' = 2f$

D. $f' = f, f'' = 2f$

Answer: D

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314. The sun makes 0.5° angle on earth surface. Its image is made by convex lens of $50cm$ focal length. The diameter of the image will be

A. $5mm$

B. $4.36mm$

C. $7mm$

D. None of these

Answer: b

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315. The chromatic aberration in lenses is due to

A. Disimilarity of main axis of rays

B. Disimilarity of radii of curvature

C. Variation of focal length of lenses with wavelength

D. None of these

Answer: c

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316. If aperture of lens is halved then image will be

A. No effect on size

B. Intensity of image decrease

C. Both (a) and (b)

D. None of these

Answer: c

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317. When the convergent nature of a convex lens will be less as compared with air

A. In water

B. In oil

C. In both (a) and (b)

D. None of these

Answer: c

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318. A magnifying glass is to be used at the fixed object distance of 1 inch. If it is to produce an erect image magnified 5 times its focal length should be

A. 0.2 inch

B. 0.8 inch

C. 1.25 inch

D. 5 inch

Answer: c

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319. An object placed $10cm$ in front of a lens has an image $20cm$ behind the lens. What is the power of the lens(in dioptres) ?

A. 1.5

B. 3.0

C. -15.0

D. $+15.0$

Answer: d

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320. A beam of parallel rays is brought to focus by a planoconvex lens. A thin Concave lens of the same focal length is joined to the first lens. The effect of this is

A. The focal point shifts away from the lens by a small distance

B. The focus remains undisturbed

C. The focus shifts to infinity

D. The focal point shifts towards the lens by a small distance

Answer: C

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321. A thin plano-convex lens acts like a concave mirror of radius of curvature $20cm$ when its plane surface is silvered. The radius of curvature of the curved surface if index of refraction of its matarial is 1.5 will be

A. $0.4m$

B. $0.2m$

C. $0.1m$

D. $0.75m$

Answer: b

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

A. $2cm$

B. $4cm$

C. $6cm$

D. $12cm$

Answer: c

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323. A plano convex lens of refractive index 1.5 and radius of curvature 30cm. Is silvered at the curved surface. Now this lens has been used to form the image of an object. At what distance from this lens an object be placed in order to have a real image of size of the object.

A. $20cm$

B. $30cm$

C. $60cm$

D. $80cm$

Answer: a

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324. At what distance from a convex lens of focal length $30cm$ an object should be placed so that the size of image be $\frac{1}{4}$that of object?

A. $30cm$

B. $60cm$

C. $15cm$

D. $90cm$

Answer: d

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325. A plano convex lens is made of glass of refractive index 1.5. The radius of curvature of its convex surface is R. Its focal length is

A. $400cm$

B. $200cm$

C. $100cm$

D. $50cm$

Answer: c

Watch Video Solution

326. The radius of curvature of the curved surface of a plano-convex lens is $20cm$. If the refractive index of the material of the lens be 1.5, it will

A. $30cm$

B. $50cm$

C. $20cm$

D. $40cm$

Answer: d

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327. A combination of two thin lenses of the same material with focal lengths f_1 and f_2, arranged on a common axis minimizes chromatic aberration, if the distance between them is

A. $0.1m$

B. $0.2m$

C. $0.3m$

D. $0.4m$

Answer: b

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328. A bi-convex lens made of glass (refractive index 1.5) is put in a liquid of refractive index 1.7. Its focal length will

A. Decrease and change sign

B. Increase and change sign

C. Decrease and remain of the same sign

D. Increase and remain of the same sign

Answer: b

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329. Spherical aberration in a lens

A. Is minimum when most of the deviation is at the first surface

B. Is minimum when most of the deviation is at the second surface

C. Is minimum when the total deviation is equally distributed over the two surface

D. Does not depend on the above consideration

Answer: c

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330. The focal lengths of convex lens for red and blue light are 100 cm and 96.8 cm respectively. The dispersive power of material of lens is

A. 0.325

B. 0.0325

C. 0.98

D. 0.968

Answer: b

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331. Two lenses of power $+12$ and -2 dioptres are placed in contact. The combined focal length of the combination will be

A. $8.33cm$

B. $1.66cm$

C. $12.5cm$

D. $10cm$

Answer: d

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332. When light rays from the sun fall on a convex lens along a direction paralle to its axis

A. Focal length for all colours is the same

B. Focal length for violet colour is the shortest

C. Focal length for yellow colour is the longest

D. Focal length for red colour is the shortest

Answer: b

Watch Video Solution

333. A convex lens if in contact with concave lens. The magnitude of the ratio of their focal length is $\frac{2}{3}$. Their equivalent focal length is 30 cm. What are their individual focal lengths?

A. $-75, 50$

B. $-10, 15$

C. $75, 50$

D. $-15, 10$

Answer: d

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334. A thin glass (refractive index 1.5) lens has optical power of $-5D$ in air.

Its optical power in a liquid medium with refractive index 1.6 will be

A. 25 D

B. $-25D$

C. 1 D

D. none of these

Answer: d

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335. The plane faces of two identical planoconvex lenses each having focal length of $40cm$ are pressed against each other to form a usual convex lens. The distance from this lens, at which an object must be placed to obtain a real, inverted image with magnification one is

A. 80 cm

B. 40 cm

C. 20 cm

D. 162 cm

Answer: b

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336. If two lenses of $+5$ dioptres are mounted at some distance apart, the equivalent power will always be negative if the distance is

A. Greater than 40 cm

B. Equal to 40 cm

C. Equal to 10 cm

D. less than 10 cm

Answer: a

Watch Video Solution

337. A concave lens and a convex lens have same focal length of $20cm$ and both put in contact this combination is used to view an object $5cm$ long kept at $20cm$ from the lens combination. As compared to object the image will be

A. Magnified and inverted

B. Reduced and erect

C. Of the same size and erect

D. Of the same size and inverted

Answer: c

Watch Video Solution

338. The focal length of field achromatic combination of a telescope is $90cm$ .The dispersive powers of lenses are 0.024 and 0.036 respectively .Their focal lengths will be-

A. 30 cm and 60 cm

B. 30 cm and -45 cm

C. 45 cm and 90 cm

D. 15 cm and 45 cm

Answer: b

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339. A combination of two thin lenses of the same material with focal lengths f_1 and f_2, arranged on a common axis minimizes chromatic aberration, if the distance between them is

A. $\frac{(f_1 + f_2)}{4}$

B. $\frac{(f_1 + f_2)}{2}$

C. $(f_1 + f_2)$

D. $2(f_1 + f_2)$

Answer: b

Watch Video Solution

340. If the focal length of a double convex lens for red light is f_R its focal length for the violet light is

A. f_R

B. Greater than f_R

C. less than f_R

D. $2f_R$

Answer: c

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341. A thin equi-convex lens is made of glass of refractive index 1.5 and its length is $0.2m$. If it acts as a concave lens of $0.5m$ focal length when dipped in a liquid, the refractive index of the liquid is

A. $\frac{17}{8}$

B. $\frac{15}{8}$

C. $\frac{13}{8}$

D. $\frac{9}{8}$

Answer: B

Watch Video Solution

342. The dispersive power of the material of lens of focal length $20 cm$ is 0.8. The longitudinal chromatic aberration of the lens is

A. 0.08 cm

B. $0.08/20$ cm

C. 1.6 cm

D. 0.16 cm

Answer: c

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343. Formula for dispersive power is (where symbols have their usual meanings) or if the refractive indices of crown glass for red, yellow and violet colours are respectively μ_r, μ_y and μ_v then the dispersive power of this glass would be

A. $\frac{\mu_v - \mu_y}{\mu_r - 1}$

B. $\frac{\mu_v - \mu_r}{\mu_y - 1}$

C. $\frac{\mu_v - \mu_y}{\mu_y - \mu_r}$

D. $\frac{\mu_v - \mu_r}{\mu_y} - 1$

Answer: b

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344. The critical angle between and equilateral prism and air is 45°. If the incident ray is perpendicular to the refracting surface, then

A. After deviation it will emerge from the second refracting surface

B. It is totally reflected on the second surface and emerges out perpendicularly from third surface in air

C. It is totally reflected from the second and third refracting surfaces and finally emerges out from the first surface

D. It is totally reflected from all the three sides of prism and never emerges out

Answer: b

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345. When white light passes through a glass prism one gets spectrum on the other side of the prism in the emergent beam the ray which is deviating least is or Deviation by a prism is lowest for

A. Violet ray

B. Green ray

C. Red ray

D. Yellow ray

Answer: c

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346. We use flint glass prism to disperse polychromatic light because light of different colours

A. Travel with same speed

B. Travel with same speed but deviate differently due to the shape of the prism

C. Have different anisotropic properties while through the prism

D. Travel with different speeds

Answer: C

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347. A prism $(\mu = 1.5)$ has the refracting angle of 30° The deviation of a monochromatic ray incident normally on its one surface will be $\left(\sin 48^\circ 36 = 0.75\right)$

A. 18° 36

B. 20° 30

C. 18°

D. $22^{\circ} 1'$

Answer: a

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348. Fraunhofer lines are obtained in

A. Solar spectrum

B. The spectrum obtained from neon lamp

C. Spectrum from a discharge tube

D. None of the above

Answer: a

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349. When light rays are incident on a prism at an angle of 45°, the minimum deviation is obtained. If refractive index of the material of prism is $\sqrt{2}$, then the angle of prism will be

A. 30°

B. 40°

C. 50°

D. 60°

Answer: d

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350. A spectrum is formed by a prism of dispersive power $'\omega'$ if the angle of deviation is $'\delta'$ then the angular dispersion is

A. ω/δ

B. δ / ω

C. $1 / \omega\delta$

D. $\omega\delta$

Answer: d

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351. Light from sodium lamp is passed through cold sodium vapours the spectrum of transmitted light consists of

A. A line at 5890 Å

B. A line at 5896 Å

C. Sodium doublet lines

D. No spectral features

Answer: d

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352. Angle of minimum deviation for a prism of refractive index 1.5 is equal to the angle of prism The angle of prism is $\left(\cos 41^{\circ} = 0.75\right)$

A. 62°

B. 41°

C. 82°

D. 31°

Answer: c

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353. In the formation of primary rainbow, the sunlight rays emerge at minimum deviation from rain- drop after

A. One internal reflection and one refraction

B. One internal reflection and two refractions

C. Two internal reflections and one refraction

D. Two internal reflections and two refractions

Answer: b

Watch Video Solution

354. Dispersive power does not depend upon

A. The shape of prism

B. Material of prism

C. Angle of prism

D. Height of the prism

Answer: b

Watch Video Solution

355. When white light passes through the achromatic combination of prisms, then what is observed

A. Only deviation

B. Only dispersion

C. Deviation and dispersion

D. None of the above

Answer: a

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356. The dispersion for a medium of wavelength λ is D, then the dispersion for the wavelength 2λ will be

A. $D/8$

B. $D/4$

C. $D/2$

D. D

Answer: a

Watch Video Solution

357. The refractive index of a prism for a monochromatic wave is $\sqrt{2}$ and its refracting angle is 60° for minimum deviation, the angle of indidence will be

A. 30°

B. 45°

C. 60°

D. 75°

Answer: b

Watch Video Solution

358. The ratio of angle of minimum deviation of a prism in air and when dipped in water will be $\left({}_{a}\mu_{g} = 3/2 \text{ and } {}_{a}\mu_{w} = 4/3\right)$

A. $1/8$

B. $1/2$

C. $3/4$

D. $1/4$

Answer: d

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359. The respective angles of the flint and crown glass prisms are A' and A. They are to be used for dispersion without deviation, then the ratio of their angles A' / A will be

A. $-\dfrac{\left(\mu_{y}-1\right)}{\left(\mu_{y}-1\right)}$

B. $\frac{(\mu_y - 1)}{(\mu_y - 1)}$

C. $(\mu_y - 1)$

D. $(\mu_y - 1)$

Answer: a

Watch Video Solution

360. The number of wavelenth in the visible spectrum

A. 4000

B. 6000

C. 2000

D. infinite

Answer: d

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361. A light ray is incident by grazing one of the face of a prism and after refraction ray does not emerge out, what should be the angle of prism while critical angle is C ?

A. Equal to 2C

B. Less than 2C

C. More than 2C

D. None of the above

Answer: c

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362. A parallel beam of monochromatic light is incident at one surface of a equilateral prism. Angle of incidence is 55° and angle of emergence is 46°. The angle of minimum deviation will be

A. Less than 41°

B. Equal to 41°

C. More than 41°

D. None of the above

Answer: A

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363. Light rays from a source are incident on a glass prism of index of refraction μ and angle of prism α At near normal incidence, the angle of deviation of the emerging rays is

A. $(\mu - 2)\alpha$

B. $(\mu - 1)\alpha$

C. $(\mu + 1)\alpha$

D. $(\mu + 2)\alpha$

Answer: b

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364. By placing the prism in minimum deviation position, images of the spectrum

A. Becomes inverted

B. Becomes broader

C. Becomes distinct

D. Becomes intensive

Answer: c

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365. To which wavelength of lights is our eye most sensitive ? In which region does this wavelength lie ?

A. 4500 Å

B. 5500 Å

C. 6500 Å

D. Equally sensitive for all wave lengths of visible spectrum

Answer: b

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366. Three prisms of crown glass, each have angle of prism 9° and two prisms of flint glass are used to make direct vision spectroscope. What will be the angle of flint glass prisms if μ for flint is 1.69 and μ for crown glass is 1.53 ?

A. 11.9°

B. 16.0°

C. 15.3°

D. 9.11°

Answer: a

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367. If the refractive indices of crown glass for red, yellow and violet colours are 1.5140, 1.5170 and 1.5318 respectively and for flint glass these are 1.6434, 1.6499 and 1.6852 respectively, then the dispersive powers for crown and flint glass are respectively.

A. 0.034 and 0.064

B. 0.064 and 0.034

C. 1.00 and 0.064

D. 0.034 and 1.0

Answer: a

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368. The minimum temperature of a body at which it emits light is

A. 1200° C

B. 1000° C

C. 500° C

D. 200° C

Answer: c

Watch Video Solution

369. Band spectrum is obtained when the source emitting light is in the form of or Band spectrum is characteristic of

A. Atoms

B. Molecules

C. Plasma

D. None of the above

Answer: b

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370. Flint glass prism is joined by a crown glass prism to produce dispersion without deviation. The refractive indices of these for mean rays are 1.602 and 1.500 respectively. Angle of prism of flint prism is 10°, then the angle of prism for crown prism will be

A. $12^\circ 2.4$

B. $12^\circ 4'$

C. 1.24°

D. 12°

Answer: a

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371. The angle of minimum deviation for a prism is 40° and the angle of the prism is 60° The angle of incidence in this position will be

A. 30°

B. 60°

C. 50°

D. 100°

Answer: c

Watch Video Solution

372. In the position of minimum deviation when a ray of yellow light passes through the prism then its angle of incidence is

A. Less than the emergent angle

B. Greater than the emergent angle

C. Sum of angle of incidence and angle is 90°

D. Equal to the emergent angle

Answer: d

Watch Video Solution

373. A circular disc of which $2/3$ part is coated with yellow and $1/3$ part is with blue it is rotated about its central axis with high velocity then it will be seen as

A. Green

B. Brown

C. White

D. Violet

Answer: a

Watch Video Solution

374. The fine powder of a coloured glass is seen as

A. Coloured

B. White

C. That of the glass colour

D. Black

Answer: b

Watch Video Solution

375. When a white light passes through a hollow prism then

A. There is no dispersion and no deviation

B. Dispersion but no deviation

C. Deviation but no dispersion

D. There is dispersion and deviation both

Answer: A

Watch Video Solution

376. The light ray is incidence at angle of 60° on a prism of angle 45°. When the light ray falls on the other surface at 90°, the refractive index of the material of prismμ and the angle of devaition δ are given by

A. $\mu = \sqrt{2}, \delta = 30^{\circ}$

B. $\mu = 1.5, \delta = 15^{\circ}$

C. $\mu = \frac{\sqrt{3}}{2}, \delta = 30^{\circ}$

D. $\mu = \sqrt{\frac{3}{2}}, \delta = 15^{\circ}$

Answer: d

Watch Video Solution

377. In dispersion without deviation

A. The emergent rays of all the colours are parallel to the incident ray

B. Yellow coloured ray is parallel to the incident ray

C. Only red coloured ray is parallel to the incident ray

D. All the rays are parallel, but not parallel to the incident ray

Answer: b

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378. Deviation of 5° is observed from a prism whose angle is small and whose refractive index is 1.5 The angle of prism is

A. 7.5°

B. 10°

C. 5°

D. 3.3°

Answer: b

Watch Video Solution

379. The refractive indices of violet and red light are 1.54 and 1.52 respectively if the angle of prism is 10° then the angular dispersion is

A. 0.02

B. 0.2

C. 3.06

D. 30.6

Answer: b

Watch Video Solution

380. The angle of minimum deviation measured with a prism is 30° and the angle of prism is 60°. The refractive index of prism material is

A. $\sqrt{2}$

B. 2

C. $3/2$

D. $4/3$

Answer: a

Watch Video Solution

381. If the refractive indices of a prism for red, yellow and violet colours be $1.61, 1.63$ and 1.65 respectively, then the dispersive power of the prism will be

A. $\dfrac{1.65 - 1.62}{1.61 - 1}$

B. $\dfrac{1.62 - 1.61}{1.65 - 1}$

C. $\dfrac{1.65 - 1.61}{1.63 - 1}$

D. $\dfrac{1.65 - 1.63}{161 - 1}$

Answer: c

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382. The minimum deviation produced by a hollow prism filled with a certain liquid is found to be 30°. The light ray is also found to be refracted at angle of 30°. The refractive index of the liquid is

A. $\sqrt{2}$

B. $\sqrt{3}$

C. $\sqrt{\frac{3}{2}}$

D. $\frac{3}{2}$

Answer: a

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383. Minimum deviation is observed with a prism having angle of prism A, angle of deviation δ angle of incidence i and angle of emergence e. We then have generally

A. $i > e$

B. $i < e$

C. $i = e$

D. $i = e = \delta$

Answer: c

Watch Video Solution

384. A thin prism P with angle 4° and made from glass of refractive index 1.54 is combined with another thin prism P made from glass of refractive index 1.72 to produce dispersion without deviation The angle of prism P is

A. 2.6°

B. 3°

C. 4°

D. 5.33°

Answer: b

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385. An achromatic prism is made by combining two prisms $P_1(\mu_v = 1.523, \mu_r = 1.515)$ and $P_2(\mu_v = 1.666, \mu_r = 1.650)$ Where μ represents the refractive index if the angle of the prism P_1 is 10° then the angle of the prism P will be

A. 5°

B. 7.8°

C. 10.6°

D. 20°

Answer: a

Watch Video Solution

386. Angle of a prism is 30° and its refractive index is $\sqrt{2}$ and one of the surface is silvered At what angle of incidence a ray should be incident on one surface so that after reflection from the silvered surface it retraces its path

A. 30°

B. 60°

C. 45°

D. $\sin^{-1}\sqrt{1.5}$

Answer: c

Watch Video Solution

387. For a material the refractive indices for red violet and yellow colour light are respectively 1.52, 1.64 and 1.60 The dispersive power of the material is

A. 2

B. 0.45

C. 0.2

D. 0.045

Answer: c

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388. Band spectrum is produced by

A. H

B. He

C. H2

D. Na

Answer: c

Watch Video Solution

389. The band spectra (characteristic of molecule specials) is due to emission of radiation

A. Gaseous state

B. Liquid state

C. Solid state

D. All of three states

Answer: a

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390. Line spectrum was first of all theoretically explained by

A. Swan

B. Fraunhofer

C. Kirchoff

D. Bohr

Answer: d

Watch Video Solution

391. A beam of white light passing through a hollow prism give no spectrum.

A. Only violet

B. Bright times

C. Only red lines

D. Some black bands in continuous spectrum

Answer: d

Watch Video Solution

392. Continuous spectrum is not due to

A. Hydrogen flame

B. Electric bulb

C. Kerosene oil lamp flame

D. Candle flame

Answer: a

Watch Video Solution

393. Fraunhofer lines are produced by

A. The element present in the photoshere of sun

B. The elements present in the chromosphere of the sun

C. The vapour of the element present in the chromosphere of the sun

D. The carbon dioxide present in the atmosphere

Answer: c

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394. A medium is said to be dispersive if

A. Light of different wavelength propagate at different speeds

B. Light of different wavelengths propagate at same speed but has different frequencies

C. Light is gradually bent rather than sharply refracted at an interface between the medium and air

D. Light is never totally internally reflected

Answer: a

Watch Video Solution

395. A ray of light is incident at an angle of 60° on one face of a prism of angle 30°. The ray emerging out of the prism makes an angle of 30° with the incident ray. The emergent ray is

A. Normal to the face through which it emerges

B. Inclined at 30° to the face through which it emerges

C. Inclined at 60° to the face through which it emerges

D. None of these

Answer: a

Watch Video Solution

396. A thin prism P with angle 4° and made from glass of refractive index 1.54 is combined with another thin prism P made from glass of refractive index 1.72 to produce dispersion without deviation The angle of prism P is

A. $\delta_m = r$

B. $\delta_m = 1.5r$

C. $\delta_m = 2r$

D. $\delta_m = \frac{r}{2}$

Answer: a

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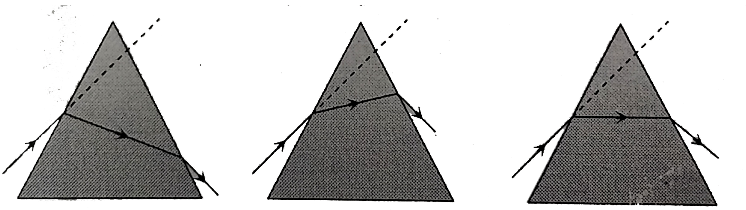
397. The figures represent three cases of a ray passing through a prism of angle A. The case corresponding to minimum deviation is



(1) (2) (3)

A. 1

B. 2

C. 3

D. None of these

Answer: c

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398. Dispersion can take place for

A. Transverse waves only but not for longitudinal waves

B. Longitudinal waves only but not for transverse waves

C. Both transverse and longitudinal waves

D. Neither transverse nor longitudinal waves

Answer: C

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399. Emission spectrum of CO_2 gas

A. Is a line spectrum

B. Is a band spectrum

C. Is a continuous spectrum

D. Does not fall in the visible region

Answer: b

Watch Video Solution

400. A ray of light passes through an equilateral glass prism in such a manner that the angle of incidence is equal to the angle of emergence and each of these angles is equal to 3/4 of the angle of the prism. The angle of deviation is

A. 45°

B. 39°

C. 20°

D. 30°

Answer: d

Watch Video Solution

401. The true statement is

A. he order of colours in the primary and the secondary rainbows is the same

B. The intensity of colours in the primary and the secondary rainbows is the same

C. The intensity of light in the primary rainbow is greater and the order of colours is the same than the secondary rainbow

D. The intensity of light for different colours in primary rainbow is greater and the order of colours is reverse than the secondary rainbow

Answer: d

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402. What will be the colour of sky as seen from the earth, if there were no atmosphere

A. Black

B. Blue

C. Orange

D. Red

Answer: a

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403. Light from sodium lamp is passed through cold sodium vapours the spectrum of transmitted light consists of

A. The D_1 and D_2 bright yellow lines of sodium

B. Two dark lines in the yellow region

C. All colours from violet to red

D. No colours at all

Answer: b

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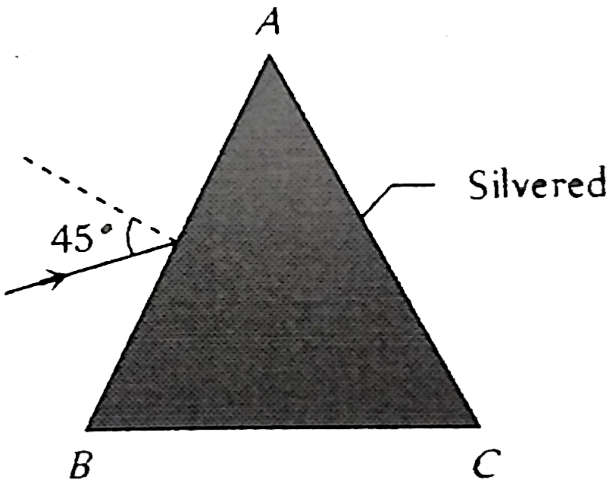
404. A prism ABC of angle 30° has its face AC silvered. A ray of light incident at an angle of 45° at the face AB retraces its path after refraction at face AB and reflection at face AC . The refractive index of the material of the prism is



A. 1.5

B. $\frac{3}{\sqrt{2}}$

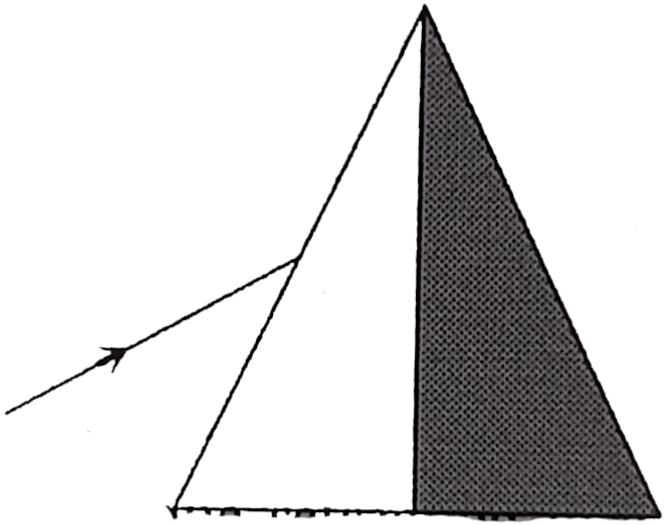
C. $\sqrt{2}$

D. $\frac{4}{3}$

Answer: c

Watch Video Solution

405. A light ray is incident upon a prism in minimum deviation position and suffers a deviation of 34°. If the shaded half of the prism is knocked off, the ray will



A. Suffer a deviation of 34°

B. Suffer a deviation of 68°

C. Suffer a deviation of 17°

D. Not come out of the prism

Answer: C

Watch Video Solution

406. A ray of monochromatic light is incident on one refracting face of a prism of angle 75°. It passes through the prism and is incident on the other face at the critical angle. If the refractive index of the material of the prism is $\sqrt{2}$, the angle of incidence on the first face of the prism is

A. 30°

B. 45°

C. 60°

D. 0°

Answer: b

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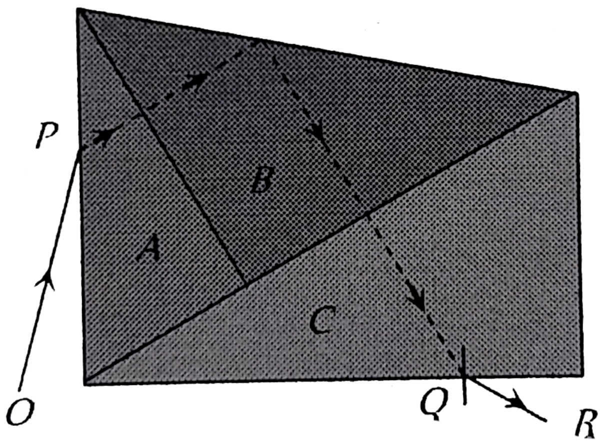
407. Three glass prisms A , B and C of same refractive index are placed in contact with each other as shown in figure, with no air gap between the prisms. Monochromatic ray of light OP passes through the prism

assembly and emerges as QR . The conditions of minimum deviation is satisfied in the prisms



A. A and C

B. B and C

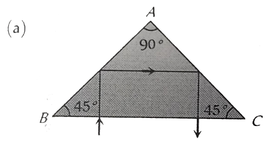
C. A and B

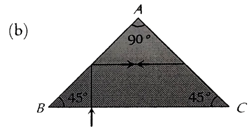
D. In all prisms A, B and C

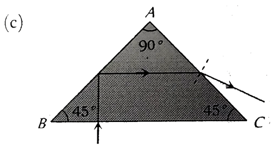
Answer: c

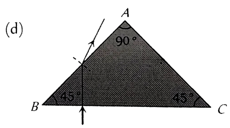
Watch Video Solution

408. The refractive index of a material of a prism of angles $45^\circ - 45^\circ - 90^\circ$ is 1.5. The path of the ray of light incident normally on the hypotenuse side is shown in

A. 

B. 

C. 

D. 

Answer: a

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409. At the time of total solar eclipse, the spectrum of solar radiation would be

A. A large number of dark Fraunhofer lines

B. A less number of dark Fraunhofer lines

C. No lines at all

D. All Fraunhofer lines changed into brilliant colours

Answer: d

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410. Angle of deviation (δ) by a prism (refractive index = μ and supposing the angle of prism A to be small) can be given by

A. $\delta = (\mu - 1)A$

B. $\delta = (\mu + 1)A$

C. $\delta = \dfrac{\dfrac{\sin(A+\delta)}{2}}{\dfrac{\sin(A)}{2}}$

D. $\delta = \dfrac{\mu - 1}{\mu + 1}A$

Answer: a

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411. Angle of prism is A and its one surface is silvered. Light rays falling at an angle of incidence $2A$ on first surface return back through the same path after suffering reflection at second silvered surface. Refraction index of the material of prism is

A. $2\sin A$

B. $2\cos A$

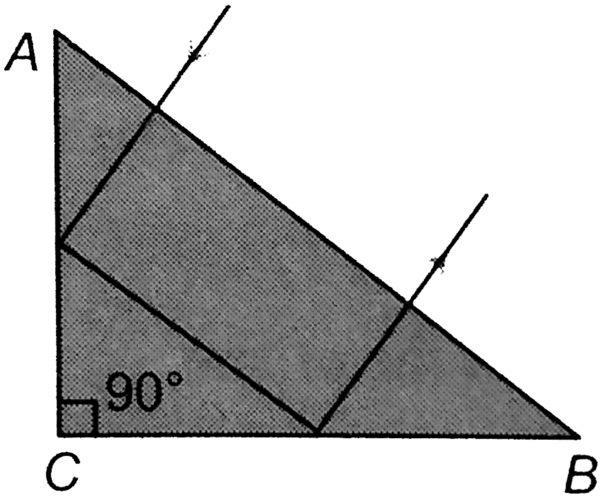
C. $\frac{1}{2}\cos A$

D. $\tan A$

Answer: b

Watch Video Solution

412. A ray of light incident normally on an isosceles right angled prism travels as shown in the figure. The least value of the refractive index of the prism must be



A. $\sqrt{2}$

B. $\sqrt{3}$

C. 1.5

D. 2

Answer: a

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413. When seen in green light, the saffron and green portions of our National Flag will appear to be

A. Black

B. Black and green respectively

C. Green

D. Green and yellow respectively

Answer: b

Watch Video Solution

414. The sun looks reddish at the time of sunrise and sunset.

A. The sun is hottest at these times

B. Of the scattering of light

C. Of the effects of refraction

D. Of the effects of diffraction

Answer: B

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415. Line spectrum contains information about

A. The atoms of the prism

B. The atoms of the source

C. The molecules of the source

D. The atoms as well as molecules of the source

Answer: b

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416. Missing lines in a continuous spectrum reveal

A. Defects of the observing instrument

B. Absence of some elements in the light source

C. Presence in the light source of hot vapours of some elements

D. Presence of cool vapours of some elements around the light source

Answer: d

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417. A source emits light of wavelength $4700\text{Å}, 5400\text{Å}$ and 6500Å . The light passes through red glass before being tested by a spectrometer. Which wavelength is seen in the spectrum

A. 6500Å

B. 5400Å

C. 4700Å

D. All the above

Answer: a

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418. A ray passes through a prism of angle 60° in minimum deviation position and suffers a deviation of 30°. What is the angle of incidence on the prism

A. 30°

B. 45°

C. 60°

D. 90°

Answer: b

Watch Video Solution

419. When light of wavelength λ on an equilateral prism, kept on its minimum deviation position, it is found that the angle of deviation equals the angle the angle of the prism itself. The refractive index of the material of the prism for the wavelength λ is

A. $\sqrt{3}$

B. $\frac{\sqrt{3}}{2}$

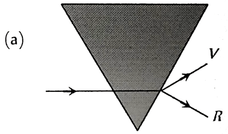
C. 2

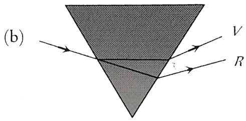
D. $\sqrt{2}$

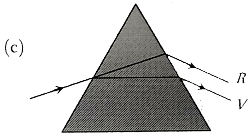
Answer: a

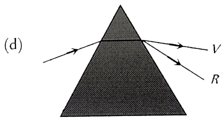
Watch Video Solution

420. Which of the following diagrams shows correctly the dispersion of white light by a prism ?

A. 

B. 

C. 

D. 

Answer: B

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421. A neon sign does not produce

A. Line spectrum

B. An emission spectrum

C. An absorption spectrum

D. Photons

Answer: c

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422. The refractive index of flint glass for blue F line is 1.6333 and red C line is 1.6161. If the refractive index for yellow D line is 1.622, the dispersive power of the glass is

A. 0.0276

B. 0.276

C. 2.76

D. 0.106

Answer: a

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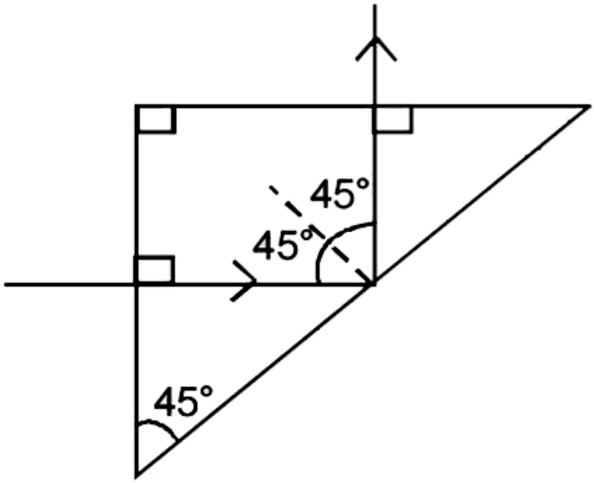
423. A light ray is incident perpendicularly to one face of a 90° prism and is totally internally reflected at the glass-air interface. If the angle of reflection is 45°, we conclude that the refractive index n



A. Less than 1.41

B. Equal to 1.41

C. Greater than 1.41

D. None of the above

Answer: c

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424. The wavelength of emission line spectrum and absorption line spectrum of a substance are related as

A. Absorption has larger value

B. Absorption has smaller value

C. They are equal

D. No relation

Answer: c

Watch Video Solution

425. White light is passed through a prism of 5°. If refractive indices for red and blue rays are 1.641 and 1.659 respectively, calculate the angular dispersion of the prism.

A. 0.1 degree

B. 0.2 degree

C. 0.3 degree

D. 0.4 degree

Answer: A

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426. From which source a continuous emission spectrum and a line absorption spectrum are simultaneously obtained

A. Bunsen burner flame

B. The sun

C. Tube light

D. Hot filament of an electric bulb

Answer: b

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427. A thin prism P_1 with angle $4 degree$ and made from glass of refractive index 1.54 is combined with another thin prism P_2 made from glass of refractive index 1.72 to produce dispersion without deviation. The angle of the prism P_2 is

A. $5\,^\circ 24'$

B. $4\,^\circ 30'$

C. $6\,^\circ$

D. $8\,^\circ$

Answer: b

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428. The refractive index of the material of prism $\sqrt{3}$, then the angle of minimum deviation of prism is

A. $30\,^\circ$

B. 45°

C. 60°

D. 75°

Answer: c

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429. The splitting of white light into several colours on passing through a glass prism is due to

A. Refraction

B. Reflection

C. Interference

D. Diffraction

Answer: a

Watch Video Solution

430. A white screen illuminated by green and red light appears to be

A. Green

B. Red

C. Yellow

D. White

Answer: c

Watch Video Solution

431. Dark lines on solar spectrum are due to

A. Lack of certain elements

B. Black body radiation

C. Absorption of certain wavelengths by outer layers

D. Scattering

Answer: c

Watch Video Solution

432. Line spectra are due to

A. Hot solids

B. Atoms in gaseous state

C. Molecules in gaseous state

D. Liquid at low temperature

Answer: b

Watch Video Solution

433. The path of a refracted ray of light in a prism is parallel to the base of the prism only when the

A. Light is of a particular wavelength

B. Ray is incident normally at one face

C. Ray undergoes minimum deviation

D. Prism is made of a particular type of glass

Answer: c

Watch Video Solution

434. For a medium, refractive indices for violet, red and yellow are 1.62, 1.52 and 1.55 respectively, then dispersive power of medium will be

A. 0.65

B. 0.22

C. 0.8

D. 0.02

Answer: c

Watch Video Solution

435. Two lenses having $f_1 : f_2 = 2 : 3$ has combination to make no dispersion. Find the ratio of dispersive power of glasses used

A. $2 : 3$

B. $3 : 2$

C. $4 : 9$

D. $9 : 4$

Answer: a

Watch Video Solution

436. If refractive index of red, violet and yellow light are $1.42, 1.62$ and 1.50 respectively for a medium. Its dispersive power will be

A. 0.4

B. 0.3

C. 0.2

D. 0.1

Answer: a

Watch Video Solution

437. A ray of light is incident at small angle I on the surface of prism of small angle A and emerges normally from the oppsite surface. If the refractive index of the material of the prism is mu, the angle of incidence is nearly equal to

A. A/μ

B. $A/2\mu$

C. μA

D. $\mu A/2$

Answer: C

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438. Fraunhofer spectrum is a

A. Line absorption spectrum

B. Band absorption spectrum

C. Line emission spectrum

D. Band emission spectrum

Answer: a

Watch Video Solution

439. The angle of a prism is 60° and its refractive index is $\sqrt{2}$. The angle of minimum deviation suffered by a ray of light in passing through it is

A. About 20°

B. 30°

C. 60°

D. 45°

Answer: b

Watch Video Solution

440. Colour of the sky is blue due to

A. Scattering of light

B. Total internal reflection

C. Total emission

D. None of the above

Answer: A

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441. Which of the following spectrum have all the frequencies from high to low frequency range

A. Band spectrum

B. Continuous spectrum

C. Line spectrum

D. Discontinuous spectrum

Answer: b

Watch Video Solution

442. Stars are not visible in the day time because

A. Stars hide behind the sun

B. Stars do not reflect sun rays during day

C. Stars vanish during the day

D. Atmosphere scatters sunlight into a blanket of extreme brightness through which faint stars cannot be visible

Answer: d

Watch Video Solution

443. Which of the following colours suffers maximum deviation in a prism

A. Yellow

B. Blue

C. Green

D. Orange

Answer: B

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444. A thin prism of glass is placed in air and water respectively. If $n_0 = \frac{3}{2}$ and $n_w = \frac{4}{3}$, then the ratio of deviation produced by the prism for a small angle of incidence when placed in air and water separately is:

A. $\frac{1}{2}$

B. $\frac{1}{4}$

C. 2

D. $\frac{1}{5}$

Answer: b

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445. The refractive indices for the light of violet and red colours of any material are 1.66 and 1.64 respectively. If the angle of prism made of this material is 10°, then angular dispersion will be

A. 0.20°

B. 0.10°

C. 0.40°

D. 1°

Answer: a

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446. The refractive index of the material of the prism for violet colour is 1.69 and that for red is 1.65. If the refractive index for mean colour is 1.66, the dispersive power of the material of the prism

A. 0.66

B. 0.06

C. 0.65

D. 0.69

Answer: B

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447. The deviation caused for red, yellow and violet colours for crown glass prism are 2.84°, 3.28° and 3.72° respectively. The dispersive power of prism material is:

A. 0.268

B. 0.368

C. 0.468

D. 0.568

Answer: a

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448. Dispersion of light is due to

A. Wavelength

B. Intensity of light

C. Density of medium

D. None of these

Answer: A

Watch Video Solution

449. A prism of refracting angle 60° is made with a material of refractive index μ. For a certain wavelength of light, the angle of minimum deviation is 30°. For this, wavelength the value of refractive index of the material is

A. 1.231

B. 1.82

C. 1.503

D. 1.414

Answer: D

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450. Which of the prism is used to see infra-red spectrum of light

A. Rock Salt

B. Nicol

C. Flint

D. Crown

Answer: a

Watch Video Solution

451. When white light enters a prism, it gets split into its constituent colours. This is due to

A. High density of prism material

B. Because μ is different for different λ

C. Diffraction of light

D. Velocity changes for different frequencies

Answer: B

Watch Video Solution

452. The dispersive powers of crown and flint glasses are 0.02 and 0.04 respectively. In an achromatic combination of lenses the focal length of flint glass lens is $40cm$. The focal length of crown glass lens will be

A. $-20cm$

B. $+20cm$

C. $-10cm$

D. $+10cm$

Answer: a

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453. When a ray of light is incident normally on one refracting surface of an equilateral prism (Refractive index of the material of the prism $= 1.5$

A. Emerging ray is deviated by 30°

B. Emerging ray is deviated by 45°

C. Emerging ray just grazes the second refracting surface

D. The ray undergoes total internal reflection at the second refracting surface

Answer: D

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454. Consider the following statement A and B and identify the correct choice of the given answers

A. Both A and B are false

B. A is true and B is false

C. A is false and B is true

D. Both A and B are true

Answer: d

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455. Under minimum deviation condition in a prism, if a ray is incident at an angle 30°, the angle between the emergent ray and the second refracting surface of the prism is

A. 0°

B. 30°

C. 45°

D. 60°

Answer: D

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456. The angle of prism is 5° and its refractive indices for red and violet colours are 1.5 and 1.6 respectively. The angular dispersion produced by the prism is

A. 7.75°

B. 5°

C. 0.5°

D. 0.17°

Answer: c

Watch Video Solution

457. If the refractive angles of two prisms made of crown glass are 10° and 20° respectively, then the ratio of their colour deviation powers will be

A. $1:1$

B. $2:1$

C. $4:1$

D. $1:2$

Answer: d

Watch Video Solution

458. The nature of sun's spectrum is

A. Continuous spectrum with absorption lines

B. Line spectrum

C. The spectrum of the helium atom

D. Band spectrum

Answer: a

Watch Video Solution

459. A ray of light is incident normally on one of the faces of a prism of apex angle 30 degree and refractive index sqrt2. The angle of deviation of the ray is...degrees.

A. 26°

B. 0°

C. 23°

D. 15°

Answer: D

Watch Video Solution

460. For a prism of refractive index 1.732, the angle of minimum deviation is equal to the angle of the prism. The angle of the prism is

A. 80°

B. 70°

C. 60°

D. 50°

Answer: c

Watch Video Solution

461. The spectrum obtained from a sodium vapour lamp is an example of

A. Line spectrum

B. Band spectrum

C. Absorption spectrum

D. Continuous spectrum

Answer: d

Watch Video Solution

462. When a glass prism of refracting angle 60° is immersed in a liquid its angle of minimum deviation is 30°. The critical angle of glass with respect to the liquid medium is

A. 42°

B. 45°

C. 50°

D. 52°

Answer: B

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463. Three prisms 1, 2 and 3 have the prism angle $A = 60^\circ$, but their refractive indices are respectively 1.4, 1.5 and 1.6. If $\delta_1, \delta_2, \delta_3$ be their respective angles of deviation then

A. $\delta_3 > \delta_2 > \delta_1$

B. $\delta_1 > \delta_2 > \delta_3$

C. $\delta_1 = \delta_2 = \delta_3$

D. $\delta_2 > \delta_1 > \delta_3$

Answer: A

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464. Which one of the following alternative is FALSE for a prism placed in a position of minimum deviation

A. $i_1 = i_2$

B. $r_1 = r_2$

C. $i_1 = r_1$

D. All of these

Answer: c

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465. In the visible region the dispersive powers and the mean angular deviations for crown and flint glass prisms are ω', ω' and d, d respectively. The condition for getting deviation without dispersion when the two prisms are combined is

A. $\sqrt{\omega d} + \sqrt{\omega' d'} = 0$

B. $\omega' d + \omega d' = 0$

C. $\omega d + \omega' d' = 0$

D. $(\omega d)^2 + (\omega' d')^2 = 0$

Answer: c

Watch Video Solution

466. A ray of light passes through the equilateral prism such that angle of incidence is equal to the angle of emergence if the angle of incidence is 45°. The angle of deviation will be

A. 15°

B. 75°

C. 60°

D. 30°

Answer: d

Watch Video Solution

467. The solar spectrum during a complete solar eclipse is

A. Continuous

B. Emission line

C. Dark line

D. Dark band

Answer: a

Watch Video Solution

468. Why sun has elliptical shape on the time when rising and sun setting ? It is due to

A. Refraction

B. Reflection

C. Scattering

D. Dispersion

Answer: a

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469. In the formation of a rainbow light from the sun on water droplets undergoes

A. Dispersion only

B. Only total internal reflection

C. Dispersion and total internal reflection

D. None of these

Answer: C

Watch Video Solution

470. The Cauchy's dispersion formula is

A. $n = A + B\lambda^{-2} + C\lambda^{-4}$

B. $n = A + B\lambda^{2} + C\lambda^{-4}$

C. $n = A + B\lambda^{-2} + C\lambda^{4}$

D. $n = A + B\lambda^{2} + C\lambda^{4}$

Answer: A

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471. A prism of refractive index m and angle A is placed in the minimum deviation position. If the angle of minimum deviation is A, then the value of A in terms of m is

A. $\sin^{-1}\left(\frac{\mu}{2}\right)$

B. $\sin^{-1}\sqrt{\frac{\mu - 1}{2}}$

C. $2\cos^{-1}\left(\frac{\mu}{2}\right)$

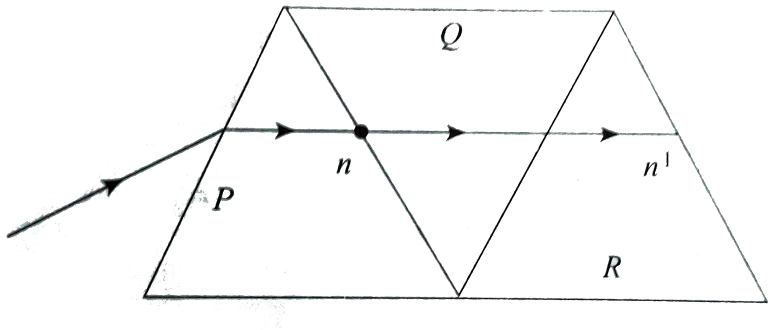
D. $\cos^{-1}\left(\frac{\mu}{2}\right)$

Answer: C

Watch Video Solution

472. A given ray of light suffers minimum deviation in an equilateral prism P. Additional prism Q and R of identical shape and of the same material as

P are now added as shown in figure. The ray will now suffer



A. Greater deviation

B. Same deviation

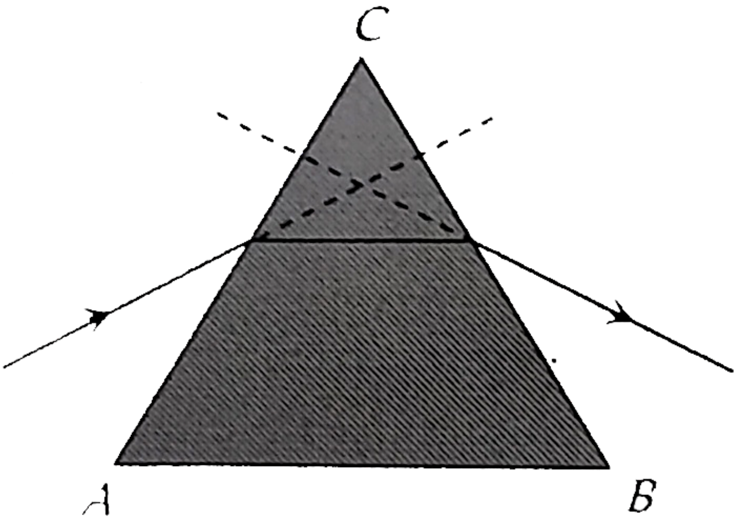
C. No deviation

D. Total internal reflection

Answer: B

Watch Video Solution

473. In the given figure, what is the angle of prism



A. A

B. B

C. C

D. D

Answer: C

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474. A prism of refractive index sqrt2 has refractive angle 60°. In the order that a ray suffers minimum deviation it should be incident at an angle of

A. 45°

B. 60°

C. 90°

D. 180°

Answer: A

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475. A convex lens, a glass slab, a glass prism and a solid sphere all are made of the same glass, the dispersive power will be

A. In the glass slab and prism

B. In the lens and solid sphere

C. Only in prism

D. In all the four

Answer: D

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476. A parallel beam of white light falls on a convex lens. Images of blue, yellow and red light are formed on other side of the lens at a distance of $0.20m, 0.205m$ and $0.214m$ respectively. The dispersive power of the material of the lens will be

A. $619/1000$

B. $9/200$

C. $14/205$

D. $5/214$

Answer: c

Watch Video Solution

Watch Video Solution

477. The refractive index of the material of the prism for violet colour is 1.69 and that for red is 1.65. If the refractive index for mean colour is 1.66, the dispersive power of the material of the prism

A. 0.66

B. 0.06

C. 0.65

D. 0.69

Answer: b

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478. If the angle of prism is 60° and the angle of minimum deviation is 40°, the angle of refraction will be

A. 30°

B. 60°

C. 100°

D. 120°

Answer: A

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479. The refractive index of a particular material is 1.67 for blue light, 1.65 for yellow light and 1.63 for red light. The dispersive power of the material is ....

A. 0.0615

B. 0.024

C. 0.031

D. 1.6

Answer: a

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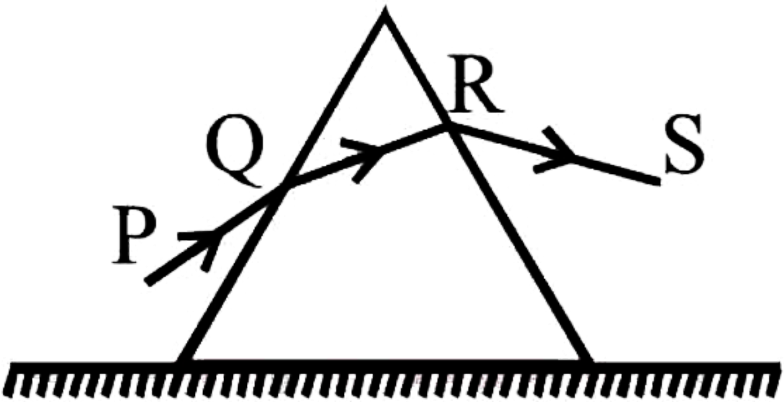
480. An equilateral prism is placed on a horizontal surface. A ray PQ is incident onto it. For minimum deviation `



A. PQ is horizontal

B. QR is horizontal

C. RS is horizontal

D. Either PQ or RS is horizontal

Answer: b

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481. A beam of light composed of red and green ray is incident obliquely at a point on the face of rectangular glass slab. When coming out on the opposite parallel face, the red and green ray emerge form

A. Two points propagating in two different directions

B. Two points propagating in two parallel directions

C. One point propagating in two different directions

D. One point propagating in the same directions

Answer: b

Watch Video Solution

482. White light is passed through a prism .... colour shows minimum deviation

A. Red

B. Violet

C. Yellow

D. green

Answer: a

Watch Video Solution

483. A ray of monochromatic light suffers minimum deviation of 38° while passing through a prism of refracting angle 60°. Refracting index of the prism material is

A. 1.5

B. 1.3

C. 0.8

D. 2.4

Answer: a

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484. A ray incident a 15° on one refracting surface of a prism of angle 60°, suffers a deviation of 55°. What is the angle of emergence

A. 95°

B. 45°

C. 30°

D. None of these

Answer: d

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485. The spectrum obtained from a sodium vapour lamp is an example of

A. Absorption spectrum

B. Emission spectrum

C. Continuous spectrum

D. Band spectrum

Answer: b

Watch Video Solution

486. The sky would appear red instead of blue if

A. Atmospheric particles scatter blue light more than red light

B. Atmospheric particles scatter all colours equally

C. Atmospheric particles scatter red light more than the blue light

D. The sun was much hotter

Answer: c

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487. Sir C.V. Raman was awarded Nobel Prize for his work connected with which of the following phenomenon of radiation

A. Scattering

B. Diffraction

C. Interference

D. Polarisation

Answer: a

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488. For a normal eye, the least distance of distinct vision is

A. 0.25 m

B. 0.50 m

C. 25 m

D. Infinite

Answer: a

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489. A person suffering from hypermetropia requires which type of spectacle lenses ?

A. Concave lens

B. Plano-concave lens

C. Convexo-concave lens

D. Convex lens

Answer: d

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490. Astigmatism for a human eye can be removed by using

A. Concave lens

B. Convex lens

C. Cylindrical lens

D. Prismatic lens

Answer: c

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491. When we see an object the image formed on the retina is

A. Real and inverted

B. Virtual and erect

C. Real and erect

D. Virtual and inverted

Answer: a

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492. A person cannot see the objects distinctly, when placed at a distance less than $100cm$. What is the power of the spectacles that he should use to see clearly the objects placed at $25cm$?

A. $+3.0D$

B. $+0.125D$

C. $-3.0D$

D. $+4.0D$

Answer: a

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493. How should people wearing spectacles work with a microscope

A. They cannot use the microscope at all

B. They should keep on wearing their spectacles

C. They should take off spectacles

D. (b) and (c) is both way

Answer: c

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494. A man who cannot see clearly beyond $5m$ wants to see starts clearly. He should use a lens of focal length

A. $-100m$

B. $+5m$

C. $-5m$

D. Very large

Answer: c

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495. A man can see only between $75cm$ and $200cm$. The power of lens to correct the near point will be

A. $+8/3D$

B. $+3D$

C. $-3D$

D. $-8/3D$

Answer: a

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496. A man can see the objects upto a distance of one metre from his eyes. For correcting his eye sight so that he can see an object at infinity, he requires a lens whose power is

A. $+0.5D$

B. $+1.0D$

C. $+2.0D$

D. $-1.0D$

Answer: d

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497. A man can see the object between $15cm$ and $30cm$. He uses the lens to see the far objects. Then due to the lens to see the far objects. Then due to the lens used, the near point will be at

A. $\frac{10}{3}cm$

B. $30cm$

C. $15cm$

D. $\frac{100}{3}cm$

Answer: b

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498. The far point of a myopia eye is at $40cm$. For removing this defect, the power of lens required will be

A. $40D$

B. $-4D$

C. $-2.5D$

D. $0.25D$

Answer: c

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499. A man suffering from myopia can read book placed at $10cm$ distance. For reading the book at a distance of $60cm$ with relaxed vision, focal length of the lens required will be

A. 45 cm

B. $-20cm$

C. $-12cm$

D. $30cm$

Answer: c

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500. The light when enters the human eye experiences most of the refraction while passing through

A. Cornea

B. Aqueous humour

C. Vitrous humour

D. Crystalline lens

Answer: a

Watch Video Solution

501. The impact of an image on the retina remains for

A. 0.1 sec

B. 0.5 sec

C. 10 sec

D. 15 sec

Answer: a

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502. A person is suffering from myopic defect. He is able to see clear objects placed at $15cm$. What type and of what focal length of lens he should use to see clearly the object placed $60cm$ away ?

A. Concave lens of 20 cm focal length

B. Convex lens of 20 cm focal length

C. Concave lens of 12 cm focal length

D. Convex lens of 12 cm focal length

Answer: a

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503. The sensation of vision in the retina is carried to the brain by

A. Ciliary muscles

B. Blind spot

C. Cylindrical lens

D. Optic nerve

Answer: d

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504. When the power of eye lens increases, the defect of vision is produced. The defect is known as

A. Shortsightedness

B. Longsightedness

C. Colourblindness

D. None of the above

Answer: a

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505. A man is suffering from colour blindness for green colour. To remove this defect, he should use goggles of

A. Green colour glasses

B. Red colour glasses

C. Smoky colour glasses

D. None of the above

Answer: d

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506. In human eye the focussing is done by

A. To and fro movement of eye lens

B. To and fro movement of the retina

C. Change in the convexity of the lens surface

D. Change in the refractive index of the eye fluids

Answer: c

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507. A short sighted person can see distinctly only those objects which lie between 10 cm and 100 cm from him. The power of the spectacle lens required to see a distant object is

A. $+0.5D$

B. $-1.0D$

C. $-10D$

D. $+4.0$

Answer: b

Watch Video Solution

508. A person can see clearly only upto a distance of $25cm$. He wants to read a book placed at a distance of $50cm$. What kind of lens does he require for his spectacles and what must be its power ?

A. Concave, $-1.0D$

B. Convex $+1.5D$

C. Concave, $-2.0D$

D. Convex, $+2.0D$

Answer: c

Watch Video Solution

509. The human eye has a lens which has

A. Soft portion at its centre

B. Hard surface

C. Varying refractive index

D. Constant refractive index

Answer: c

Watch Video Solution

510. A man with defective eyes cannot see distinctly object at the distance more than 60 cm from his eyes. The power of the lens to be used will be

A. $+60D$

B. $-60D$

C. $-1.66D$

D. $\frac{1}{1.66}D$

Answer: c

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511. A person's near point is $50cm$ and his far point $3m$. Power of the lenses he requires for

(i) reading and

(ii) for seeing distant stars are

A. $-2D$ and 0.33 D

B. 2 D and $-0.33D$

C. $-2D$ and 3D

D. 2 D and $-3D$

Answer: b

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512. A person wears glasses of power $-2.5D$. The defect of the eye and the far point of the person without the glasses are, respectively

A. Farsightedness, 40 cm

B. Nearsightedness, 40 cm

C. Astigmatism, 40 cm

D. Nearsightedness, 250 cm

Answer: b

Watch Video Solution

513. Myopia is due to

A. Elongation of eye ball

B. Irregular change in focal length

C. Shortening of eye ball

D. Older age

Answer: a

Watch Video Solution

514. A person is suffering from the defect astigmatism. Its main reason is

A. Distance of the eye lens from retina is increased

B. Distance of the eye lens from retina is decreased

C. The cornea is not spherical

D. Power of accommodation of the eye is decreased

Answer: c

Watch Video Solution

515. A person cannot see objects clearly beyond 2.0 m . The power of lens required to correct his vision will be

A. $+2.0D$

B. $-1.0D$

C. $+1.0D$

D. $-0.5D$

Answer: d

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516. The resolving lime of healthy eye is about

A. $1'$ or $\left(\frac{1}{60}\right)^{\circ}$

B. $1''$

C. 1°

D. $\frac{1}{60}''$

Answer: a

Watch Video Solution

517. When objects at different distances are seen by the eye, which of the following remai constant?

A. The focal length of the eye lens

B. The object distance from the eye lens

C. The radii of curvature of the eye lens

D. The image distance from the eye lens

Answer: d

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518. A person wears glasses of power -2.0 D . The defect of the eye and the far point of the person without the glasses will be

A. Nearsighted, 50 cm

B. Farsighted, 50 cm

C. Nearsighted, 250 cm

D. Astigmatism, 50 cm

Answer: a

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519. An eye specialist prescribes spectacles having combination of convex lens of focal length 40cm in contact with a concave lens of focal length 25cm. The power of this lens combination in diopters is

A. +1.5

B. -1.5

C. +6.67

D. -6.67

Answer: b

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520. Match the List I with the List II from the combinations shown

(I)	Presbiopia	(A)	Sphero-cylindrical lens
(II)	Hypermetropia	(B)	Convex lens of proper power may be used close to the
(II)	Astigmatism	(C)	Concave lens of suitable forcal length
(IV)	Myopia	(D)	Bifocal lens of suitable forcal length

A. I - A, II - C, III - B, IV - D

B. I - B, II - D, III - C, IV - A

C. I - D, II - B, III - A, IV - C

D. I - D, II - A, III - C, IV - B

Answer: c

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521. Near and far points of a human eye are

A. 0 and 25 cm

B. 0 and ∞

C. 25 cm and 100 cm

D. 25 cm and ∞

Answer: d

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522. Two parallel pillars are $11km$ away from an observer. The minimum distance between the pillars so that they can be seen separately will be

A. 3.2 m

B. 20.8 m

C. 91.5 m

D. 183 m

Answer: a

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523. Retina of eye acts like .... of camer

A. Shutter

B. Film

C. Lens

D. None of these

Answer: b

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524. The hyper-metropia is a

A. Short-side defect

B. Long- side defect

C. Bad vision due to old age

D. None of these

Answer: b

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525. Amount of light entering into the camera depends upon

A. Focal length of the objective lens

B. Product of focal length and diameter of the objective lens

C. Distance of the object from camera

D. Aperture setting of the camera

Answer: d

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526. A man cannot see clearly the objects beyond a distance of 20 cm from his eyes. To see distant objects clearly he must use which kind of lenses and of what focal length

A. 100 cm convex

B. 100 cm concave

C. 20 cm convex

D. 20 cm concave

Answer: d

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527. A person uses spectacles of power +2 D . He is suffering from

A. Short sightedness or myopia

B. Long sightedness or hypermetropia

C. Presbyopia

D. Astigmatism

Answer: b

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528. To remove myopia (short sightedness) a lens of power 0.66 D is required. The distant point of the eye is approximately

A. 100 cm convex

B. 150 cm

C. 50 cm

D. 25 cm

Answer: b

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529. A person suffering from 'presbyopia' (myopia and hyper metropia both defects) should use

A. A concave lens

B. A convex lens

C. A bifocal lens whose lower portion is convex

D. A bifocal lens whose upper portion is convex

Answer: c

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530. A person who can see things most clearly at a distance of $10cm$. Requires spectacles to enable to him to see clearly things at a distance of

$30 cm$. What should be the focal length of the spectacles ?

A. 15 cm (Concave)

B. 15 cm (Convex)

C. 10 cm

D. 0

Answer: a

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531. Far points of myopic eye is $250 cm$, then the focal length of the lens to be used will be

A. $-250 cm$

B. $-250/9 cm$

C. $+250 cm$

D. $+250/9 cm$

Answer: a

Watch Video Solution

532. A man can see clearly up to 3 metres. Prescribes a lens for his spectacles so that he can see clearly up to 12 metres

A. -$3/4D$

B. 3 D

C. -$1/4D$

D. -$4D$

Answer: c

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533. A satisfactory photographic print is obtained when the exposure time is $10\sec$ at a distance of $2m$ from a $60cd$ lamp. The time of exposure required for the same quality print at a distance of $4m$ from a $120cd$ lamp is

A. 5 sec

B. 10 sec

C. 15 sec

D. 20 sec

Answer: d

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534. A person can not see the objects clearly placed at a distance more than 40 cm . He is advised to use a lens of power

A. $-2.5D$

B. $+2.5D$

C. $-6.25D$

D. $+1.5D$

Answer: a

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535. A person uses a lens of power $+3D$ to normalise vision. Near point of hypermetropic eye is

A. 1 m

B. 1.66 m

C. 2 m

D. 0.66 m

Answer: a

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536. A defective eye cannot see close objects clearly because their image is formed

A. On the eye lens

B. Between eye lens and retina

C. On the retina

D. Beyond retina

Answer: d

Watch Video Solution

537. Image formed on retina of eye is proportional to

A. Size of object

B. Area of object

C. $\dfrac{\text{Size of object}}{\text{Size of image}}$

D. $\dfrac{\text{Size of image}}{\text{Size of object}}$

Answer: a

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538. A student can distinctly see the object upto a distance $15cm$. He wants to see the black board at a distance of $3m$. Focal length and power of lens used respectively will be

A. $-4.8cm, -3.3D$

B. $-5.8cm, -4.3D$

C. $-7.5cm, -6.3D$

D. $-15.8cm, -6.3D$

Answer: d

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539. A camera objective has an aperture diameter d . If the aperture is reduced to diameter $d/2$ the exposure time under identical conditions of light should be made

A. $\sqrt{2}$ fold

B. 2 fold

C. $2\sqrt{2}$ fold

D. 4 fold

Answer: d

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540. Amount of light entering into the camera depends upon

A. Its diameter only

B. Ratio of focal length and diameter

C. Product of focal length and diameter

D. Wavelength of light used

Answer: a

Watch Video Solution

541. The exposure time of a camera lens at the $\frac{f}{2.8}$ setting is $\frac{1}{200}$ second. The correct time of exposure at $\frac{f}{5.6}$ is

A. 0.4sec

B. 0.02sec

C. 0.002sec

D. 0.04sec

Answer: b

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542. Ability of the eye to see objects at all distances is called

A. Binocular vision

B. Myopia

C. Hypermetropia

D. Accommodation

Answer: d

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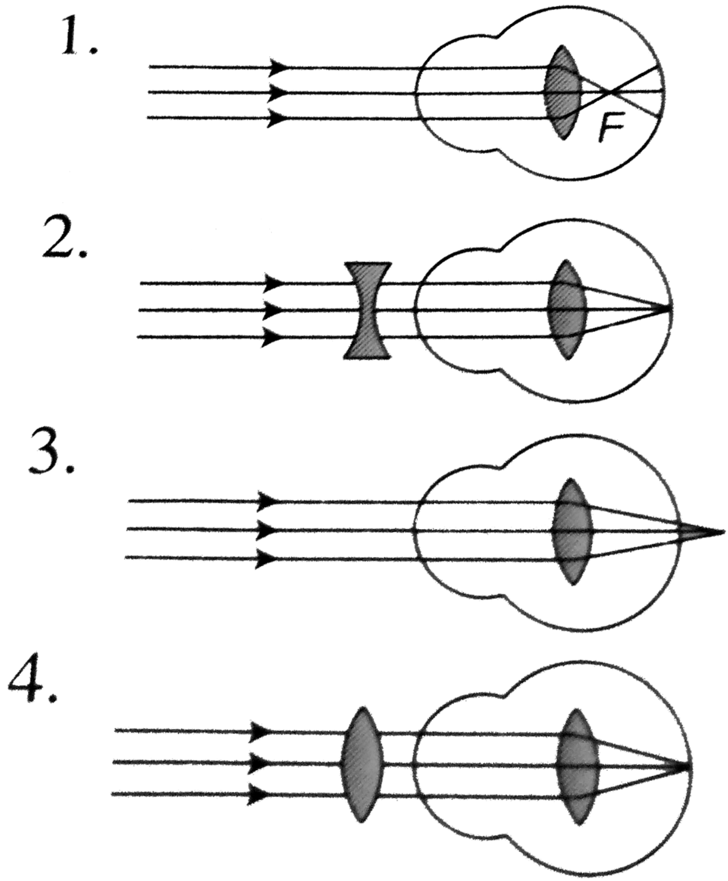

543. 1.

Identify the wrong description of the above figures

A. 1 represents far-sightedness

B. 2 correction for short sightedness

C. 3 represents far sightedness

D. 4 correction for far-sightedness

Answer: a

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544. The focal lengths of the objective and eye - lens of a microscope are $1cm$ and $5cm$ respectively. If the magnifying power for the relaxed eye is 45, then the length of the tube is

A. $30cm$

B. $25cm$

C. $15cm$

D. $12cm$

Answer: c

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545. In a compound microscope magnification will be large, if the focal length of the eye piece is

A. Large

B. Smaller

C. Equal to that of objective

D. Less than that of objective

Answer: b

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546. The focal length of the objective lens of a compound microscope is

A. Equal to the focal length of its eye piece

B. Less than the focal length of eye piece

C. Greater than the focal length of eye piece

D. Any of the above three

Answer: b

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547. Microscope is an optical instrument which

A. Enlarges the object

B. Increases the visual angle formed by the object at the eye

C. Decreases the visual angle formed by the object at the eye

D. Brings the object nearer

Answer: b

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548. If in compound microscope m_1 and m_2 be the linear magnification of the objective lens and eye lens respectively, then magnifying power of the compound microscope will be

A. m_1 - m_2

B. $\sqrt{m_1 + m_2}$

C. $(m_1 + m_2)/2$

D. $m_1 \times m_2$

Answer: d

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549. For which of the following colour, the magnifying power of a microscope will be maximum

A. White colour

B. Red colour

C. Violet colour

D. Yellow colour

Answer: c

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550. The length of the compound microscope is $14cm$. The magnifying power for relaxed eye is 25. If the focal length of eye lens is $5cm$, then the object distance for objective lens will be

A. $1.8cm$

B. $1.5cm$

C. $2.1cm$

D. $2.4cm$

Answer: a

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551. If the focal length of objective and eye lens are $1.2cm$ and $3cm$ respectively and the object is put $1.25cm$ away from the objective lens

and the final image is formed at infinity. The magnifying power of the microscope is

A. 150

B. 200

C. 250

D. 400

Answer: b

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552. The focal length of objective and eye lens of a microscope are $4cm$ and $8cm$ respectively. If the least distance of distinct vision is $24cm$ and object distance is $4.5cm$ from the objective lens, then the magnifying power of the microscope will be

A. 18

B. 32

C. 64

D. 20

Answer: b

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553. When the length of a microscope tube increases, its magnifying power

A. Decreases

B. Increases

C. Does not change

D. May decrease or increase

Answer: a

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554. In a compound microscope, if the objective produces an image I_o and the eye piece produces an image I_e, then

A. I_o is virtual but I_e is real

B. I_o is real but I_e is virtual

C. I_o and I_e are both real

D. I_o and I_e are both virtual

Answer: b

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555. The magnifying power of a simple microscope can be increased, if we use eye-piece of

A. Higher focal length

B. Smaller focal length

C. Higher diameter

D. Smaller diameter

Answer: B

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556. An electron microscope is superior to an optical microscope in

A. Having better resolving power

B. Being easy to handle

C. Low cost

D. Quickness of observation

Answer: a

Watch Video Solution

557. The magnifying power of a microscope with an objective of $5mm$ focal length is 400. The length of its tube is $20cm$. Then the focal length of the eye - piece is

A. $200cm$

B. $160cm$

C. $2.5cm$

D. $0.1cm$

Answer: c

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558. The maximum magnification that can be obtained with a convex lens of focal length 2.5 cm is (the least distance of distinct vision is 25 cm)

A. 10

B. 0.1

C. 62.5

D. 11

Answer: d

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559. When the object is self-luminous, the resolving power of a microscope is given by the expression

A. $\frac{2\mu \sin\theta}{1.22\lambda}$

B. $\frac{\mu \sin\theta}{\lambda}$

C. $\frac{2\mu \cos\theta}{1.22\lambda}$

D. $\frac{2\mu}{\lambda}$

Answer: a

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560. The power of two convex lenses A and B are 8 diopters and 4 diopters respectively. If they are to be used as a simple microscope, the magnification of

A. B will be greater than A

B. A will be greater than B

C. The information is incomplete

D. None of the above

Answer: b

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561. Finger prints are observed by the use of

A. Telescope

B. Microscope

C. Gallilean telescope

D. Concave lens

Answer: b

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562. To produce magnified erect image of a far object, we will be required along with a convex lens, is

A. Another convex lens

B. Concave lens

C. A plane mirror

D. A concave mirror

Answer: b

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563. In order to increase the magnifying power of a compound microscope

A. The focal lengths of the objective and the eye piece should be small

B. Objective should have small focal length and the eye piece large

C. Both should have large focal lengths

D. The objective should have large focal length and eye piece should have small

Answer: a

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564. If the focal length of the objective lens is increased then

A. Magnifying power of microscope will increase but that of telescope will decrease

B. Magnifying power of microscope and telescope both will increase

C. Magnifying power of microscope and telescope both will decrease

D. Magnifying power of microscope will decrease but that of telescope will increase

Answer: d

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565. The magnification produced by the objective lens and the eye lens of a compound microscope are 25 and 6 respectively. The magnifying power of this microscope is

A. 19

B. 31

C. 150

D. $\sqrt{150}$

Answer: c

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566. The focal length of the objective and the eye piece of a compound microscope are 2.0 cm and 3.0 cm, respectively. The distance between the objective and the eye piece is 15.0 cm. The final image formed by the eye piece is at infinity. The two lenses are thin. The distance in cm of the object and the image produced by the objective, measured from the objective lens, are respectively

A. 2.4 and 12.0

B. 2.4 and 15.0

C. 2.3 and 12.0

D. 2.3 and 3.0

Answer: a

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567. Resolving power of a microscope depends upon

A. The focal length and aperture of the eye lens

B. The focal lengths of the objective and the eye lens

C. The apertures of the objective and the eye lens

D. The wavelength of light illuminating the object

Answer: d

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568. The objective lens of a compound microscope produces magnification of 10. In order to get an overall magnification of 100 when image is formed at $25cm$ from the eye, the focal length of the eye lens should be

A. $4cm$

B. $10cm$

C. $\frac{25}{9}cm$

D. $9cm$

Answer: c

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569. A person using a lens as a simple microscope sees an

A. Inverted virtual image

B. Inverted real magnified image

C. Upright virtual image

D. Upright real magnified image

Answer: c

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570. Least distance of distinct vision is 25 cm . Magnifying power of simple microscope of focal length 5 cm is

A. $1/5$

B. 5

C. $1/6$

D. 6

Answer: d

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571. The objective of a compound microscope is essentially

A. A concave lens of small focal length and small aperture

B. Convex lens of small focal length and large aperture

C. Convex lens of large focal length and large aperture

D. Convex lens of small focal length and small aperture

Answer: d

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572. Resolving power of a microscope depends upon

A. Wavelength of light used, directly

B. Wavelength of light used, inversely

C. Frequency of light used

D. Focal length of objective

Answer: b

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573. In a compound microscope, the focal lengths of two lenses are $1.5cm$ and $6.25cm$ an object is placed at $2cm$ form objective and the final image is formed at $25cm$ from eye lens. The distance between the two lenses is

A. $6.00 cm$

B. $7.75 cm$

C. $9.25 cm$

D. $11.00 cm$

Answer: d

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574. The length of the tube of a microscope is 10 cm . The focal lengths of the objective and eye lenses are 0.5 cm and 1.0 cm . The magnifying power of the microscope is about

A. 5

B. 23

C. 166

D. 500

Answer: d

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575. In a compound microscope, the intermediate image is

A. Virtual, erect and magnified

B. Real, erect and magnified

C. Real, inverted and magnified

D. Virtual, erect and reduced

Answer: c

Watch Video Solution

576. The magnifying power of a compound microscope is

A. The focal length of objective lens is increased and that of eye lens is decreased

B. The focal length of eye lens is increased and that of objective lens is decreased

C. Focal lengths of both objective and eye-piece are increased

D. Focal lengths of both objective and eye-piece are decreased

Answer: d

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577. If the red light is replaced by blue light illuminating the object in a microscope the resolving power of the microscope

A. Decreases

B. Increases

C. Gets halved

D. Remains unchanged

Answer: b

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578. The magnifying power of a simple microscope is 6. The focal length of its lens in metres will be, if least distance of distinct vision is 25cm

A. 0.05

B. 0.06

C. 0.25

D. 0.12

Answer: a

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579. Two points separated by a distance of $0.1mm$ can just be resolved in a microscope when a light of wavelength 6000Å is used. If the light of wavelength 4800Å is used this limit of resolution becomes

A. $0.08mm$

B. $0.10mm$

C. $0.12mm$

D. $0.06mm$

Answer: a

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580. A compound microscope has two lenses. The magnifying power of one is 5 and the combined magnifying power is 100. The magnifying power of the other lens is

A. 10

B. 20

C. 50

D. 25

Answer: b

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581. To increase the angular magnification of a simple microscope, one should increase

A. Focal length of lens

B. Size of object

C. Aperture of lens

D. Power of lens

Answer: d

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582. Wavelength of light used in an optical instrument are $\lambda_1 = 4000\text{Å}$ and $\lambda_2 = 5000\text{Å}$ then ratio of their respective resolving powers (corresponding to λ_1 and λ_2) is

A. $16 : 25$

B. $9 : 1$

C. $4 : 5$

D. $5 : 4$

Answer: d

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583. The separation between two microscopic particles is measured P_A and P_B by two different lights of wavelength 2000Å and 3000Å respectively, then

A. $P_A > P_B$

B. $P_A < P_B$

C. $P_A < 3/2P_B$

D. $P_A = P_B$

Answer: b

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584. The image formed by an objective of a compound microscope is

A. Virtual and enlarged

B. Virtual and diminished

C. Real and diminished

D. Real and enlarged

Answer: d

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585. If F_0 andF_e are the focal lengths of the objective and eye-piece respectively for a Galilean telescope, its magnifying power is about

A. $F_o + F_e$

B. $F_o \times F_e$

C. F_o / F_e

D. $\frac{1}{2}\left(F_o + F_e\right)$

Answer: c

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586. The magnifying power of a telescope can be increased

A. Increasing focal length of the system

B. Fitting eye piece of high power

C. Fitting eye piece of low power

D. Increasing the distance of objects

Answer: b

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587. A simple telescope, consisting of an objective of focal length $60cm$ and a single eye lens of focal length $5cm$ is focussed on a distant object is such a way that parallel rays comes out from the eye lens. If the object subtends an angle 2° at the objective, the angular width of the image.

A. 10°

B. 24°

C. 50°

D. $1/6^{\circ}$

Answer: b

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588. The diameter of the objective of the telescope is 0.1 metre and wavelength of light is 6000Å. Its resolving power would be approximately

A. $7.32 \times 10^{-6} rad$

B. $1.36 \times 10^{6} rad$

C. $7.32 \times 10^{-5} rad$

D. $1.36 \times 10^{5} rad$

Answer: d

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589. For a telescope to have large resolving power the

A. Focal length of its objective should be large

B. Focal length of its eye piece should be large

C. Focal length of its eye piece should be small

D. Aperture of its objective should be large

Answer: d

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590. The focal length of objective and eye lens of a astronomical telescope are respectively $2m$ and $5cm$. Final image is formed at (i) least distance of distinct vision (ii) infinity. The magnifying power in both cases will be

A. $-48, -40$

B. $-40, -48$

C. $-40, 48$

D. $-48, 40$

Answer: a

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591. For observing cricket macth a binocular is preferred to a terrestrial telescope because

A. The binocular gives the proper three dimensional view

B. The binocular has shorter length

C. The telescope does not give erect image

D. Telescope have chromatic aberrations

Answer: a

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592. To increase the magnifying power of telescope (f_o = focal length of the objective and f_e = focal length of the eye lens)

A. f_o should be large and f_e should be small

B. f_o should be small and f_e should be large

C. f_o and f_e both should be large

D. f_o and f_e both should be small

Answer: a

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593. Relative difference of focal lengths of objective and eye lens in the microscope and telescope is given as

A. It is equal in both

B. It is more in telescope

C. It is more in microscope

D. It may be more in any one

Answer: b

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594. If the telescope is reversed .i.e., seen seen from the objective side, then

A. Object will appear very small

B. Object will appear very large

C. There will be no effect on the image formed by the telescope

D. Image will be slightly greater than the earlier one

Answer: a

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595. The focal length of the objective of a terrestrial telescope is 80 cm and it is adjusted for parallel rays, then its magnifying power is 20. If the focal length of erecting lens is 20 cm , then full length of telescope will be

A. $84cm$

B. $100cm$

C. $124cm$

D. $164cm$

Answer: d

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596. An astronomical telescope has an angular magnification of magnitude 5 for distant object. The separation between the objective and the eyepiece is 36 cm and the final image is formed at infinity. The focal length f_0 of the objective and the focal length f_0 of the eyepiece are

A. $f_o = 45cm$ and $f_e = -9cm$

B. $f_o = 7.2cm$ and $f_e = 5cm$

C. $f_o = 50cm$ and $f_e = 10cm$

D. $f_o = 30cm$ and $f_e = 6cm$

Answer: d

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597. An astronomical telescope of magnifying power 7 consists of two thin lenses $40cm$ apart, in normal adjustment. Calculate the focal lengths of the lenses.

A. 1080

B. 200

C. 30

D. 186

Answer: c

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598. The magnifying power of an astronomical telescope for relaxed vision is 16. On adjusting, the distance between the objective and eye lens is 34 cm . Then the focal length of objective and eye lens will be respectively

A. $17cm, 17cm$

B. $20cm, 14cm$

C. $32cm, 2cm$

D. $30cm, 4cm$

Answer: c

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599. In Galilean telescope, if the powers of an objective and eye lens are respectively $+1.25D$ and $-20D$, then for relaxed vision, the length and magnification will be

A. $21.25cm$ and 16

B. $75cm$ and 20

C. $75cm$ and 16

D. $8.5cm$ and 21.25

Answer: c

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600. The aperture of a telescope is made large, because

A. To increase the intensity of image

B. To decrease the intensity of image

C. To have greater magnification

D. To have lesser resolution

Answer: a

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601. In Gallilean telescope, the final image formed is

A. Real, erect and enlarged

B. Virtual, erect and enlarged

C. Real, inverted and enlarged

D. Virtual, inverted and enlarged

Answer: b

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602. The magnifying power of a telescope is 9. When it is adjusted for parallel rays the distance between the objective and eyepiece is $20cm$. The focal lengths of lenses are

A. $18cm, 2cm$

B. $11cm, 9cm$

C. $10cm, 10cm$

D. $15cm, 5cm$

Answer: a

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603. The focal length of the objective and eye piece of a telescope are respectively 60 cm and 10 cm . The magnitude of the magnifying power when the image is formed at infinity is

A. 50

B. 6

C. 70

D. 5

Answer: b

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604. The magnifying power of an astronomical telescope is 8 and the distance between the two lenses is $54cm$. The focal length of eye lens and objective lens will be respectively

A. 6 cm and 48 cm

B. 48 cm and 6 cm

C. 8 cm and 64 cm

D. 64 cm and 8 cm

Answer: a

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605. An opera glass (Galilean telescope) measures $9cm$ from the objective to the eyepiece. The focal length of the objective is $15cm$. Its magnifying power is

A. 2.5

B. $2/5$

C. $5/3$

D. 0.4

Answer: a

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606. When a telescope is adjusted for parallel light, the distance of the objective from the eye piece is found to be $80cm$. The magnifying power of the telescope is 19 . The focal length of the lenses are

A. 61 cm , 19 cm

B. 40 cm , 40 cm

C. 76 cm , 4 cm

D. 50 cm , 30 cm

Answer: c

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607. A reflecting telescope utilizes

A. A concave mirror

B. A convex mirror

C. A prism

D. A plano-convex lens

Answer: a

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608. The aperture of the objective lens of a telescope is made large so as to

A. Increase the magnifying power of the telescope

B. Increase the resolving power of the telescope

C. Make image aberration less

D. Focus on distant objects

Answer: b

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609. On which of the following does the magnifying power of a telescope depends

A. The focal length of the objective only

B. The diameter of aperture of the objective only

C. The focal length of the objective and that of the eye piece

D. The diameter of aperture of the objective and that of the eye piece

Answer: c

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610. Large aperture of telescope are used for

A. Large image

B. Greater resolution

C. Reducing lens aberration

D. Ease of manufacture

Answer: b

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611. Two convex lenses of focal lengths $0.3m$ and $0.05m$ are used to make a telescope. The distance kept between the two is

A. $0.35m$

B. $0.25m$

C. $0.175m$

D. $0.15m$

Answer: a

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612. The diameter of the objective lens of a telescope is $5.0m$ and wavelength of light is $6000Å$. The limit of resolution of this telescope will be

A. $0.03\sec$

B. $3.03\sec$

C. $0.06\sec$

D. $0.15\sec$

Answer: a

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613. All of the following statements are correct except

A. The total length of an astronomical telescope is the sum of the focal lengths of its two lenses

B. The image formed by the astronomical telescope is always erect because the effect of the combination of the two lenses is divergent

C. The magnification of an astronomical telescope can be increased by decreasing the focal length of the eye-piece

D. he magnifying power of the refracting type of astronomical telescope is the ratio of the focal length of the objective to that of the eye-piece

Answer: b

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614. A terrestrial telescope is made by introducing an erecting lens of focal length f between the objective and eye piece lenses of an astronomical telescope. This causes the length of the telescope tube to increase by an amount equal to

A. f

B. $2f$

C. $3f$

D. $4f$

Answer: d

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615. The length of an astronomical telescope for normal vision (relaxed eye) (f_o = focal length of objective lens and f_e = focal length of eye lens) is

A. $f_o \times f_e$

B. $\frac{f_o}{f_e}$

C. $f_o + f_e$

D. $\left(f_o - f_e\right)$

Answer: c

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616. A Galilean telescope has objective and eye - piece of focal lengths $200cm$ and $2cm$ respectively. The magnifying power of the telescope for normal vision is

A. 90

B. 100

C. 108

D. 198

Answer: b

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617. In an astronomical telescope, the focal length of the objective lens is 100 cm and of eye-piece is 2 cm . The magnifying power of the telescope for the normal eye is

A. 50

B. 10

C. 100

D. $\frac{1}{50}$

Answer: a

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618. When diameter of the aperture of the objective of an astronomical telescope is increased, its

A. Magnifying power is increased and resolving power is decreased

B. Magnifying power and resolving power both are increased

C. Magnifying power remains the same but resolving power is increased

D. Magnifying power and resolving power both are decreased

Answer: c

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619. The focal lengths of the objective and eye lenses of a telescope are respectively 200 cm and 5 cm . The maximum magnifying power of the telescope will be

A. -40

B. -48

C. -60

D. -100

Answer: b

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620. The minimum magnifying power of an astronomical telescope is M. If the focal length of its eye-lens is halved, the minimum magnifying power will become:

A. $M/2$

B. $2M$

C. $3M$

D. $4M$

Answer: b

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621. The astronomical telescope consists of objective and eye-piece. The focal length of the objective is

A. Equal to that of the eye-piece

B. Greater than that of the eye-piece

C. Shorter than that of the eye-piece

D. Five times shorter than that of the eye-piece

Answer: b

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622. Four convergent lenses have focal lengths $100cm, 10cm, 4cm$ and $0.3cm$. For a telescope with maximum possible magnification, we choose the lenses of focal lengths

A. $100cm, 0.3cm$

B. $10cm, 0.3cm$

C. $10cm, 4cm$

D. $100cm, 4cm$

Answer: a

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623. The focal length of objective and eye-piece of a telescope are 100 cm and 5 cm respectively. Final image is formed at least distance of distinct vision. The magnification of telescope is

A. 20

B. 24

C. 30

D. 36

Answer: b

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624. A planet is observed by an astronomical refracting telescope having an objective of ofcal length 16m and an eyepiece of focal length 2 cm. Then,

A. The distance between the objective and the eye-piece is 16.02 m

B. The angular magnification of the planet is 800

C. The image of the planet is inverted

D. The objective is larger than the eye-piece

Answer: abcd

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625. If tube length of astronomical telescope is 105 cm and magnifying power is 20 for normal setting, calculate the focal length of objective

A. $100cm$

B. $10cm$

C. $20cm$

D. $25cm$

Answer: a

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626. The length of a telescope is 36 cm . The focal lengths of its lenses can be

A. $30cm, 6cm$

B. $-30cm, -6cm$

C. $30cm, -6cm$

D. $-30cm, 6cm$

Answer: a

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627. An astronomical telescope of ten-fold angular magnification has a length of $44cm$. The focal length of the objective is

A. $4cm$

B. $40cm$

C. $44cm$

D. $440cm$

Answer: b

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628. If both the object and image are at infinite distances form a refracting telescope its magnifying power will be equal to

A. The sum of the focal lengths of the objective and the eyepiece

B. The difference of the focal lengths of the two lenses

C. The ratio of the focal length of the objective and eyepiece

D. The ratio of the focal length of the eyepiece and objective

Answer: c

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629. The number of lenses in a terrestrial telescope is

A. Two

B. Three

C. Four

D. Six

Answer: b

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630. The focal lengths of the lenses of an astronomical telescope are $50cm$ and $5cm$. The length of the telescope when the image is formed at the least distance of distinct vision is

A. $45cm$

B. $55cm$

C. $\frac{275}{6}cm$

D. $\frac{325}{6}cm$

Answer: d

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631. The focal length of the objective and eye piece of a telescope are respectively $100cm$ and $2cm$. The moon subtends and angle of 0.5°, the angle subtended by the moon's image will be.

A. 100°

B. 50°

C. 25°

D. 10°

Answer: c

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632. The diameter of the objective of a telescope is a, its magnifying power is m and wavelength of light is λ. The resolving power of the telescope is

A. $(1.22\lambda)/a$

B. $(1.22a)/\lambda$

C. $\lambda m/(1.22a)$

D. $a/(1.22\lambda)$

Answer: d

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633. Sun's diameter is $1.4 \times 10^9 m$ and its distance from the earth is $10^{11} m$. The diameter of its image, formed by a convex lens of focal length $2m$ will be

A. $0.7cm$

B. $1.4cm$

C. $2.8cm$

D. Zero (i . e . point image)

Answer: c

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634. In a terrestrial telescope, the focal length of objective is $90cm$ and of eye lens is $6cm$. If the final image is at $30cm$, then the magnification will be

A. 21

B. 12

C. 18

D. 15

Answer: c

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635. The resolving power of a telescope depends on

A. Focal length of eye lens

B. Focal length of objective lens

C. Length of the telescope

D. Diameter of the objective lens

Answer: d

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636. Four lenses of focal length $+15cm, \ + 20cm, \ + 150cm$ and $+250cm$ are available for making an astronomical telescope. To produce the largest magnification, the focal length of the eye-piece should be

A. $+15cm$

B. $+20cm$

C. $+150cm$

D. $+250cm$

Answer: a

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637. In an astronomical telescope, the focal length of objective lens and eye-piece are 150 cm and 6 cm respectively. In case when final image is formed at least distance of distinct vision. the magnifying power is

A. 20

B. 30

C. 60

D. 15

Answer: b

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638. In a laboratory four convex lenses L_1, L_2, L_3 and L_4 of focal lengths $2, 4, 6$ and $8cm$ respectively are available. Two of these lenses form a telescope of length $10cm$ and magnifying power 4 . The objective and eye lenses are

A. L_2, L_3

B. L_1, L_4

C. L_3, L_2

D. L_4, L_1

Answer: d

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639. A telescope has an objective of focal length $50cm$ and eye piece of focal length $5cm$. The least distance of distinct vision is $25cm$. The telescope is focussed for distinct vision on a scale $200cm$ away from the objective. Calculate

(i) the separation between objective and eye piece

(ii) the magnification produced.

A. $75cm$

B. $60cm$

C. $71cm$

D. $74cm$

Answer: c

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640. The resolving power of a telescope whose lens has a diameter of 1.22 m for a wavelength of 5000Å is

A. 2×10^5

B. 2×10^6

C. 2×10^2

D. 2×10^4

Answer: b

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641. To increase both the resolving power and magnifying power of a telecscope

A. Both the focal length and aperture of the objective has to be increased

B. The focal length of the objective has to be increased

C. The aperture of the objective has to be increased

D. The wavelength of light has to be decreased

Answer: a

Watch Video Solution

642. A Galileo telescope has an objective of focal length $100cm$ and magnifying power 50. The distance between the two lenses in normal adjustment will be

A. $96cm$

B. $98cm$

C. $102cm$

D. $104cm$

Answer: b

Watch Video Solution

643. An astronomical telescope has a magnifying power 10. The focal length of eyepiece is 20 cm . The focal length of objective is

A. $2cm$

B. $200cm$

C. $\frac{1}{2}cm$

D. $\frac{1}{200}cm$

Answer: b

Watch Video Solution

644. A telescope of diameter $2m$ uses light of wavelength 5000Å for viewing stars.The minimum angular separation between two stars whose is image just resolved by this telescope is

A. $4 \times 10^{-4} rad$

B. $0.25 \times 10^{-6} rad$

C. $0.31 \times 10^{-6} rad$

D. $5.0 \times 10^{-3} rad$

Answer: c

Watch Video Solution

645. A simple magnifying lens is used in such a way that an image is formed at $25 cm$ away from the eye. In order to have 10 times magnification, the focal length of the lens should be

A. $5 cm$

B. $2 cm$

C. $25 mm$

D. $0.1 mm$

Answer: c

Watch Video Solution

646. In a simple microscope, if the final image is located at infinity then its magnifying power is

A. $\frac{25}{f}$

B. $\frac{D}{26}$

C. $\frac{f}{25}$

D. $\frac{f}{D+1}$

Answer: a

Watch Video Solution

647. In a compound microscope the objective of f_o and eyepiece of f_e are placed at distance L such that L equals

A. $f_o + f_e$

B. f_o - f_e

C. Much greater than f_o or f_e

D. Much less than f_o or f_e

Answer: c

Watch Video Solution

648. For a compound microscope, the focal length of object lens and eye lens are f_o and f_e respectively, then magnification will be done by microscope when

A. $f_o = f_e$

B. $f_o > f_e$

C. $f_o < f_e$

D. None of these

Answer: c

Watch Video Solution

649. The angular resolution of a $10cm$ diameter telescope at a wavelength 5000Å is of the order

A. $10^{6}rad$

B. $10^{-2}rad$

C. $10^{-4}rad$

D. $10^{-6}rad$

Answer: d

Watch Video Solution

650. The resolving power of an astronomical telescope is 0.2 seconds. If the central half portion of the objective lens is covered, the resolving power will be

A. 0.1sec

B. 0.2sec

C. 1.0sec

D. 0.6sec

Answer: a

Watch Video Solution

651. An astronomical telescope has objective and eye-piece lens of powers 0.5 D and 20 D respectively, its magnifying power will be

A. 8

B. 20

C. 30

D. 40

Answer: d

Watch Video Solution

652. Which of the following is not correct regarding the radio telescope

A. It can not work at night

B. It can detect a very faint radio signal

C. It can be operated even in cloudy weather

D. It is much cheaper than optical telescope

Answer: a

Watch Video Solution

653. The diameter of objective of a telescope is $1m$. Its resolving limit for the light of wave length 4538Å, will be

A. $5.54 \times 10^{-7} rad$

B. $2.54 \times 10^{-4} rad$

C. $6.54 \times 10^{-7} rad$

D. None of these

Answer: a

Watch Video Solution

654. A telescope has an objective lens of focal length $200 cm$ and an eye piece with focal length $2 cm$. If this telescope is used to see a 50 meter tall building at a distance of $2 km$, what is the height of the image of the building formed by the objective lens?

A. $5 cm$

B. $10 cm$

C. $1 cm$

D. $2 cm$

Answer: a

Watch Video Solution

655. Magnification of a compound microscope is 30. Focal length of eye - piece is $5cm$ and the image is formed at a distance of distinct vision of $25cm$. The magnificatio of the objective lens is

A. 6

B. 5

C. 7.5

D. 10

Answer: b

Watch Video Solution

656. At Kavalur in India, the astronomers using a telescope whose objective had a diameter of one meter started using a telescope of diameter 2.54 m . This resulted in

A. The increase in the resolving power by 2.54 times for the same λ

B. The increase in the limiting angle by 2.54 times for the same λ

C. Decrease in resolving power

D. No effect on the limiting angle

Answer: a

Watch Video Solution

657. A Galileo telescope has an objective of focal length $100cm$ and magnifying power 50. The distance between the two lenses in normal adjustment will be

A. $98cm$

B. $100cm$

C. $150cm$

D. $200cm$

Answer: a

Watch Video Solution

658. A compound microscope has an eye piece of focal length $10cm$ and an objective of focal length $4cm$. Calculate the magnifcation, if an object is kept at a distance of $5cm$ from the objective so that final image is formed at the least distance vision $(20cm)$

A. 12

B. 11

C. 10

D. 13

Answer: a

Watch Video Solution

659. In a movie hall, the distance between the projector and the screen is increased by 1% illumination on the screen is

A. Increased by 1%

B. Decreased by 1%

C. Increased by 2%

D. Decreased by 2%

Answer: d

Watch Video Solution

660. A bulb of 100 watt is hanging at a height of one meter above the centre of a circular table of diameter 4 m . If the intensity at a point on its rim is I_0 , then the intensity at the centre of the table will be

A. I_0

B. $2\sqrt{5}I_0$

C. $2I_0$

D. $5\sqrt{5}I_0$

Answer: d

Watch Video Solution

661. Total flux produced by a source of $1cd$ is

A. $\frac{1}{4\pi}$

B. 8π

C. 4π

D. $\frac{1}{8\pi}$

Answer: c

Watch Video Solution

662. Lux is equal to

A. $1 \text{lumen} / m^2$

B. $1 \text{lumen} / cm^2$

C. $1 \text{candela} / m^2$

D. $1 \text{candela} / cm^2$

Answer: c

Watch Video Solution

663. A lamp rated at 100 cd hangs over the middle of a round table with diameter 3 m at a height of 2 m . It is replaced by a lamp of 25 cd and the distance to the table is changed so that the illumination at the centre of the table remains as before. The illumination at edge of the table becomes X times the original. Then X is

A. $\frac{1}{3}$

B. $\frac{16}{27}$

C. $\frac{1}{4}$

D. $\frac{1}{9}$

Answer: a

Watch Video Solution

664. Venus looks brighter than other planets because

A. It has higher density than other stars

B. It is closer to the earth than other stars

C. It has no atmosphere

D. Atomic fission takes place on its surface

Answer: b

Watch Video Solution

665. Which has more luminous efficiency

A. A 40 W bulb

B. A 40 W fluorescent tube

C. Both have same

D. Cannot say

Answer: b

Watch Video Solution

666. Light from a point source falls on a small area placed perpendicular to the incident light. If the area is rotated about the incident light by an angle of 60°, by what fraction will the illuminance change

A. It will be doubled

B. It will be halved

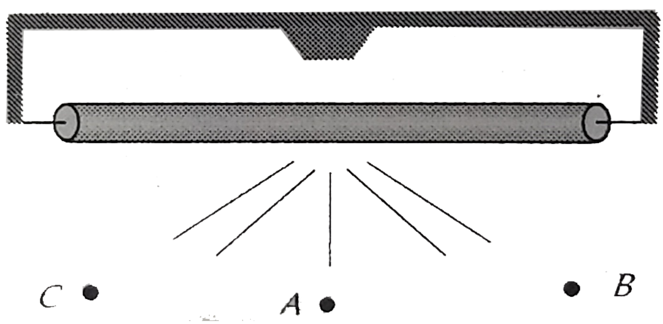
C. It will not change

D. It will become one-fourth

Answer: c

Watch Video Solution

667. Figure shows a glowing mercury tube. The illuminances at point A, B and C are related as



A. $B > C > A$

B. $A > C > B$

C. $B = C > A$

D. $B = C < A$

Answer: D

Watch Video Solution

668. The relative luminosity of wavelength 600 nm is 0.6. Find the radiant flux of 600 nm needed to produce the same brightness sensation as produced by 120 W of radiant flux at 555 nm.

A. $50W$

B. $72W$

C. $120 \times (0.6)^2 W$

D. $200W$

Answer: D

Watch Video Solution

669. Find the luminous intensity of the sun if it produces the same illuminance on the earth as produced by a bulb of 10000 candela at a distance $0.3m$. The distance between the sun and the earth is $1.5 \times 10^{11}m$

A. $25 \times 10^{22}cd$

B. $25 \times 10^{18}cd$

C. $25 \times 10^{26}cd$

D. $25 \times 10^{36}cd$

Answer: C

Watch Video Solution

670. A lamp is hanging at a height of $4m$ above a table. The lamp is lowered by $1m$. The percentage increase in illuminace will be

A. $40\ \%$

B. $64\ \%$

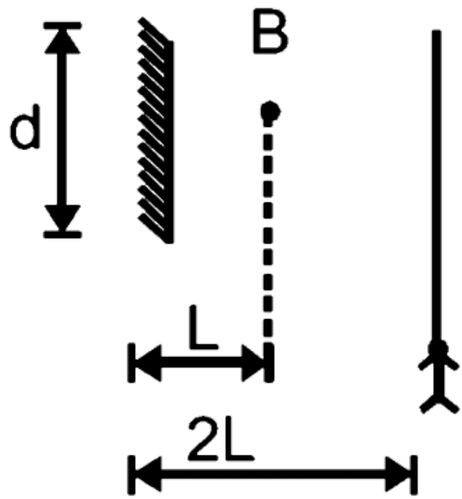
C. 78 %

D. 92 %

Answer: C

Watch Video Solution

671. 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 in fig. The greatest distance over which he can see the image of the light source in the mirror is



A. $d/2$

B. d

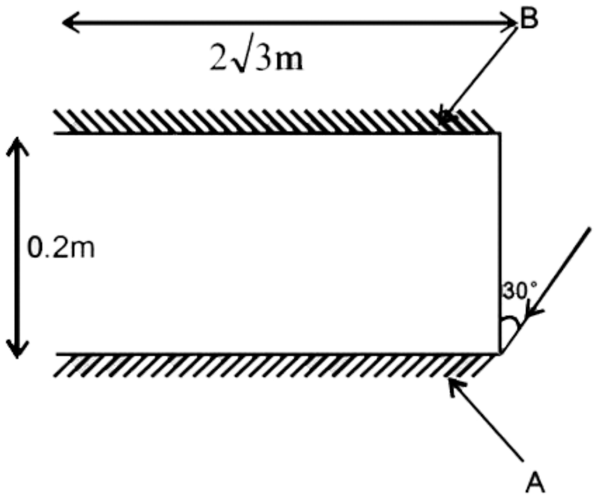
C. $2d$

D. $3d$

Answer: D

Watch Video Solution

672. 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 30degree 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

Answer: B

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673. A square wire of side $3.0cm$ is placed $25cm$ away from a concave mirror of focal length $10cm$. What is the area enclosed by the image of the wire ? The centre of the wire is on the axis of the mirror, with its two sides normal to the axis.

A. $4cm^2$

B. $6cm^2$

C. $16cm^2$

D. $36cm^2$

Answer: A

Watch Video Solution

674. A short linear object of length b lies along the axis of a concave mirror of focal length f at a distanee u from the pole of the mirror. The size of the image is approximately equal to

A. $l\left(\frac{u-f}{f}\right)^{1/2}$

B. $l\left(\frac{u-f}{f}\right)^{2}$

C. $l\left(\frac{f}{u-f}\right)^{1/2}$

D. $l\left(\frac{f}{u-f}\right)^{2}$

Answer: D

Watch Video Solution

675. A thin rod of length $f/3$ is placed along the optical axis of a concave mirror of focal length f such that its image whichis real and elongated just touches the rod. Calculate the magnification.

A. f

B. $\frac{1}{2}f$

C. $2f$

D. $\frac{1}{4}f$

Answer: B

Watch Video Solution

676. A ray of light falls on the surface of a spherical glass paper weight making an angle α with the normal and is refracted in the medium at an angle β. The angle of deviation of the emergent ray from the direction of the incident ray is :

A. $(\alpha - \beta)$

B. $2(\alpha - \beta)$

C. $(\alpha - \beta)/2$

D. $(\beta - \alpha)$

Answer: B

Watch Video Solution

677. Light enters at an angle of incidence in a transparent rod of refractive index n. For what value of the refractive index of the material of the rod the light once entered into it will not leave it through its lateral face whatsoever be the value of angle of incidence.

A. $n > \sqrt{2}$

B. $n = 1$

C. $n = 1.1$

D. $n = 1.3$

Answer: A

Watch Video Solution

678. A glass hemisphere of radius 0.04 m and refractive index of the material 1.6 is placed centrally over cross mark on a paper (i) with the flat face, (ii) with the curved face in contact with the paper. In each case, the cross mark is viewed directly from above. The position of the images will be

A. (i) $0.04m$ from the flat face, (ii) $0.025m$ from the flat face

B. (i) At the same position of the cross mark, (ii) 0.025 m below the flat face

C. (i) 0.025 m from the flat face, (ii) 0.04 m from the flat face

D. For both (i) and (ii) 0.025 m from the highest point of the hemisphere

Answer: B

Watch Video Solution

679. One face of a rectangular glass plate 6 cm thick is silvered. An object held 8 cm in front of the first face, forms an image 12 cm behind the silvered face. The refractive index of the glass is

A. 0.4

B. 0.8

C. 1.2

D. 1.6

Answer: C

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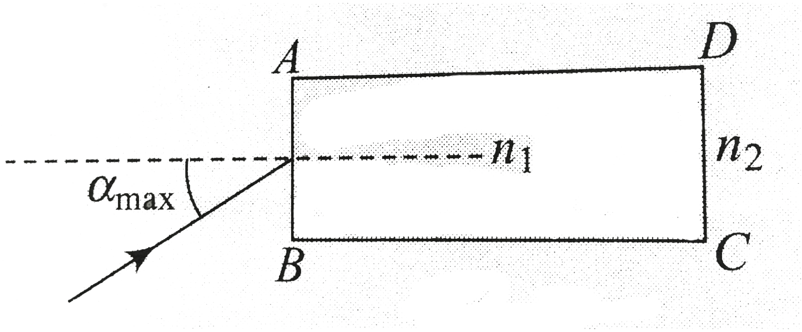
680. A rectangular slab ABCD, of refractive index n_1 , is immersed in water of refractive index $n_2 \left(n_1 < n_2\right)$. A ray of light is incident at the surface AB of the slab as shown in Fig. Find the maximum value of angle of incidence α_{max}, such that the ray comes out only from the other surface CD.



A. $\sin^{-1}\left[\frac{n_1}{n_2}\cos\left(\frac{\sin^{-1}(n_2)}{n_1}\right)\right]$

B. $\sin^{-1}\left[n_1\cos\left(\frac{\sin^{-1}(1)}{n_2}\right)\right]$

C. $\sin^{-1}\left(\frac{n_1}{n_2}\right)$

D. $\sin^{-1}\left(\frac{n_2}{n_1}\right)$

Answer: A

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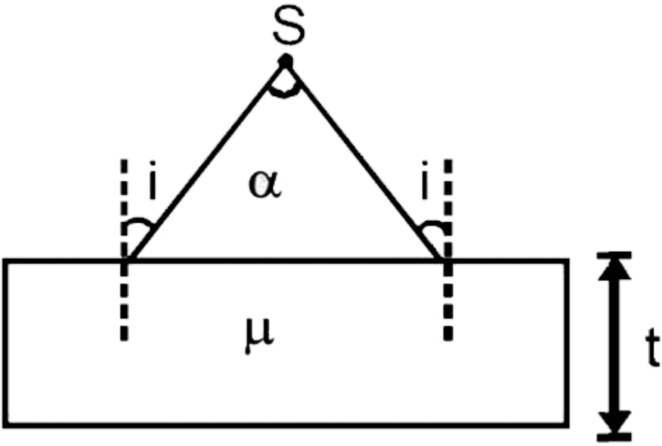

681.

A diverging beam of light from a point source S having devergence angle α, falls symmetrically on a glass slab as shown. The angles of incidence of the two extreme rays are equal. If the thickness of the glass slab is t and the refractive index n, then the divergence angle of the emergent beam is

A. Zero

B. α

C. $\sin^{-1}(1/n)$

D. $2\sin^{-1}(1/n)$

Answer: B

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Watch Video Solution

682. A concave mirror is placed at the bottom of an empty tank with face upwards and axis vertical. When sunlight falls normally on the mirror, it is focussed at distance of $32cm$ from the mirror. If the tank filled with water $(\mu = 4/3)$ up to a height of $20cm$, then the sunlight will now get focussed at

A. 16 cm above water level

B. 9 cm above water level

C. 24 cm below water level

D. 9 cm below water level

Answer: B

Watch Video Solution

683. A small air bubble in a sphere of glass with radius 4 cm appears to be 1 cm from the surface when observed along a diameter. Find the true positino of the air bubble.

A. 1.2 cm

B. 3.2 cm

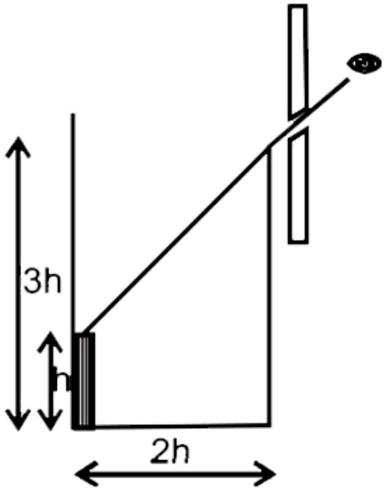
C. 2.8 cm

D. 1.6 cm

Answer: A

Watch Video Solution

684. An observer can see through a pin-hole the top end of a thin rod of height h, placed as shown in the figure. The beaker height is 3h and its radius h. When the beaker is filled with a liquid up to a height 2h, he can see the lower end of the rod. Then the refractive index of the liquid is



A. $5/2$

B. $\sqrt{(5/2)}$

C. $\sqrt{(3/2)}$

D. $3/2$

Answer: B

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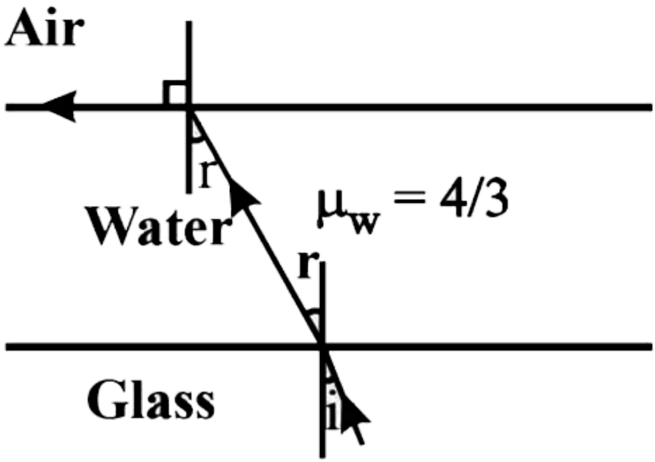
685. A ray of light is incident at the glass-water interface at an angle I, it emerges fimally parallel to the surface of water, the the value of μ_g would be



A. $(4/3)\sin i$

B. $1/\sin i$

C. $4/3$

D. s

Answer: B

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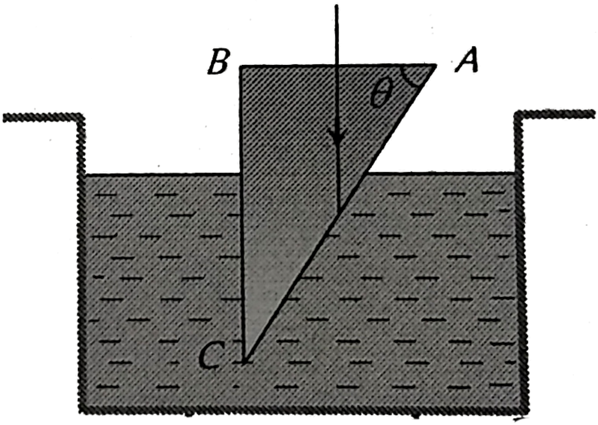
686. A glass prism ($\mu = 1.5$) is dipped in water ($\mu = 4/3$) as shown in figure. A light ray is incident normally on the surface AB . It reaches the surface BC after totally reflected, if



A. $\sin\theta \geq 8/9$

B. $2/3 < \sin\theta < 8/9$

C. $\sin\theta \leq 2/3$

D. It is not possible

Answer: A

Watch Video Solution

687. A convex lens A of focal length $20cm$ and a concave lens B of focal length $5cm$ are kept along the same axis with a distance d between them. If a parallel beam of light falling on A and B as a parallel beam, then d is equal to ......cm

A. 25

B. 15

C. 30

D. 50

Answer: B

Watch Video Solution

688. The diameter of a plano convex lens is $6cm$ and thickness at the centre is $3mm$. If the speed of light in the material of the lens is $2 \times 10^8 m/s$, what is the focal length of the lens ?

A. 15 cm

B. 20 cm

C. 30 cm

D. 10 cm

Answer: C

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689. A point object O is placed on the principal axis of a convex lens of focal length $f = 20cm$ at a distance of 40 cm to the left of it. The diameter of the lens is 10. An eye is placed 60 cm to right of the lens and a distance h below the principal axis. The maximum value of h to see the image is

A. 0

B. 5 cm

C. 2.5 cm

D. 10 cm

Answer: C

Watch Video Solution

690. A luminous object is placed at a distance of $30cm$ from the convex lens of focal length $20cm$. On the other side of the lens, at what distance from the lens a convex mirror of radius of curvature $10cm$ be placed in order to have an upright image of the object coincident with it ?

A. 12 cm

B. 30 cm

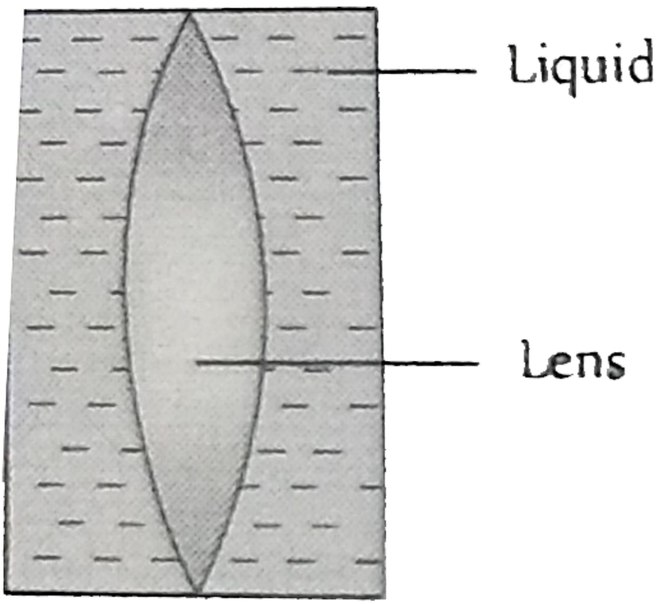
C. 50 cm

D. 60 cm

Answer: C

Watch Video Solution

691. Shown in the figure here is a convergent lens placed inside a cell filled with a liquid. The lens has focal length $+20cm$ when in air and its material has refractive index 1.50. If the liquid has refractive index 1.60, the focal length of the system is



A. $+80cm$

B. $-80cm$

C. $-24cm$

D. $-100cm$

Answer: D

Watch Video Solution

692. 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 $\left(n_2 > n_1 > 1\right)$. The lens will diverge parallel beam of light if it is filles with

A. Air and placed in air

B. Air and immersed in L_1

C. L_1 and immersed in L_2

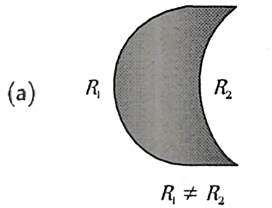
D. L_1 and immersed in L_2

Answer: D

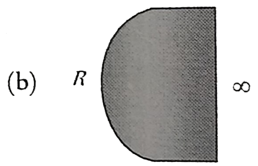
Watch Video Solution

693. Which one of the following spherical lenses does not exhibit dispersion? The radii of curvature of the surfaces of the lenses are as given in the diagrams.`

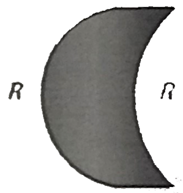
A.



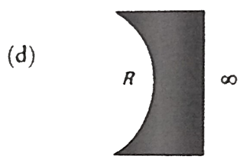
B.



C.



D.



Answer: C

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694. The size of the image of an object, which is at infinity, as formed by a convex lens of focal length 30 cm is 2 cm. If a concave lens of focal length 20 cm is placed between the convex lens and the image at a distance of 26 cm from the convex lens, calculate the new size of the image

A. 1.25 cm

B. 2.5 cm

C. 1.05 cm

D. 2 cm

Answer: B

Watch Video Solution

695. An achromatic prism is made by crown glass prism $\left(A_c = 19^\circ\right)$ and flint glass prism $\left(A_F = 6^\circ\right)$. If $.^C\mu_y = 1.5$ and $.^F\mu_v = 1.66$, then resultant

deviation for red coloured ray will be

A. 1.04°

B. 5°

C. 0.96°

D. 13.5°

Answer: D

Watch Video Solution

696. The refracting angle of a prism is A and refractive index of the material of prism is $\cot(A/2)$. The angle of minimum deviation will be

A. $180^\circ - 3A$

B. $180^\circ + 2A$

C. $90^\circ - A$

D. $180^\circ - 2A$

Answer: D

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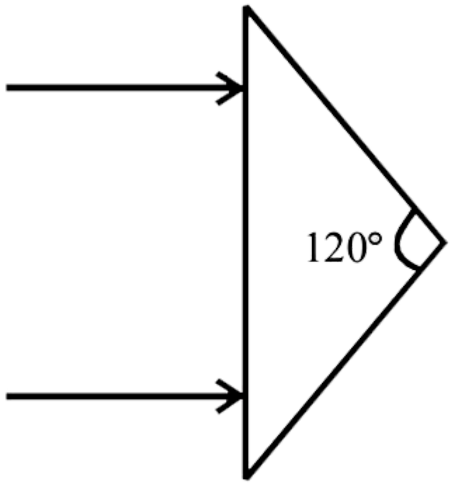


697.

An isosceles prism of angle 120degree has a refractive index 1.44. Two parallel monochromatic rays enter the prism parallel to each other in air as shown. The rays emerge from the opposite faces

A. Are parallel to each other

B. Are diverging

C. Make an angle $2\sin^{-1}(0.72)$ with each other

D. Make an angle $2\left\{\sin^{-1}(0.72) - 30^{\circ}\right\}$ with each other

Answer: D

Watch Video Solution

698. A ray of light is incident on the hypotenuse of a right-angled prism after travelling parallel to the base inside the prism. If μ is the refractive index of the material of the prism, the maximum value of the base angle for which light is totally reflected from the hypotenuse is

A. $\sin^{-1}\left(\frac{1}{\mu}\right)$

B. $\tan^{-1}\left(\frac{1}{\mu}\right)$

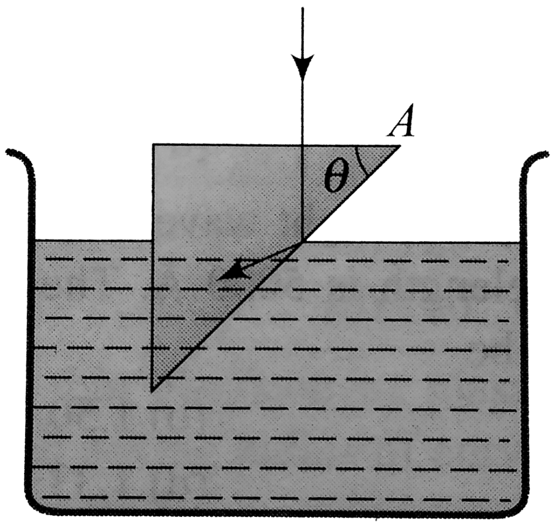
C. $\sin^{-1}\left(\frac{\mu - 1}{\mu}\right)$

D. $\cos^{-1}\left(\frac{1}{\mu}\right)$

Answer: D

Watch Video Solution

699. The refractive indices of the material of the prism and liquid are 1.56 and 1.32 respectively. What will be the value of θ for the following refraction?



A. $\sin\theta \geq \frac{13}{11}$

B. $\sin\theta \geq \frac{11}{13}$

C. $\sin\theta \geq \frac{\sqrt{3}}{2}$

D. $\sin\theta \geq \frac{1}{\sqrt{2}}$

Answer: B

Watch Video Solution

700. A spherical surface of radius of curvature R separates air (refractive index 1.0) from glass (refractive index 1.5). The centre of curvature is in the glass. A point object P placed in air is found to have a real image Q in the glass. The line PQ cuts the surface at a point O, and $PO = OQ$. The distance PO

A. 5 R

B. 3 R

C. 2 R

D. 1.5 R

Answer: A

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701. A plano-convex lens when silvered on the plane side behaves like a concave mirror of focal length 60 cm. However when silvered on the convex side it behaves like a concave mirror of focal length 20 cm. Then the refractive index of the lens

A. 3

B. 2

C. 2.5

D. 1.5

Answer: D

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702. A ray of light travels from an optically denser to rarer medium. The critical angle of the two media is C. The maximum possible deviation of the ray will be

A. $\left(\frac{\pi}{2} - C\right)$

B. $2C$

C. $\pi - 2C$

D. $\pi - C$

Answer: C

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703. An astronaut is looking down on earth's surface from a space shuttle at an altitude of $400km$. Assuming that the astronaut's pupil diameter is $5mm$ and the wavelength of visible light is $500nm$. The astronaut will be able to resolve linear object of the size of about .

A. 0.5 m

B. 5 m

C. 50 m

D. 500 m

Answer: C

Watch Video Solution

704. The average distance between the earth and moon is $3.86 \times 10^4 km$. The minimum separation between the two points on the surface of the moon that can be resolved by a telescope whose objective lens has a diameter os $5m$ with $\lambda = 6000\text{Å}$ is

A. 5.65 m

B. 28. 25 m

C. 11.30 m

D. 56.51 m

Answer: D

Watch Video Solution

705. The distance of the moon from earth is $3.8 \times 10^5 km$. The eye is most sensitive to light of wavelength 5500Å. The separation of two points on the moon that can be resolved by a 500 cm telescope will be

A. 51 m

B. 60 m

C. 70 m

D. All the above

Answer: A

Watch Video Solution

706. A small source of light is to be suspended directly above the centre of a circular table of radius R . What should be the height of the light source above the table so that the intensity of light is maximum at the edges of the table compared to any other height of the source

A. $\frac{R}{2}$

B. $\frac{R}{\sqrt{2}}$

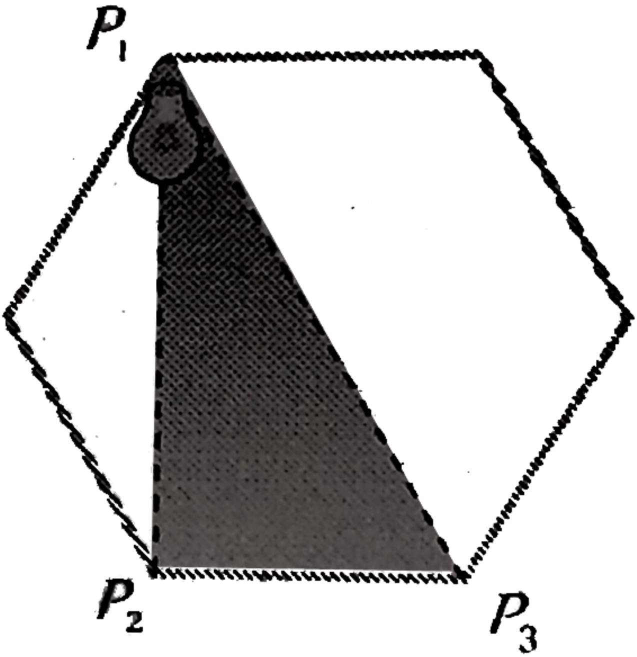
C. R

D. $\sqrt{2}R$

Answer: B

Watch Video Solution

707. A light source is located at P_1 as shown in the figure. All sides of the polygon are equal. The intensity of illumination at P_2 is I_0 . What will be the intensity of illumination at P_3



A. $\frac{3\sqrt{2}}{8}I_0$

B. $\frac{I_0}{8}$

C. $\frac{3}{8}I_0$

D. $\frac{\sqrt{3}}{8}I_0$

Answer: A

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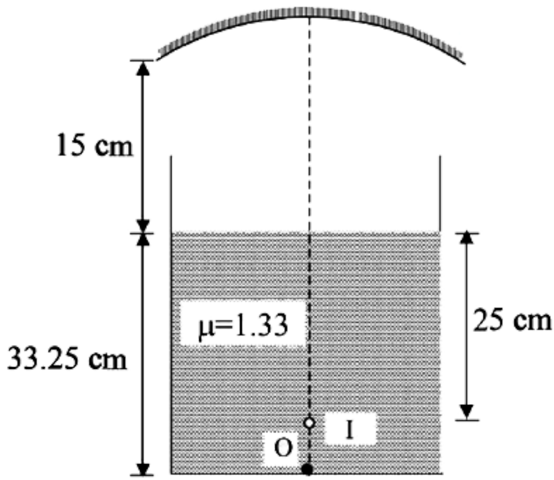
708. A container is filled with water ($\mu = 1.33$) upto a height of 33.25 cm. A concave mirror is placed 15cm above the water level and the image of an object placed at the bottom is formed 25 cm below the water level. Focal length of the mirror is



A. 10

B. 15

C. 20

D. 25

Answer: C

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

A. $5cm/\sec$ towards the mirror

B. $4cm/\sec$ towards the mirror

C. $4cm/\sec$ away from the mirror

D. $9cm/\sec$ away from the mirror

Answer: C

Watch Video Solution

710. A concave mirror is placed on a horizontal table, with its axis directed vertically upwards. Let O be the pole of the mirror and C its centre of curvature. A point object is placed at C. It has a real image, also located at C. If the mirror is now filled with water, the image will be.

A. Real, and will remain at C

B. Real, and located at a point between C and

C. Virtual and located at a point between C and O

D. Real, and located at a point between C and O

Answer: D

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711. The diameter of the moon is $3.5 \times 10^3 km$ and its distance from the earth is $3.8 \times 10^5 km$. It is seen through a telescope having focal lengths of objective and eye-piece as $4m$ and $10cm$ respectively. Calculate (a) magnifying power of telescope (b) length of telescope tube and (c) anngular size of image of moon.

A. $15\,^{\circ}$

B. $20\,^{\circ}$

C. $30\,^{\circ}$

D. $35\,^{\circ}$

Answer: b

Watch Video Solution

712. The focal length of an objective of a telescope is 3 metre and diameter 15 cm . Assuming for a normal eye, the diameter of the pupil is 3 mm for its complete use, the focal length of eye piece must be

A. 6 cm

B. 6.3 cm

C. 20 cm

D. 60 cm

Answer: a

Watch Video Solution

713. We wish to see inside an atom. Assuming the atom to have a diameter of 100 pm, this means that one must be able to resolve a width of say 10 pm. If an electron microscope is used, the minimum electron energy required is about

A. $1.5 KeV$

B. $15 KeV$

C. $150 KeV$

D. $1.5 KeV$

Answer: b

Watch Video Solution

714. A telescope has an objective lens of $10 cm$ diameter and is situated at a distance of one kilometre from two objects. The minimum distance between these two objects, which can be resolved by the telescope, when the mean wavelength of light is 5000Å, of the order of

A. 0.5 m

B. 5 m

C. 5 mm

D. 5 cm

Answer: c

Watch Video Solution

715. Two point white dots are 1mm apart on a black paper. They are viewed by eye of pupil diameter 3mm. Approximately, what is the maximum distance at which these dits can be resolved by the eye? [Take wavelelngth of light =500nm]

A. 6 m

B. 3 m

C. 5 mm

D. 1 m

Answer: c

Watch Video Solution

716. A small plane mirror placed at the centre of a spherical screen of radius R. A beam of light is falling on the mirror, If the mirror makes n revolution per second, the speed of light on the screen after reflection from the mirror will be

A. $4\pi nR$

B. $2\pi nR$

C. $\frac{nR}{2\pi}$

D. $\frac{nR}{4\pi}$

Answer: a

Watch Video Solution

717. A room (cubical) is made of mirros. An insect is moving along the diagonal on the floor such that the velocity of image of insect on two adjacent wall mirrors is $10\frac{cm}{\sec}$. The velocity of image of insect in ceiling mirror is

A. $10cms^{-1}$

B. $20cms^{-1}$

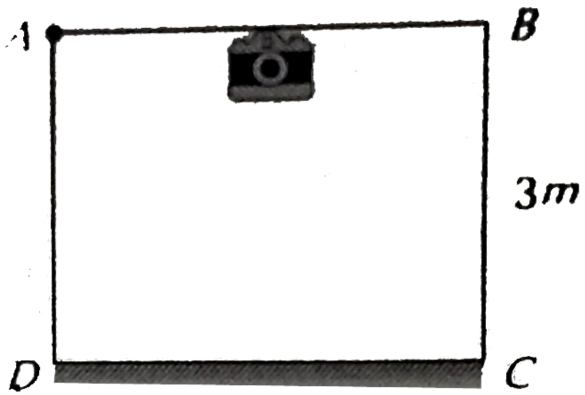
C. $\frac{10}{\sqrt{2}}cms^{-1}$

D. $10\sqrt{2}cms^{-1}$

Answer: d

Watch Video Solution

718. Figure shows a cubical room ABCD with the wall CD as a plane mirror. Each side of the room is 3 m . 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.



A. 1.5 m

B. 3 m

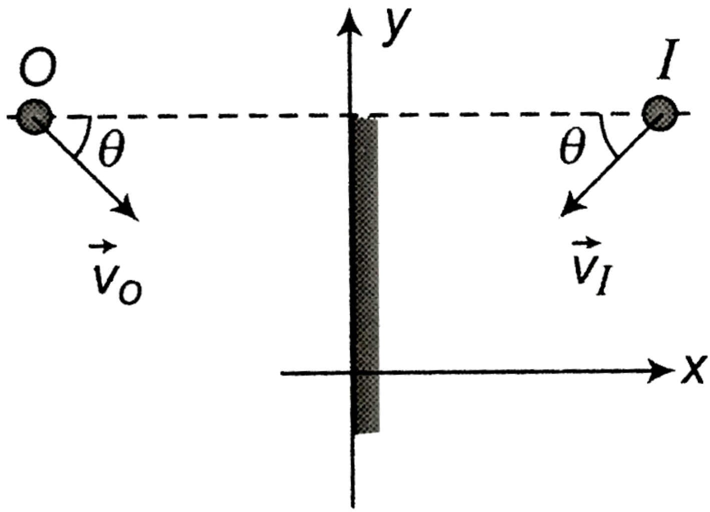
C. 6 m

D. More than 6 m

Answer: d

Watch Video Solution

719.



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.

A. v

B. 2v

C. $2v\cos\theta$

D. $2v\sin\theta$

Answer: c

Watch Video Solution

720. 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 sees P and its image in the mirror. The apparent distance between these two will be

A. $2\mu h$

B. $\frac{2h}{\mu}$

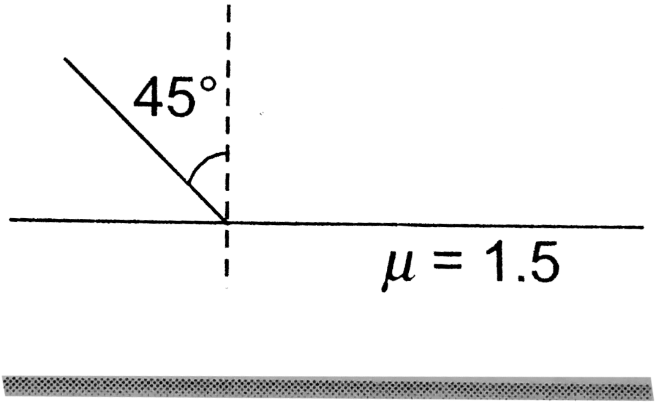
C. $\frac{2h}{\mu - 1}$

D. $h\left(1 + \frac{1}{\mu}\right)$

Answer: b

Watch Video Solution

721. 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



A. 90°

B. 180°

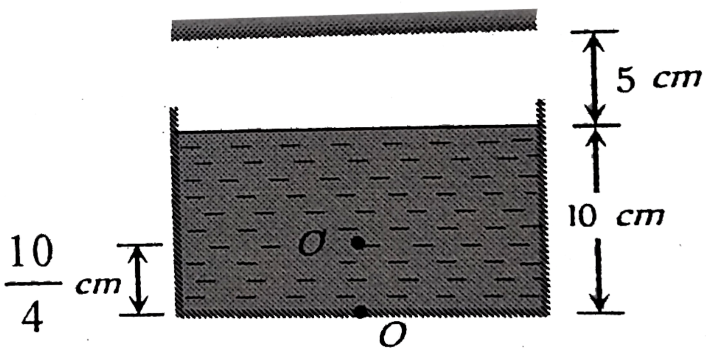
C. 120°

D. 45°

Answer: a

Watch Video Solution

722. Consider the situation shown in figure. Water $\left(\mu_W = \frac{4}{3}\right)$ is filled in a breaker upto a height of 10 cm . A plane mirror fixed at a height of 5 cm from the surface of water. Distance of image from the mirror after reflection from it of an object O at the bottom of the beaker is



A. 15 cm

B. 12.5 cm

C. 7.5 cm

D. 10 cm

Answer: b

Watch Video Solution

723. A person runs with a speed u towards a bicycle moving away from him with speed v . The person approaches his image in the mirror fixed at the rear of bicycle with a speed of

A. $u - v$

B. $u - 2v$

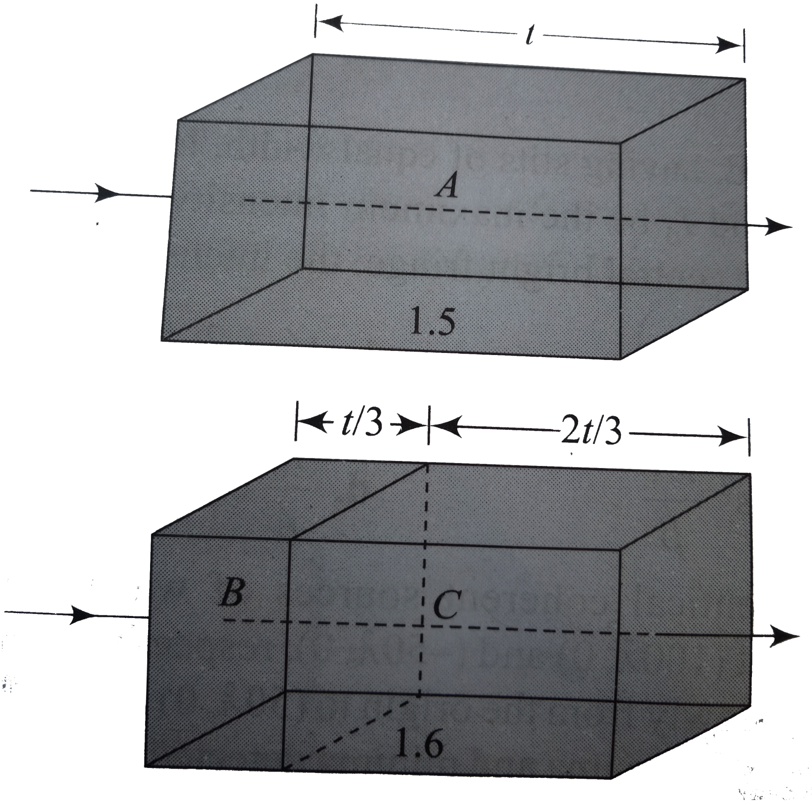
C. $2u - v$

D. $2(u - v)$

Answer: d

Watch Video Solution

724. Two transparent slabs have the same thickness as shown in figure. One in made of material A of refractive index 1.5. The other is made of two materilas B and C with thickness in the ratio 1:2. The refractive index of C is 1.6. If a monochromatic parallel beam passing through the slabs has the same number of wavelengths inside both, the refractive index of B is



A. 1.1

B. 1.2

C. 1.3

D. 1.4

Answer: c

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725. An object is placed in front of a convex mirror at a distance of 50cm. A plane mirror is introduced covering the lower half of the convex mirror. If the distance between the object and the plane mirror is 30cm, it is found that there is no parallax between the images formed by the two mirrors. What is the radius of curvature of the convex mirror?

A. $12.5cm$

B. 25 cm

C. $\frac{50}{3}cm$

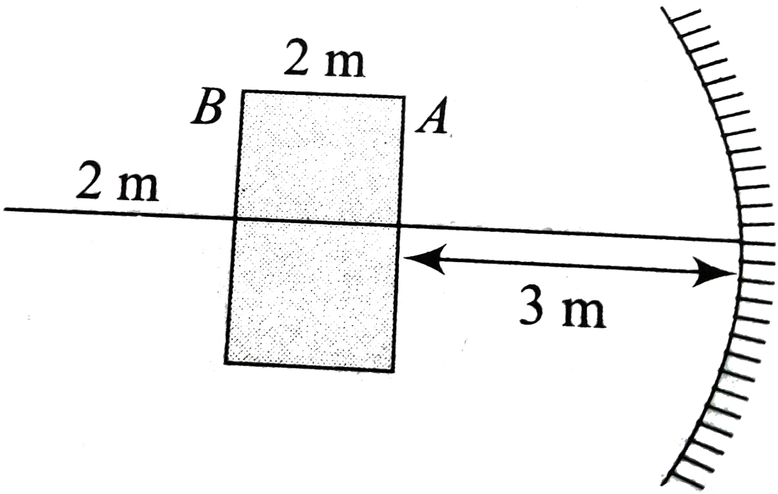
D. 18 cm

Answer: b

Watch Video Solution

726. A cube of side 2m is placed in front of a concave mirror of focal l ength 1m with its face A at a distance of 3m and face B at a distance of

5m form the mirror. The distance between the images of faces A and B and heights of images of A and B are , repectively,



A. $1m, 0.5m, 0.25m$

B. $0.5m, 1m, 0.25m$

C. $0.5m, 0.25m, 1m$

D. $0.25m, 1m, 0.5m$

Answer: d

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727. 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 10cm. I fthe bend is 20cm from the pole of the mirror, then the ration of the lengths of the images of the upright and horizontal portions of the wire is

A. $1:2$

B. $3:1$

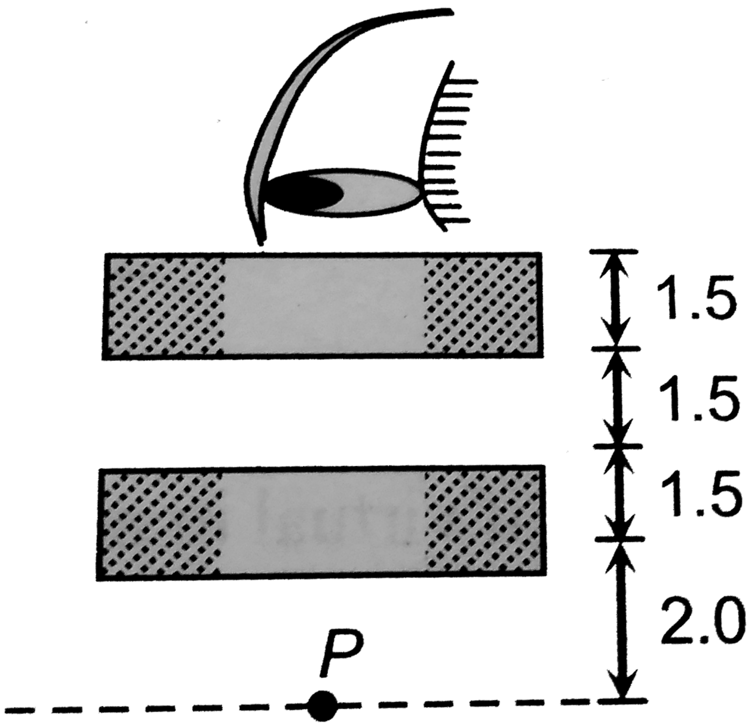
C. $1:3$

D. $2:1$

Answer: b

Watch Video Solution

728. The image of point P when viewed from top of the slabs will be



A. 2.0 cm above P

B. 1.5 cm above P

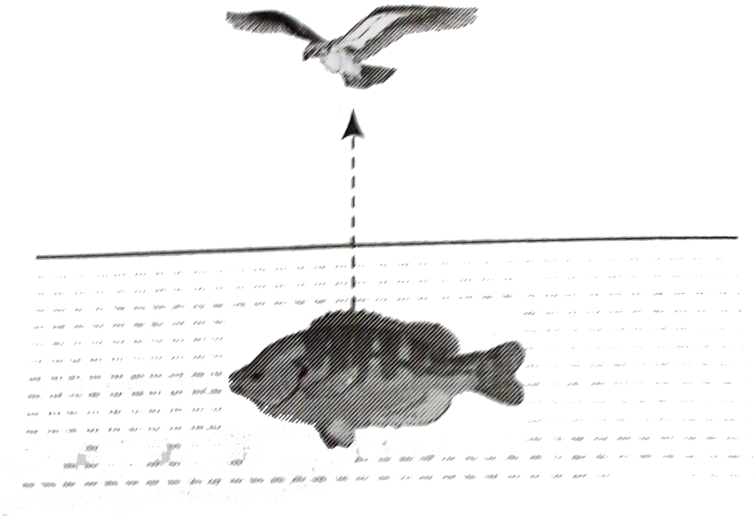
C. 2.0 cm below P

D. 1 cm above P

Answer: d

Watch Video Solution

729. A fish rising up vertically toward the surface of water with speed $3ms^{-1}$ observes a bird diving down vertically towards it with speed $9ms^{-1}$. The actual velocity of bird is



A. $4.5ms^{-1}$

B. $5ms^{-1}$

C. $3.0ms^{-1}$

D. $3.4ms^{-1}$

Answer: a

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730. A beaker containing liquid is placed on a table, underneath a microscope which can be moved along a vertical scale. The microscope is focused, through the liquid onto a mark on the table when the reading on the scale is a. It is next focused on the upper surface of the liquid and the reading is b. More liquid is added and the observations are repeated, the corresponding readings are c and d. The refractive index of the liquid is

A. $\dfrac{d-b}{d-c-b+a}$

B. $\dfrac{b-d}{d-c-b+a}$

C. $\dfrac{d-c-b+a}{d-b}$

D. $\dfrac{d-b}{a+b-c-d}$

Answer: a

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731. Two point light sources are 24 cm apart. Where should a convex lens of focal length 9 cm be put in between them from one source so that the images of both the sources are formed at the same place

A. 6 cm

B. 9 cm

C. 12 cm

D. 15 cm

Answer: a

Watch Video Solution

732. There is an equiconcave glass lens with radius of each face as R and $._a\mu_g = 3/2$ and $._a\mu_W = 4/3$. If there is water in object space and air in image space, then the focal length is

A. 2 R

B. R

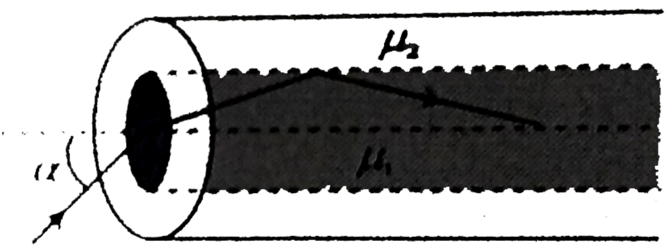
C. $3R/2$

D. R^2

Answer: c

Watch Video Solution

733. An optical fibre consists of core of μ_1 surrounded by a cladding of $\mu_2 < \mu_1$. A beam of light enters from air at an angle α with axis of fibre. The highest α for which ray can be travelled through fibre is



A. $\cos^{-1}\sqrt{\mu_2^2 - \mu_1^2}$

B. $\sin^{-1}\sqrt{\mu_1^2 - \mu_2^2}$

C. $\tan^{-1}\sqrt{\mu_1^2 - \mu_2^2}$

D. $\sec^{-1}\sqrt{\mu_1^2 - \mu_2^2}$

Answer: b

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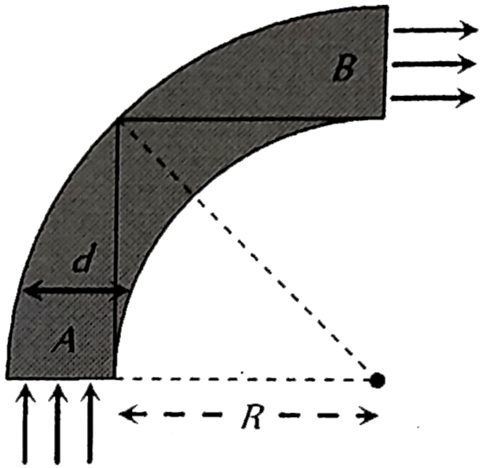
734. A rod of glass ($\mu = 1.5$) and of square cross section is bent into the shape shown in the figure. A parallel beam of light falls on the plane flat surface A as shown in the figure. If d is the width of a side and R is the radius of circular arc then for what maximum value of $\frac{d}{R}$ light entering the glass slab through surface A emerges from the glass through B



A. 1.5

B. 0.5

C. 1.3

D. None of these

Answer: b

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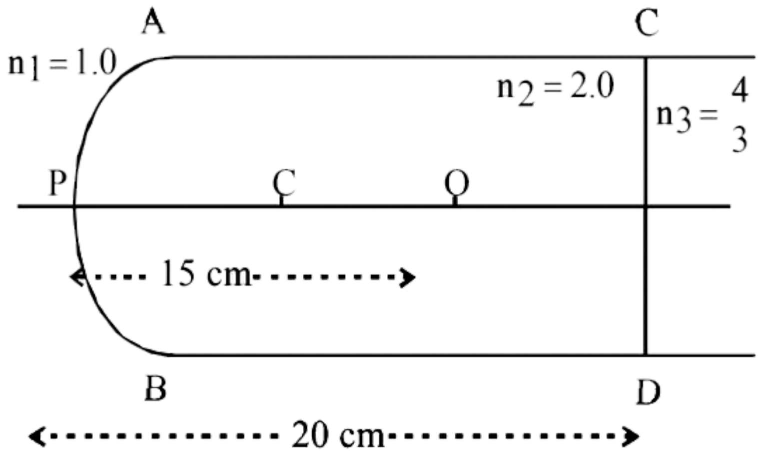


735.

A slab of a material of refractive index 2 shown in fig. has a curved surface APB of radius of curvature 10 cm and a plane surface CD. On the left of APB is air and on the right CD is water with refractive indices as given in the figure. An object O is placed at a distance of 15 cm from the pole P as shown. The distance of the final image of O from P, as viewed from the left is......

A. 20 cm

B. 30 cm

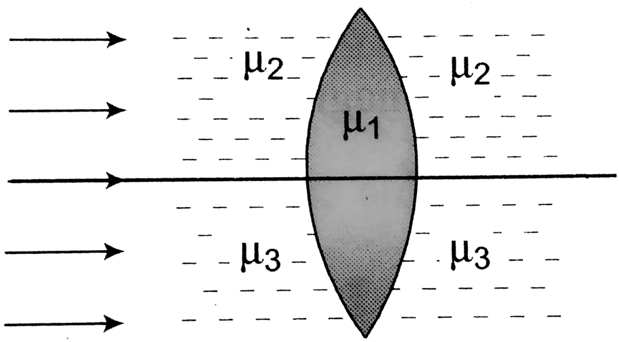
C. 40 cm

D. 50 cm

Answer: b

Watch Video Solution

736. A double convex lens, lens made of a material of refractive index μ_1, is placed inside two liquids or refractive indices μ_2 and μ_3, as shown. $\mu_2 > \mu_1 > \mu_3$. A wide, parallel beam of light is incident on the lens from the left. The lens will give rise to



A. A single convergent beam

B. Two different convergent beam

C. Two different divergent beams

D. A convergent and a divergent beam

Answer: d

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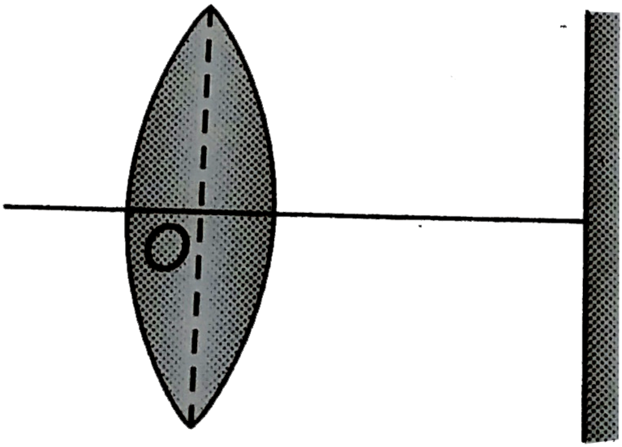

737.

The distance between a convex lens and a plane mirror is 10 cm. The parallel rays incident on the convex lens after reflection from the mirror forms image at the potical centre of the lens. Focal length of lens will be

A. $10 cms^{-1}$

B. 20 cm

C. 30 cm

D. Cannot be determined

Answer: b

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738. A compound microscope is used to enlarge an object kept at a distance $0.03m$ from cuts objective which consists of serval convex lenses in contact and has focal length $0.03m$. If a lens focal length $0.1m$is removed from the objective, find out the distance by which the eye-piece of the microscope must be moved to refocus the image.

A. 2.5 cm

B. 6 cm

C. 15 cm

D. 9 cm

Answer: d

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739. If the focal length of the objective lens and the eye lens are 4 mm and 25 mm respectively in a compound microscope. The length of the tube is 16 cm . Find its magnifying power for relaxed eye position

A. 32.75

B. 327.5

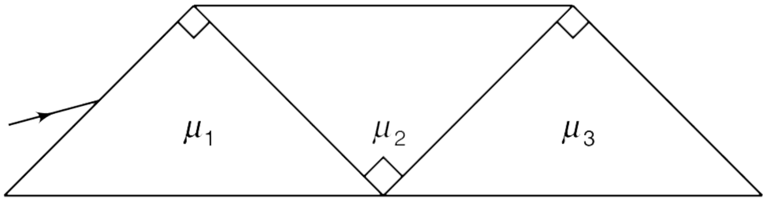
C. 0.3275

D. None of these

Answer: b

Watch Video Solution

740. Three right angled prisms are glued as shown in the figure. An incident ray passes undeviated through the system. Express the refractive index (μ_2) of the middle prism in terms of μ_1 and μ_3.



A. $n_1 = n_2 = n_3$

B. $n_1 = n_2 \neq n_3$

C. $1 + n_1 = n_2 + n_3$

D. $1 + n_2^2 = n_1^2 + n_3^2$

Answer: d

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741. In a compound microscope, the focal length of the objective and the eye lens are $2.5cm$ and $5cm$ respectively. An object is placed at $3.75cm$ before the objective and image is formed at the least distance of distinct vision, then the distance between two lenses will be $(i.e.$ length of the microscope tube)

A. 11.67 cm

B. 12.67 cm

C. 13.00 cm

D. 12.00 cm

Answer: a

Watch Video Solution

742. In a grease spot photometer light from a lamp with dirty chimney is exactly balanced by a point source distance 10 cm from the grease spot. On clearing the chimney, the point source is moved 2 cm to obtain balance again. The percentage of light absorbed by dirty chimney is nearly

A. 56%

B. 44 %

C. 36 %

D. 64 %

Answer: c

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743. The separation between the screen and a plane mirror is 2 r . An isotropic point source of light is placed exactly midway between the mirror and the screen. Assume that mirror reflects 100% of incident light. Then the ratio of illuminances on the screen with and without the mirror is

A. $10 : 1$

B. $2 : 1$

C. $10 : 9$

D. $9 : 1$

Answer: c

Watch Video Solution

744. The separation between the screen and a concave mirror is 2 r . An isotropic point source of light is placed exactly midway between the mirror and the point source. Mirror has a radius of curvature r and reflects 100% of the incident light. Then the ratio of illuminances on the screen with and without the mirror is

A. $10:1$

B. $2:1$

C. $10:9$

D. $9:1$

Answer: b

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745. The apparent depth of water in cylindrical water tank of diameter $2Rcm$ is reducing at the rate of $xcm/\min$ when water is being drained out at a constant rate. The amount of water drained in $c.c.$ per minute is $(n_1 =$ refractive index of air, $n_2 =$ refractive index of water)

A. $x\pi R^2 n_1/n_2$

B. $x\pi R^2 n_2/n_1$

C. $2\pi R n_1/n_2$

D. $\pi R^2 x$

Answer: b

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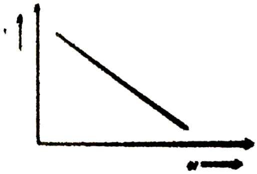
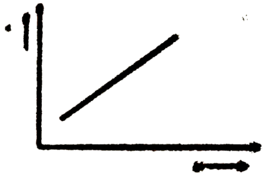
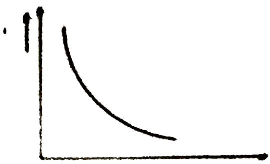
746. In an experiment to find focal length of a concave mirror, a graph is drawn between the magnitudes of (u) and (v). The graph looks like.

A. 

B. 

C. 

D. 

Answer: c

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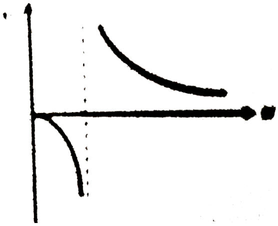
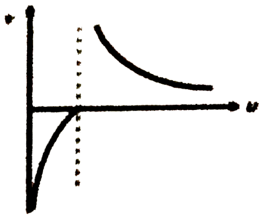
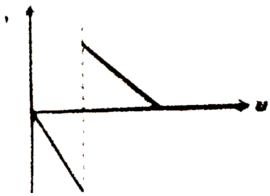
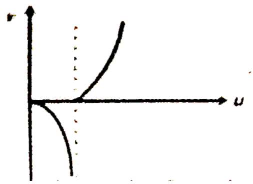
747. As the position of an object (u) reflected from a concave mirrorr is varies, the position of the image (v) also varies. By letting the u changes from 0 to $+\infty$ the graph between v versus u will be

A. 

B. 

C. 

D. 

Answer: a

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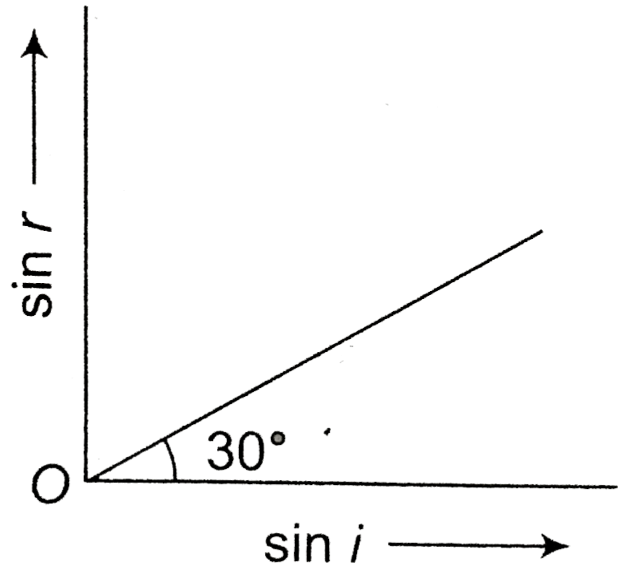
748. When light is incident on a medium at angle i and refracted into a second medium at an angle r, the graph of $\sin r$ versus $\sin i$ is as shown.

From this one can conclude that



(i) the velocity of light in second medium is $\sqrt{3}$ times the velocity of light in the first medium

(ii) the velocity of light in the first medium is $\sqrt{3}$ times the velocity of ligth in second medium

(iii) the critical angle of the two media is given by $\sin i_C = 1\sqrt{3}$

(iv) the critical anlge of the two media is given by $\sin i_C = 1\sqrt{2}$

A. Velocity of light in the second medium is 1.73 times the velocity of light in the I medium

B. Velocity of light in the I medium is 1.73 times the velocity in the II medium

C. The critical angle for the two media is given by $\sin i_C = \frac{1}{\sqrt{3}}$

D. $\sin i_C = \frac{1}{2}$

Answer: bc

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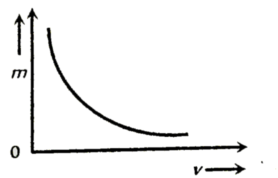
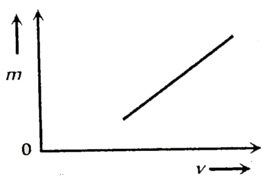
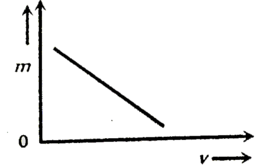
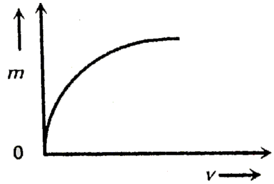
749. The graph between the lateral magnification (m) produced by a lens and the distance of the image (v) is given by

A. 

B. 

C. 

D. 

Answer: c

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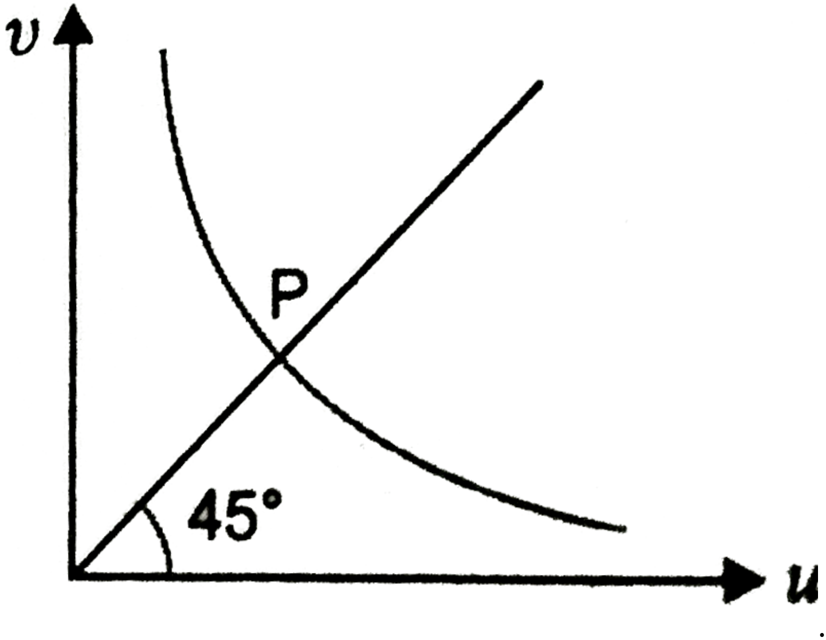
750. The graph in Fig. shows plot of variation of v with change in u for a concave mirror. Points plotted above the point P on the curve are for values of v :



A. Smaller then f

B. Smaller then 2 f

C. Larger then 2 f

D. Larger than f

Answer: c

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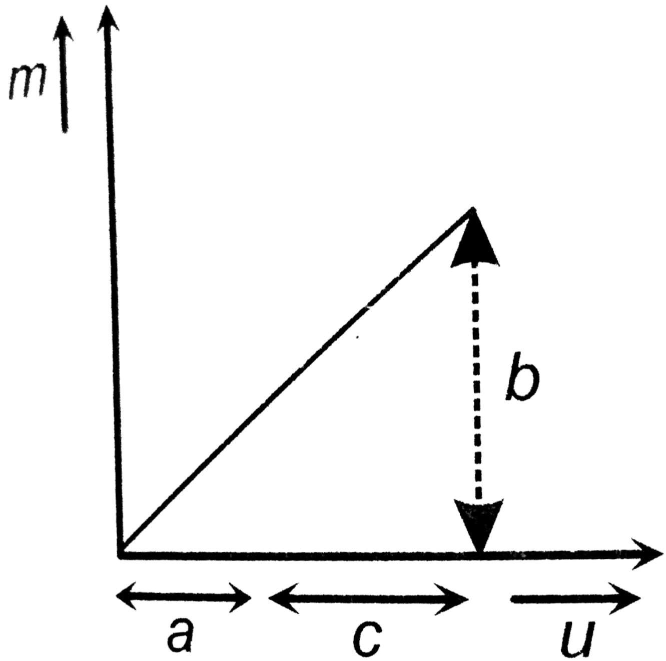
751. The graph shows how the magnification m produced by a convex thin lens varies with image distance v. What was the focal length of the used ?



A. $\frac{b}{c}$

B. $\frac{b}{ca}$

C. $\frac{bc}{a}$

D. $\frac{c}{b}$

Answer: d

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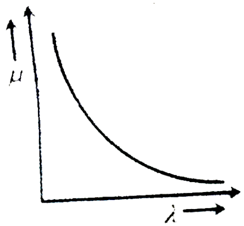
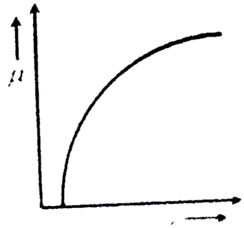
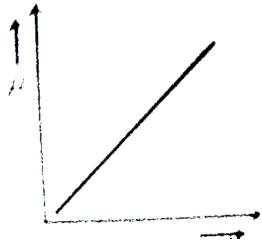
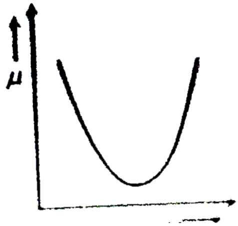
752. Which of the following graphs shows appropriate variation of refractive index μ with wavelength λ

A. 

B. 

C. 

D. 

Answer: a

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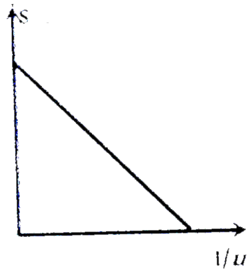
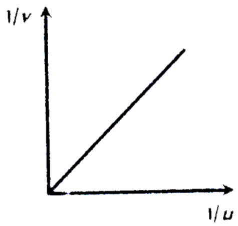
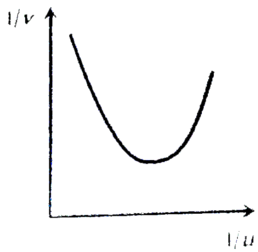
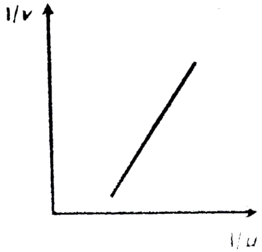
753. For a concave mirrorr, if real image is formed the graph between $\frac{1}{u}$ and $\frac{1}{v}$ is of the form

A. 

B. 

C. 



D.

Answer: a

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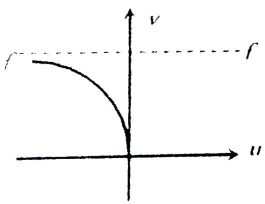
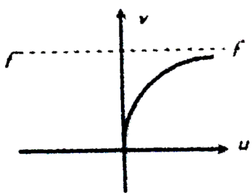
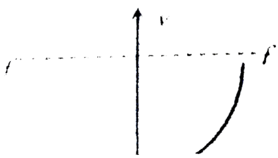
754. The graph between u and v for a convex mirrorr is



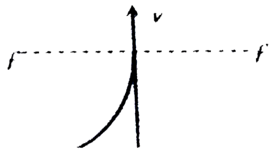
A.



B.



C.

D. 

Answer: a

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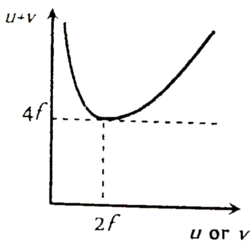
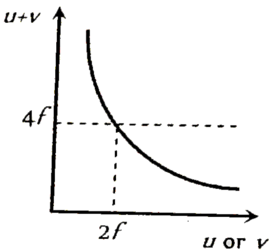
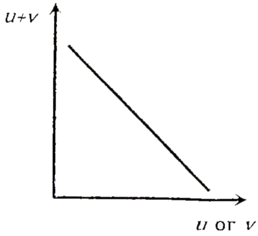
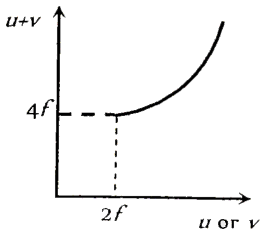
755. For a convex lens, if real image is formed the graph between $(u + v)$ and u or v is as follows

A. 

B. 

C. 

D. 

Answer: a

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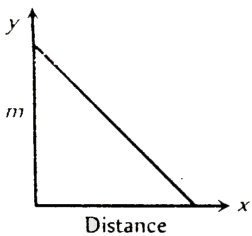
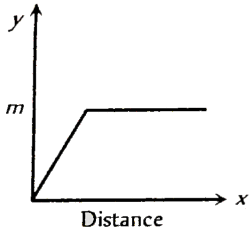
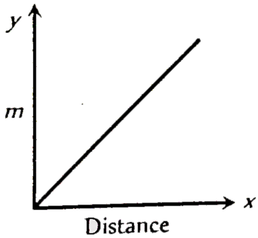
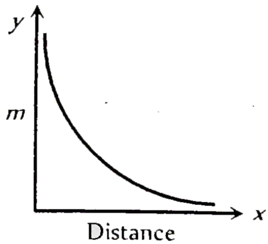
756. Which of the following graphs is the magnification of a real image against the distance from the focus of a concave mirrorr ?

A. 

B. 

C. 

D. 

Answer: d

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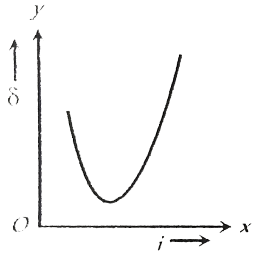
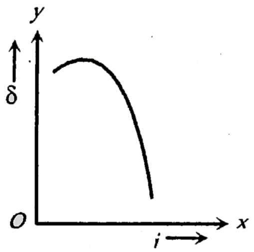
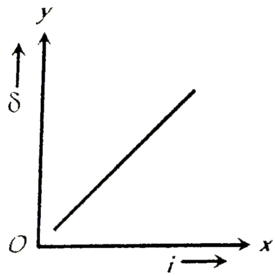
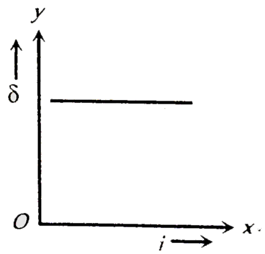
757. The graph between angle of deviation (δ) and angle of incidence (i) for a triangular prism is represented by

A. 

B. 

C. 

D. 

Answer: a

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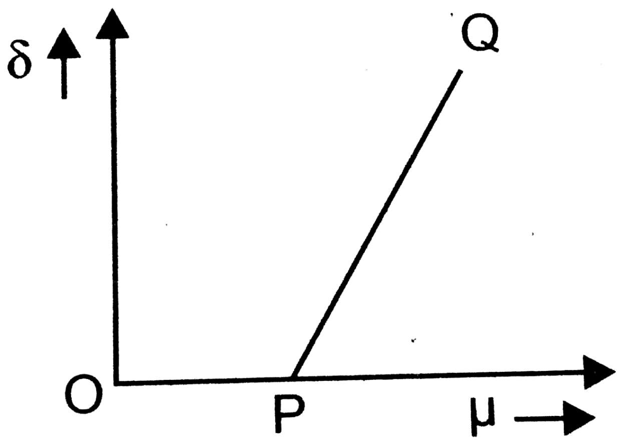
758. For a small angled prism, angle of prism A of minimum deviation(δ) varies with the refractive index of the prism as shown in the graph



A. Point P corresponds to $\mu = 1$

B. Slope of the line PQ = A /2

C. Slope = A

D. None of the above statements is true

Answer: ac

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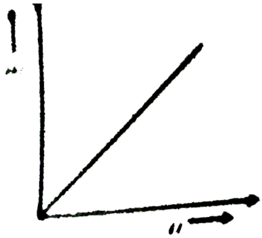
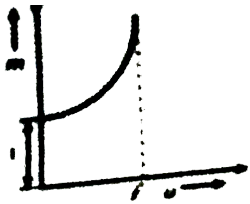
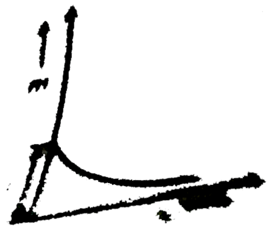
759. For a concave mirrorr, if virtual image is formed, the graph between m and u is of the form

A. 

B. 

C. 

D. 

Answer: b

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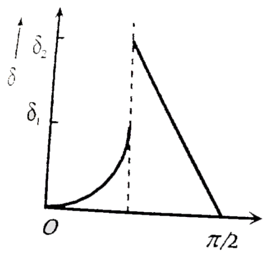
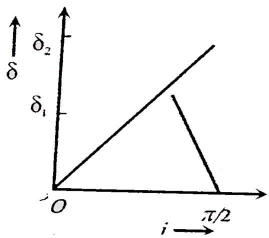
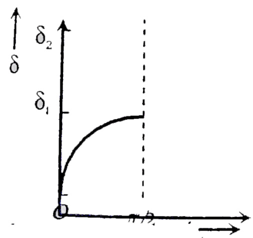
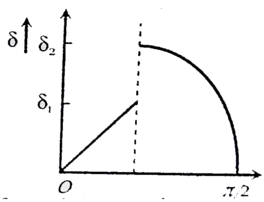
760. A ray of light travels from a medium of refractive index μ to air. Its angle of incidence in the medium is i, meansured from the normal to the boundary , and its angle of deviation is δ. δ is plotted against i. Which of the following best represents the resulting curve ?

A. 

B. 

C. 

D. 

Answer: a

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761. The graph between the object distance along the X-axis and image distance along Y-axis for a convex lens is

A. Straight line

B. Circle

C. Parabola

D. Hyperbola

Answer: d

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762. Assertion: A red object appears dark in the yellow light .

Reason: The red colour is scattered less.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: b

Watch Video Solution

763. Assertion : The stars twinkle while the planets do not.

Reason : The stars are much bigger in size than the planets.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: b

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764. Assertion : Owls can move freely during night.

Reason : They have large number of rods on their retina.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: c

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765. Assertion : The air bubble shines in water.

Reason : Air bubble in water shines due to refraction of light.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: c

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766. Assertion : In a movie, ordinarily 24 frames are projected per second from one end to the other of the complete film.

Reason : The image formed on retina of eye is sustained up to $1/10s$ after the removal of stimulus.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: c

Watch Video Solution

767. Assertion : Blue colour of sky appears due to scattering of blue colour.

Reason : Blue colour has shortest wave length in visible spectrum.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: a

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768. Assertion : The refractive index of diamond is $\sqrt{6}$ and that of liquid is $\sqrt{3}$. If the light travels from diamond to the liquid, it will totally reflected when the angle of incidence is 30°.

Reason : $\mu = \frac{1}{\sin C}$, where μ is the refractive index of diamond with respect to liquid.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is f alse but reason is true

Answer: d

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769. Assertion : The setting sun apears to be red.

Reason : Scattering of light is directly proportional to the wavelength .

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: c

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770. Assertion : A double convex lens $(\mu = 1.5)$ has focal length $10cm$. When the lens is immersed in water $(\mu = 4/3)$ its focal length becomes $40cm$.

Reason : $\frac{1}{f} = \frac{\mu_1 - \mu_m}{\mu_m}\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: a

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771. Assertion : Different colours travel with different speed in vacuum.

Reason : Wavelength of light depends on refractive index of medium. [AIIMS 1998]

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is f alse but reason is true

Answer: d

Watch Video Solution

772. Assertion : The colour of the green flower seen through red glass appears to be dark.

Reason : Red glass transmits only red light.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: a

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773. Assertion : The focal length of the mirrorr is f and distance of the object from the focus is u, the magnification of the mirror is f/u.

Reason : Magnification $= \frac{\text{Size of the image}}{\text{Size of object}}$

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: a

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774. Assertion : If a plane glass slab is placed on the letters of different colours all the letters appear to be raised up to the same height.

Reason : Different colours have different wavelengths.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is f alse but reason is true

Answer: d

Watch Video Solution

775. Assertion : The fluorescent tube is considered better than an electric bulb.

Reason : Efficiency of fluorescent tube is more than the efficiency of electric bulb.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: a

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776. Assertion : The polar caps of earth are cold in comparison to equatorial plane.

Reason : The radiation absorbed by polar caps is less than the radiation absorbed by equatorial plane.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: c

Watch Video Solution

777. Assertion : When an objecct is placed between two plane parallel mirrorrs, then all the images found are of equal intensity.

Reason : In case of plane parallel mirrorrs, only two images are possible.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: d

Watch Video Solution

778. Assertion : The mirrorrs used in search lights are parabolic and not concave spherical.

Reason : In a concave spherical mirrorr the image formed is always virtual.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: c

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779. Assertion : The size of the mirrorr affect the nature of the image.

Reason : Small mirrorrs always forms a virtual image.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: d

Watch Video Solution

780. Assertion : Just before setting, the sun may appear to be elliptical. This happens due to refraction.

Reason : Refraction of light ray through the atmosphere may cause different magnification in mutually perpendicular directions.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: a

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781. Assertion : Critical angle of light passing from glass to air is minimum for violet colour.

Reason : The wavelength of blue light is greater than the light of other colour.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: c

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782. STATEMENT-1 We cannot produce a real image by plane of convex mirror under any circumstances.

$STATEMENT2$ The focal length of a convex mirror is always taken as positive.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is f alse but reason is true

Answer: d

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783. Assertion : A piece of red glass is heated till it glows in dark. The colour of glowing glass would be orange.

Reason : Red and orange is complementary colours.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: d

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784. Assertion : Withing a glass slab, a double convex air bubble is formed. This air bubble behaves like a converging lens.

Reason : Refrative index of air is more than the refractive index of glass.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: d

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785. Assertion : The images formed by total internal reflections are much brighter than those formed by mirrorrs or lenses.

Reason : There is no loss of intensity in total internal reflection.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: a

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786. Assertion : The focal length of the lens does not change when red light is replaced by blue light.

Reason : The focal length of lens does not depends on colour of light used.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: d

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787. Assertion : There is no dispersion of light refracted through a rectangular glass slab.

Reason : Dispersion of light is the phenomenon of splitting of a beam of white light into its constituent colours.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: b

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788. Assertion : All the materials always have the same colour, whether viewed by reflected light or through transmitted light.

Reason : The colour of material does not depend on nature of light .

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: d

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789. Assertions : A beam of white light give a spectrum on passing through a hollow prism.

Reason : Speed of light outside the prism is different from the speed of light inside the prism.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: d

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790. Assertion : By increasing the diameter of the objective of telescope, we can increase its range.

Reason : The range of a telescope tells us how far away a star of some standard brightness can be spotted by telescope.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: b

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791. Assertion : For the sensitivity of a camera, its aperture should be reduced

Reason : Smaller the aperture, image focussing is also sharp.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: c

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792. Assertion : If objective and eye lenses of a microscope are interchanged then it can work as telescope.

Reason : The objective of telescope has small focal length.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: d

Watch Video Solution

793. Assertion : The illuminance of an image produced by a convex lens is greater is the middle and less towards the edges.

Reason : The middle part of image is formed by undeflected rays while out part by inclined rays.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: a

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794. Assertion : Although the surfaces of a goggle lens are curved, it does not have any power.

Reason : In case of goggles, both the curved surfaces have equal radii of curvature.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: a

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795. The resolving power of electron microscope is higher that that of an optical microscope because the wavelength of electrons is .... Than the wavelength of visible light.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: c

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796. Assertion : If the angles of the base of the prism are equal, then in the position of minimum deviation, the refracted ray will pass parallel to the base of prism.

Reason : In the case of minimum deviation, the angle of incidence is equal to the angle of emergence.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: a

Watch Video Solution

797. Assertion : Dispersion of light occurs because velocity of light in a material depends upon its colour.

Reason : The dispersive power depends only upon the material of the prism, not upon the refracting angle of the prism

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: b

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798. Assertion : An empty test tube dipped into water in a beaker appears silver, when viewed from a suitable direction.

Reason : Due to refraction of light, the substance in water appears silvery.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: c

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799. Statement-1 : it is impossible to photograph a virtual image.

Statement-2 : The rays which appear diverging from a virtual image fall on the camera and a real image is captured.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is f alse but reason is true

Answer: d

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800. Assertion : The frequencies of incident, reflected and refracted beam of monochromatic light are same.

Reason : The incident, reflected and refracted rays are coplanar.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: b

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801. Statement-1 : The refractive index of a prism depends only on the kind of glass of which this is made and the colour of light.

Statement-2 : The refractive index of a prism depens upon refracting angle of prism and angle of minimum deviation.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: c

Watch Video Solution

802. Assertion : The resolving power of a telescope is more if the diameter of the objective lens is more.

Reason : Objective lens of large diameter collectd more light.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: a

Watch Video Solution

803. Assertion: By roughening the surface of a glass sheet its transparency can be reduced.

Reason: Glass sheet with rough surface absorbs more light.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: c

Watch Video Solution

804. Assertion : The clouds in the sky generally appear to be whitish.

Reason : Diffraction due to clouds is efficient in equal measures its all wavelengths.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: c

Watch Video Solution

Refraction of Light at Plane Surfaces

1. A beam of monochromatic blue light of wavelength 4200Å in air travels in water ($\mu = 4/3$). Its wavelength in water will be

A. 2800Å

B. 5600Å

C. 3150Å

D. 4000Å

Answer: c

View Text Solution

2. On a glass plate a light wave is incident at an angle of 60°. If the reflected and the refracted waves are mutually perpendicular, the refractive index of material is

A. $\frac{\sqrt{3}}{2}$

B. $\sqrt{3}$

C. $\frac{3}{2}$

D. $\frac{1}{\sqrt{3}}$

Answer: B

View Text Solution

3. Refractive index of glass is $\frac{3}{2}$ and refractive index of water is $\frac{4}{3}$. If the speed of light in glass is $2.00 \times 10^{8} m/s$, the speed in water will be

A. $2.67 \times 10^{8} m/s$

B. $2.25 \times 10^{8} m/s$

C. $1.78 \times 10^8 m/s$

D. $1.50 \times 10^8 m/s$

Answer: b

View Text Solution

4. Light of wavelength is 7200 Å in air. It has a wavelength in glass ($\mu = 1.5$) equal to

A. 7200 Å

B. 4800 Å

C. 10800 Å

D. 7201.5 Å

Answer: B

View Text Solution

5. Which of the following is not a correct statement

A. The wavelength of red light is greater than the wavelength of green light

B. The wavelength of blue light is smaller than the wavelength of orange light

C. The frequency of green light is greater than the frequency of blue light

D. The frequency of violet light is greater than the frequency of blue light

Answer: C

View Text Solution

6. Which of the following is a correct relation

A. $._{a}\mu_{r} = ._{a}\mu_{w} \times ._{r}\mu_{\omega}$

B. $._a\mu_r \times ._r\mu_w = ._w\mu_a$

C. $._a\mu_r \times ._r\mu_a = 0$

D. $._a\mu_r / ._w\mu_r = ._a\mu_w$

Answer: d

View Text Solution

7. The time taken by sunlight to cross a 5 mm thick glass plate $(\mu = 3/2)$ is

A. 0.25×10^{-10} s

B. $0.167 \times 10^{-7} s$

C. $2.5 \times 10^{-10} s$

D. $1.0 \times 10^{-10} s$

Answer: a

View Text Solution

8. The distance travelled by light in glass (refractive index =1.5) in a nanosecond will be

A. 45 cm

B. 40 cm

C. 30 cm

D. 20 cm

Answer: d

View Text Solution

9. When light is refracted from air into glass

A. Its wavelength and frequency both increase

B. Its wavelength increases but frequency remains unchanged

C. Its wavelength decreases but frequency remains unchanged

D. Its wavelength and frequency both decrease

Answer: c

View Text Solution

Refraction at Curved Surface

1. A concave and convex lens have the same focal length of 20 cm and are put into contact to form a lens combination. The combination is used to view an object of 5 cm length kept at 20 cm from the lens combination. As compared to the object, the image will be

A. Magnified and inverted

B. Reduced and erect

C. Of the same size as the object and erect

D. Of the same size as the object but inverted

Answer: c

View Text Solution

2. An achromatic combination of lenses produces

A. Coloured images

B. Highly enlarged image

C. Images in black and white

D. Images unaffected by variation of refractive index with wavelength

Answer: d

View Text Solution

3. n a parallel beam of white light is incident on a converging lens, the colour which is brought to focus nearest to the lens is

A. Violet

B. Red

C. The mean colour

D. All the colours together

Answer: a

View Text Solution

4. A film projector magnifies a $100cm^2$ film strip on a screen. If the linear magnification is 4, the area of magnified film on the screen is

A. $1600cm$

B. $400cm$

C. $800cm$

D. $200cm$

Answer: a

View Text Solution

5. In order to obtain a real image of magnification 2 using a converging lens of focal length 20 cm , where should an object be placed

A. $50cm$

B. $30cm$

C. $-50cm$

D. $-30cm$

Answer: D

View Text Solution

6. A double convex lens $\left(R_1 = R_2 = 10cm\right)(\mu = 1.5)$ having focal length equal to the focal length of a concave mirror. The radius of curvature of the concave mirror is

A. $10cm$

B. $20cm$

C. $40cm$

D. $15cm$

Answer: B

View Text Solution

7. The power of an achromatic convergent lens of two lenses is + 2 D . The power of convex lens is + 5 D . The ratio of dispersive power of convex and concave lens will be

A. $5:3$

B. $3:5$

C. $2:5$

D. $5:2$

Answer: b

View Text Solution

8. The focal lengths for violet, green and red light rays are f_V, f_G , and f_R respectively. Which of the following is the true relationship

A. $f_R < f_G < f_V$

B. $f_V < f_G < f_R$

C. $f_G < f_R < f_V$

D. $f_G < f_V < f_R$

Answer: b

View Text Solution

Prism Theory & Dispersion of Light

1. Which source is associated with a line emission spectrum

A. Electric fire

B. Neon street sign

C. Red traffic light

D. Sun

Answer: b

View Text Solution

2. The black lines in the solar spectrum during solar eclipse can be explained by

A. Plank's law

B. Kirchoff's law

C. Boltzmann's law

D. solar disturbances

Answer: b

View Text Solution

3. The dispersive power is maximum for the material

A. Flint glass

B. Crown glass

C. Mixture of both

D. None of these

Answer: a

View Text Solution

4. The spectrum of light emitted by a glowing solid is

A. Continuous spectrum

B. Line spectrum

C. Band spectrum

D. Absorption spectrum

Answer: a

View Text Solution

5. Which of the following element was discovered by study of Fraunhofer lines

A. Hydrogen

B. Oxygen

C. Helium

D. Ozone

Answer: c

View Text Solution

6. In absorption spectrum of Na the missing wavelength (s) are

A. 589 nm

B. 589.6 nm

C. Both

D. None of these

Answer: c

View Text Solution

Human Eye and Lens Camera

1. A far sighted man who has lost his spectacles, reads a book by looking through a small hole $(3 - 4mm)$ in a sheet of paper. The reason will be

A. Because the hole produces an image of the letters at a longer distance

B. Because in doing so, the focal length of the eye lens is effectively increased

C. Because in doing so, the focal length of the eye lens is effectively decreased

D. None of these

Answer: c

View Text Solution

2. For the myopic eye, the defect is cured by

A. Convex lens

B. Concave lens

C. Cylindrical lens

D. Toric lens

Answer: b

View Text Solution

3. Substance on the choroid is

A. Japan black

B. Nigrim pigment

C. Carbon black

D. Platinum black

Answer: b

View Text Solution

4. Circular part in the centre of retina is called

A. Blind spot

B. Yellow spot

C. Red spot

D. None of the above

Answer: b

View Text Solution

5. If there had been one eye of the man, then

A. Image of the object would have been inverted

B. Visible region would have decreased

C. Image would have not been seen three dimensional

D. (b) and (c) both

Answer: d

View Text Solution

6. Image is formed for the short sighted person at

A. Retina

B. Before retina

C. Behind the retina

D. Image is not formed at all

Answer: b

View Text Solution

7. If the distance of the far point for a myopia patient is doubled, the focal length of the lens required to cure it will become

A. Half

B. Double

C. The same but a convex lens

D. The same but a concave len

Answer: b

View Text Solution

8. A presbyopic patient has near point as 30 cm and far point as 40 cm . The dioptric power for the corrective lens for seeing distant objects is

A. 40 D

B. 4 D

C. $-2.5D$

D. 0.25 D

Answer: c

View Text Solution

9. An imaginary line joining the optical centre of the eye lens and the yellow point is called as

A. Principal axis

B. Vision axis

C. Neutral axis

D. Optical axis

Answer: b

View Text Solution

Microscope and Telescope

1. Magnifying power of a simple microscope is (when final image is formed at $D = 25cm$ from eye)

A. $\frac{D}{f}$

B. $1 + \frac{D}{f}$

C. $1 + \frac{f}{D}$

D. $1 - \frac{D}{f}$

Answer: b

View Text Solution

2. In a compound microscope cross-wires are fixed at the point

A. Where the image is formed by the objective

B. Where the image is formed by the eye-piece

C. Where the focal point of the objective lies

D. Where the focal point of the eye-piece lies

Answer: a

View Text Solution

3. An achromatic telescope objective is to be made by combining the lenses of flint and crown glasses. This proper choice is

A. Convergent of crown and divergent of flint

B. Divergent of crown and convergent of flint

C. Both divergent

D. Both convergent

Answer: a

View Text Solution

4. A photograph of the moon was taken with telescope. Later on, it was found that a housefly was sitting on the objective lens of the telescope. In photograph

A. The image of housefly will be reduced

B. There is a reduction in the intensity of the image

C. There is an increase in the intensity of the image

D. The image of the housefly will be enlarged

Answer: b

View Text Solution

5. An observer looks at a tree of height 15 m with a telescope of magnifying power 10. To him, the tree appears

A. 10 times taller

B. 15 times taller

C. 10 times nearer

D. 15 times nearer

Answer: c

View Text Solution

Photometry

1. If luminous efficiency of a lamp is 2 lumen/watt and its luminous intensity is 42 candela, then power of the lamp is

A. $62W$

B. $76W$

C. $138W$

D. $264W$

Answer: d

View Text Solution

2. An electric bulb illuminates a plane surface. The intensity of illumination on the surface at a point 2 m away from the bulb is 5×10^{-4} phot $\left(\text{lumen}/cm^2\right)$. The line joining the bulb to the point makes an angle of 60° with the normal to the surface. The intensity of the bulb in candela is

A. $40\sqrt{3}$

B. 40

C. 20

D. 40×10^{-4}

Answer: b

View Text Solution

3. Correct exposure for a photographic print is 10 seconds at a distance of one metre from a point source of 20 candela . For an equal fogging of the print placed at a distance of 2 m from a 16 candela source, the necessary time for exposure is

A. 100sec

B. 25sec

C. 50sec

D. 75sec

Answer: c

View Text Solution

4. A movie projector forms an image 3.5 m long of an object 35 mm. Supposing there is negligible absorption of light by aperture then illuminance on slide and screen will be in the ratio of

A. $100 : 1$

B. $10^4 : 1$

C. $1 : 100$

D. $1 : 10^4$

Answer: b

View Text Solution

5. A 60 watt bulb is hung over the center of a table $4m \times 4m$ at a height of 3 m . The ratio of the intensities of illumination at a point on the centre of the edge and on the corner of the table is

A. $(17/13)^{3/2}$

B. $2/1$

C. $17/13$

D. $5/4$

Answer: a

View Text Solution

6. "Lux" is a unit of

A. Luminous intensity of a source

B. Illuminance on a surface

C. Transmission coefficient of a surface

D. Luminous efficiency of source of light

Answer: b

View Text Solution

7. If the luminous intensity of a 100 W unidirectional bulb is 100 candela, then total luminous flux emitted from the bulb is

A. 861 lumen

B. 986 lumen

C. 1256 lumen

D. 1561 lumen

Answer: c

View Text Solution

8. The maximum illumination on a screen at a distance of 2 m from a lamp is 25 lux . The value of total luminous flux emitted by the lamp is

A. 1256 lumen

B. 1600 lumen

C. 100 candela

D. 400 lumen

Answer: a

View Text Solution

9. A small lamp is hung at a height of 8 feet above the centre of a round table of diameter 16 feet . The ratio of intensities of illumination at the centre and at points on the circumference of the table will be

A. $1:1$

B. $2:1$

C. $2\sqrt{2}:1$

D. $3:2$

Answer: c

View Text Solution

10. Five lumen/watt is the luminous efficiency of a lamp and its luminous intensity is 35 candela . The power of the lamp is

A. $80W$

B. $176W$

C. $88W$

D. $36W$

Answer: c

View Text Solution

11. The distance between a point source of light and a screen which is 60 cm is increased to 180 cm . The intensity on the screen as compared with the original intensity will be

A. $(1/9)$ times

B. $(1/3)$ times

C. 3 times

D. 9 times

Answer: a

View Text Solution

12. A source of light emits a continuous stream of light energy which falls on a given area. Luminous intensity is defined as

A. Luminous energy emitted by the source per second

B. Luminous flux emitted by source per unit solid angle

C. Luminous flux falling per unit area of a given surface

D. Luminous flux coming per unit area of an illuminated surface

Answer: b

View Text Solution

13. To prepare a print the time taken is 5 sec due to lamp of 60 watt at 0.25 m distance. If the distance is increased to 40 cm then what is the time taken to prepare the similar print

A. 3.1sec

B. 1sec

C. 12.8sec

D. 16sec

Answer: c

View Text Solution

14. A lamp is hanging 1 m above the centre of a circular table of diameter 1 m . The ratio of illuminaces at the centre and the edge is

A. $\frac{1}{2}$

B. $\left(\frac{5}{4}\right)^{\frac{3}{2}}$

C. $\frac{4}{3}$

D. $\frac{4}{5}$

Answer: b

View Text Solution

15. Two stars situated at distances of 1 and 10 light years respectively from the earth appear to possess the same brightness. The ratio of their real brightness is

A. $1:10$

B. $10:1$

C. $1:100$

D. $100:1$

Answer: c

View Text Solution

16. The intensity of direct sunlight on a surface normal to the rays is I_0 . What is the intensity of direct sunlight on a surface, whose normal makes an angle of 69° with the rays of the sun

A. I_0

B. $I_0\left(\frac{\sqrt{3}}{2}\right)$

C. $\frac{I_0}{2}$

D. $2I_0$

Answer: c

View Text Solution

17. Inverse square law for illuminance is valid for

A. Isotropic point source

B. Cylindrical source

C. Search light

D. All types of sources

Answer: a

View Text Solution

18. 1% of light of a source with luminous intensity 50 candela is incident on a circular surface of radius 10 cm . The average illuminance of surface is

A. 100 lux

B. 200 lux

C. 300 lux

D. 400 lux

Answer: b

View Text Solution

19. Two light sources with equal luminous intensity are lying at a distance of 1.2 m from each other. Where should a screen be placed between them such that illuminance on one of its faces is four times that on another face

A. $0.2m$

B. $0.4m$

C. $0.8m$

D. $1.6m$

Answer: bc

View Text Solution

20. Two lamps of luminous intensity of 8 Cd and 32 Cd respectively are lying at a distance of 1.2 m from each other. Where should a screen be placed between two lamps such that its two faces are equally illuminated due to two sources

A. 10 cm from 8 Cd lamp

B. 10 cm from 32 Cd lamp

C. 40 cm from 8 Cd lamp

D. 40 cm from 32 Cd lamp

Answer: c

View Text Solution

21. A lamp is hanging along the axis of a circular table of radius r. At what height should the lamp be placed above the table, so that the illuminance at the edge of the table is $\frac{1}{8}$ of that at its center

A. $\frac{r}{2}$

B. $\frac{r}{\sqrt{2}}$

C. $\frac{r}{3}$

D. $\frac{r}{\sqrt{3}}$

Answer: d

View Text Solution

22. A point source of 100 candela is held 5 m above a sheet of blotting paper which reflects 75% of light incident upon it. The illuminance of blotting paper is

A. 4 phot

B. 4 lux

C. 3 phot

D. 3 lux

Answer: b

View Text Solution

23. A lamp is hanging at a height 40 cm from the centre of a table. If its height is increased by 10 cm the illuminance on the table will decrease by

A. 10 %

B. 20 %

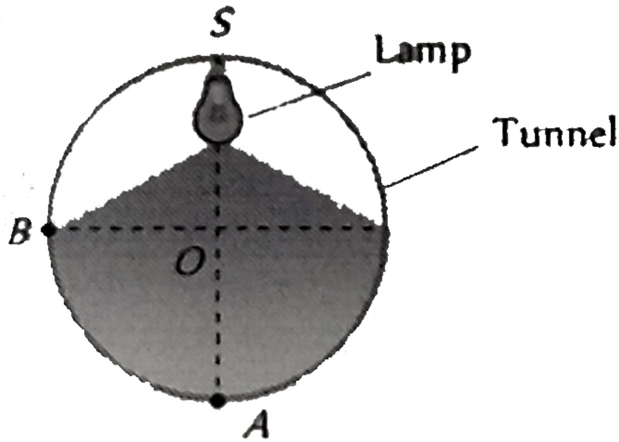
C. 27 %

D. 36 %

Answer: d

View Text Solution

24. An electric lamp is fixed at the ceiling of a circular tunnel as shown is figure. What is the ratio the intensities of light at base A and a point B on the wall



A. $1:2$

B. $2:\sqrt{3}$

C. $\sqrt{3}:1$

D. $1:\sqrt{2}$

Answer: d

View Text Solution

25. When sunlight falls normally on earth, a luminous flux of $1.57 \times 10^5 \text{lumen}/m^2$ is produced on earth. The distance of earth from sun is $1.5 \times 10^8 Km$. The luminous intensity of sun in candela will be

A. 3.53×10^{27}

B. 3.53×10^{25}

C. 3.53×10^{29}

D. 3.53×10^{21}

Answer: a

View Text Solution

26. In the above problem, the luminous flux emitted by sun will be

A. $4.43 \times 10^{25} lm$

B. $4.43 \times 10^{26} lm$

C. $4.43 \times 10^{27} lm$

D. $4.43 \times 10^{28} lm$

Answer: d

View Text Solution

27. A screen receives 3 watt of radiant flux of wavelength 6000 Å . One lumen is equivalent to watt 1.5×10^{-3}watt of monochromatic light of wavelength 5550 Å . If relative luminosity for 6000 Å is 0.685 while that for 5550 Å is 1.00, then the luminous flux of thesource is

A. $4 \times 10^{3} lm$

B. $3 \times 10^{3} lm$

C. $2 \times 10^{3} lm$

D. $1.37 \times 10^{3} lm$

Answer: d

View Text Solution

28. A point source of 3000 lumen is located at the centre of a cube of side length 2 m . The flux through one side is

A. 500 lumen

B. 600 lumen

C. 750 lumen

D. 1500 lumen

Answer: a

View Text Solution

29. A point source of light moves in a straight line parallel to a plane table. Consider a small portion of the table directly below the line of movement of the source. The illuminance at this portion varies with its distance r from the source as

A. $E \propto \frac{1}{r}$

B. $E \propto \frac{1}{r^2}$

C. $E \propto \frac{1}{r^3}$

D. $E \propto \frac{1}{r^4}$

Answer: C

View Text Solution

Critical Thinking

1. A concave mirror of focal length $100 cm$ is used to obtain the image of the sun which subtends an angle of . 30° The diameter of the image of the sun will be

A. $1.74 cm$

B. $0.87 cm$

C. $0.435 cm$

D. $100 cm$

Answer: B

View Text Solution

2. The object distance u , the image distance v and the magnification m in a lens follow certain linear relations. These are

A. $\frac{1}{u}$ versus $\frac{1}{v}$

B. m versus u

C. \`u versus v

D. m versus v

Answer: A::D

View Text Solution

3. A convex lens of focal length 30 cm and a concave lens of 10 cm focal length are placed so as to have the same axis. If a parallel beam of light falling on convex lens leaves concave lens as a parallel beam, then the distance between two lenses will be

A. 40 cm

B. 30 cm

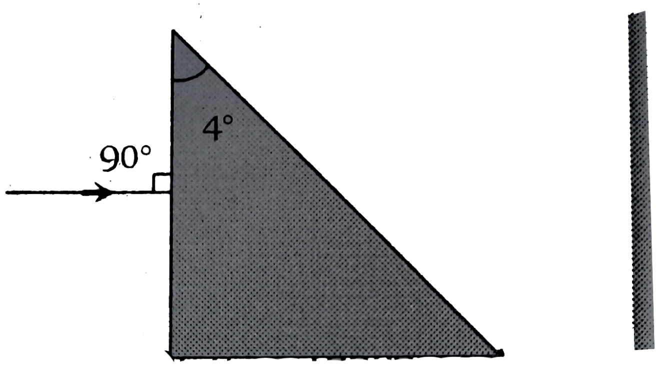
C. 20 cm

D. 10 cm

Answer: c

View Text Solution

4. A prism having an apex angle 4o and refraction index 1.5 is located in front of a vertical plane mirror as shown in figure. Through what total angle is the ray deviated after reflection from the mirror



A. 176°

B. 4°

C. 178°

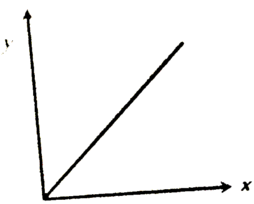
D. 2°

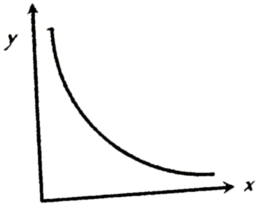
Answer: c

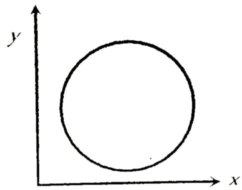
View Text Solution

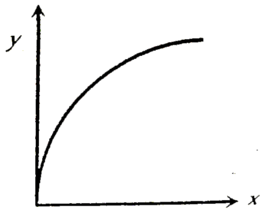
GQ

1. If x is the distance of an object from the focus of a concave mirror and y is the distance of image from the focus, then which of the following graphs is correct between x and y

A. 

B. 

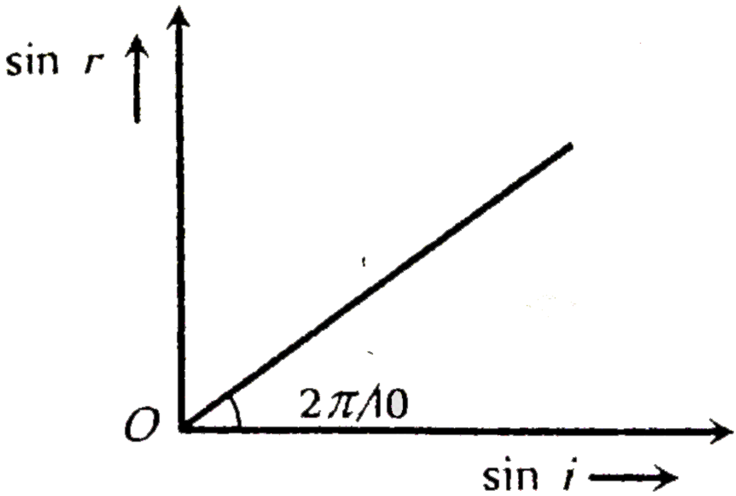
C. 

D. 

Answer: b

View Text Solution

2. The graph between sine of angle of refraction $(\sin r)$ in medium 2 and sine of angle of incidence $(\sin i)$ in medium 1 indicates that $\left(atn36^{\circ} \approx \frac{3}{4}\right)$



A. Total internal reflection can take place

B. Total internal reflection cannot take place

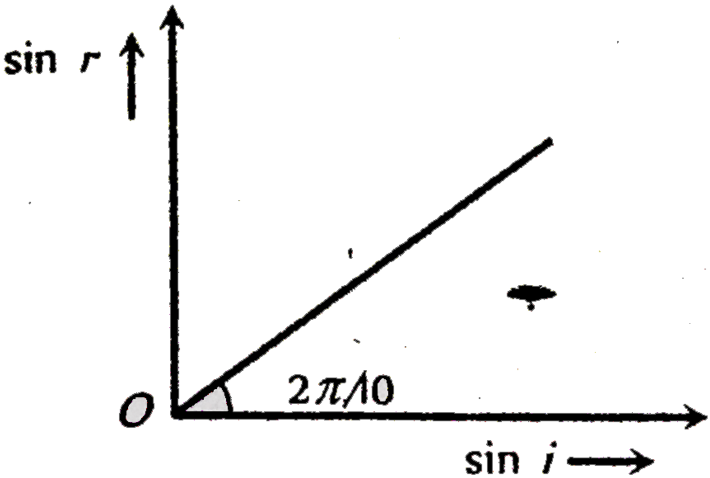
C. Any of (a) and (b)

D. Data is incomplete

Answer: b

View Text Solution

3. A medium shows relation between i and r as shown. If speed of light in the medium is nc then value of n is



A. 1.5

B. 2

C. 2^{-1}

D. $3^{-1/2}$

Answer: d

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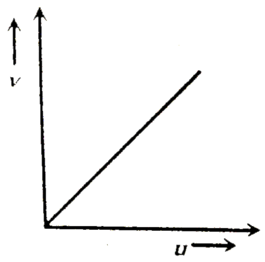
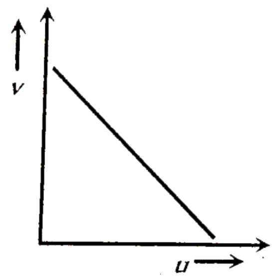
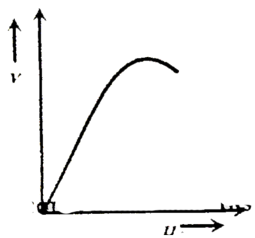
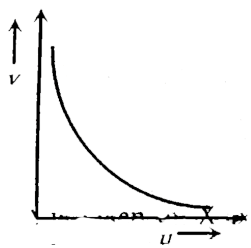
4. The distance v of the real image formed by a convex lens is measured for various object distance u . A graph is plotted between v and u , which one of the following graphs is correct

A. 

B. 

C. 

D. 

Answer: d

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Assertion and Reason

1. Assertion : The illumination of earth's surface from sun is more at noon than in the morning.

Reason : Luminance of a surface refers to brightness of the surface.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: b

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2. Assertion : Spherical aberration occur in lenses of larger aperture.

Reason : The two rays, paraxial and marginal rays focus at different points.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: a

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3. Assertion : The speed of light in a rarer medium is greater than that in a denser medium

Reason : One light year equals to $9.5 \times 10^{12} km$

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: b

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4. Assertion : Diamond glitters brilliantly.

Reason : Diamond does not absorb sunlight.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: b

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SET

1. In an astronomical telescope in normal adjustment a straight black line of length L is drawn on inside part of objective lens. The eye piece forms a real image of this line. The length of this image is I. The magnification of the telescope is

A. $\frac{L}{l}$

B. $\frac{L}{l} + 1$

C. $\frac{L}{l} - 1$

D. $\frac{L + l}{L - l}$

Answer: a

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2. Three lenses L_1, L_2, L_3 are placed co-axially as shown in figure. Focal length's of lenses are given 30 cm , 10 cm and 5 cm respectively. If a parallel beam of light falling on lens L_1, emerging L_3 as a convergent beam such that it converges at the focus of L_3 . Distance between L_1 and L_2 will be

A. 40 cm

B. 30 cm

C. 20 cm

D. 10 cm

Answer: c

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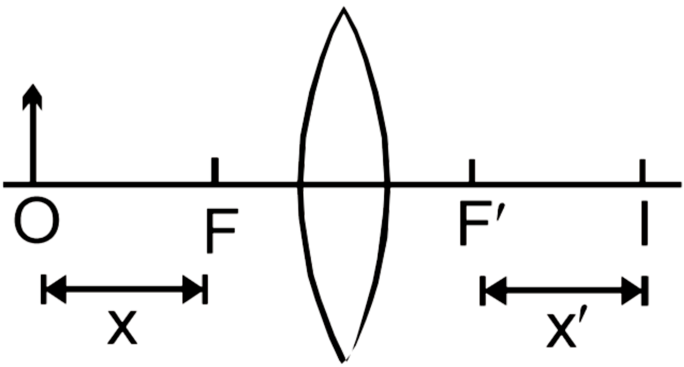
3. An object is placed at a point distant x from the focus of a convex lens and its imge is formed at I as shown in the figure. The distance x, x' satisfy the relation



A. $\frac{x+x'}{2}=f$

B. $f=xx'$

C. $x + x' \le 2f$

D. $x + x' \ge 2f$

Answer: d

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4. The diameter of the eye-ball of a normal eye is about 2.5 cm . The power of the eye lens varies from

A. 2 D ro 10 D

B. 40 D to 32 D

C. 9 D to 8 D

D. 44 D to 40 D

Answer: d

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5. In a thin spherical fish bowl of radius 10 cm filled with water of refractive index 4/3 there is a small fish at a distance of 4 cm from the centre C as shown in figure. Where will the image of fish appears, if seen from E

A. 5.2 cm

B. 7.2 cm

C. 4.2 cm

D. 3.2 cm

Answer: a

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6. A small fish 0.4 m below the surface of a lake is viewed through a simple converging lens of focal length 3 m.the lens is kep at 0.2 m above the water surface such that the fish lies on the optical axis of the lens.

Find the image of the fish seen by the observed. $\left(\mu_{water} = \frac{4}{3}\right)$

A. A distance of 0.2 m from the water surface

B. A distance of 0.6 m from the water surface

C. A distance of 0.3 m from the water surface

D. The same location of fish

Answer: d

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7. A water drop in air refractes the light ray as

A.

B.

C.

D.

Answer: b

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8. Which of the following ray diagram show physically possible refraction

, ,

A. (i)

B. (ii)

C. (iii)

D. None of these

Answer: a

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9. Following figure shows the multiple reflections of a light ray along a glass corridor where the walls are either parallel or perpendicular to one another. If the angle of incidence at point P is 30°, what are the angles of reflection of the light ray at points Q , R , S and T respectively

A. $30^\circ, 30^\circ, 30^\circ, 30^\circ$

B. $30^\circ, 60^\circ, 30^\circ, 60^\circ$

C. $30^\circ, 60^\circ, 60^\circ, 30^\circ$

D. $60^\circ, 60^\circ, 60^\circ, 60^\circ$

Answer: c

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10. When the rectangular metal tank is filled to the top with an unknown liquid, as observer with eyes level with the top of the tank can just see the corner E , a ray that refracts towards the observer at the top surface of the liquid is shown. The refractive index of the liquid will be

A. 1.2

B. 1.4

C. 1.6

D. 1.9

Answer: a

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11. A concave mirror and a converging lens (glass with $\mu = 1.5$) both have a focal length of 3 cm when in air. When they are in water $\left(\mu = \frac{4}{3}\right)$, their new focal length are

A. $f_{\text{Lens}} = 12cm, f_{\text{Mirror}} = 3cm$

B. $f_{\text{Lens}} = 3cm, f_{\text{Mirror}} = 12cm$

C. $f_{\text{Lens}} = 3cm, f_{\text{Mirror}} = 3cm$

D. $f_{\text{Lens}} = 12cm, f_{\text{Mirror}} = 12cm$

Answer: a

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12. A ray of light strikes a plane mirror M at an angle of 45° as shown in the figure. After reflection, the ray passes through a prism of refractive index 1.5 whose apex angle is 4°. The total angle through which the ray is deviated is

A. 90°

B. 91°

C. 92°

D. 93°

Answer: c

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13. A slab of glass, of thickness 6 cm and refractive index 1.5, is placed in front of a concave mirror, the faces of the slab being perpendicular to the principal axis of the mirror. If the radius of curvature of the mirror is 40 cm and the reflected image coincides with the object, then the distance of the object from the mirror is

A. 30 cm

B. 22 cm

C. 42 cm

D. 28 cm

Answer: c

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14. A point source of light S is placed at the bottom of a vessel containing a liquid of refractive index $5/3$. A person is viewing the source from above the surface. There is an opaque disc of radius $1cm$ floating on the surface.

The centre of disc lies vertically above the source O. The liquid from the vessel is gradually drained out through a tap. What is the maximum height of the liquid for which the source cannot be seen at all.

A. 1.50 cm

B. 1.64 cm

C. 1.33 cm

D. 1.86 cm

Answer: c

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15. A point object is placed midway between two plane mirrors a distance apart. The plane mirrors form an infinite number of images due to multiple reflections. The distance between n^{th} order images formed in the two mirrors is

A. na

B. $2na$

C. $na/2$

D. na

Answer: b

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16. A convergent beam of light is incident on a convex mirror so as to converge to a distance 12 cm from the pole of the mirror. An inverted image of the same size is formed coincident with the virtual object. What is the focal length of the mirror

A. 24 cm

B. 12 cm

C. 6 cm

D. 3 cm

Answer: c

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17. PQR is a right angled prism with other angles as 60° and 30°. Refractive index of prism is 1.5. PQ has a thin layer of liquid. Light falls normally on the face PR . For total internal reflection, maximum refractive index of liquid is

A. 1.4

B. 1.3

C. 1.2

D. 1.6

Answer: b

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18. When a ray is refracted from one medium to another, the wavelength changes from 6000 Å to 4000 Å. The critical angle for the interface will be

A. $\cos^{-1}\left(\frac{2}{3}\right)$

B. $\sin^{-1}\left(\frac{2}{\sqrt{3}}\right)$

C. $\sin^{-1}\left(\frac{2}{3}\right)$

D. $\cos^{-1}\left(\frac{2}{\sqrt{3}}\right)$

Answer: c

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19. Two this lenses, when in contact, produce a combination of power $+10$ diopters. When they are 0.25 m apart, the power reduces to $+6$ diopters. The focal length of the lenses are.... m and ...m.

A. 0.125 and 0.5

B. 0.125 and 0.125

C. 0.5 and 0.75

D. 0.125 and 0.75

Answer: a

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20. The plane faces of two identical plano convex lenses, each with focal length f are pressed against each other using an optical glue to form a usual convex lens. The distance from the optical centre at which an object must be placed to obtain the image same as the size of object is

A. $\frac{f}{4}$

B. $\frac{f}{2}$

C. f

D. $2f$

Answer: c

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21. A parallel beam of light emerges from the opposite surface of the sphere when a point source of light lies at the surface of the sphere. The refractive index of the sphere is

A. $\frac{3}{2}$

B. $\frac{5}{3}$

C. 2

D. $\frac{5}{2}$

Answer: c

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22. A ray of light makes an angle of 10° with the horizontal and strikes a plane mirror which is inclined at an angle θ to the horizontal. The angle θ for which the reflected ray becomes vertical, is

A. 40°

B. 50°

C. 80°

D. 100°

Answer: a

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23. 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

Answer: b

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24. A telescope using light having wavelength 5000 Å and using lenses of focal 2.5 and 30 cm . If the diameter of the aperture of the objective is 10 cm , then the resolving limit and magnifying power of the telescope is respectively

A. 6.1×10^{-6} rad and 12

B. 5.0×10^{-6} rad and 12

C. 6.1×10^{-6} rad and 8.3×10^{-2}

D. 5.0×10^{-6} rad and 8.3×10^{-2}

Answer: a

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25. A lens when placed on a plane mirror then object needle and its image coincide at 15 cm . The focal length of the lens is

A. 15 cm

B. 30 cm

C. 20 cm

D. ∞

Answer: a

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