PHYSICS

BOOKS - TARGET PHYSICS (MARATHI ENGLISH)

OPTICS

EXERCISE

1. Light is a form of energy which travels as ________.

A. electromagnetic radiation

B. longitudinal waves

C. microwaves radiatioin

D. stationary waves

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2. Speed of light in vacuum is

A. $10^8 m / s$

B. $2 \times 10^8 m / s$

C. $3 \times 10^7 m / s$

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

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3. The photoelectric effect indicates that

A. light has wave nature.

B. light has quantum nature.

C. light has dual nature.

D. light has continuous nature.

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4. Choose the correct option.

	Categories		Phenomenon explained
i.	Geometrical optics	p.	Compton effect
ii.	Physical optics	q.	Doppler effect
iii.	Particle nature	r.	Double refraction

A. i - p, ii-q, iii - r

B. i - r, ii - p, iii - q

C. i - r, ii - q, iii - p

D. i - q, ii - p, iii - r

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5. Ray optics is valid, when chracteristic dimension are

A. much smaller than the wavelength of light.

B. much larger than the wavelength of light.

C. of the same order as that of wavelength of light.

D. of the order of millimetre.

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6. According to Cartesian sign conventions all distances are measured from the ________.

A. centre of curvature

B. focus

C. origin

D. optical centre.

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7. According to new Cartesian sign convention, all distance measured

A. to the leftof the pole of the mirro or optical centre of a lens are regarded as negative.

B. to the left of the pole of the mirror or optica centre of a lens are regarded as positive.

C. vertically upwards are negative.

D. vertically downwards are positive

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8. A ___________ beam of light corresponds to rays of light coming from real point object.

A. diverging

B. converging

C. laser

D. solar

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9. The angle made by incident ray of light with the reflecting surface is called

A. respective angle of deviation

B. angle of minimum deviation

C. glancing angle

D. emergence angle.

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10. A ray of light is reflected at an angle of 15°. If the angle of incidence is doubled, then the angle of reflection will be

A. 90°

B. 60°

C. 30°

D. 15°

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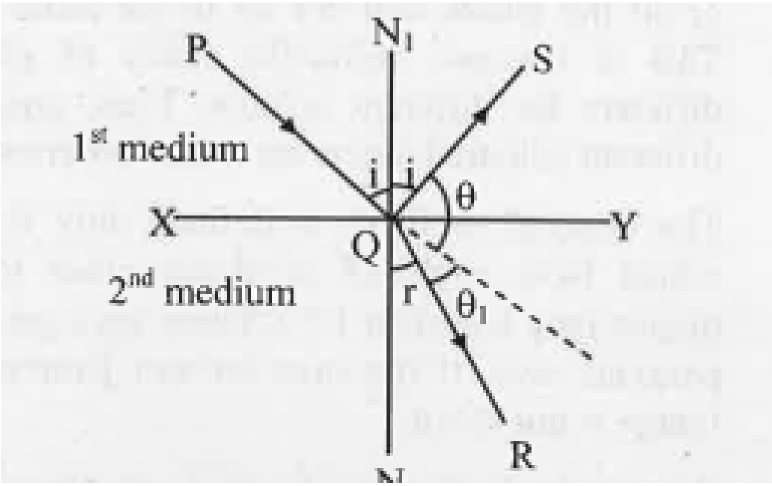
11. From the following ray diagram θ and θ_1 are



A. θ and θ_1 are glancing angles for reflection.

B. θ and θ_1 are glancing angles for the refraction.

C. θ and θ_1 are angles of deviation for reflection.

D. θ is angle of deviation for reflection an θ_1 is angle of deviations for refractions.

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12. When a ray of light passes from air to denser medium, its speed is reduced by 30%. What is the refractive index of the medium

A. 1.33

B. 1.43

C. 1.5

D. 1.1

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13. A ray of light is incident on the surface of separatio of a medium with the velocity of light at an angle 45° and is refracted int eh medium at an angle 30°. What will be the velocity of light in the medium ?

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

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

C. $3.86 \times 10^8 m / s$

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

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14. Monochromatic light of wavelength $6000\overset{\circ}{A}$ travels through a glass of refractive index $\frac{3}{2}$. The distance travelled by the light in 1 picosecond is

A. $100\mu m$

B. $200\mu m$

C. $300\mu m$

D. $400\mu m$

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15. When an object is placed between two plane mirrors facing each other inclined at an angle $'\theta'$, then the number of images (n) formed is given by

A. $\left[\left(\frac{360^\circ}{\theta}-1\right]\right.$ if $\left(\frac{360^\circ}{\theta}\right)$ is even.

B. $\left[\left(\frac{360^\circ}{\theta}-1\right]\right.$ if $\left(\frac{360^\circ}{\theta}\right)$ is odd and object is asymmetrical.

C. $\left[\frac{360^\circ}{\theta}\right]$ for all the positions of object.

D. $\left[\left(\frac{360^\circ}{\theta}\right)+1\right]$ for all the positions of object.

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16. Two mirrors are kept inclined to each other at an angle of 60° and an object is placed between them. The total number of images formed is ________.

A. six

B. five

C. four

D. three

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17. To get three images of a single object placed symmetrically between two plane mirrors, one should have the mirrors inclined at an angle of

A. 30°

B. 60°

C. 90°

D. 150°

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18. Choose the CORRECT statement.

A. The laws of refraction are valid fr spherical mirros.

B. The law of polarisation s valid for spherical mirros.

C. The laws of reflection are valid for any reflecting surface.

D. The laws of reflection are not valid for spherical mirros.

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19. The geometrical centre of surface of spherical mirror is called its ______

A. centr of curvature

B. focus

C. pole

D. optical centre.

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20. The principle axis of spherical mirror passes through ______

A. pole and centre of curavture

B. centre of curvature only

C. focus only

D. pole only

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21. A ray of light falls on a mirror normally. What are the values of angle of incidence and the angle of reflection.

A. $i = 0^{\circ}, r = 90^{\circ}$

B. $i = 90^{\circ}, r = 0^{\circ}$

C. $i = 90^{\circ}, r = 90^{\circ}$

D. $i = 0^{\circ}, r = 0^{\circ}$

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22. For the spherical mirros, the relation between forcal length (f) and radius of curvature (R) is given by

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

B. $R = \frac{f}{2}$

C. $fR = 2$

D. $f = \frac{1}{R}$

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23. Focal length of a convex/ concave mirror depends on

A. distance f object u.

B. distance of image v.

C. both u and v.

D. radius of curvature.

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24. Given a point source of light, which of the following can produce a convergent beam of light?

A. convex mirror

B. convex lens

C. concave mirror

D. a plane mirror

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25. A concave mirror produces a virtual image when the object is ______

A. beyond C

B. at C

C. between C and F

D. between F and pole

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26. For concave mirror, if the object is at the focusn f, the image is

A. real and at focus.

B. virtual and at radius of curvature.

C. real and imperceptible.

D. virtual and at infinity (imperceptible).

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27. A virtual image larger than the object canbe produced by ____

A. a concave lens

B. a plane mirror

C. a convex mirror

D. a concave mirror

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28. In an experiment to find the focal length of a concave mirror, an object is placed at a distance of 40 cm from it and forms image at 24 cm from the mirror, then the focal length is

A. $-15cm$

B. $-16cm$

C. -30

D. -32

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29. An object is at a distance of 10 cm from a concave mirror and the image of the object is at a distance of 30 cm from the mirror on the same side as that of the object. The radius of curvature of the concave mirror is

A. $+15.0cm$

B. $+7.5cm$

C. $-7.5cm$

D. $-15.0cm$

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30. An object is kept in front of a concave mirror of focal length 15 cm. The image formed is three times the size of the object. The two possible distances of the object are

A. $u = -20cm$ and $u = -10cm$

B. $u = -15cm$ and $u = -10cm$

C. $u = -20cm$ and $u = -30cm$

D. $u = -15m$ and $u = -30cm$

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31. After reflection, the parallel beam of light appears to come from a point then the type of mirror is ______

A. concave

B. plane

C. convex

D. plano-convex

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32. Which spherical mirror is divergent ?

A. Convex

B. Concave

C. Plane

D. Concavo

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33. An object is placed at a distance equal to focal length of a convex mirror. If the focal length of the mirror, be if then the distance of image from the pole of the mirror is

A. less than f

B. equal to f

C. more than f

D. infinity

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34. The field of view is maximum for

A. plane mirror

B. concave mirror

C. convex mirror

D. parabolic mirror

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35. A virtual object placed between the pole and principle focus of a convex mirror produce and image which is

A. real, magnified and erect.

B. virtual, diminished and inverted

C. virtual, magnified and inverted

D. real, diminished and inverted.

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36. A convex mirror may be used for all but it can NOT be used for _____

A. a magnifying mirror

B. a reflecting mirror

C. a dentist mirror

D. a carving mirror

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37. A convex mirror gives an images which is

A. real and inverted.

B. virtual and inverted.

C. virtual and magnified.

D. virtual and diminished.

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38. A 4.5 cm long needle is placed 12 cm away from a convex mirror of focal length of cm. Located the image of the needle from the mirror

A. $+6.7cm$

B. $-4.5cm$

C. $-6.7cm$

D.

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39. An object is placed at a distance of 25 cm from a spherical mirror, its image is formed behind the mirror at a distance of 5 cm. The focal length and type mirror is

A. $+6.25cm, concave$

B. $-6.25cm, concave$

C. $+6.25cm, convex$

D. $-6.25cm, convex$

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40. An object is placed at a distance of 15 cm from a convex mirror of curvature 90 cm. The image position and magnification respectively are at

A. 15 cm behind the mirror, 0.50.

B. 11.25 cm behind the mirror, 0.60.

C. 15 cm behind the mirror, 0.75.

D. 11.25 cm behind the mirror, 0.75.

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41. An object is placed in front of a convex mirror of focal length 60 cm. If image formed is half the size of the object, the position of the image

A. 15 cm in front of the mirror

B. 15 cm behind the mirror.

C. 30 cm in front of the mirror.

D. 30 cm behind the mirror.

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42. $\hat{}\ 1n_2$ is called as

A. refractive index of 2nd medium with respet to 1st medium.

B. refractive index of 1st medium with respect to 2nd medium.

C. the relative refractive index of 1st medium.

D. absolute refractive index of 2nd medium.

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43. If n_1 and n_2 are absolute refractive index of medium 1 and medium 2 respectively, then

A. $\hat{\ } 1n_2 = \frac{n_1}{n_2}$

B. $\hat{\ } 1n_2 = \frac{n_2}{n_1}$

C. $\hat{\ } 1n_2 = n_1 n_2$

D. $\hat{\ } 1n_2 = \frac{1}{n_1 n_2}$.

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44. The absolute refractive index of any medium is always

A. greater than one.

B. less than one.

C. equal to one.

D. any value between 0 to 1.

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45. The value of refractive index of ______ is highest.

A. ice

B. water

C. diamond

D. glass

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46. When a ray of monochromatic light enters from rarer medium to denser medium obliquely, the angle of incidence i and angle of refraction r is related as

A. i less than r

B. i = r

C. i greater than r

D. $i \leq r$

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47. The refractive index of water and glass with respect to air is 1.3 and 1.5 respectively, what will be the refractive index of glass with respect to water?

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

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

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

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

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48. A monochromatic ray is incident on a glass slab with glancing angle 30° with the surface. If the refractive index of glass with respect to air is $\sqrt{3}$, the angle of refraction in the glass slab is

A. 30°

B. 45°

C. 60°

D. 70°

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49. The velocity of light in glass is 2×10^8 m/s. If refractive index of glass with respect to water is 9/8, then the velocity of light in water is

A. $1.6 \times 10^8 m/s$

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

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

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

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50. The bottom of a swimming pool appears to be less deep than actual because of ____________.

A. reflection

B. scattering.

C. refraction

D. diffraction.

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51. A person swimming pool appears to be less deep than actual because it __________.

A. is not seen at all.

B. appears nearer.

C. appears fater.

D. appears at the correct position.

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52. A man stnading 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? (Line of vision is normal, Refractive index of water is n)

A. h / n

B. n / h

C. h

D. hn

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53. A bucket completely full of water is 46 cm deep. A coin kept at the bucket when viewed normally will appearat $\left(n_W = \frac{4}{3}\right)$

A. 40 cm

B. 34.5 cm

C. 39 cm

D. 32 cm

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54. When the ray of light travels from an optically denser medium to optically rarer medium themaximum value of angle of refraction is

A. 30°

B. 60°

C. 90°

D.

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55. Which of the following is a CORRECT statement?

A. For total internal reflection, light must pass from optically denser medium to optically rarer medium with angle of incidence greater than the critical angle.

B. For total internal reflection, light must pass from optically rarer medium to optically denser medium with angle of incidence greater than the critical angle.

C. For total internal reflection, light must pass from optically denser medium to optically rarer medium with a

D. For total internal reflection, only medium plays a role and not angle of incidence.

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56. When a monochromatic ray of light travels from an optically denser medium to optically rarer medium then critical angle is the angle of incidence for which angle of refraction is

A. 0°

B. 45°

C. 90°

D. 180°

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57. A yellow light travels from rarer medium to denser medium. At the critical angle the ray will

A. graze along the surface with angle of refracton of 90°.

B. be reflected back only.

C. be dispersed into other medium.

D. be refracted into denser medium.

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58. The angle of incidence corresponding to which the angle of refraction is a right angle is called as ____________.

A. angle of reflection.

B. angle of refraction

C. critical angle

D. polarising angle

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59. A ray of light travelling in water is incident on its open surface in air. The angle of incidence is θ°, which is less than the critical angle. Then there will be

A. only reflected ray and no refracted ray.

B. only refrated ray and no reflected ray.

C. a reflected ray and a refracted ray.and the angle between them would be less than 180-theta

D. a reflected ray and a refracted ray.and the angle between them would be greater than 180-theta

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60. The critical angle i_C is given is given by [n is the refractiveindex of optically denser medium with respect to air]

A. $i_C = \sin^{-1}(n)$

B. $i_C = \sin^{-1}\frac{1}{n}\Big)$

C. $i_C - \frac{1}{2}\sin^{-1}(n)$

D. $i_C = 2\sin^{-1}\left(\frac{1}{n}\right)$

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61. Critical angle of light passing from glass to air is maximum for _____

A. red

B. green

C. yellow

D. violet

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62. The refractive index of a medium with respect to air the critical angle 60° is given by

A. 1.6

B. 1.5

C. 1.2

D. 1.15

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63. The critical angle for total internal reflection in diamond is 24.5° The refractive index of the diamond is

A. 2.41

B. 1.41

C. 2.59

D. 1.59

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64. The principle used in optical fibre is __________.

A. scattering

B. successive reflections

C. refraction

D. total internal reflection

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65. Optical fibre consists of large number of

A. extremely thin fibres of fine quality glass or quartz.

B. extremely thin fibres of metal with high ductility.

C. extremely fine fibres of wood with very high plished surface.

D. thick fibres of fine quality glass or quartz.

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66. Consider telecommunication through optical fibres. Which of the following statement is not ture?

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 inerference from outside.

D. Optical fibres have extremely low transmission loss.

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67. When a light is incident at one end of the fibre at a small angle, then refracted light falls on the wall of the fibre at an angle

A. equal to critical angle.

B. greater than 90°

C. equal t 0°.

D. greater than critical angle.

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68. The light entering into the fibre suffers

A. number of reflections.

B. total internal reflections.

C. number of refractions.

D. multiple refractions.

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69. If I is the intesity of light entering into the optical fibre and I_C is that emerging from the fibre then

A. $I \approx I_e$

B. $I < \; < I_e$

C. $I > \; > I_e$

D. $I_e \approx \frac{I}{2}$

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70. In periscopes, totally reflecting prisms are used which turns the ray through

A. 180°

B. 90°

C. 270°

D. 45°

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71. While deriving expression for refraction at single curved, surface, the object is ocnidered as

A. linear object

B. thick object

C. point object

D. any size object.

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72. The correct expression for refraction at single convex spherical surface separating two media of refractive indices μ_1 and $\mu_2(\mu_2 > \mu_1)$ and radius of curvature

R is (u and v are object, image distane respectively)

A. $\frac{n_1}{u}$ - frac(n_2)(v) = frac((n_1 - n_2))(R)`

B. $\frac{n_1}{v} - \frac{n_2}{u} = \frac{(n_1 - n_2)}{R}$

C. $\frac{n_2}{u} - \frac{n_1}{v} = \frac{(n_2 - n_1)}{R}$

D. $\frac{n_2}{v} - \frac{n_1}{u} = \frac{(n_2 - n_1)}{R}$

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73. The reciprocalof $\left(\frac{\mu_2-\mu_1}{R}\right)$ gives the value of

A. focal length of curved surface.

B. power of surface

C. refractive index of surface

D. radius of curvature of surface.

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74. A point object is situated in air at a distance of 20 cm from a convex refracting surface of 5cm radius. The position of the image is $[\mu = 1.5]$

A. 40 cm

B. 30 cm

C. 25 cm

D. 15 cm

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75. The focal length of a lens depends upon

A. radii of curvatures of two surface only.

B. refractive index of the lens material only.

C. length of the lens.

D. both radii of curvatures of two surfaces and refractive index of the lens material.

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76. The lense formula with normal notation is given by

A. $\frac{1}{V} - \frac{1}{u} = \frac{1}{f}$

B. $\frac{1}{u} - \frac{1}{v} = \frac{1}{f}$

C. $\frac{1}{u} - (1)(f) = \frac{1}{v}$

D. $\frac{1}{v} + \frac{1}{f} = \frac{1}{u}$

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77. The lens maker's equation is given by

A. $\frac{1}{f}=\left(\frac{n_1}{n_2}-1\right)\left(\frac{1}{R_1}+\frac{1}{R_2}\right)$

B. $\frac{1}{f}=\left(\frac{n_2}{n_1}-1\right)\left(\frac{1}{R_1}+\frac{1}{R_2}\right)$

C. $\frac{1}{f}=\left(\frac{n_2}{n_1}-1\right)\left(\frac{1}{R_1}-\frac{1}{R_2}\right)$

D.

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78. For convex lens, the radii of curvatures of the first and second surface are R_1 and R_2 respectively. Using new Cartesian sign conventions they are

A. $-R_1, \ -R_2$

B. $-R_1, \ +R_2$

C. $+R_1, \ +R_2$

D. $+R_1, \ -R_2$

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79. A beam of light is incident on a convex lens nparallel to its principal axis. As one moves away from the optical centre of the lens on its other side the intensity of light

A. continuously decreases.

B. first decreases and then increases.

C. continuously increases.

D. first increases and then decreases.

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80. An object is kept at 0.2 m from a convex lens of focal length of 0.15 m. the position of the image is

A. 0.3 m

B. 0.6 m

C. 8 m

D. 11.6m

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81. A convex lens of focal length f produces a real image 3 times as that of size of the object, the distance between the object and the lens is

A. $-\left(\frac{2f}{3}\right)$

B. $-\left(\frac{3f}{4}\right)$

C. $-\left(\frac{4f}{3}\right)$

D. $-\left(\frac{3f}{2}\right)$

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82. when an object is kept in frnt of a convex lens the distance between it and the real image is 54 cm. if the magnification produced is 2, the focal length of the lens is

A. 4 cm

B. 6 cm

C. 12 cm

D. 24 cm

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83. What is the focal length of double convex lens for which radius of curvature of either of the surfaces is 30 cm? $\left[{}_{a}\mu_{g}=1.5\right]$

A. 50 cm

B. 30 cm

C. $-30cm$

D. $-50cm$

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84. A plano-convex lens has focal length of 20 cm. the radius of its spherical suface is $\left({}_{a}\mu_{g} = 1.5\right)$

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85. The focal length of concave lens, accroding to new Cartesiaon sign conventions is

A. negative.

B. positive.

C. can be negative only for object kept between opotical centre and focus.

D. can be positive only for object kept between optical centre and focus.

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86. A diverging lens may NOT have ______

A. positive focal lenth

B. negative focal length

C. one plane surface

D. one convex surface.

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87. A concave lens of focal length f produces an image $\frac{1}{4}$ of the size of the object, the object should be kept at ____ from the lens.

A. 2f

B. 3f

C. 4f

D. 5f

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88. A concave lens has radioi of curvatures of 20 cm and 30 cm respectively. If the refrative index of the material of lens is 1.6 it focal length is given by

A. $-30cm$

B. $-25cm$

C. $-20cm$

D. $-10cm$

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89. The radius of curvature of each surface of a biconcave lens made up of glass of refrative indx 1.5 is 30 cm. the focal length of the lens is

A. 60 cm

B. 30 cm

C. $-30cm$

D. $-60cm$

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90. A single lens, which will form the image of a given object at the same point as it formed by the combination of twoor more thin lenses, is calles as _____

A. equivalent lens

B. added lens

C. concave-convex lens

D. convexo-concave lens

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91. Two thin lenses may be combined so as to

A. produce diminished image.

B. produce magnified image.

C. produce virtual image.

D. cancel images and no image is formed.

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92. Two thin lenses with focal lenghts f_1 and f_2 make a lens of focal length f given by

A. $f = f_1 + f_2$

B. $\frac{1}{f} = \frac{1}{f_1} + \frac{1}{f_2}$

C. $f = \frac{f_1}{f_2}$

D. $f = \frac{f_2}{f_1}$

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93. Two thin converging lenses of focal length 15 cm and 30 cm are held in contact with each other. The focal length of the combination is

A. 45 cm

B. 15 cm

C. 10 cm

D. 9 cm

94. What is the focal of the combination of a convex lens of focal length 30 cm in contact with a concave lens of focal length 20 cm ?[Igonre thickness of the lennses]

A. 30 cm

B. $-10cm$

C. $-20cm$

D. $-60cm$

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95. Two thin lenses, aone convex of focal length 10 cm and other concave lens are kept in contact to form a composite lens of focal length 13 cm . If the combination acts as a converging lense the focal length of second lens is

A. $-43.33cm$

B. $-5.65cm$

C. $+5.65cm$

D. $+43.\ 33cm$

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96. Two lenses of power +12and-2 dioptres are placed in contact. What will focal length of combination?

A. 10 cm

B. 12.5 cm

C. 16.6 cm

D. 8.33 cm

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97. When two or more lnses of magnification m_1, m_2, m_3 are kept in contact, the total magnification (m) produced is given by

A. `m = m_1 + m_2 + m_3 + _________

B. `m = m_1 + m_2 - m_3 - m_4 _____

C. `m = frac(m_1m_2)(m_3) + frac(m_2m_3)(m_4) + _________

D. `m = m_1 xx m_2 xx m_3 xx _____

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98. The separation of whtie light into its constituent colours after passing through a prism is called as ______ of light.

A. deviation

B. refraction

C. scattering

D. dispersion

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99. A _______ shaped triangular transparent block havin three rectangular planes and two triangles planes is called is prism.

A. wedge

B. hexagonal

C. polygonal

D. ellipsoidal

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100. The angle between the two-plane rectangular refracing surface of a prism is called________.

A. refracting angle of the prison

B. angle of refraction

C. reflecting angle of the prism

D. dispersion angle

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101. The rectangular face opposite to the refracting edge is called __________.

A. refracting surface.

B. base of prism

C. intersection of base and one of the refracting surface

D. principle section of a prism.

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102. The refractivity of the material of the prism is given by

A. n

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

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

D. (n -1)

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103. A glass prism placed in a homogeneous transparent medium will deviate an incident ray

A. always towards its base.

B. always away from its base.

C. toward its base, only if the medium has a refractive index greater than that of glass.

D. towards the base, only if the medium has a refractive index less than that of glass.

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104. As the refractive index of the material of prism for different colours increases their corresponding wavelength __________.

A. decrease

B. increases

C. remains the same

D. depends on frequency

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105. When while light passes through prism then constituent colours are obtained because

A. different colours are due to different velocities and different wavelengths.

B. different colours are due to same velocity and different wavelengths.

C. different colours are already present in prism.

D. same colour appears different due to different frequency in another medium.

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106. A prism splits a beam of white light into its constituent colours. This is because.

A. phase of different colours is different.

B. amplitude of different colours is different.

C. energy of idfferent colours is different.

D. velocity of different colours is different.

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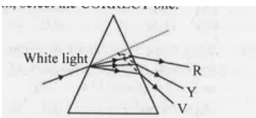
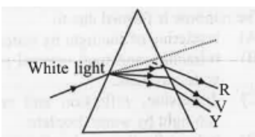
107. Dispersion of light is shown in the following diagram, select the CORRECT one.

A.

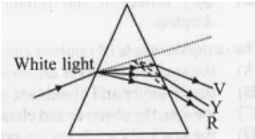
B.



C.



D.



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108. The angle between incident ray and ___________ ray is called angle of deviation.

A. reflected

B. refracted

C. emergent

D. normal

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109. When white light passes through prism, the angle of deviation is

A. maximum for red and minimum for violet.

B. maximum for yellow and minimum for red.

C. maximum for yellow and minimum for violet.

D. minimum for red and maximum for violet.

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110. While deriving prism formula, angle of deviation is minimum if

A. angle of incidence is equal to angle of deviation.

B. angle of incidence is equal to angle of refraction.

C. angle of incidence is equal to refracting angle of prism.

D. angle of emergence and angle of incidence are equal.

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111. 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 emergent angle is 90°.

D. equal to the emergent angle.

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

A. 30°

B. 60°

C. 100°

D. 120°

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113. The relation between i,e, A and δ for prism is

A. $i+e=\frac{A+\delta}{2}$

B. $i=A+\delta+e$

C. $A = ie + \delta$

D. $i + e = A + \delta$

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114. 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°

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115. 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°

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116. A parallel beam of monochromatic light is incident on one surface of an 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. zero

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117. A prism of a 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 μ of material is

A. 1.82

B. 1.503

C. 1.414

D. 1.231

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118. Thin prism has small _______.

A. angle of incidence

B. Refractive index

C. angle od reflection

D. refracting angle

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119. A prism of angle 4° gives a deviation of 2.4°. The refractive index of the material of the prism is

A. 1.5

B. 1.55

C. 1.6

D. 1.8

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120. Angular dispersion depends upon

A. refracting angle of the prism.

B. refractive index of the prism.

C. velocity of light in the prism.

D. both (A) and (B).

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121. Which of the following of CORRECT statement?

A. The dispersive power depends upon the angle of prism.

B. The angular dispersion depends upon the refracting angle of the prism.

C. The angular dispersion does not depend upon the dispersive power.

D. The dispersive in vaccum is one.

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122. The net angular dispersion produced without deviation for crown glass (n = 1.56) and flint glass (n = 1.7) is

A. positive

B. zero

C. negative

D. infinite

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123. The refractive index of glass is 1.520 for red light and 1.525 for blue light. Let 'delta_r' and 'delta_b' be the angle of minimum deviation for red and blue light respectively in a prism of thin glass, then

A. $\delta = \delta_b$

B. $\delta_r > \delta_b$

C. $\delta_r < \delta_b$

D. both (A) and (B).

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124. The angular dispersion produced by a prism of angle 5° is $[n_V = 1.665, n_r = 1.645]$

A. 2°

B. 1°

C. 0.2°

D. 0.1°

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125. 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°

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126. A spectrum is formed by a prism of dispersive power ω. If the angle of deviation is δ. Then the angular dispersion is

A. $\frac{\omega}{\delta}$

B. $\frac{\delta}{\omega}$

C. $\frac{1}{\delta\omega}$

D. $\omega\delta$

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127. Dispersive power depend upon

A. the shape of prism.

B. material of prism.

C. angle of prism.

D. height of the prism.

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128. The dispersive power (ω) of the material of prism is given by

A. $\omega = \dfrac{A}{n_v - n_r}(n_y - 1)$

B. $\omega = \dfrac{n_v - n_r}{A(n_y - 1)}$

C. $\omega = \dfrac{n_v + n_r}{n_y - 1}$

D. $\omega = \dfrac{n_v - n_r}{n_y - 1}$

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129. The refractive index of the prism for violet colour is 1.7 and that for red is 1.65. Then dispersive power of the material of prism is

A. 0.74

B. 0.074

C. 0.054

D. 0.015

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130. Mirage' is a phenomenon due to

A. reflection of light.

B. refractin of light.

C. total internal reflection of light.

D. diffraction of light.

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131. The rainbow is formed due to

A. scattering of sun light by water droplets

B. refraction and total internal reflection by water droplets.

C. dispersion, reflection and refraction of sun light by water droplets.

D. only reflection and refraction by water droplets.

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132. The complete circle of rainbow can be seen when

A. the sun and observer are co-axial.

B. the observer and clouds are co-axial.

C. the sn, the observer and clouds are co-axial.

D. the un and clouds are co-axial.

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133. To observe any rainbow the altitude of sun or the angle made by the sun with the horizontal should be ________.

A. less than 42°

B. greatr than 42°

C. $between$45^@ $\rightarrow$ 50^@`

D. between 60° to 63°

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134. The primary rainbow is due to ______ internal reflection inside droplet and two refractions.

A. one

B. two

C. three

D. infinite

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135. Angular width of primary rainbow is

A. 2°

B. 3°

C. 5°

D. 6°

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136. The average angle of inclination of the primary rainbow with the axis is

A. 40°

B. 41°

C. 42°

D. 43°

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137. In case of secondary rainbow, __________ colour is at the top.

A. red

B. orange

C. violet

D. pink

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138. The secondary rainbow is due to _______ internal reflection inside droplet.

A. one

B. two

C. three

D. four

Watch Video Solution

139. The straight line joining the sun and the observer along which centre of both the primary and secondary rainbow lies is called

A. axis of rainbow.

B. principal line of rainbow.

C. radius of secondary rainbow.

D.

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140. Pick the correct statement from the following.

A. Primary rainbow is a virtual image and secondary rainbow is a real image.

B. Primary rainbow is a real image and secondary rainbow is a virtual image.

C. Both primary and secondary rainbows are virtual images.

D. Both primary and secondary rainbows are real images.

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141. Rays of different colours fail to converge to a point after passing through a converging lens. This defect is called________.

A. distortion

B. spherical aberration

C. chromatic aberration

D. circle of confusion

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142. What causes chromatic aberration?

A. Central rays

B. Marginal rays

C. Difference in radii of curvatureof its surfaces.

D. Variation of focal length of a lens with colour.

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143. Achromatic combination can not be achieved by using

A. two thin convex lenses with proper separation.

B. two thin concave lenses with proper separation.

C. a convex and a concave lens in contact.

D. all of the above.

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144. An achromatic combination of lenss produce.

A. real and diminished images.

B. high resolution images.

C. highly magnified images.

D. images unaffectd by changes in wavelength.

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145. In presence of _______ aberration, circular image is formed of a point.

A. chromatic

B. achromatic

C. spherical

D. singular

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146. Spherical aberration of a convex and a concave lens respectively is

A. positive, negative

B. negative, positive

C. zero, positive

D. positive, zero

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147. An optical instrument , in general, extends our range of vision by

A. making the incident rays subtend a larger angle at the eye.

B. making the incident rays subtend a larger angle at the eye.

C. producing inverted image.

D. producing real image.

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148. The least distance of distinc vision for a young adult with normal vision is _____

A. 25 m

B. 2.5 m

C. 25 cm

D. 2.5 cm

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149. A norml eye is unable to see objects at a distance less than distance of distinct vision. If is because

A. the focal length of the eye-lens is equal to the distance of distinct vision.

B. The distance between eye-lens and retina is equal to distance of distinct vision.

C. the eye-lens cannot decrease its focal length beyond a limit.

D. the eye-lens cannot decrease its distance from the retina beyond a limit.

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150. The clearity of image formed on retina of eye depends on the _____

A. visual angle

B. environmental conditions.

C. distance of eye-lens from retina.

D. material of the object whose image is observed.

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151. A convex lens of the short focal length held very close to the eye, to observed minute objects clearly is called as _____

A. compound microscope

B. telescope

C. simple microscope

D. special effect camera

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152. The magnifying power of simple microscope is

A. directly proportiona to object distance.

B. directly proportional to object distance.

C. inversely proportional to square of its focal length.

D. inversely proportional to its focal length.

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153. A perosn using a lens as a simple microscope sees an

A. inverted virtua image.

B. inverted real image.

C. upright virtual image.

D. upright real magnified image.

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154. The magnifying power of simple microscope, when image is formed at DDV, is (where f is its focal lengths of)

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

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

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

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

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155. Magnification of simple microscope when image is at infinity is given by

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

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

C. $\frac{L}{f_0}, \frac{D}{f_0}$

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

Watch Video Solution

156. The magnifying power of simple microscope is maximum when image is formed at _____

A. infinity

B. focus

C. twice the focus

D. D.D.V

Watch Video Solution

157. When a convex lens of 2.5 cm focal length is used as a magnifying glass, normal eye can see an object clearly at a distance of 25 cm. The magnifying power of the instrument is

A. 110

B. 100

C. 11

D. 10

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158. The compound microscope is used to see

A. large objects at infinity.

B. small objects at infinity.

C. large objects near objective.

D. small objects near objective.

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159. Compound microscope is NOT used in

A. travelling microscope in physics laboratory

B. pathology laboratories.

C. science to study details of plant tissues.

D. watch repairing industry.

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160. The focal length of the eye-piece of compound microscope is

A. greater than the focal length of objective.

B. less than the focal length of objective.

C. equal to focal length length of the objectives.

D. arbitrary

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161. In 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.

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162. The length (L) of compound microscope when final image is formed at D.D.V. is given by

A. $(v_0 + u_e)$

B. $(v_0 - u_e)$

C. $(u_0 + v_0)$

D. $(u_0 + u_e)$

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163. When the final image is formed at infinity the magnifying power of compound microscope is (using new Cartesian sign conventions)

A. $-\left(\frac{v_0}{u_0}\right)\left(\frac{D}{f_e}+1\right)$

B. $\left(\frac{v_0}{u_0}\left(\frac{d}{f_e}\right)\right.$

C. $-\left(\frac{u_0}{v_0}\left(\frac{D}{f_e}-1\right)\right)$

D. $-\left(\frac{u_0}{v_0}\left(\frac{D}{f_e}\right)\right)$

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164. Which of the following is NOT an expression for magnifying power of compound microscope when final image is formed at distance of distinct vision ? (using new Cartesian sign conventions)

A. $\left(\frac{v_0}{u_0}\left(\frac{D}{u_e}\right)\right.$

B. $\left(\frac{v_0}{u_0}\left(\frac{D}{f_e}+1\right)\right)$

C. $-\left(\frac{f_0}{u_0-f_0}\left(\frac{1+\frac{D}{f_e}}{}\right.\right.$

D. $\left(\frac{f_0}{u_0-f_0}\left(\frac{D}{f_e}\right.\right.$

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165. A compound microscope has a magnifying power of 35. Assume that the final image is formed at DDV (25 cm). If the focal length of eyepiece is 8 cm, the magnification produced by objective is

A. 1.3

B. 8.48

C. 14.12

D. 12.84

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166. 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.

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167. The object which are at large distance as compared to the focal length of lens (greater than $10 \times f$) are referred as _____

A. decade objects

B. neares objects

C. distant objects

D. unpredictable objects.

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168. The number of lenses in a terrestrial telescope is

A. two

B. three

C. four

D. six

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169. The objective of astronomical telescope has

A. large aperture and large focal length.

B. small aperture and small focal length.

C. small aperture and large focal length.

D. large aperature and small focal length.

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170. In astronomcial telescop, which of the following statement is NOT applicable ?

A. The telescope is very heavy and bulky.

B. The telescope suffers spehrical aberraton.

C. The telescope suffers chromatic aberration.

D.

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171. The intermediate image fomred by the objective is

A. in the focus plane of objective.

B. beyond the focus of eye-piece.

C. at twice the distance of focal length of eye-piece.

D.

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172. To see terrestiral objects, the final image must be ______

A. inverted and magnified

B. diminished, inverted and magnified

C. real, erect and dimished

D. vitual erect ad magnified.

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173. Whan a _____ is introduced between objective and eye piece of telescope then it can be used as a terrestrial telescope.

A. concave lens

B. concave mirror

C. convex lens

D. convex mirror

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174. When as tronomical telescope is adjusted for normal adjustment the finla image is formed at

A. infinity

B. D.D.V. from eye piece.

C. D.D.V. from objective.

D. focus of eye-piece.

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175. 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 apertre 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.

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176. The length (L) of the astronomical telescope, for normal adjustment is

A. $\left(\frac{f_0+f_e}{2}\right)$

B. $\left(\frac{f_0-f_e}{2}\right)$

C. $f_0 \times f_e$

D. (f_0+f_e)

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177. The focal length of objective and eye-piece of astronomical telescope are 2 m and 5 cm respectively. The magnifying power of telescope when final image is formed at infinity is

A. 40

B. 50

C. 80

D. 100

Watch Video Solution

178. Magnifying power of an astronomical telescope is M.P. If the focal length of the eye-piece is doubled, then its magnifying power will become

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

B. $\sqrt{2}M$

C. $2M$

D. $3M$

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179. An astronomical telescope has an agular magnification of magnitude 5 for distant objects. The separation between the objective and the eye piece is 36 cm and the final image is formed at infinity. The focal length f_o of the objective and the focal length f_e of the eye piece are

A. $f_0 = 45cm$ and $f_e = -9cm$

B. $f_0 = 7.2cm$ and $f_e = 5cm$

C. $f_0 50cm$ and $f_e = 10cm$

D. $f_0 = 30cm$ and $f_e = 6cm$

Answer: $f_0 30cm$ and $f_e = 6cm$

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180. An astronomical telescope of ten fold angular magnification has length of 44 cm. the focal length of object is

A. 4 cm

B. 40 cm

C. 44 cm

D. 440 cm

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181. A completely trasnparent material will be invisible in vaccum when its refractive index μ is ________.

A. unity

B. more than unity

C. less then unity

D. equal to 1.33

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

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183. 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 mirros inclind at an angle of 90°

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184. The magnifying power of simple microscope is 6 when the image is formed at distance of distinct vision (25 cm) from its optical centre. The focal power of the simple microscope in dipotre is

A. -20

B. -2

C. 2

D. 20

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185. The refractive index of glass is minimum for

A. red light

B. green light

C. yellow light

D. violet light

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186. The ratio of the refactive index of red light to that of blue light in air is ________.

A. less than unity

B. equal to unity

C. greater than unity

D. less or greater than unity, depending upon the experimental arrangement.

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187. Ray optics is based on:

A. Transverse nature of light.

B. Light travels with very high speed.

C. Rectilinear propagation as well as two or more rays can intersect at a point without affecting their path beyond that point.

D. Light does not need material medium to travel.

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188. Light exhibits.

A. wave nature.

B. particle nature.

C. dual nature.

D. continuous nature.

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189. Light from a point source travel in a straight line with a very high speed hence

A. casts off a sharp shadow of an opaque object.

B. reflected from a rough surface.

C. absorbed in the medium.

D. deviated when incident on an opagque object.

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190. Assertion: The frequencies of incident, reflected and refracted beam of monochromatic light incident from one medium to another are same.

Reason: The incident, reflected and refracted rays are coplanar.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion.

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion.

C. Assertion is True, Reason is False.

D. Assertion is False, Reason is False.

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

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

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

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

D. $\mu\left(\hat{i} \times \widehat{n}\right) = \hat{r} \times \widehat{n}\Big)$

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192. If $2\mu_1 \times_3 \mu_2 \times_4 \mu_3$ is equal to

A. $3\mu_1$

B. $3\mu_2$

C. $\dfrac{1}{1\mu_4}$

D. $4\mu_1$

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193. A ray of light incident on a glass slab of refractive index $\frac{3}{2}$, travels a distance of 6 cm in glass in time (t). What will be the distance travelled by the ray in the same time (t) if it travels in air?

A. 2 cm

B. 3 cm

C. 6 cm

D. 9 cm

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194. Velocity of light in air is $3 \times 10^{8} m/s$ and refractive index of water is 1.33. The time taken by light to travel a distance of 500 m in water is

A. $1.25 \mu s$

B. $2.22 \mu s$

C. $12.5 \mu s$

D. $22.6 \mu s$

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195. Rays of light fall on a glass plate, the refractive index of which is n. If the angle between the reflected and refracted rays is 90°, then the angle of incidence is

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

B. $\cos^{-1}(n)$

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

D. $\tan^{-1}(1/n)$

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196. 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

$[\mu_{oil} = 1.45, \mu_{water} = 1.33]$

A. 36.1°

B. 44.5°

C. 26.8°

D. 28.9°

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197. One side of a glass slab is silvered as shown in figure. A ray of light is incident on the other side at angle of incident $i = 30^\circ$. Refractive index of glass is given as 1.5 the deviation of the ray of light from its intial path when it comes out of slab is

A. 90°

B. 30°

C. 120°

D. 60°

198. If two plane mirrors are parallel to each other, the object lying between them will have (n) number of images given by

A. n = 0

B. n = 1

C. n = 3

D. $n = \infty$

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199. A plen mirrore, reflecting a ray of incident light, is rotated through and angle θ about an axis through the point of incidencein the plane of the mirror and perpendicular to the plane, the refrlected ray

A. does not rotate.

B. rotates through an angle $\left(\frac{\theta}{2}\right)$.

C. rotates through an angle θ.

D. rotates through an angle (2θ)

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200. How will you arrange the two plane mirros so that whatever may be the angle of incidence, the incident ray and the reflected ray from the two mirrors will be paralle to each other ?

A. The two plane mirros should be parallel toeach other.

B. The two plane mirros should be inclined at an angle of 30°

C. The two plane mirrors should be inclined at an angle of 30°

D. The two plane mirros should be inclined at an angle of 45°.

Answer: The two plane mirros should be perpendicular to each other.

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201. In case of reflection from curved surface

A. the normal is considered to be tangent to the spherical surface at the point of incidence.

B. the normal is considered to be drawnat the pole of the spherical surface only.

C. the normal is the principal axis only.

D. the normal is not required.

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202. A concave mirror is placed on a horizontal table with its axis vertically upward. Let O be the pole of the mirror and C be the cenre of curvature. A point object placed at C, froms real image at C. if the mirror is now filled with water, the image will be

A. real and remain at C.

B. real and located at a point between C an infinity.

C. virtal and located at a point between C and O.

D. real and located at a point between C and O.

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203. A boy and lamb post are 80 m away from a concave mirror of focal length 20 cm. the boyd walks 40 m towrds the mirror. The boy will see

A. his image inverted and same size while that of the lamp post as inverted and diminished.

B. inverted and diminished images of both himself and the lamp post.

C. his image inverted and enlarged while that of the lamp post as inverted and same size.

D. his image is erect and enlarged while that of the lamp post as inverted and same size.

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204. A person standing 12 cm away from mirror A of focal length 10 cm see his image inverted and enlarged. When the mirror A is replaced by mirror B of same focal length the person observes diminished and erect image. Mirrors A and B are respectively.

A. concave and plane.

B. concave and convex.

C. convex and plane.

D. convex and concave.

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205. In a concave mirror experiment, an object is placed at a distance x_1 from the focus and the image is formed at a distance x_2 from the focus. The focus length of the mirror would be

A. $x_1 x_2$

B. $\sqrt{x}_1 x_2)$

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

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

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206. A square wire of side 3 cm is placved 25 cm away from a concave mirror of focal lengthn 10 cm. What is the area enclosed by the iamge of the wire ? [The centre of the wire lies on te axis of the mirror, with its two sides normal to the axis]

A. $2cm^2$

B. $4cm^2$

C. $6cm^2$

D. $8cm^2$

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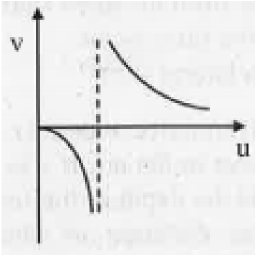
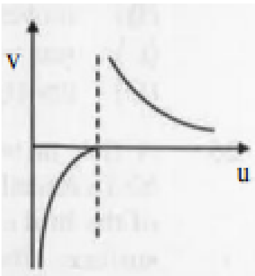
207. As the position of a object (u) reflected fro a concave mirror is varied, the position of the image (v) also varies. By lettiong the u change from 0 to $+\infty$ the graph between v versus u will be

A.



B.



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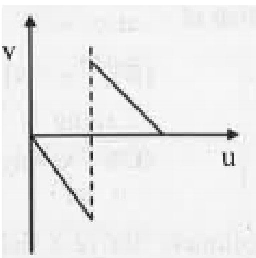

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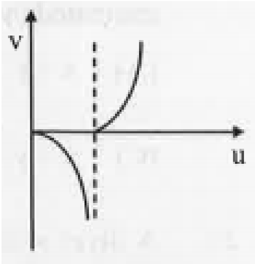

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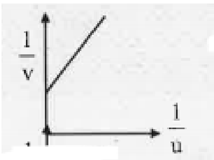
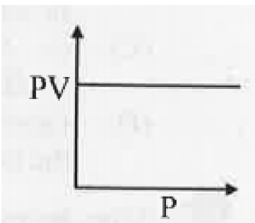
208. An object is placed at a distance u from a concave mirror and its real image is formed on the screen placed at distance v from the mirror. If f is the focal length of the mirror, then the graph between $\frac{1}{v} versus \frac{1}{u}$ is (magnitude only)

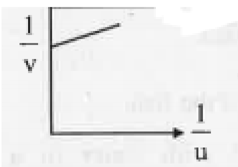
A.



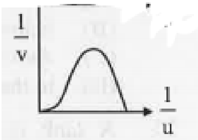
B.



C.



D.



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209. An object is placed in front of a convex mirror at a distance of 50 cm. A plne mirror is introduced convering the lower half of the convex mirror.if the distance between the object and the plane mirror is 30 cm, it is observed that the images formed by two mirrors coicide (n o parallax). The radius of curvature of the convex mirror is

A. 12.5 cm

B. 15.0 cm

C. 25 cm

D. 30.0 cm

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210. The refractive index of glass W.t.r. a medium is $\frac{4}{3}$. If $v_m - vg = 6.25 \times 10^7$ m/s. then the velocity of light in the medium will be

A. 2.5 xx 10^8 m//s`

B. $1.5 \times 10^7 m / s$

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

D. $4.5 \times 10^7 m / s$

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211. A glass-slab is placed in the path of convergent light. The point of convergence of light_____

A. moves towards the glass slab.

B. moves away from the glass slab.

C. remains at the same point.

D. undergoes a lateral shift.

Watch Video Solution

212. A fish in water (refractive index n) looks at a bird vertically above in the air. If y is the height of the bird and x is the depth of the fish from the surface, then the distance of the bird as estimated by the fish is

A. $x+y\left(1+\frac{1}{n}\right)$

B. $y=x\left(1-\frac{1}{n}\right)$

C. $x+y\left(1-\frac{1}{n}\right)$

D. $x+ny$

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213. A diver swims oblquely above a fish in water If he wants to hit the fish, he must aim

A. at the fish.

B. below the fish.

C. above fish.

D. to the left of the fish.

Watch Video Solution

214. A tank is filled with water to height of 12.5 cm. The apparent depth of a needl lying at the bottom of the tank is measured by a microscope to be 9.4 cm. 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. 1.33, 1.7 cm

B. 1.7, 1.33 cm

C. 1.33, 7.7 cm

D. 1.7, 7.7 cm

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215. A vessel of depth 2d cm is half filled with liquid of refractive index μ_1 and the upper hlaf with a liquid of refractive indexμ_2 . The apprent depth of the vessel seen perpendicular is

A. $d\left(\frac{n_1 n_2}{n_1 + n_2}\right)$

B. $d\left(\frac{1}{n_1} + \frac{1}{n_2}\right)$

C. $2d\left(\frac{1}{n_1 + \frac{1}{n_2}}\right)$

D. $2d\left(\frac{1}{n_2 n_2}\right)$

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216. A layer of oil 3 cm thick is flowing on a layer of coloured wtater 5 cm thick. Refractive index of coloured water is $\frac{5}{3}$ and the apparent depth of the two liquids appears to be $\frac{36}{7}$ cm . What is the refractive index of oil?

A. 1.4

B. 2

C. 2.4

D. 3

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217. A ray of light is incident on the surface of a glass plate of thichness t. if the angle of incidence θ is small, the emerging ray would be displaced sideways by an amount [take n = refractive index of glass]

A. $\mathbf{h}\eta n / (n+1)$

B. $\mathbf{h}\eta(n_1) / n$

C. $\mathbf{h}\eta n / (n-1)$

D. $\mathbf{h}\eta(n+1) / n$

Watch Video Solution

218. How much water should be filled in a container 21 cm in height, so that it appaers half filled when viewed from the top of the contaier?

[Given that : ${}_{a}\mu_{w} = \dfrac{4}{3}$]

A. 8.0 cm

B. 10.5 cm

C. 12.0 cm

D. 14.0 cm

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219. As 'i' increases, intensity of

A. reflected light gradually decreases and that of refracted light gradually increases.

B. reflected and refracted light increases.

C. reflected light gradually increases and that of refracted light gradually decreases.

D. reflected light and refracted light both decreases

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220. Assertion : The image formed by total internal reflection are much brighter than those formed by mirrors or lenses.

Reason: There is no loss of intensity in total internal reflection

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion.

B. Assertion is True, Reason is True, Reason is not a correct explanation for

Assertion.

C. Assertion is True, Reason is False.

D. Assertion is False, Reason is True.

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221. Light travels from a medium of refractive index μ_1 to another of refractive index $\mu_2(\mu_1 > \mu_2)$. For total internal reflection of light, which is NOT true?

A. Light can travel from medium of refractive index $n_1 \rightarrow n_2$.

B. Angle of incidence must be greater than the critical angle.

C. There is no refraction of light.

D. Light can travel from the medium of refractiveindex $n_2 \rightarrow n_1$

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222. A diver in a swimming pool wants to signal his distress to a perosn lying on the edge of the pool by flashing his water proof flash light then,

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 wich is slightly less tahn he criticl angle of incidence.

D. he has to direct the beam at an angle to the vertical which is slightly more than the critical angle of incidence.

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223. A ray of light travelling inside a rectangular galss block of refractive index $\sqrt{2}$ is incident glass-air suface at an angle of incidence of 45°. The refractive index of air is one. 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°.

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224. 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. $\frac{1}{\sin i} < n$

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

C. $\sin i < n$

D. $\sin i > n$

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

A. yellow, orange and red.

B. violet, indigo and blue.

C. all colours.

D. all colours except green.

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226. With respect to air,critical angle in a medium for light of red colour $[\gamma_1]$ is θ. Other facts remaining same, critical angle for light of yellow colour$[\gamma_2]$ will be

A. θ

B. more than θ

C. $\leq ssthan\theta$

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

Watch Video Solution

227. A transparent solid cylindrical rod has a refractive index of $\frac{2}{\sqrt{3}}$. Itis surrounded by air. A light ray is incident at the mid-point of one end of the rod as shown in the figure.

The incident angle θ for which the light ray grazes along the wall of the rod is

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

B. $\sin^{-1}(\sqrt{3}/2)$

C. $\sin^{-1}(2/\sqrt{3})$

D. $\sin^{-1}(1/\sqrt{3})$

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228. Assertion: in optical fibre, the diameter of the core is kept small.

Reason: This smaller diameter fo the fibre should have incident angle more than the critical angle required for total internal reflection.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion.

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion.

C. Assertion is True, Reason is False.

D. Assertion is False, Reason is False.

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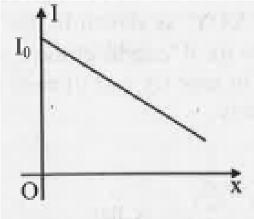
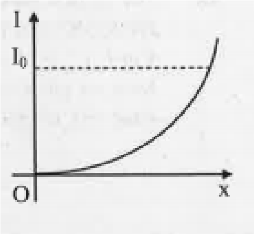
229. Transmission by optical fibres is an important method in communications. By total internal reflection, light is made to travel only along the core. However, the intensity falls-off exponentially with distance and is given by, $I = I_0^e - \alpha x$, where α is absorption coefficient. Then te correct graph for intensity vs distance is

A.



B.



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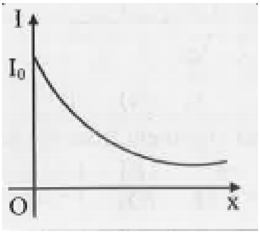

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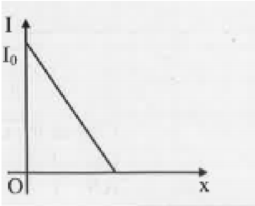

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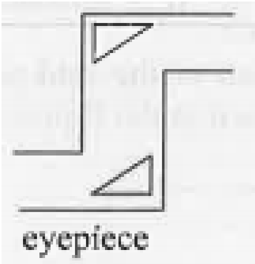
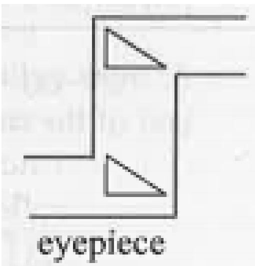
230. Which of the following diagrams shows the correct use of prisms in the periscope?

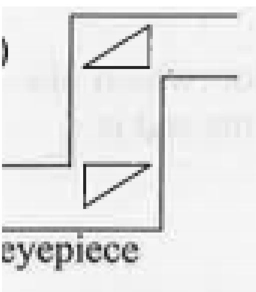
A.



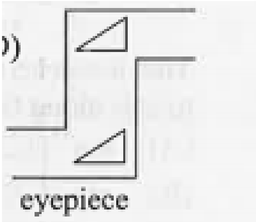
B.



C.



D.



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

A. 30 cm left

B. Infinity

C. 1 cm to the right

D. 18 cm to the left.

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232. A virtual cannot be caought on a screen, Yet when we see a virtual image, we bring it to the screen i.e., retina of our eye. This happnes because

A. we have two eyes.

B. eye lens is convergent.

C.

D. eye lens is divergent.

Answer: image on retina is in the form of electrical neural pulse.

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233. If two power of a thick lense is P_1 and that of a thin lens is P_2 then

A. $P_1 < P_2$

B. $P_1 = P_2$

C. $P_1 > P_2$

D. $P_1 = \frac{P_2}{2}$

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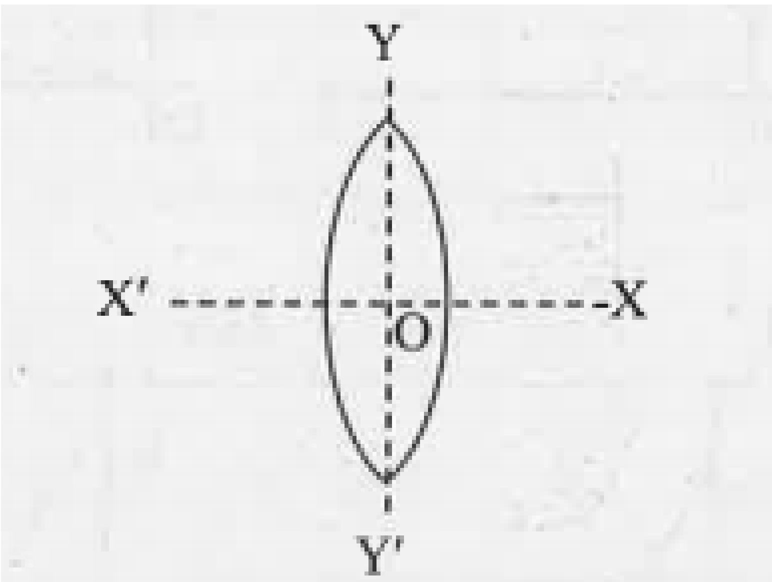
234. An equiconvex lens is cut into two halves along (i) XOX' and (ii) YOY' as shown in the figure. Let f, f ', f " be the focal lengths of the complete lens, of each half in case (i), and of each half in case (ii), respectively.



Choose the correct statement form the following.

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

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

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

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

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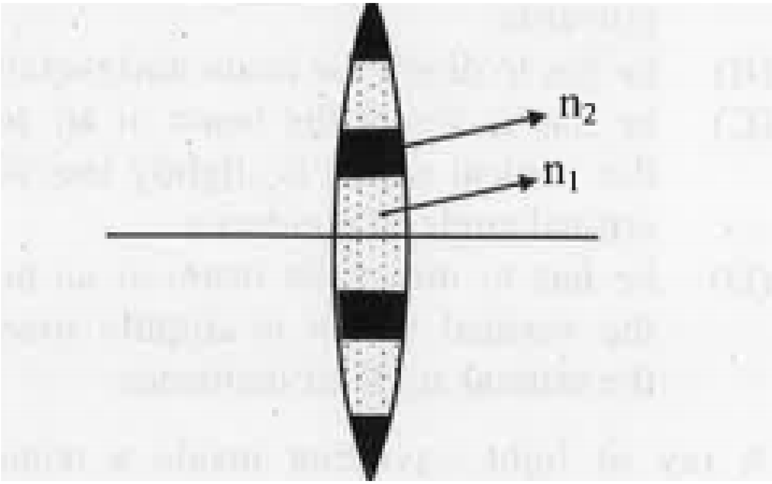
235. The lens shown in the figure drawn below is made of two different materials. A point object is placed on the axis. The number of images formed is ________.



A. zero

B. one

C. two

D. four

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236. An object is placed at a distance of $\frac{f}{2}$ from a convex lens of focal length. The image will be

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

B. at 2f and of same size.

C. at 2f, virtual and erect.

D. virtual and half its size.

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237. In an optics experiment, with the position of the object fixed, a student varies the position of a convex lens and for each position the screen is adjusted to get a clear image of the object. A graph between the object distance u and the image distance v, from the lens, is plotted using the same scale for the two axes. A straight line passing through the origin and making an angle of 45° with the x-axis meets the experimental curve at P. The coordinates of P will be

A. (2f, 2f)

B. $\left(\frac{f}{2}, \frac{f}{2}\right)$

C. (f,f)

D. (4f,4f)

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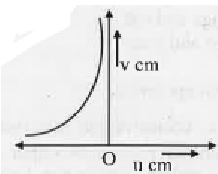
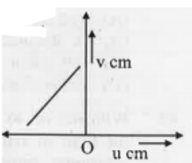
238. A student measures the focal length of a convex lens by keeping an object pin at a distance u from the lens and measuring the distance v of the image pin. The graph between v versus u plotted will look like

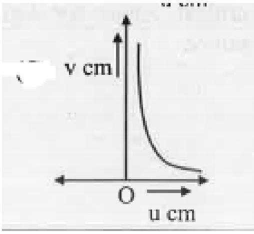
A.



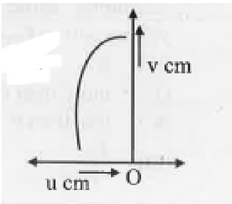
B.



C.



D.



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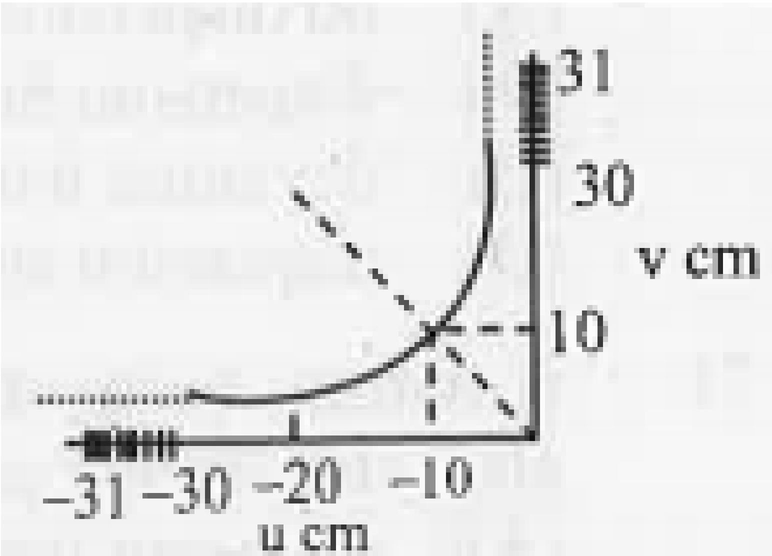
239. Graph of position of image vs position of point object from a convex lens is shown. Then, focal length of the lens is



A. $0, 50 \pm 0.05 cm$

B. $0.50 \pm 0.10 cm$

C. $5.00 \pm 0.05 cm$

D. $5.00 \pm 0.15cm$

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240. The distance between an object and the screen is 75 cm. When a convex lens of focal length 12 cm is placed in the between theobject and the screen, magnification of real formed can be (magnitude only)

A. 2

B. 4

C. 8

D. 16

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241. Convex lens made up of glass $(\mu_g = 1.5)$ and radius of curvature R is dipped into water. Its focal length will be (Refractive index of water =4/3)

A. 4R

B. 2R

C. R

D. R/2

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242. 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

convature at a distance L such that

A. L = 20 cm

B. L = 10 cm

C. L = 40 cm

D. $L = \frac{20}{3} cm$

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243. A convex lens of glass $(\mu = 1.5)$ has a focal length of 8 cm when placed in air. What is the focal length of lens when it is immersed in water $\left(\mu = \frac{4}{3}\right)$?

A. 8 cm

B. 20 cm

C. 30 cm

D. 40 cm

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244. The power of a thin convex lens $\left({}_a\mu_g = 1.5\right)$ is $+5.0D$. When it is placed in liquid of refractive index ${}_a\mu_l$ then it behaves as a concavelens of focal length 100 cm. the refractive index of liquid ${}_a\mu_i$ will be

A. 1.875

B. 1.68

C. $\sqrt{3}$

D. $\sqrt{2}$

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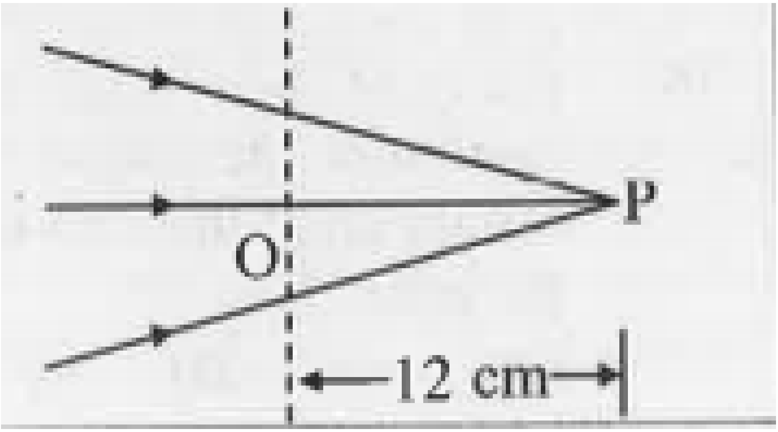
245. Figure given below shows a beam of light converging at point P. When a concave lens of focal length 16 cm is introduced in the path of the beam at a place O shown by dotted line such that OP becomes the axis of the lens, the beam converges at a distance x from the lens.

The value x will be equal to



A. 12 cm

B. 24 cm

C. 36 cm

D. 48 cm

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246. When two thin lenses are kept in contanct, the focal length of the combination is

A. the geometrical mean of the two focal lengths.

B. the same as the larger focal length.

C. greater than either focal length.

D. smaller than either focal length.

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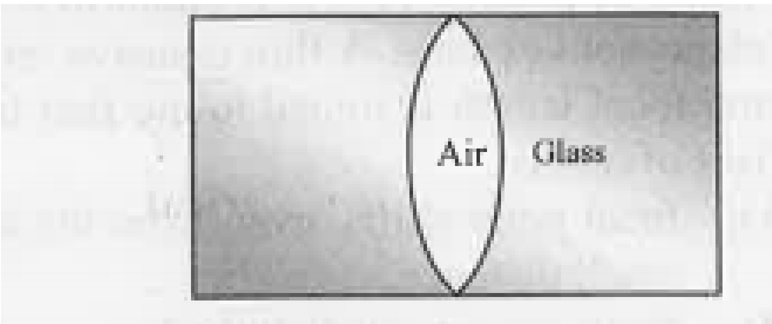
247. In the figure an air less of raddi of curvature 10 cm $(R_1 = R_2 = 10cm)$ is cut in a cylinder of glass (n = 1.5). The focal length and the nature of the lens is



A. 15 cm, concave

B. 15 cm, convex

C. `infty, neither concave nor convex.

D. 0, concave

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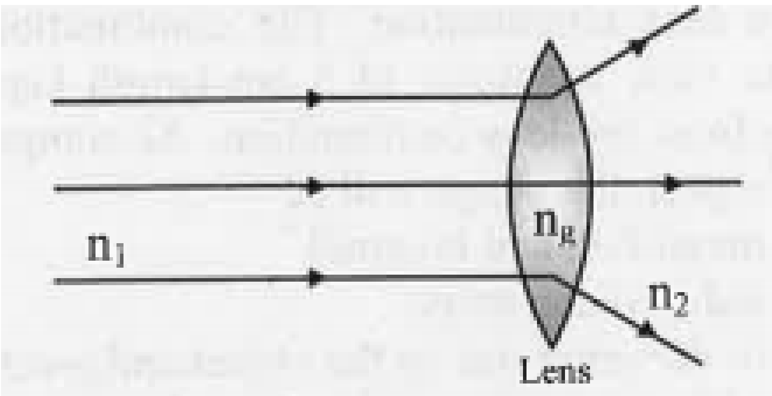
248. The ray diagram could be correct.



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.

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249. How does the magnification (m) of the real image formed by a lens vary with the distance (x) of the object from the focus of a concave mirror ?

A. $m \propto x$

B. $m \propto \frac{1}{x}$

C. $m \propto x^2$

D. $m \propto \frac{1}{x^2}$.

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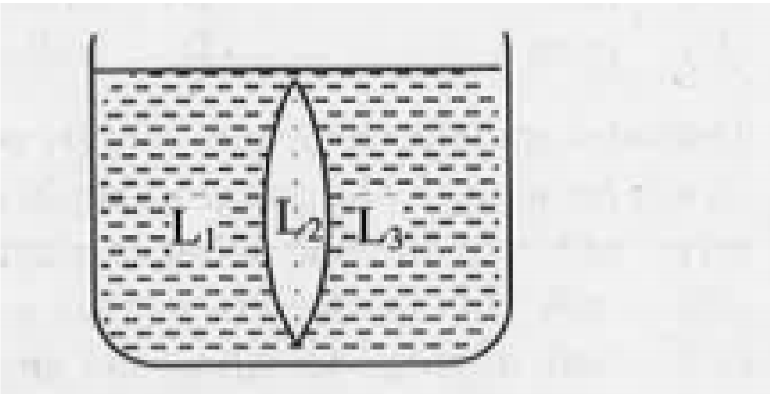
250. As shown in the figure, the liquids L_1, L_2 and L_3 have refractive indices 1.55, 1.50 and 1.20 respectively. Therefore, the arrangement corresonds to



A. a bi-convex lens.

B. a bi-concave lens.

C. a concavo-convex lens.

D. a convexo-concave lens.

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251. Twon similar plano-covexlenses are combined together in three different wayes as shown in the adjoining figure. The ratio of the focal lenghts in three cases will be

A. 0.084733796296296

B. 0.042372685185185

C. 0.043078703703704

D. 0.084039351851852

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252. A beam of parallel rays is brought to a focus by a plano-convex lens. A thin concave lens of the same focal length is joined to the first lens. The effect of this is

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

B. focus remains undisturbed.

C. focus shifts to infinity

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

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253. A concave and convex and have the same focal length of 20 cm and are placed in contact to form a lens combination. The combination is used to view an object of 5 length kept at 20 cm from the lens combination. As compared to the object, the image will be

A. magnified and invertd

B. reduced and erect.

C. of the same size as the object and erect.

D. of the same size as the object but inverted.

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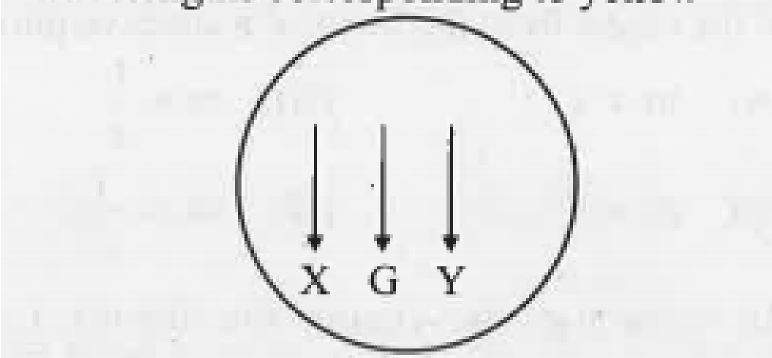
254. The figure shows the view through the eye piece of a prism spectrometer with its slit illuminated by the source of light emitting three wavelengths corresponding to yellow



(Y), green (G) and unknown colour (X). The colour X may be ________.

A. red

B. orange

C. pink

D. blue

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255. During dispersion of white light by prism placed in air, for a particular value of angle of prism.

A. only angular spread takes place.

B. only anglar deviation takes place.

C. both angular deviation and angular spread take place.

D. for a particular value of angle of prism, either of angular deviation for mean colour or spread takes place.

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256. When a white light passes through a hollow prism, then there is

A. no dispersion and no deviation.

B. dispersion but no deviation.

C. deviatin but no dispersion.

D. dispersion and deviation both.

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257. A narrow beam of white light passes through glass slab having parallel faces. Then,

A. the beam inside the slab remains as white light.

B. the emergent beam is red in colour.

C. the beam inside the slab undergoes dispersion.

D. the glass slab never causes dispersion.

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258. A beam of light composed of red and green rays is incident obliquely at a point on the face of rectangular glass slab. When coming out onn the opposite parellel face, the red and green rays emerge from

A. two points propagting in two different non-parallel directions.

B. two points propagating in two different parallel directions.

C. one point proagating in two different directions.

D. one point propagating in same direction.

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259. A given ray of light suffers minimum deviation in an equilateral prism P. Additional prisms Q and R of identical shape and of same material as P are now added as shown in the figure. The ray will now suffer

A. greater deviation.

B. no deviation.

C. same deviation.

D. total internal reflection.

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260. A prism is placed in water. The angle of minimum deviation__________.

A. increases

B. remains the same

C. decreases

D. depends on frequency of incident light.

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

A. PQ is horizontal

B. QR is horizontal

C. RS is horizontal

D. Either PQ or RS is horizontal

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262. A ray of light is incident on a 60° prism at the minimum of deviation position. The angle of refraction at the first face (i.e. incident face) of the prism is

A. zero

B. 30°

C. 45°

D. 60°

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263. A prism having refractive index $\sqrt{2}$ and refracting angle 30°, has one of the refracting surfaces polished. A beam of monochromatic light incident on the other refracting surface will retrace its path if the angle of incidence is

A. 0°

B. 30°

C. 45°

D. 60°

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264. A ray of light is incident at an angle of 60° on the face of a prism with an angle of 60°. Then the refractive index of the material of the prism is (the prism is in minimum deviation position)

A. 0°

B. 90°

C. 45°

D. 30°

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265. A monochromatic ray of light travels through an equilateral prism such that angle of deviation is 30°. If the difference between angles of incidence and emergence is 10°, then I and r respectively are

A. $45^{\circ}, 55^{\circ}$

B. 50^@, 40^@`

C. $35^{\circ}, 45^{\circ}$

D. $30^{\circ}, 40^{\circ}$

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266. 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 $[\sin 48^{\circ} 36' = 075]$

A. $18^{\circ} 36'$

B. $20^{\circ} 30'$

C. 18°

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

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267. A ray of light is incident on a refracting face of glass prism of refracting angle 30°. If the ray emerges normally from the second refracting surface, the angle of incidence is

refracting surface, the angle of incidence is

$\left[{}_a\mu_g = 1.5\right]$

A. $\sin^{-1}(0.6)$

B. $\sin^{-1}(0.7)$

C. $\sin^{-1}(0.75)$

D. $\sin^{-1}(0.8)$

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268. A ray of light is incident normally on one face of a prism of refracting angle A. After travelling through prism, the ray emerges from the second refracting surface making an angle of deviation of δ. The refractive index of the material of prism is

A. $\dfrac{\sin\left(\frac{A+\delta}{2}\right)}{\sin\left(\frac{A}{2}\right)}$

B. $\dfrac{\sin A}{\sin \delta}$

C. $\dfrac{\sin \delta}{\sin A}$

D. $\sin(A+\delta)(\sin(A))$

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269. The angle of the prism is A and if the angle of minimum deviation is $(180^\circ - 2A)$

then the refractive index of the material of the prism is

A. $\cos\left(\frac{A}{2}\right)$

B. $\sin\left(\frac{A}{2}\right)$

C. $\tan\left(\frac{A}{2}\right)$

D. $\cot\left(\frac{A}{2}\right)$

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270. Angle of minimum deviation for a prism of refactive index 1.5, is equal to the angle of the prism. Then the angle of the prism is

$(\cos 41^\circ = 0.75)$

A. 62°

B. 41°

C. 82°

D. 31°

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271. The angle of minimum deviation of a prism of refractive index $\sqrt{3}$ is equal to its refracting angle. Then the refracting angle of that prism is

A. 30°

B. 45°

C. 60°

D. 90°

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272. The angle of minimum deviation for an incident light ray on an equilateral prism is equal to its refracting angle. The refractive index of its material is

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

B. $\sqrt{3}$

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

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

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273. A ligh ray is incident upon a prism in minimum deviation position and surfers 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.

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274. The ratio of the angle of minimum deviation of a prism in air and when dipped in water will be

$\left({}_{a}\mu_{g}=\frac{2}{3} \text{ and } {}_{w}\mu_{g}=\frac{9}{8}\right)$ and

A. $\frac{1}{8}$

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

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

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

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275. The refractve index of a glass is 1.520 for red light and 1.525 for blue light . Let D_1 and D_2 be the angles of minimum deviation for red light and blues light respectively in a prism of this glass. Then

A. $D_1 > D_2$

B. $D_1 = D_2$

C. $D_1 < D_2$

D. $D1$ can be less than or greater than D_2 depending upon the angle of prism

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276. The deviation produced by a thin glass prism placed in air, when immersed in water is

[Given ${}_a\mu_g = 3/2$ and ${}_a\mu_w = 4/3$]

A. reduces to one fourth.

B. reduces to half.

C. remains the same.

D. increases four times.

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277. For a small angled prism, angle of prism A, the angle of minimum deviation (δ) veries with the refractive index of the prism as shown in the graph

A. Point P corresponds to n=1

B. Slope of the line PQ = A/2

C. Slope of line PQ = A

D. Both (A) and (C) are true.

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278. ir the refractive indices of crown glass for red yellow and violet colours are 1.5140, 1.570 and 1.5318 respectivelyand ofr flint glass these values are 1.6434, 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

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279. A crown glass prism ofg refrecting 6° is to be achromatised for red and blue light using a flint glass prism. The angle of sercond and net deviation is

A. $9^\circ, 1.134^\circ$

B. $6^\circ, 2.268^\circ$

C. $3^\circ, 3.334^\circ$

D. $3^\circ, 1.134^\circ$

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280. The dispersive power of crown and flint glasses are 0.03 and 0.05 respectively. The refractive indices ofr yellow light for these glasses are 1.517 and 1.621 respectively .it is desired to form an achromatic combination of prism of crown and flint glasses which can produce a deviation of 1° in thev yellow ray.

Select right statement from the following

A. refracting angle of crown glass is 4.8°

and that of flint glassis 2.4^@`.

B. refracting angle of crown glass is 2.4°

and that of flint glass is 4.8°.

C. refracting angle of both the glasses is

4.8° each.

D. refracting angle of both the glasses is

2.4° each.

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281. Between the primary and secondary rainbows, there is a dark band known as Alexander's dark band. This is because

A. this region forms an image on blind spot on retina.

B. there is no light scattered into this region.

C. light is absorbed in this region.

D. angle made at the eye by the scattered rays with respect to the incident light of the sun lies between approximately 42° and 50°.

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282. Assertion : A single lens produces a coloured image of an object illuminated by white light.

Reason : The refractive index of material of lens is different for different wavelengths of light.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion.

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion.

C. Assertion is True, Reason is False.

D. Assertion is False, Reason is True.

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283. Assertion: A thin lens suffers from greater chromatic aberration.

Reason: Angular dispersion produced by a prism is directly proportional to angle of prism.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion.

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion.

C. Assertion is True, Reason is False.

D. Assertion is False, Reason is True.

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284. To reduce chromatic aberrtion.

A. a lens of power 1 D should be used.

B. a lens cut vertically into a half should be used.

C. combination of multiple lenses should be used.

D. all of the above.

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285. Unit of longitudinal chromatic aberration of a thin lens is ________ .

A. metre

B. dioptre

C. candela

D. W/m^2

Watch Video Solution

286. Focal length of convex lens made up of flint glass is 12 cm. It is placed in contnat with a concave lens made up of crown glass to remove chrmoatic aberration. If ratio of dispersive powers of flint of crown glass is $\frac{3}{2}$ then focal length of concave lens is

A. $-8cm$

B. $-12cm$

C. $-15cm$

D. 12 cm

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287. After cataract operation, a peisun is recommended with concavo-convex spectacles of curvatures 8 cm and 40 cm. Crown glass of refractive indices 1.51 for red and 1.53 for violet colours is used for this. The lateral chromatic aberration occuring due to these glasses is

A. 0.33 cm

B. 0.74 cm

C. 1.15 cm

D. 1.2 cm

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288. Refractive index of a flint glass varier from 1.60 to 1.66 for visible range. Radii of curvature of a thin convex lens are 10 cm and 15 cm. Calculate the chromatic aberration between extreme colours.

A. 1.33 cm

B. 0.67 cm

C. 1.5 cm

D. 0.83 cm

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289. What causes chromatic aberration?

A. Central rays.

B. Marginal rays.

C. Parallax.

D. All of the above.

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290. When object at difference distance are seen by the eye, which of the following remains 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.

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291. If we need a magnification of 375 from a microscope of tube length 15 cm and an objective of focal length 0.5 cm, what focal length of the eye-piece should we use?

A. 2.0 cm

B. 2.2 cm

C. 2.4 cm

D. 2.5 cm

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292. A man with normal near point reads a book using a magnifying glass of focal lenghts of 5 cm. the ratio of closest and farthest distances at which he can read the book when vieweing though mgnifying glass is

A. $-5:6$

B. $5:6$

C. $6:5$

D. $-6:5$

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293. When we view object of height 15 m with a telescop of magnifying power 10. the object appears _____

A. 10 times taller

B. 15 times taller

C. 10 times taller

D. 15 times nearer

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294. A fly is sitting on the objective of a telescop pointed to the moon takne through the elescope ?

A. The entire field of vision is blocked.

B. There is an image of the fly on the photograph.

C. There is no effect at all.

D. The image of the moon is of lesser intensity.

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295. The objectiveof a telescope A has diameter 3 times thatof the objective of telescope B. How much greather amout of light is gathered by A as compared to B ?

A. $\frac{1}{9}$

B. `frac(1)(3)

C. 3

D. 9

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296. The focal lengths of the objective and eye-piece of a telescop are respetively 100 cm and 2 cm. The moon substends an angle of 0.5° at the eye. If it is looked trough the telescop, the angle subtended by the moon's will be s

A. 100°

B. 50°

C. 25°

D. 10°

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297. Four double convex lenses with following specifications are available

Lens	focal length	aperture
A	120 cm	15 cm
B	120 cm	10 cm
C	15 cm	1.5 cm
D	10 cm	1.5 cm

Which of the given four lenses should be selected as objective and eyepiece respectively to construct an astronomical telescope?

A. A and C

B. B and D

C. A and D

D. B and C

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298. If astronomical telescope of length $1.53m$ has magnifying powerof magnitude 50,the values of f_0 and f_e are

A. $f_0 = 0.03m, f_e = 1.5m$

B. $f_0 = 1.55m, f_e = -0.02m$

C. $f_0 = 1.5m, f_e = -0.03m$

D. $f_0 = 1.5m, f_e = 0.03m$

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299. 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.

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

A. coloured

B. white.

C. that of the glass colour.

D. black.

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301. 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. blue

C. white

D. yellow

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302. Light enters at an angles 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

303. 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 total reflection, 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.

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304. An isosceles prism of angle 120° has a refractive index of 1.44. Two parallel monochromatic rays enter the prism paralled to each other in air as shown. The rays emerging 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.

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305. When light is incident on a medium at angle i and refracted into a second medium at an angle r, the graph of sin i vs sin r is as shown in the graph, From this, one can conclude that

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 45°

D. $\sin i_C = \frac{1}{2}$

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306. Immixable 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 liquied 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.

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307. A fish at a depth of $\sqrt{7}$ cm bleow the surface of water sees the outside world through a circular horizon. What is the radius of the circular horizon? $\left[{}_a\mu_w = \frac{4}{3}\right]$

A. 4 cm

B. 3 cm

C. $\sqrt{7}$ cm

D. 1 cm

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308. A ray of light is incident normally on one of the faces of a prism of apex angle 30° and refractive index $\sqrt{2}$. The angle of deviation through prism is

A. 15°

B. 30°

C. 45°

D. 60°

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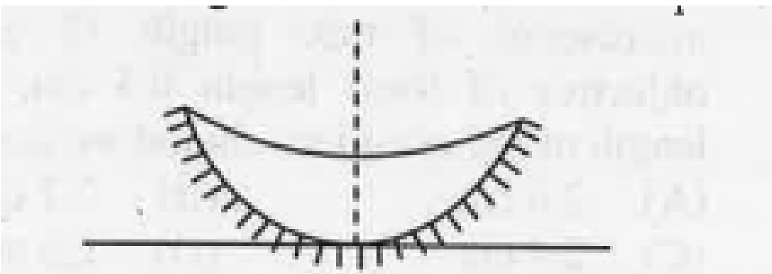
309. The convex surface of a thin concavo-convex lens of glass of refractive index 1.5 has radius of curvature 10 cm. The concave surface has a radius of curvature 30 cm. The convex side is silvered and placed on a horizontal surface. Then where should a pin be placed on the optic axis such that its image is formed at the same place?



A. 7.5 cm

B. 12 cm

C. 15 cm

D. $21\sqrt{2}cm$

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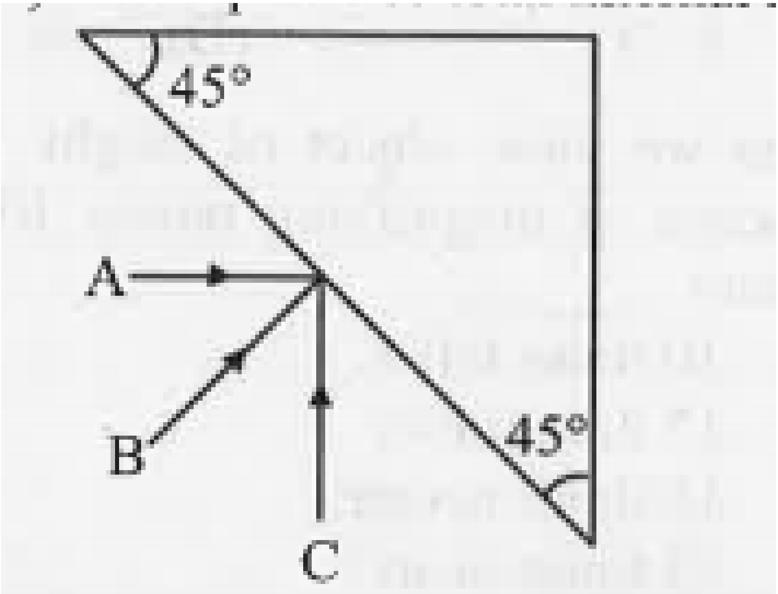
310. A, B, C in the diagram represent rays of light incident upon a face of a right-angled prism. Before emerging from the prism, which ray (or rays) will experience total internal reflection?



A. ray A

B. ray B

C. ray C

D. ray A and C

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311. In the given figure, the principal section of a glass prism is an isosceles triangle ABC with AB = AC. The face AC is silvered. A ray incident normally on face AB, after two reflection, emerges from the the base BC in a direction perpendicular to it. What is the angle $\angle BAC$ of a prism?

A. 30°

B. 36°

C. 60°

D. 72°

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

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

B. it is totally reflected on the second surface and emerges out perpendicular 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 three sides of prism and never emerges out.

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313. If the critical angle for the material of a prism is C and the angle of the prism is A, then there will be no emergent ray when

A. A lt 2C

B. A = 2 C

C. A gt 2 C

D. $A < \frac{C}{2}$

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314. When the wavelenght of the light used is increased, the focal length of a spherical mirror

A. remains the same.

B. decreases to half its value.

C. decreases slightly

D. increases.

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315. If a lens is cut into two pieces perpendicular to the principal axis and only one part is used, the intensity of the iamage will be

A. same

B. $\frac{1}{2}\times$

C. 2 times

D. infinite

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316. Assertion : A concave mirror and convex lens both have the same lengths in air. When they are submerged in water, they will have same focal length.

Reason : The refractive index of water is smaller than the refractive index of air.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion.

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion.

C. Assertion is True, Reason is False.

D. Assertion is False, Reason is False.

317. A ray of monochromatic light is incident on one refracting face of a prism of refracting angle75° . It passes through the prism and is incident on the other face at the critical angle If the refracive index of the material of prism is $\sqrt{2}$, the angle of incidence on the first face o the prism is

A. 0°

B. 30°

C. 45°

D. 60°

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318. A ray of light passing through a prism having refractive index $\sqrt{2}$ suffers minimum devitation. It is found that the angle of incidence is double the angle of refraction within the prism. Then angle of prism is

A. 45°

B. 60°

C. 75°

D. 90°

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319. The distance travelled by a ray of light in two media, in the same time are in the ratio 2 : 3. The ratio of refractive index of the first medium to second medium is

A. $3:2$

B. $4:9$

C. $2:3$

D. $9:8$

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320. A small bulb is placed at the bottom of a tank containing water to a depth of 80cm. What is the area of the bulb can emerge out?

Refractive index of water is 1.33. (Consider the bulb to be a point source.)

A. $3.13m^2$

B. $1.43m^2$

C. $2.61m^2$

D. $0.88m^2$

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321. Assertion: By roughening the surface of a glass sheet its transparency can be reduced.

Reason: Glass sheet with rough surface absorbs more light.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion.

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion.

C. Assertion is True, Reason is False.

D. Assertion is False, Reason is False.

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322. An experiment needs to heat a small sample to 700 K, but the only available oven has a maximum temperature of 500 K. Could experimenter heat the sample to 700 K by using a large lens to concentrate the radiation from the over into the sample ?

A. Yes, if the sample is placed at the focal point of the lens.

B. No, because it would violate the law of conservation of energy.

C. No,because it would violate the second law of thermodynamics.

D. Yes, if the areas of the front of the oven is at least as much as the area of the front of the sample.

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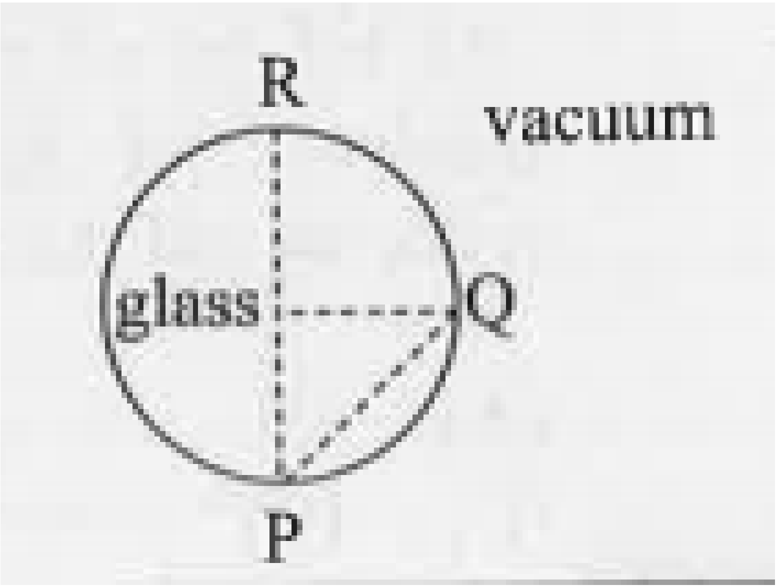
323. It is found that all electromagnetic signals sent from P towards Q reach point R. The speed of electromagnetic signals in glass cannot be



A. $10^8 m / s$

B. $2.4 \times 10^8 m / s$

C. $8 \times 10^7 m / s$

D. $14 \times 10^7 m / s$

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324. The angle made by incident ray of light with the reflecting surface is called

A. glancing angle

B. angle of incidence

C. angle of deviation

D. angle of refraction

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325. There is a small air bubble at the centre of a solid glass sphere of radius 'r' and refractive index μ. What wil be the apparent distance of

the bubble from the centre of the sphere, when viewed from outside?

A. r

B. $\frac{r}{\mu}$

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

D. Zero

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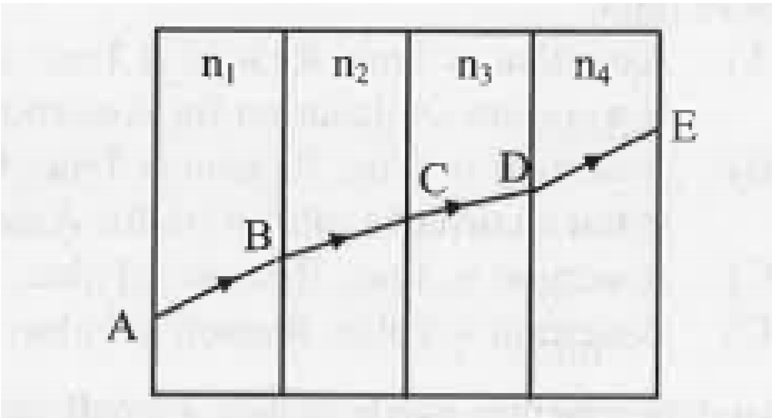
326. A ray of light passes through four transparent media wit refractive index n_1, n_2, n_3 and n_4 as shown. The surfaces of all media are paralleld



If the emergent ray DE is parallel to incident ray AB, then

A. $n_1 = n_4$

B. $n_2 = n_4$

C. $n_3 = n_4$

D. $n_1 = \dfrac{n_2 + n_3 + n_4}{3}$

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327. A light beam is incident at an angle twice the angle twice the angle of refraction. The angle of refraction is

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

B. $\cos^{-1}(2\mu)$

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

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

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328. A ray of light strikes a tansparent rectangular slab (of refractive index $\sqrt{2}$) At an angle of incidence of 45°. The angle between the reflected and refracted rays is

A. 75°

B. 90°

C. 105°

D. 120°

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329. According to Cartesian sign convention, in ray optics

A. all distances are taken negative.

B. all distances in the direction of incident ray are taken positive.

C. all distances are taken positive.

D. all distances in the direction of incident ray are taken negative.

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330. The power of plane mirror is ______.

A. ∞

B. 0

C. 2 D

D. 4 D

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331. A beam of light from a source L is incident normally on a plane mirror fixed at a certain distance x from the source. The beam is

reflected back as a spot on a scale placed just above the source L. When the mirror is rotated through a small angle θ, the spot of the light is found to move through a distance y on the scale. The angle θ is given by

A. $\frac{y}{x}$

B. $\frac{x}{2y}$

C. $\frac{x}{y}$

D. $\frac{y}{2x}$

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332. For concave mirror, if the object is at the focusn f, the image is

A. virtual, inverted and magnified.

B. virtual, erect and magnified.

C. real, erect and magnified

D. virtual, erect and diminished.

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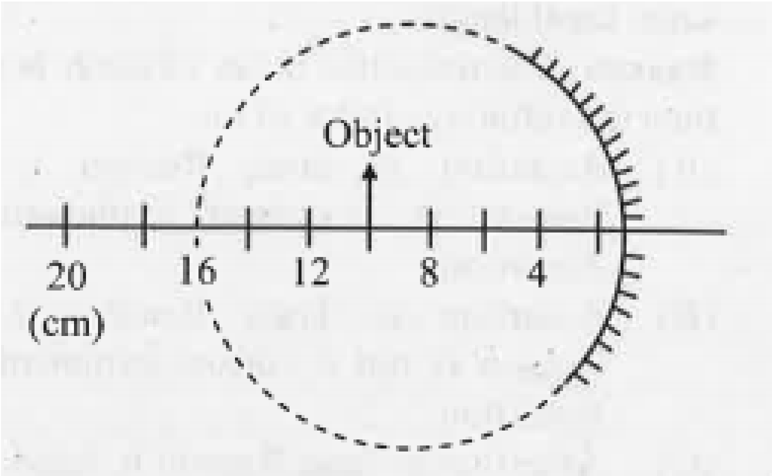
333.



A spherical mirror is obtained as shown in the figure from a hollow glass sphere. If an object is positioned in front of the mirror, what will be the nature and magnification of the image of the object? (Figure drawn as schematic and not to scale)

A. Erect, virtual and unmagnified

B. Inverted, real and magnified

C. Erect, virtual and magnified

D. Inverted, real and unmagnified.

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334. Which of the following statements is incorrect?

A. The magnification produced by a convex mirro is always less than one.

B. A virtual, erect, same sized image can be obtained using a place 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.

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335. A concave mirror of focal length f (in air) is immersed in water $\left(\mu = \frac{4}{3}\right)$. The focal length of mirror in water will be

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

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

C. f

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

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336. An object is placed on the principal axis of a concave mirror at a distance of 1.5 f (f is thefocal length). The image will be at,

A. 3f

B. $-3f$

C. $1.5f$

D. $-1.5f$

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337. An object is placed at a distance of 40 cm from concave mirror of focal length 15 cm. If the object is displaced through a distance of 20 cm towards the mirror , the displacement of the image will be

A. 30 cm away from the mirror

B. 36 cm away from the mirror

C. 30 cm towards the mirror

D. 36 cm towards the mirror

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338. A linear object of heigth 10 cm is kept in front of concave mirror of radius of curvature 15 cm, at distance of 10 cm. The image formed is

A. magnified and erect

B. magnified and inverted

C. diminished and erect

D. diminished and inverted

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339. An infinitely long bar lies alont the adis of cancave mirror of focal length f. the nerar end of bar is a distance $v > f$ from the mirror. Its images will have a length

A. $\frac{uf}{u+f}$

B. $\frac{uf}{u-f}$

C. $\frac{f^2}{u+f}$

D. $\frac{f^2}{u-f}$

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340. A person wants a real imag of his own, 3 times enlarged. Where should he stand in front of a conave mirror of radius of curvature 30 cm?

A. 90 cm

B. 10 cm

C. 20 cm

D. 30 cm

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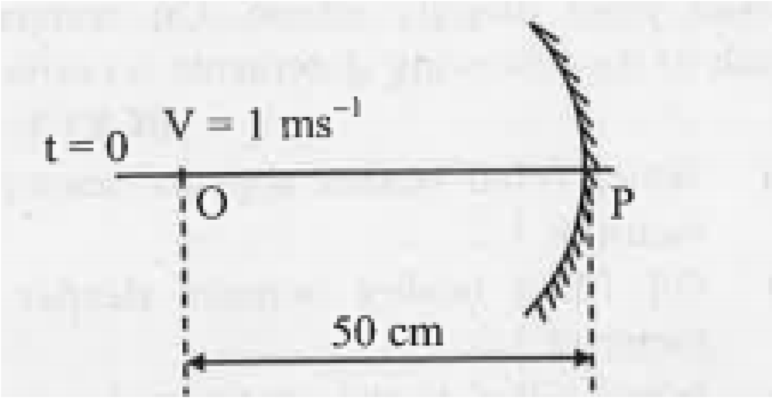
341. A point object is moving uniformly towards the pole of a concave mirror of focal length 25 cm along its axis as shown below. The speed of the object is 1 ms" . At t = 0, the distance of the object from the mirror is 50 cm. The average velocity of the image formed by the mirror between time t = 0 and t = 0.25 s

is



A. zero

B. $40cms^{-1}$

C. infinity

D. $20cms^{-1}$

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342. Consider a light source placed at a distance of 1.5 m along the aixs facing facing the convex side of a spherical mirror of radius of curvature 1m. The position (s), nature and magnification (m) of the image are

A. s' = 0.375 m, Virtual, upright, m = 0.25

B. s' = 0.375 m, Real, inverted, m = 0.25

C. s' = 3.75 m, Virtual, inverted, m = 2.5

D. s' = 3.75 m, Real, upright, m = 2.5

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343. A ray of light travels from air to water to glass and again from glass to air. Refractive index of water with respect to air is 'x' glass with respect to water is 'y' and air with respect to glass is 'z` which one of the following is correct?

A. $xz = y$

B. $yz = x$

C. $xy = z$

D. $xyz = 1$

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344. A glass cobe is placed on a white paper having spots of red. Blue, yellow and green colour. Then, the one that appears least raised is

A. blue

B. red

C. yellow

D. green

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345. A plane glass is placed over a various coloured letters (Violet, green, yellow ,red). The letter which appears to be raised more is

A. red

B. yellow

C. green

D. violet

Watch Video Solution

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

A. 16

B. 8

C. 10

D. 12

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347. Two undentical beakers, one filled with water $\mu = \frac{4}{3}$ and the other filled with oil $(\mu = 1.6)$ are viewed from directly above. On

comparison, which of the following statements is correct?

A. Water filled beaker appers deeper by at factor of 1.2

B. Oil filled beaker appears deeper by a factor of 1.2.

C. Water filled beaker appears deeper by a factor of $\frac{4}{3}$.

D. Oil filled beaker appears deeper by a factor of 1.6.

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348. In total internal reflection when the angle of incidence is equal to the critical angle for the pair of media in contact, what will be angle of refraction?

A. equal to angle of incidence

B. 90°

C. 180°

D. 0°

Watch Video Solution

349. A diamond sparkles because of its

A. hardness

B. emission of light by the diamond.

C. absorption of light by the diamond.

D. high refractive index.

Watch Video Solution

350. A green light is incident from the water to the air-water interface at the critical angle (θ). Select the correct statement

A. The entire spectrum of visible light will come out of the water at an angle 90° to the normal.

B. The specturm of visible light whose frequency is less than that of green light will come out to the air medium.

C. The spectrum of visible light whose frequecy is more than that of green light will come out to the air medium.

D. The entire spectrum of visible light will come out of the water at various angles to the normal.

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351. A light beam is travelling from Region I to Region IV (Refer Figure). The refractive index in Regions I, II , III and IV are $n_0, \frac{n_0}{2}, \frac{n_0}{6}$ and $\frac{n_0}{8}$, respectively. The angle of incidence θ for which the beam just misses entering Region IV is

A. $\sin^{-1}\left(\frac{3}{4}\right)$

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

C. $\sin^{-1}\left(\frac{1}{4}\right)$

D. $\sin^{-1}\left(\frac{1}{4}\right)$

Answer: $\sin^{-1}\left(\frac{1}{3}\right)$

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352. A ray of light passes from a medium A having refractive index 1.6 to the medium B having refractive index 1.5. the value of critical angle of medium A is _____

A. $\sin^{-1}\left(\frac{16}{15}\right)$

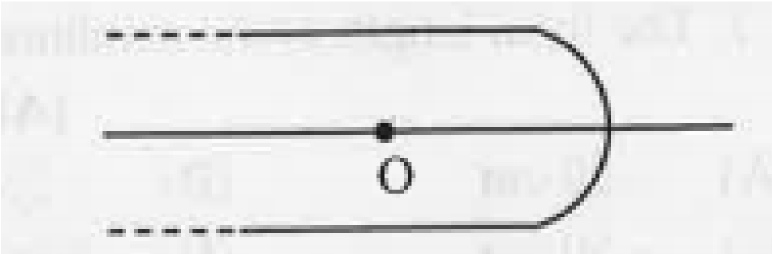
B. $\sin^{-1}\left(\sqrt{\frac{16}{15}}\right)$

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

D. $\sin^{-1}\left(\frac{15}{16}\right)$

Watch Video Solution

353. A point object 'O' is placed on the axis of a cylindrical piece of glass of refractive index 1.6 as shown in the figure. One surface of the glass piece is convex with radius of curvature 3 mm. The point appeared to be at 5 mm on the axis when viewed along the axis and from right side of convex surface. The distance of the point object from the convex surface is



A. 4 mm

B. 6 mm

C. 3 mm

D. 2.5 mm

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354. Focal length of a convex lens is 20 cm and its R.I. is 1.5. It produces an erect, enlarged image if the distance from the object of the lens is

A. 40 cm

B. 30 cm

C. 15 cm

D. 20 cm

Watch Video Solution

355. An equiconvex lens has power P. It is cut into two symmetrical halves by a plane containing the principal axis. The power of one part will be,

A. P

B. 0

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

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

Watch Video Solution

356. A plano-convex lens of unknown material and unknown focal length is given. With the help of a spherometer we can measure the,

A. refractive index of the meterial.

B. focal length of the lens.

C. radius of curvature of the curved surface.

D. aperture of the lens.

Watch Video Solution

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

A. $+18.75cm \text{ and } convex \leq ns$

B. $-18.75cm \text{ and } concave \leq ns$

C. $+20.25cm \text{ and } convex \leq ns$

D. $-20.25cm \text{ and } concave \leq ns$

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358. Calculate the focal length of a reading glass of a person if his distance of distinct vision is 75 cm.

A. 75.2 cm

B. 25.6 cm

C. 100.4 cm

D. 37. 5 cm

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359. A converging beam of rays is incident on a diverging lens. Having passed through the lens the rays intersect at a point 15 cm from the lens on the opposite side. If has lens is removed the point where the rays meet will move 5 cm closer to the lens. The focal length of the lens is

A. $-30cm$

B. 5 cm

C. $-10cm$

D. 20 cm

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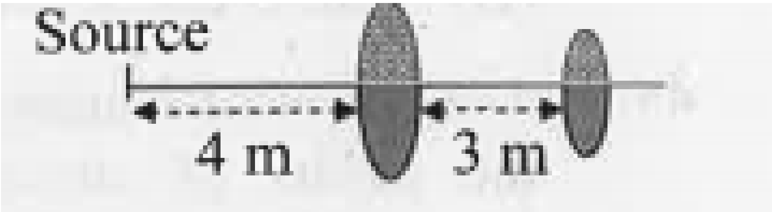
360. An object is located 4 m from the first of two thin converging lenses of focal lengths 2 m and T m respectively. The lenses are separated by 3 m. The final image formed by

the second lens is located from the source at a distance of



A. 8.0 m

B. 7.5 m

C. 6.0 m

D. 6.5 m

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

A. convex, + 0.15 dioptre

B. convex , + 2.25 dioptre

C. concave, -0.25 dioptre

D. concave, - 0.2 dioptre.

Watch Video Solution

362. Two convex lenses of focal lengths f_1 and f_2 form images with magnification m_1 and m_2, when used individually for an object kept at the same distance from the lenses. Then f_1 / f_2 is

A. $\dfrac{m_1(1+m_1)}{m_2(1+m_2)}$

B. $\dfrac{m_1(1+m_2)}{m_2(1+m_1)}$

C. $\frac{m_2(1+m_1)}{m_1(1+m_2)}$

D. $\frac{m_2(1+m_2)}{m_1(1+m_1)}$

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363. The equiconvex lens has focal length f. If is cut perpendicular to the principal axis passing through optical centre, then focal length of each half is

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

B. f

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

D. 2f

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364. A plano-convex lens is made of material having refractive index 1.5. The radius of curvature of curved surface is 60 cm. The focal length of the lens is _____ cm.

A. -60

B. 120

C. 60

D. -120

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365. A convex lens (with material of refractive index of 3/2) has two surfaces of equal radii of

curvature R. The magnitude of its focal length is

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

B. R

C. 2R

D. zero

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366. A double convex lens has focal length 25 cm. The radius of curvature of one of the surfaces is double of the other. Find the radii if the refractive index of the material of the lens is 1.5.

A. 50 cm, 100 cm

B. 100 cm, 50 cm

C. 25 cm, 50 cm

D. 18.75 cm, 37.5 cm

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367. The power of a biconvex lens is 10 dioptre and the radius of curvature of each surface is 10 cm. Then the refractive index of the material of the lens is,

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

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

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

D. $\frac{5}{3}$

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368. A convex lens of glass $(\mu = 1.5)$ has a focal length of 8 cm when placed in air. What is the focal length of lens when it is immersed in water $\left(\mu = \frac{4}{3}\right)$?

A. 4 cm

B. 8 cm

C. 16 cm

D. 32 cm

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369. A convex lens of glass $(\mu_g = 1.45)$ has focal length f_g is air. The lens is immersed in a liquid of refractive index (μ_g) 1.3. The ratio of the f_{liquid} / f_g is

A. 3.9

B. 0.23

C. 0.43

D. 0.39

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370. A thin convex lens made from crown glass $\left(\mu = \frac{3}{2}\right)$ has focal f. When it is measured in two different liquids having refractive indices $\frac{4}{3}$ and $\frac{5}{3}$ it has the focal lengths f_1 and f_2 respectively. The corrent relation between the focal lengths is

A. $f_1 = f_2 < f$

B. $f_1 > f$ and $f_2 becomes \neg ative$

C. $f_2 > f$ and $f_1 becomes \neg ative$

D. f_1 and $f_2 \perp hbecome \neg ative$

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371. Two similar thin equiconvex lenses, of focal length f each, are kept coaxially in contact with each other such that the focal

length of the combination is F_1. When the space between the two lenses is filled with glycerin (which has the same refractive index $(\mu = 1.5)$ as that of glass) then the equivalent focal length is f_2. The ratio $F_1 : F_2$ will be:

A. $2:3$

B. $3:4$

C. $2:1$

D. $1:2$

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372. Two identical thin plano-convex glass lenses (refractive index 1.5) each having radius of 20 cm are placed with their convex surfaces in contact at the centre. The intervening space is filled with oil of refractive index 1.7. The facal length of the combination is

A. $-20cm$

B. $-25cm$

C. $-50cm$

D. 50 cm

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373. A plnao=convex lens fits exactly into a plano-concave lens. Their plane surfaces are parallel to each other. If lenses are made of different materials of refractive indices μ_1 and μ_2 and R is the radius of curvature of the curved surface of the lenses, then the focal length of the combination is

A. $\dfrac{R}{2(\mu_1 + \mu_2)}$

B. $\dfrac{R}{2(\mu_1 - \mu_2)}$

C. $\dfrac{R}{\mu_1 - \mu_2}$

D. $\dfrac{2R}{u_2 - u_1}$

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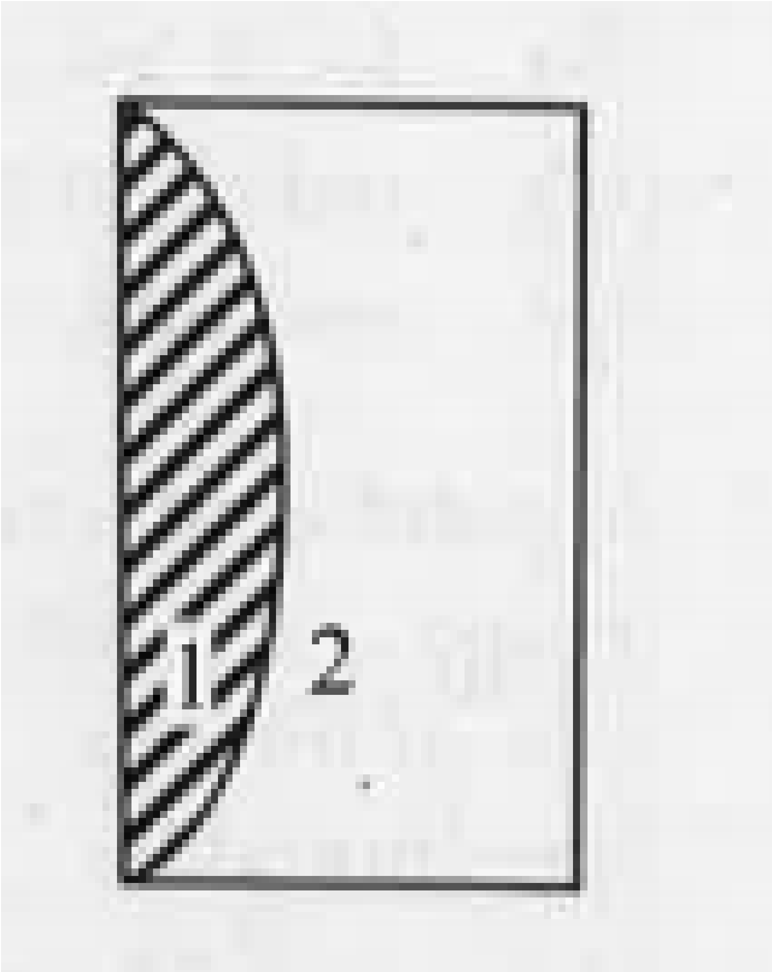
374. A plano-convex lens fits exactly into plano-concave lens as shown in the figure. Their plane surfaces are parallel to each other. If the

lenses are made of different materials of refractive indices 1.6 and 1.5 respectively, if R is the radius of curvature of curved surface of lenses, then the focal length of the

combination



A. $\frac{R}{6.2}$

B. $\frac{R}{0.2}$

C. $\frac{R}{3.1}$

D. $\frac{R}{0.1}$

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375. A comvex lens and a concave lens are placed in contact. The ratio of magnitude of the power of the convex lens to that of the concave lens is 4:3. If the focal length of the convex lens is 12 cm, then the focal length of the combination will be

A. 16 cm

B. 24 cm

C. 32 cm

D. 48 cm

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376. Two identical glass $(\mu_w = 3/2)$ equiconvex lenses of focal length f each are kept in contact. The space between the two

lenses in filled with water $(\mu_w = 4/3)$. The focal length of the combination is

A. 3f/4

B. f/3

C. f

D. 4f/3

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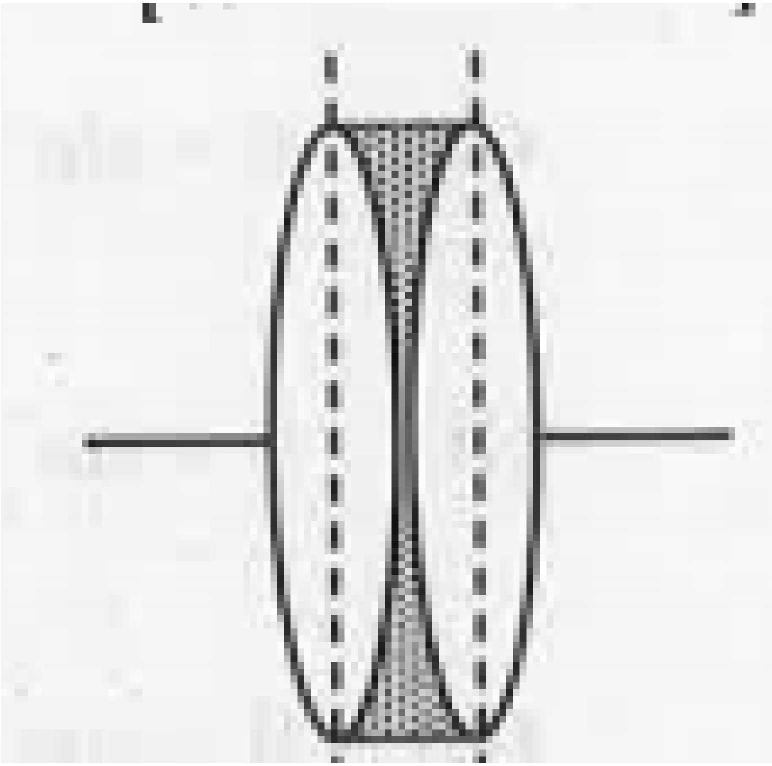
377. Two identical equiconvex lenses, each of focal length 'f' are placed side by side in contact with each other with a layer of water in between them as shown in the figure. If refractive index of the material of the lenses is greater than that of water, how the combined

focal length 'F' is related of 'f'?



A. F gt f

B. $\frac{f}{2} < F < f$

C. $F < \frac{f}{2}$

D. $F = f$

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378. A bi-convex lens is formed with two thin plano convex lenses as shown in the figure. Refractive index n of the first lens is 1.5 and that of the second lens is 1.2. Both the curved surfaces are of the same radius of curvature R = 14 cm. For this bi-convex lens, for an object distance of 40 cm, the image distance will be

A. $-280.0cm$

B. $40.0cm$

C. $21.5cm$

D. $13.3cm$

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379. Two convex lenses of focal lengths f_1 and f_2 are separated co-axially by a

distance d. The power of the combination will be zero if

A. $d = (\_\,1 + f_2)$

B. $d = (f_1 - f_2)$

C. $d = \sqrt{f}_1 f_2$

D. $d = \dfrac{f_1 - f_2}{2}$

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380. A diverging lens with magnitude of focal length 25 cm is placed at a distance of 15 cm from a converging lens of magnitude of focal length 20 cm. A beam of parallel light falls on the diverging lens. The final image formed is

A. real and at a distance of 10 cm fromt he divergent lens.

B. real and at a distance of 6 cm from the convergent lens.

C. real and at a distance of 40 cm from converget lens.

D. virtual and at a distace of 40 cm from convergent lens.

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381. 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. Assertion is True, Reason is True, Reason is a correct explanation for Assertion.

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion.

C. Assertion is True, Reason is False.

D. Assertion is False, Reason is False.

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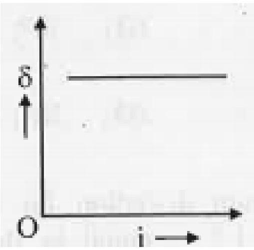
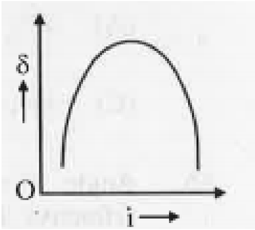
382. The graph between angle of deviation (δ) and angle of incidence (i) for a triangular prism is represented by

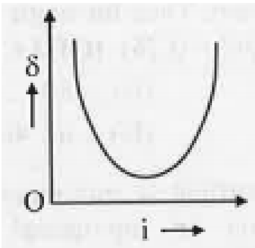
A.



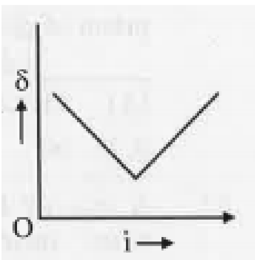
B.



C.



D.



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383. Two beams of red and violet colours are made to pass separately through a prism of A = 60° In the minimum deviation position, the angle of refraction inside the prism will be

A. greater for red colour.

B. equal but not 30° for both the colours.

C. greater for violet colour.

D. 30° for both the colours.

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384. A ray is incident at an angle of incidence i on one surface of a small angle prism (with angle of prism A) and emerges normally from the opposite surface. If the refractive index of the material of the prism is μ , then the angle of incidence is nearly equal to:

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

B. μA

C. $\frac{\mu A}{2}$

D. $\frac{A}{2\mu}$

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385. A ray of light is incident at an angle of 60° on the face of a prism with an angle of 60°. Then the refractive index of the material of the prism is (the prism is in minimum deviation position)

A. 1.414

B. 1.623

C. 1.524

D. 1.732

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386. In an experiment for determination of refractive index of glass of a prism by $i - \delta$ plot, it was found that a ray incident at angle

35°, suffers a deviation on 40° and that it emerges at angle 79°. In that case which of the following is closest to the maximum possible value of the refractive index?

A. 1.6

B. 1.7

C. 1.8

D. 1.5

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387. The angle of incidence for a ray of light at a refracting surface of a prism is 45°. The angle of prism is 60° . If the ray suffers minimum deviation through the prism. The angle of minimum deviation and refractive index of the material of the prism respectively, are

A. $45^{\circ}, \sqrt{2}$

B. $30^{\circ}, \frac{1}{\sqrt{2}}$

C. $45^{\circ}, \frac{1}{\sqrt{2}}$

D. $30^{\circ}, \sqrt{2}$

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388. Angle of minimum deviation for a prism of refactive index 1.5, is equal to the angle of the prism. Then the angle of the prism is

_____ $(\sin 48^{\circ} 36' = 0.75)$

A. $41^{\circ} 24'$

B. 80°

C. 60°

D. $82^{\circ}48'$

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389. A ray of light suffers a minimum deviation when incident on an equilateral prism of refractive index $\sqrt{2}$ The angle of incidence is

A. 30°

B. 45°

C. 60°

D. 50°

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390. For an angle of incidence θ on an equilateral prism of refractive index $\sqrt{3}$, the ray refracted is parallel to the base inside the prism. The value of θ is

A. 30°

B. 45°

C. 60°

D. 75°

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391. The refractive index of the material of an equilateral prism is 1.6. The angle of minimum deviation due to the prism would be

A. 30°

B. between 30° and 45°

C. 45°

D. between 30^@ and 60^@`

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392. The refracting angle of a prism is A, and refractive index of the material of the prism is $\cot\left(\frac{A}{2}\right)$. The angle of minimum deviation is

A. $180^\circ - 3A$

B. $180^\circ - 2A$

C. $90^{\circ} - A$

D. $180^{\circ} + 2A$

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393. A small angled prism of refractive index 1.6 gives a deviation of 3.6°. The angle of prism is ______.

A. 7°

B. 6°

C. 5°

D. 8°

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394. Pick the wrong answer in the context with rainbow.

A. An observer can see a rainbow when his front is towards the sun.

B. Rainbow is a combined effect of dispersion, refraction and reflection of sunlight.

C. When the light rays undergo two internal reflections in a water drop, a secondary rainbow is formed.

D. The order of colours is reveresed in the secondary rainbow.

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395. A convex lens of focal length 12.5 cm is used as a simple microscope. When the image is formed at infinite, magnification is ______ (Near point for the normal vision is 25 cm).

A. 25

B. 2.5

C. 2.0

D. 1.0

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396. In compound microscope, the focal length and aperture of the objective used is respectively

A. large and large

B. large and small

C. short and large

D. short and small

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397. If we need a magnification

A. 2 mm

B. 33 mm

C. 22 mm

D. 12 mm

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398. A compound microscope consist of an objective of focal length 1.0 cm and an eyepiece of focal length 5.0 cm separated by 12.2 cm. At what distance from the objective should an object be placend to focus it properly so that the final image be formed at the least distance of distinct vision 25 cm?

A. $-1.1cm$

B. $-2.1cm$

C. $-1.5cm$

D. $-2.5cm$

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399. If the focal length of objective lens is increased then magnifying power of

A. microscope will increase but that of telescope decrease

B. microscope and telescope both will increase.

C. microscope and telescope both wll decrease.

D. microscope will decrease but that of telescope will increase.

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400. An observer looks at a distant tree of height 10 m with a telescope of magnifying power of 20. To the observer the tree appears

A. 10 times nearer

B. 20 times taller

C. 20 times nearer

D. 10 times taller

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401. An astronomical telescope has objective and eyepiece of focal length 40 cm and 4 cm respectivly. To view on object 200 cm away

from the objective, the lenses must be separated by a distance

A. 50.0 cm

B. 54.0 cm

C. 37.3 cm

D. 46.0 cm

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402. A telescope using an eye piece of focal length 3 cm has a magnification 10 in normal adjustment. If the telescope is now used to view an object placed at a distance of 180 cm from the objective, the new length of the telescope is (assume final image is at infinity).

A. 36 cm

B. 39 cm

C. 32 cm

D. 33 cm

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403. In an astronomical telescope in normal adjustment, a straight black line of length L is drawn on inside part of objective lens. The eys-piece forms real image of this line. The length of this image is I. The magnification of the telescope

A. $\frac{L}{I}$

B. $\frac{L}{I}+1$

C. $\frac{L}{I} - 1$

D. $\frac{L+I}{L-I}$

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404. The angle of a prism is A . One of its refracting surfaces is silvered. Lihgt rays falling at an angle of incidence 2A on the first surface returns back through the same path after suffering reflection at the silvered surface. The refractive index. μ, of the prism is

A. 2 sin A

B. 2 cos A

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

D. $\tan A$

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405. The refractive index of the material of a prism is $\sqrt{2}$ and the angle of the prism is 30°. One of the two refracting surfaces of the

prism is made a mirror inwards, by silver coating. A beam of monochromatic light entering the prism from the other face will retrace its path (after reflection from the silvered surface) if its angle of incidence on the prism is

A. 60°

B. 45°

C. 30°

D. zero

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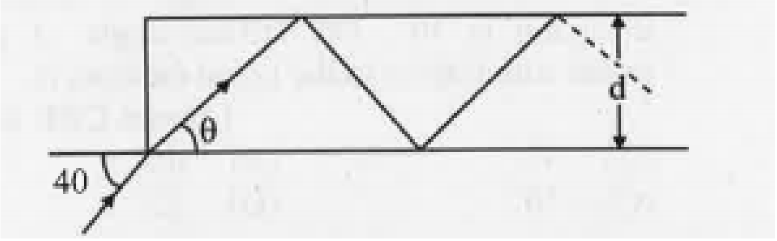
406. In figure, the optical fibre is l = 2 m long and has a diameter of $d = 20 \mu m$. If a ray of light is $\theta_1 = 40^\circ$, the number of reflections it makes before emerging from the other end is1.31 and $\sin 40^\circ = 0.64)$



A. 55000

B. 66000

C. 45000

D. 57000

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407. An upright object is placed at a distance of 40 cm in front of a convergent lens of focal length 20 cm. A convergent mirror of focal length 10 cm is placed at a distance of 60 cm on the other side of the lens. The position and size of the final image will be:

A. 10 cm form the convergent mirror, same size as the object.

B. 20 cm from the convergent mirror, twice the size of the object.

C. 20 cm from the convergent mirror, same size as the object.

D. 40 cm from the convergent lens, twice the size of the object.

408. 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. $\frac{3}{\sqrt{2}} \times 10^{8} m / s$

D. $\sqrt{2} \times 10^{8} m / s$

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409. A point object is placed on the axis of a thin convex lens of focal length 0.05 m at a distance of 0.2 m from the lens and its image is formed on the axis. If the object is now made to oscillate along the axis with a small amplitude of A cm, then what is the amplitude of oscillation of the image? [you may assume,

$\frac{1}{1+x \approx 1-x}$, where x << 1]

A. $\frac{4A}{9} \times 10^{-2} m$

B. $\frac{5A}{9} \times 10^{-2} m$

C. $\frac{A}{3} \times 10^{-2} m$

D. $\frac{A}{9} \times 10^{-2} m$

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410. A convex lens is put 10 cm from a light source and it makes a sharp image on a screen, kept 10 cm from the lens. Now a glass block (refractive index 1.5) of 1.5 cm thickness is placed in contact with the light source. To get the sharp image again, the screen is shifted by a distance d. Then d is

A. 1.1 cm away from the lens

B. 0.55 cm towards the lens.

C. 0

D. 0.55 cm away from the lens

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411. 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

prism with respect to the liquid medium is

A. 42°

B. 45°

C. 50°

D. 52°

412. A beam of light consisting of red, green and blue colours is incident on right angled prism. The refractive indices of the material of the prism for the above red, green and blue wavelengths are 1.39, 1.44 and 1.47 respectively.

A. separate the red colour part from the green and blue colours.

B. seaparate the blue colour part from the red and green colours.

C. separate all the three colours form one another.

D. not separate the three colours at all.

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413. A ray falls on a prism ABC (AB = BC) and travels are shown in the figure. The minimum refractive index of the material of the prism

should be

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

B. $\sqrt{2}$

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

D. $\sqrt{3}$

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414. A point source is placed at co-ordinates (0, 1) in X-Y plane. A ray of light from the source is reflected on a plane along the X-axis and peipendicular to the X-Y plane. The reflected ray passes through the point (3,3). What is the path length of the ray from (0, 1) to (3, 3)?

A. 5

B. $\sqrt{13}$

C. $2\sqrt{13}$

D. $1+2\sqrt{3}$

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415. The ratio of the diameter of the sun to the distance between the earth and the sun is approximately 0.009. The approximate diameter of the image of the sun formed by a concave spherical mirror of radius of curvature 0.4 m is

A. $4.5 \times 10^{-6} m$

B. $4.0 \times 10^{-6} m$

C. $3.6 \times 10^{-3} m$

D. $1.8 \times 10^{-3} m$

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416. A point object is held above a thin equiconvex lens at its focus. The focal length is

0.1 m and the lens rests on a horizontal thin plane mirror. The final image will be formed at

A. infinite distance above the lens.

B. 0.1 m above the centre of the lens.

C. infinite distance below the lens.

D. 0.1 m below the centre of the lens.

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417. Diameter of a plano-convex lens is 6 cm and thickness at the centre is 3 mm. If speed of light in material of lens is 2×10^8 m/s, the focal length of the lens is

A. 15 cm

B. 20 cm

C. 30 cm

D. 10 cm

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418. The image of an object, formed by a plano- convex lens at a distance of 8 m behind the lens, is real and is one-third the size of the object. The wavelength of light inside the lens is $\frac{2}{3}$ times the wavelength in free space. The radius of the curved surface of the lens is

A. 1m

B. 2m

C. 3m

D. 6m

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419. By placing a comvex lens of focal length equal to 15.0 cm between an object and a screen separated by a distance of 75.0 cm, the sizes of the images obtained are 6.0 cm and $\frac{2}{3}cm$. The size of the object must be

A. 2.0 cm

B. 4.0 cm

C. 3.0 cm

D. 1.5 cm

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420. For a normal eye, the cornea of eye provides a converging power of 40 D and the least converging power of the eye lens behind the cornea is 20 D. Using this information, the distacne between the retina and the cornea-eye lens can be estimated to be

A. 5 cm

B. 2.5 cm

C. 1.67 cm

D. 1.5 cm

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421. The focal length of a plano-convex lens is f and its refractive index is 1.5. It is kept over a plane glass plane with its curved surface

touching the glass plate. The gap between the lens and the glass plate is filled by a liquid. As a result, the effective focal length of the combination becomes 2f. Then the refractive index of the liquid is

A. 1.5

B. 2

C. 1.25

D. 1.33

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422. A convex lens is made of a glass of refractive index 1.5. The radius of curvature of each of its surfaces is 20 cm. Then the ratio of the power of the lens when placed in air to its power when immersed inside a liquid of refractive index 1.25 is

A. $2:5$

B. $5:2$

C. $3:2$

D. $2:3$

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423. Three thin lenses are combined by placing them in contact with each other to get more magnification in an optical instrument. Each lens has a focal length of 3 cm. If the lens, distance of distinct vision is taken as 25 cm, the total magnification of the lens combination in normal adjustment is

A. 9

B. 26

C. 300

D. 3

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424. When image is fomred by reflaction, the field of veiw is maximum for

A. plane mirro.

B. convex mirro

C. concave mirror.

D. cylindrical mirror.

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425. A candle flame 2 cm high is palced at distance of 2 metere from a wall. How far from the wall must a concave mirror to placed in order to form an images of the flame 6 cm high on the wall ?

A. 225 cm

B. 300 cm

C. 450 cm

D. 500 cm

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426. An infinitely long bar lies alont the adis of cancave mirror of focal length f. the nerar end

of bar is a distance $v > f$ from the mirror. Its images will have a length

A. $\dfrac{uf}{u-f}$

B. $\dfrac{f^2}{u-f}$

C. $\dfrac{f^2}{u+f}$

D. $\dfrac{uf}{u+f}$

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427. Radius of the circle of least confusion is called as __________.

A. longitudinal chromatic aberration.

B. transverse chromatic aberration.

C. coma

D. achromcatic aberration.

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428. Assertion : If objective and eye lens of a mcroscope are interchanged then it can work as telsecope.

Reason : The object of telescope has large focal lengths.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion.

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion.

C. Assertion is True, Reason is False.

D. Assertion is False, Reason is True.

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429. A convex lens focal lenghts 30 cm made of glass of refractive index 1.5 is immersed in water having refrctive 1.33. The change in the focal length of lens is

A. 62.2 cm

B. 87.4cm

C. 58.2 cm

D. 73.6 cm

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430. Magnifying power of a telescope in normal adjustment when final images of a star is formed at infinity is 9. the image of a star is formed at

A. 54 cm

B. 9 cm

C. 6 cm

D. 36 cm

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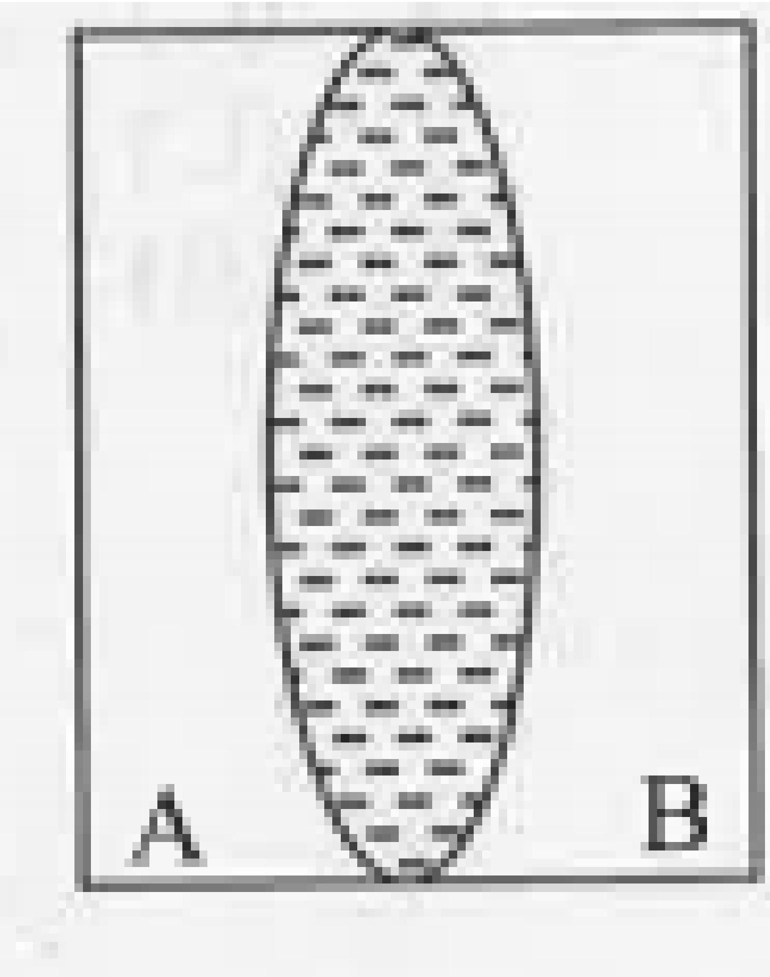
431. Two plano-concave lenses (1 and 2) of glass of refractive index 1.5 have radii of curvature 20 cm and 10 cm. They are placed in

contact with their curved surface towards each other and the space between them is filled with liquid of refractive index 4/3. Then the combination is



A. convex lens of focal length 40 cm

B. concave lens of focal length 40 cm

C. concave lens of focal length 66.6 cm

D. convex lens of focal length 66.6 cm

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432. Assertion : If radius of curvature of mirror is doubled, focal length is halved.

Reason : Radius of curvature =2 times the focal lenghts

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion.

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion.

C. Assertion is True, Reason is False.

D. Assertion is False, Reason is True.

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433. Assertion : A dentist uses a convex mirror to examine a small cavity in the both.

Reason : A convex mirror forms only diminished virtual images.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion.

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion.

C. Assertion is True, Reason is False.

D. Assertion is False, Reason is True.

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434. For a given compound microscope, increase in length of tube

A. increases magnifying power.

B. has no effect on magnifying power.

C. decreases magnifying power.

D. doubles the magnifying power.

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435. A light ray enters a solid glass sphere of refractive index $\sqrt{3}$ at an angle of incidence 60°. The ray is both reflected and refracted at the farther surface of the sphere. The angle between the reflected and refracted rays at this surface is

A. 90°

B. 60°

C. 45°

D. 30°

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436. A telescope using an eye piece of focal length 2 cm has a magnification 20 in normal adjustment. If the telescope is now used to

view an object placed at a distance of 2 m from the objective, the new length of the telescope is (assume final image is at infinity).

A. 56 cm

B. 59 cm

C. 52 cm

D. 50 cm

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437. Which of the following (referred to a spherical mirror) do (does) not depend on whether the rays are paraxial or not?

A. Radius of curvature

B. Focus

C. Pole

D. Principal axis.

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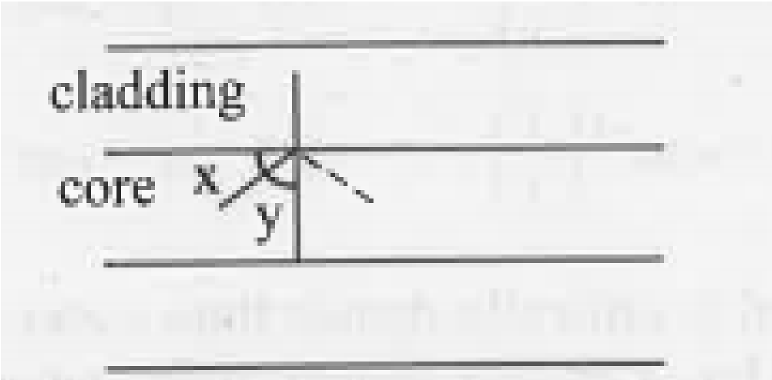
438. In optical fibre, assuming, the cladding is uniform, light is transmitted if the value of



A. x gt the critical angle.

B. x = 2 (critical angle).

C. y gt the critical angle.

D. y lt the critical angle.

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439. Light propagates 4 cm distance in glass of refractive index 1.5 in time to. In the same time to, light propagates a distance of 4.8 cm in a medium. The refractive index of the medium is

A. 1.25

B. 1.5

C. 1.7

D. 0.867

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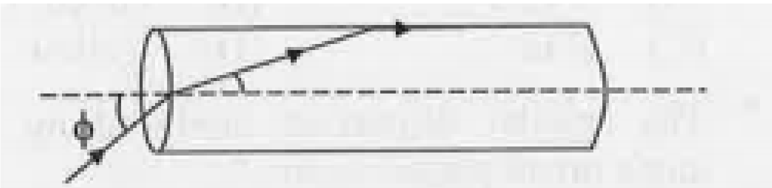
440. A transparent solid cylindrical rod has a refractive index of $\left(\frac{2}{\sqrt{3}}\right)$. It is surrounded by air. A light ray is incident at the mid-point of one end of the rod as shown in the figure.



The incident angle Φ for which the light ray grazes along the wall of the rod is

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

B. $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$

C. $\sin^{-1}(\sqrt{2})$

D. $\sin^{-1}\left(\frac{1}{\sqrt{3}}\right)$

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441. A beam of light consisting of red, and blue colours is incident on a right-angled prism ABC. The refractive indices of the

material of the prism for the red and blue wavelength are 1.39 and 1.47 respectively. The colour/colours transmitted through the face AC of the prism will be

A. red only

B. red and blue.

C. blue only.

D. none.

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442. A light ray is incident normally on the face AB of a right-angled prism ABC $(\mu = 1.50)$ as shown in the figure. What is the largest angle ϕ for which the light ray is totally reflected at the face AC?

A. $\Phi = \sin^{-1}\left(\frac{2}{3}\right)$

B. $\Phi = \cos^{-1}\left(\frac{2}{3}\right)$

C. $\Phi = \cos^{-1}\left(\frac{1}{3}\right)$

D. $\Phi = \cot^{1}\left(\frac{2}{3}\right)$

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443. Diamond is optically more dense than water because

A. it has a greater density than water.

B. water is more transparent.

C. water retards the speed of light less than a diamond.

D. a diamond glitters more than water.

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444. Critical angle of glass is θ_1 and that of water is θ_2. The critical angle for water and glass surface would be $(\mu_g = 3/2, \mu_w = 4/3)$

A. between $\theta_1 \text{ and } \theta_2)$

B. greater than 'theta_2`

C. $\leq ssthan\theta_1$

D. $\leq ssthan\theta_2$

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445. The value of critical angle is least for which of the following colours of light?

A. Violet

B. Green

C. Blue

D. Yellow.

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446. The angular dispersion produced by a small angle prism placed in air

A. increases if the average refractive index of the prism increases.

B. increases if the average refractive index decreases.

C. remains constant whether the average refractive index increases or decreases.

D. has no relation with average refractive index.

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447. Assertion: The rainbow is seen sometimes in the sky when it is raining. When one sees a rainbow, one's back is towards the sun.

Reason: Interanl reflection from water droplet causes dispersion. The final ray is in the backward direction.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion.

B. Assertion is True, Reason is True, Reason is not a correct explanation for Assertion.

C. Assertion is True, Reason is False.

D. Assertion is False, Reason is False.

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