PRE-MEDICAL

PHYSICS

ENTHUSIAST | LEADER | ACHIEVER

EXERCISE

Ray optics and optical Instruments

ENGLISH MEDIUM

EXERCISE-I (Conceptual Questions) — Build Up Your Understanding

REFLECTION OF LIGHT AT PLANE SURFACE

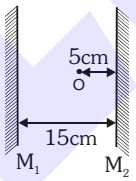
1. When a ray of light is incident normally on a plane mirror then the angle of reflection will be
(1) 0° (2) 90° (3) 180° (4) – 90°
GO0001

2. A ray is incident at 30° angle on plane mirror. What will be deviation after reflection from mirror.
(1) 120° (2) 60° (3) 30° (4) 45°
GO0002

3. Two plane mirrors are lying perpendicular to each other, there is lamp in between mirrors. Then number of images of lamp will be
(1) 3 (2) 4 (3) 5 (4) 6
GO0003

4. A man runs towards stationary plane mirror at a speed of 15 m/s. What is the speed of his image with respect to mirror :–
(1) 7.5 m/s (2) 15 m/s
(3) 30 m/s (4) 45 m/s
GO0004

5. Figure shows two plane mirrors parallel to each other and an object O placed between them. Then the distance of the first three images from the mirror M_2 will be :(in cm)
(1) 5, 10, 15
(2) 5, 15, 30
(3) 5, 25, 35
(4) 5, 15, 25



GO0005

6. A ray gets succesively reflection from two mirrors inclined at an angle of 40°. If the angle of incidence on the first mirror is 30° then the net deviation of this ray after two reflections.
(1) 40° (2) 280° (3) 90° (4) 240°
GO0006

7. A tall man of height 6 feet, want to see his full image. Then required minimum length of the mirror will be :-
(1) 12 feet (2) 3 feet
(3) 6 feet (4) Any length
GO0007

8. A man is 180 cm tall and his eyes are 10 cm below the top of his head. In order to see his entire height right from toe to head, he uses a plane mirror kept at a distance of 1 m from him. The minimum length of the plane mirror required is
(1) 180 cm (2) 90 cm
(3) 85 cm (4)170 cm
GO0008

9. Two plane mirrors are at 45° to each other. If an object is placed between them then the number of images will be
(1) 5 (2) 9 (3) 7 (4) 8
GO0009

REFLECTION AT SPHERICAL SURFACE

10. The focal length of a concave mirror is 50 cm. where an object be placed so that its image is two times magnified, real and inverted -
(1) 75 cm (2) 72 cm (3) 63 cm (4) 50 cm
GO0010

11. An object of height 7.5 cm is placed in front of a convex mirror of radius of curvature 25 cm at a distance of 40 cm. The height of the image should be -
(1) 2.3 cm (2) 1.78 cm (3) 1 cm (4) 0.8 cm
GO0011

12. A square of side 3 cm is placed at a distance of 25 cm from a concave mirror of focal length 10 cm. The centre of the square is at the axis of the mirror and the plane is normal to the axis. The area enclosed by the image of the wire is -
(1) 4 cm^2 (2) 6 cm^2 (3) 16 cm^2 (4)36 cm^2
GO0012

13. The focal length of a concave mirror is 12 cm. Where should an object of height 4 cm be placed, so that a real image of 1 cm height is formed ?
(1) 48 cm (2) 3 cm
(3) 60 cm (4) 15 cm
GO0013

14. An object is lying at a distance of 90 cm from a concave mirror of focal length 30 cm. The position and nature of image formed by it will be
(1) 45 cm, of the size of object
(2) 90 cm, smaller than object
(3) 30 cm, bigger than object
(4) – 45 cm smaller than object
GO0014

15. An object of height 1.5 cm is situated at a distance of 15 cm from a concave mirror. The concave mirror forms its real image of height 3.0 cm. The focal length of concave mirror will be

(1) – 10 cm (2) – 20 cm

(3) 20 cm (4) 30 cm

GO0015

16. A boy stands straight infront of a mirror at a distance of 30 cm away from it. He sees his erect image whose height is 1/5th of his real height. The mirror he is using is -

(1) Plane mirror (2) Convex mirror

(3) Concave mirror (4) None

GO0016

17. A point object is moving on the principal axis of a concave mirror of focal length 24 cm towards the mirror. When it is at a distance of 60 cm from the mirror, its velocity is 9 cm/sec. What is the velocity of the image at that instant -

(1) 5 cm/sec. (2) 12 cm/sec

(3) 4 cm/sec (4) 9 cm/sec

GO0017

18. A concave mirror gives an image three times as large as the object placed at a distance of 20 cm from it. For the image to be real, the focal length should be -

(1) –10 cm (2) –15 cm

(3) –20 cm (4) –30 cm

GO0018

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

(1) f (2) $2f$ (3) $4f$ (4) Zero

GO0019

20. A convex mirror has a radius of curvature of 22 cm. If an object is placed 14 cm away from the mirror then its image is formed at-

(1) 6.2 cm on the front side of the mirror

(2) 6.2 cm on the back side of the mirror.

(3) 51.3 cm on the front of the mirror.

(4) 51.3 cm on the back side of the mirror.

GO0020

21. The focal length of a spherical mirror is :-

(1) Maximum for red light

(2) Maximum for blue light

(3) Maximum for white light

(4) Same for all lights

GO0021

22. A point object is placed at a distance of 10 cm and its real image is formed at a distance of 20 cm from a concave mirror. If the object is moved by 0.1 cm towards the mirror, the image will shift by about.

(1) 0.4 cm away from the mirror

(2) 0.4 cm towards the mirror

(3) 0.8 cm away from the mirror

(4) 0.8 cm towards the mirror

GO0022

23. The focal length of a convex mirror is 20 cm its radius of curvature will be

(1) 10 cm (2) 20 cm

(3) 30 cm (4) 40 cm

GO0023

24. A diminished virtual image can be formed only in

(1) Plane mirror (2) A concave mirror

(3) A convex mirror (4) None

GO0024

REFRACTION AT PLANE SURFACE : SNELL'S LAWS TIR

25. The colour are characterised by which of following character of light-

(1) Frequency (2) Amplitude

(3) Wavelength (4) Velocity

GO0025

26. The wavelength of light in two liquids 'x' and 'y' is 3500 Å and 7000Å , then the critical angle will be

(1) 60° (2) 45°

(3) 30° (4) 15°

GO0026

27. A microscope is focused on a mark, then a glass slab of refractive index 1.5 and thickness of 6 cm is placed on the mark to get the mark again in focus, the microscope should be moved

(1) 4 cm (2) 2 cm (3) 6 cm (4) 8 cm

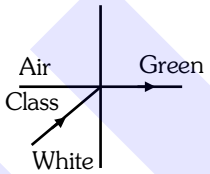
GO0027

28. Velocity of light in glass, whose refractive index w.r.t. air is 1.5, is 2×10^8 m/Sec. In a certain liquid the velocity of light is found to be 2.5×10^8 m/Sec. The refractive index of liquid w.r.t. air is
(1) 0.64 (2) 0.80 (3) 1.20 (4) 1.44
GO0028

29. A point source of light is place 4 m below the surface of water of refractive index 5/3. The minimum diameter of a disc which should be placed over the source on the surface of water to cut-off all light coming out of water is ($\mu = 5/3$)
(1) 2 m (2) 6 m (3) 4 m (4) 3 m
GO0029

30. When a ray of light enters a medium of refractive index μ, it is observed that the angle of refraction is half of the angle of incidence is than angle of incidence is
(1) $2\cos^{-1}(\mu/2)$ (2) $\cos^{-1}(\mu/2)$
(3) $2\cos^{-1}(\mu)$ (4) $2\sin^{-1}(\mu/2)$
GO0030

31. 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
(1) Yellow, orange, red
(2) Violet, indigo, blue
(3) All colours
(4) All colours except green



GO0031

32. A plane glass slab is kept over various coloured letters; the letter which appears least raised is
(1) blue (2) voilet (3) green (4) red
GO0032

33. A bubble in glass slab (μ = 1.5) when viewed from one side appears at 5 cm and 2cm from other side, then thickness of slab is:-
(1) 3.75 cm (2) 3 cm (3) 10.5 cm. (4)2.5 cm
GO0033

34. A ray of light travelling in air have wavelength λ, frequency n, velocity V and intensity I. If this ray enters into water than these parameters are λ', n', v' and I' respectively. Which relation is correct from following-
(1) $\lambda = \lambda'$ (2) n = n' (3) v = v' (4) I = I'
GO0034

35. Light travels through a glass plate of thickness t and having refractive index n. If c is the velocity of light in vacuum. the time taken by the light to travel this thickness of glass is
(1) $\frac{t}{nc}$ (2) tnc
(3) $\frac{nt}{c}$ (4) $\frac{tc}{n}$
GO0035

36. A ray of light propagates from glass (refractive index = 3/2) to water (refractive index = 4/3). The value of the critical angle
(1) $\sin^{-1}(1/2)$ (2) $\sin^{-1}\left(\frac{\sqrt{8}}{9}\right)$
(3) $\sin^{-1}(8/9)$ (4) $\sin^{-1}(5/7)$
GO0036

37. Relation between critical angles of water and glass is
(1) $C_w > C_g$ (2) $C_w < C_g$
(3) $C_w = C_g$ (4) $C_w = C_g = 0$
GO0037

38. Critical angle of light passing from glass to air is minimum for
(1) Red (2) Green (3) Yellow (4) Violet
GO0038

39. Which of the following is used in optical fibres
(1) T.I.R. (2) Scattering
(3) Diffraction (4) Refraction
GO0039

40. Brilliance of diamond is due to
(1) Shape (2) Cutting
(3) Reflection (4) T.I.R.
GO0040

41. 'Mirage' is a phenomenon due to
(1) Reflection of light (2) Refraction of light
(3) T.I.R. of light (4) Diffraction of light
GO0041

42. An object is immersed in a fluid. In order that the object becomes invisible, it should.
(1) Bahave as a perfect reflector
(2) Absorb all light falling on it
(3) Have refractive index one
(4) Have refractive index exactly matching with that of the surrounding fluid
GO0042

PRISM & DISPERSION

43. The angle of a glass prism is 4.5° and its refractive index is 1.52. The angle of minimum deviation will be –
(1) 1.5° (2) 2.3° (3) 4.5° (4) 2°

GO0043

44 A ray of light passes through equilateral Prism (μ =1.5) such that angle of incidence is equal to angle of emergence and the later is equal to 3/4th of Prism angle. The angle of deviation is
(1) 60° (2) 30° (3) 45° (4) 120°

GO0044

45. Prism angle of glass prism is 10°. It's refractive index of red and violet colour is 1.51 and 1.52 respectively. Then its dispersive power will be .
(1) 0.015 (2) 0.020 (3) 0.011 (4) 0.019

GO0045

46. If the refractive indices of crown glass for red, yellow and violet colours are 1.5140, 1.5170 and 1.5318 respectively and for flint glass these are 1.6434, 1.6499 and 1.6852 respectively, then the dispersive powers for crown and flint glass are respectively.
(1) 0.034 and 0.064 (2) 0.064 and 0.034
(3) 1.00 and 0.064 (4) 0.034 and 1.0

GO0046

47. A thin Prism P_1 with angle 4° and made from glass of refractive index 1.54 is combined with another thin Prism P_2 made from glass of refractive index 1.72 to produce dispersion without deviation. The angle of Prism P_2 is
(1) 5.33° (2) 4° (3) 3° (4) 2.6°

GO0047

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

(1) $\sqrt{2}$ (2) 2 (3) $\frac{3}{2}$ (4) $\frac{4}{3}$

GO0048

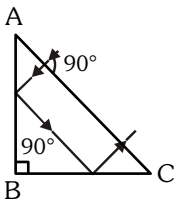
49. Angle of prism is A and its one surface is silvered. Light rays falling at an angle of incidence 2A on first surface return back through the same path after suffering reflection at second silvered surface. Refractive index of the material of prism is

(1) 2 sin A (2) 2 cos A

(3) $\frac{1}{2}$ cosA (4) tanA

GO0049

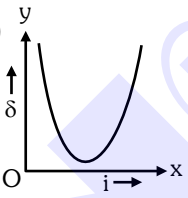
50. A ray falls on a prism ABC (AB = BC) and travels as shown in figure. The minimum refractive index of the prism material should be



(1) $\frac{4}{3}$ (2) $\sqrt{2}$ (3) 1.5 (4) $\sqrt{3}$

GO0050

51. For a prism, graph between angle of deviation (δ) and angle of incidence will be

(1)


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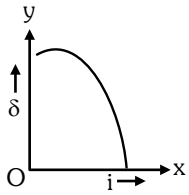

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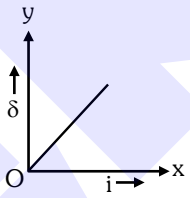

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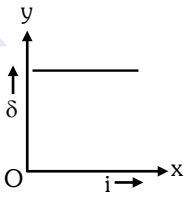


GO0051

52. Three prisms 1,2 and 3 have the prism angle A = 6°, but their refractive indices are respectively 1.4, 1.5 and 1.6.If δ_1, δ_2, δ_3, be their respective angles of deviation then :–
(1) $\delta_3 > \delta_2 > \delta_1$ (2) $\delta_1 > \delta_2 > \delta_3$
(3) $\delta_1 = \delta_2 = \delta_3$ (4) $\delta_2 > \delta_1 > \delta_3$

GO0052

53. Rainbow is formed due to :-
(1) Scattering & refraction
(2) Internal reflection & dispersion, refraction
(3) Reflection only
(4) Diffraction and dispersion

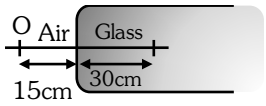
GO0053

54. The refractive index of the material of a prism is $\sqrt{2}$ and its refracting angle is 30°. One of the refracting surfaces of the prism is silvered. 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 :–
(1) 60° (2) 0°
(3) 30° (4) 45°

GO0054

REFRACTION AT SPHERICAL SURFACES

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



(1) 30 cm left (2) infinity
(3) 1 cm to the right (4) 18 cm to the left

GO0055

56. A spherical surface of radius of curvature R separates air (refractive index 1.0) from glass (refractive index 1.5). The centre of curvature is in glass. A point object P placed in air is found to have a real image Q in the glass. The line PQ cuts the surface at a point O and PO = OQ. The distance PO is equal to

(1) R (2) 3 R (3) 2 R (4) 5 R

GO0056

LENSES

57. Two convex lens of focal length 20 cm and 25 cm are placed in contact with each other, then power of this combination is –

(1) + 1 D (2) + 9 D
(3) – 1 D (4) – 9 D

GO0057

58. Two lenses of power +2.50 D and –3.75 D are combined to form a compound lens. Its focal length in cm will be -

(1) 40 (2) –40 (3) –80 (4) 160

GO0058

59. Lenses of powers 3D and -5D are combined to form a compound lens. An object is placed at a distance of 50 cm from this lens. Calculate the position of its image.

(1) –10 cm (2) +10 cm
(3) –25 cm (4)+ 25 cm.

GO0059

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

(1) –1.5 D (2) -6.5 D
(3) +6.5 D (4) +6.67 D

GO0060

61. An object is put at a distance of 5 cm from the first focus of a convex lens of focal length 10cm. If a real image is formed it's distance from the lens will be :-

(1) 15 cm (2) 20 cm (3) 25 cm (4) 30 cm

GO0061

62. An equiconvex lens has a power of 5 dioptre. If it is made of glass of refractive index 1.5. then radius of curvature of its each surface will be ?

(1) 20 cm (2) 10 cm (3) 40 cm (4) ∞

GO0062

63. An object placed at a distance of 9cm from first principal focus of convex lens, produces a real image at a distance of 25cm from its second principal focus. Then focal length of lens is

(1) 9 cm (2) 25 cm (3) 15 cm (4) 17 cm

GO0063

64. A glass convex lens (μ_g = 1.5) has a focal length of 8 cm when placed in air. What would be the focal length of the lens when it is immersed in water
(μ_w = 1.33)

(1) 2 m (2) 4 cm
(3) 16 cm (4) 32 cm

GO0064

65. Two thin convex lenses of focal length 10 cm and 15 cm are separated by a distance of 10 cm. The focal length of the combination is :-

(1) 4.2 cm (2) 6 cm (3) 10 cm (4) 15 cm

GO0065

66. A convex lens of power P is immersed in water. how will its power change ?

(1) Increases
(2) Decreases
(3) Remains unchanged
(4) Increases for red colour and decreases for blue colour

GO0066

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

(1) 1 (2) 3 (3) 4 (4) 5

GO0067

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

(1) 7.5 cm (2) 15.0 cm (3) 75 cm (4)5.0 cm

GO0068

69. A plano convex lens (μ = 1.5) has radius of curvature 10 cm. It is silvered on its plane surface. Find focal length after silvering:-

(1) 10 cm (2) 20 cm (3) 15 cm (4) 25 cm

GO0069

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

(1) 50 cm (2) 100 cm
(3) 200 cm (4)400 cm

GO0070

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

(1) 1.5 (2) 1.66 (3) 1.33 (4) 3

GO0071

72. If a convex lens of focal length 80 cm and a concave lens of focal length 50 cm are combined together, what will be their resulting power

(1) + 6.5 D (2) – 6.5 D
(3) + 7.5 D (4) –0.75 D

GO0072

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

(1) Become zero
(2) Become infinite
(3) Become small, but non–zero
(4) Remain unchanged

GO0073

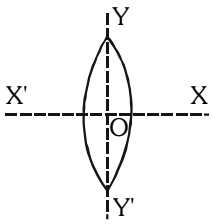
74. An equiconvex lens is cut into two halves along (i) XOX′ and (ii) YOY′ as shown in the figure. Let f, f′, f″ be the focal lengths of the complete lens, of each half in case (i), and of each half in case (ii), respectively Choose the correct statement from the following :–

(1) f′ = f, f″ = 2f

(2) f′ = 2f, f″ = f

(3) f′ = f, f″ = f

(4) f′ = 2f, f″ = 2f



GO0074

75. An object and its real image are located at distances 25 cm and 40 cm respectively from the two principal focii of a convex lens. The linear magnification of the image is near to

(1) + 1.3 (2) –1.3 (3) + 1.8 (4) –1.8

GO0075

CHROMATIC & SPHERICAL ABERRATIONS

76. Lenses applied in achromatic combination having dispersive power in ratio of 5:3 if focal length of concave lens is 15 cm, then focal length of other lens will be :

(1) -9 cm (2) +9 cm (3) -12 cm (4)+12 cm

GO0076

77. If the magnitude of dispersive powers of two lenses are 0.024 and 0.036. Then their focal lengths will be for aberration free combination.

(1) 30 cm, -40 cm (2) 30 cm, -45 cm
(3) 10 cm, 30 cm (4) 20 cm, -35 cm

GO0077

78. An achromatic convergent doublet of two lenses in contact has a power of + 2D. The convex lens has a power + 5D. What is the ratio of the dispersive powers of the convergent and divergent lenses

(1) 2 : 5 (2) 3 : 5 (3) 5 : 2 (4) 5 : 3

GO0078

79. The dispersive powers of the materials of the two lenses are in the ratio 4 : 3. If the achromatic combination of these two lenses in contact is a convex lens of focal length 60 cm then the focal lengths of the component lenses are

(1) – 20 cm and 25 cm (2) 20 cm and – 25 cm
(3) – 15 cm and 40 cm (4) 15 cm and – 20 cm

GO0079

80. Two lenses of focal length + 10 cm and - 15 cm when put in contact behave like a convex lens. They will have zero longitudinal chromatic aberration if their dispersive powers are in the ratio

(1) + 3/2 (2) + 2/3

(3) - 3/2 (4) -2/3

GO0080

81. Refractive index of violet,yellow and Red colour of light for a material of lens are 1.66, 1.64 & 1.62 respectively. If mean focal length of lens is 10cm Then chromatic abberation between the colour of violet and red will be

(1) 0.625 cm (2) 0.125 m

(3) .02 cm (4) 0 cm

GO0081

MICROSCOPES AND TELESCOPES

82. The focal length of convex lens is 2.5 cm. Its magnifying power for minimum distance of distinct vision will be -

(1) 25 (2) 52 (3) 11 (4) 1.1

GO0082

83. An astronomical telescope of magnifying power 8 is made using two lenses spaced 45 cm apart. The focal length of the lenses used are

(1) f = 40 cm, f = 5 cm

(2) f = 8 cm, f = 5 cm

(3) f = 5 cm, f = 47 cm

(4) f = 20 cm, f = 5 cm

GO0083

84. The magnifying power of the objective of a compound microscope is 7 if the magnifying power of the microscope is 35, then the magnifying power of eyepiece will be -

(1) 245 (2) 5 (3) 28 (4) 42

GO0084

85. An astronomical telescope has focal lengths 100 cm and 10 cm of objective and eyepiece lens respectively when final image is formed at least distance of distinct vision, magnification power of telescope will be :

(1) –10 (2) –11

(3) –14 (4) –15

GO0085

86. If tube length of astronomical telescope is 105 cm and magnifying power is 20 for normal setting. Calculate the focal length of objective.

(1) 100 cm (2) 10 cm

(3) 20 cm (4) 25 cm

GO0086

87. Least distance of distinct vision is 25 cm, What will be Magnifying power of simple microscope of focal length 5 cm, if final image is formed at minimum distance of distinct vision –

(1) $\frac{1}{5}$ (2) 5 (3) $\frac{1}{6}$ (4) 6

GO0087

88. In a compound microscope, the intermediate image, in normal use is

(1) Virtual, erect and magnified

(2) Real, erect and magnified

(3) Real, inverted and magnified

(4) Virtual, inverted and magnified

GO0088

89. The focal lengths of the objective and eye- piece of a telescope are respectively 100 cm and 2 cm. The moon subtends an angle of 0.5° at the eye. If it is looked through the telescope, the angle subtended by the moon's image will be

(1) 100° (2) 50° (3) 25° (4) 10°

GO0089

90. In a laboratory four convex lenses L_1 ,L_2 ,L_3 ,and L_4 of focal lengths 2,4,6 and 8 cm respectively are available. Two of these lenses form a telescope of length 10 cm and magnifying power 4. The objective and eye lenses are

(1) L_2 , L_3 (2) L_1 , L_4 (3) L_3 ,L_2 (4) L_4 , L_1

GO0090

91. The magnifying power of a simple microscope is 6. The focal length of its lens in metres will be, if least distance of distinct vision is 25 cm

(1) 0.05 (2) 0.06 (3) 0.25 (4) 0.12

GO0091

92. An astronomical telescope has a magnifying power 10. The focal length of eyepiece is 20 cm. The focal length of objective is

(1) 2 cm (2) 200cm

(3) $\frac{1}{2}$ cm (4) $\frac{1}{200}$ cm

GO0092

93. A telescope has an objective lens of focal length 200 cm and an eye piece with focal length 2cm. If this telescope is used to see a 50 meter tall building at a distance of 2km, what is the height of the image of the building formed by the objective lens

(1) 5 cm (2) 10 cm (3) 1 cm (4) 2 cm

GO0093

DEFECTS OF VISION

94. Minimum and maximum distance should be for clear vision of healthy eye

(1) 100 cm & 500 cm (2) Infinite & 25 cm

(3) 25 cm & 100 cm (4) 25 cm & infinite

GO0094

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

(1) Concave, – 1.0 D (2) Convex, + 1.5 D

(3) Concave, – 2.0 D (4) Convex, + 2.0 D

GO0095

96. A person can not see the objects beyond 50 cm. The power of a lens to correct this vision will be-

(1) +2D (2) –2D

(3) +5D (4) 0.5 D

GO0096

97. A myopic person can not see objects lying beyond 2 m. The focal length and power of the lens required to remove this defect will be -

(1) 1 m & 0.5 D (2) – 2 m & – 0.5 D

(3) 0.5 m & 0.5 D (4) – 0.5 m & 0.5 D

GO0097

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

(1) 100 cm (2) 150 cm

(3) 50 cm (4) 25 cm

GO0098

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

(1) – 2.5 D (2) + 2.5 D

(3) – 6.25 D (4) + 1.5 D

GO0099

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

(1) 10 cm convex (2) 100 cm concave

(3) 20 cm convex (4) 20 cm concave

GO0100

EXERCISE-I (Conceptual Questions) ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	1	1	1	2	3	2	2	2	3	1	2	1	3	4	1
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	2	3	2	4	2	4	1	4	3	1	3	2	3	2	1
Que.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans.	1	4	3	2	3	3	1	4	1	4	3	4	2	2	4
Que.	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	1	3	1	2	2	1	1	2	4	1	4	2	3	3	1
Que.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
Ans.	4	1	3	4	3	2	2	2	1	2	3	4	2	1	2
Que.	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
Ans.	2	2	2	4	2	1	3	1	2	3	1	4	3	3	4
Que.	91	92	93	94	95	96	97	98	99	100					
Ans.	1	2	1	4	3	2	2	2	1	4					

EXERCISE-II (Previous Year Questions) AIPMT/NEET

AIPMT 2006

1. A microscope is focussed on a mark on a piece of paper and then a slab of glass of thickness 3 cm and refractive index 1.5 is placed over the mark. How should the microscope be moved to get the mark in focus again :-

(1) 1 cm upward (2) 4.5 cm downward

(3) 1 cm downward (4) 2 cm upward

GO0101

2. A convex lens and a concave lens, each having same focal length of 25 cm, are put in contact to form a combination of lenses. The power in diopters of the combination is :-

(1) 25 (2) 50 (3) Infinite (4) Zero

GO0102

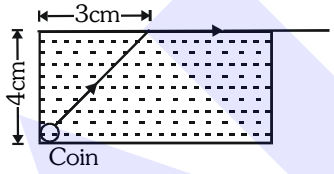
AIPMT 2007

3. The frequency of a light wave in a material is 2×10^{14} Hz and wavelength is 5000 Å. The refractive index of material will be :

(1) 1.33 (2) 1.40 (3) 1.50 (4) 3.00

GO0104

4. A small coin is resting on the bottom of a beaker filled with a liquid. A ray of light from the coin travels upto the surface of the liquid and moves along its surface (see figure).



How fast is the light travelling in the liquid ?

(1) 1.2×10^8 m/s (2) 1.8×10^8 m/s

(3) 2.4×10^8 m/s (4) 3.0×10^8 m/s

GO0105

AIPMT 2008

5. Two thin lenses of focal lengths f_1 and f_2 are in contact and coaxial.The power of the combination is :-

(1) $\frac{f_1 + f_2}{2}$ (2) $\frac{f_1 + f_2}{f_1 f_2}$ (3) $\sqrt{\frac{f_1}{f_2}}$ (4) $\sqrt{\frac{f_2}{f_1}}$

GO0106

AIPMT (Pre) 2010

6. A lens having focal length f and aperture of diameter d forms an image of intensity I. Aperture of diameter $\frac{d}{2}$ in central region of lens is covered by a black paper. Focal length of lens and intensity of image now will be respectively :-

(1) $\frac{f}{2}$ and $\frac{I}{2}$ (2) f and $\frac{I}{4}$

(3) $\frac{3f}{4}$ and $\frac{I}{2}$ (4) f and $\frac{3I}{4}$

GO0107

7. A ray of light travelling in a transparent medium of refractive index μ, falls on a surface separating the medium from air at an angle of incidence of 45°. For which of the following value of μ the ray can undergo total internal reflection ?

(1) μ = 1.25 (2) μ = 1.33

(3) μ = 1.40 (4) μ = 1.50

GO0108

AIPMT (Mains) 2010

8. The speed of light in media M_1 and M_2 is 1.5×10^8 m/s and 2.0×10^8 m/s respectively. A ray of light enters from medium M_1 to M_2 at an incidence angle i. If the ray suffers total internal reflection, the value of i is :-

(1) Equal to or less than $\sin^{-1}\left(\frac{3}{5}\right)$

(2) Equal to or greater than $\sin^{-1}\left(\frac{3}{4}\right)$

(3) Less than $\sin^{-1}\left(\frac{2}{3}\right)$

(4) Equal to $\sin^{-1}\left(\frac{2}{3}\right)$

GO0109

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

(1) 30° (2) 45°

(3) 60° (4) Zero

GO0110

AIPMT (Pre) 2011

10. Which of the following is not due to total internal reflection ?

(1) Working of optical fibre

(2) Difference between apparent and real depth of a pond

(3) Mirage on hot summer days

(4) Brilliance of diamond

GO0111

11. A biconvex lens has a radius of curvature of magnitude 20 cm. Which one of the following options describe best the image formed of an object of height 2 cm placed 30 cm from the lens ? (μ = 1.5)

(1) Virtual, upright, height = 1 cm

(2) Virtual, upright, height = 0.5 cm

(3) Real, inverted, height = 4 cm

(4) Real, inverted, height = 1 cm

GO0112

AIPMT (Mains) 2011

12. A thin prism of angle 15° made of glass of refractive index μ_1 = 1.5 is combined with another prism of glass of refractive index μ_2 = 1.75. The combination of the prisms produces dispersion without deviation. The angle of the second prism should be :-

(1) 5° (2) 7° (3) 10° (4) 12°

GO0113

AIPMT (Pre) 2012

13. The magnifying power of a telescope is 9. When it is adjusted for parallel rays, the distance between the objective and eyepiece is 20 cm. The focal length of lenses are :

(1) 18 cm, 2 cm (2) 11 cm, 9 cm

(3) 10 cm, 10 cm (4) 15 cm, 5 cm

GO0114

14. A ray of light is incident at an angle of incidence, i, on one face of a prism of angle A (assumed to be small) and emerges normally from the opposite face. If the refractive index of the prism is μ, the angle of incidence i, is nearly equal to :

(1) A/μ (2) A/2μ

(3) μA (4) $\frac{\mu A}{2}$

GO0115

15. A concave mirror of focal length 'f_1' is placed at a distance of 'd' from a convex lens of focal length 'f_2'. A beam of light coming from infinity and falling on this convex lens-concave mirror combination returns to infinity. The distance 'd' must equal :

(1) $2f_1 + f_2$ (2) $-2f_1 + f_2$

(3) $f_1 + f_2$ (4) $-f_1 + f_2$

GO0116

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

(1) greater than that of glass

(2) less than that of glass

(3) equal to that of glass

(4) less than one

GO0117

AIPMT (Mains) 2012

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

(1) 2.5 cm (2) 5 cm

(3) 10 cm (4) 15 cm

GO0118

18. For the angle of minimum deviation of a prism to be equal to its refracting angle, the prism must be made of a material whose refractive index :-

(1) is less than 1

(2) is greater than 2

(3) lies between $\sqrt{2}$ and 1

(4) lies between 2 and $\sqrt{2}$

GO0119

NEET-UG 2013

19. A plano 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 combination is

(1) $\frac{2R}{(\mu_2 - \mu_1)}$ (2) $\frac{R}{2(\mu_1 + \mu_2)}$

(3) $\frac{R}{2(\mu_1 - \mu_2)}$ (4) $\frac{R}{(\mu_1 - \mu_2)}$

GO0121

20. 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 distance between the retina and the cornea eye lens can be estimated to be -

(1) 1.5 cm (2) 5 cm

(3) 2.5 cm (4) 1.67 cm

GO0122

AIPMT 2014

21. If the focal length of objective lens is increased then magnifying power of :-

(1) microscope will increase but that of telescope decrease.

(2) microscope and telescope both will increase.

(3) microscope and telescope both will decrease

(4) microscope will decrease but that of telescope increase.

GO0123

22. The angle of a prism is 'A'. One of its refracting surfaces is silvered. Light 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 :-

(1) 2sinA (2) 2cos A

(3) $\frac{1}{2}$cosA (4) tanA

GO0124

AIPMT 2015

23. The refracting angle of a prism is A, and refractive index of the material of the prism is cot(A/2). The angle of minimum deviation is :-

(1) 180° – 2A (2) 90° – A

(3) 180° + 2A (4) 180° – 3A

GO0125

24. Two identical thin plano-convex glass lenses (refractive index 1.5) each having radius of curvature 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 focal length of the combination is :-

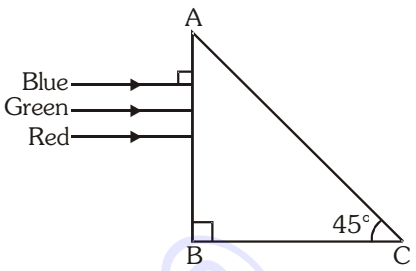
(1) –25 cm (2) –50 cm

(3) 50 cm (4) –20 cm

GO0126

Re-AIPMT 2015

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



The prism will :-

(1) separate the red colour part from the green and blue colours

(2) separate the blue colour part from the red and green colours

(3) separate all the three colours from one another

(4) not separate the three colours at all

GO0127

NEET-I 2016

26. 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 :

(1) 45°, $\frac{1}{\sqrt{2}}$ (2) 30°, $\sqrt{2}$

(3) 45°, $\sqrt{2}$ (4) 30°, $\frac{1}{\sqrt{2}}$

GO0132

27. An astronomical telescope has objective and eyepiece of focal lengths 40 cm and 4 cm respectively. To view an object 200 cm away from the objective, the lenses must be separated by a distance :-

(1) 37.3 cm

(2) 46.0 cm

(3) 50.0 cm

(4) 54.0 cm

GO0133

28. Match the corresponding entries of **column-1** with **coloumn-2** (Where m is the magnification produced by the mirror) :-

Column-1	**Column-2**
(A) $m = -2$	(a) Convex mirror
(B) $m = -\frac{1}{2}$	(b) Concave mirror
(C) $m = +2$	(c) Real image
(D) $m = +\frac{1}{2}$	(d) Virtual image

(1) A → b and c, B → b and c, C → b and d, D → a and d.
(2) A → a and c, B → a and d, C → a and b, D → c and d
(3) A → a and d, B → b and c, C → b and d, D → b and c
(4) A → c and d, B → b and d, C → b and c, D → a and d

GO0134

NEET-II 2016

29. Two identical glass ($\mu_g = 3/2$) equiconvex lenses of focal length f each are kept in contact. The space between the two lenses is filled with water ($\mu_w = 4/3$). The focal length of the combination is :-

(1) 4f/3 (2) 3f/4 (3) f/3 (4) f

GO0135

30. 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 :-

(1) 12 (2) 16 (3) 8 (4) 10

GO0136

31. 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:-

(1) concave, – 0.2 diopter
(2) convex, + 0.15 diopter
(3) convex, + 2.25 diopter
(4) concave, – 0.25 diopter

GO0137

NEET(UG) 2017

32. 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 :-

(1) $\frac{y}{x}$ (2) $\frac{x}{2y}$ (3) $\frac{x}{y}$ (4) $\frac{y}{2x}$

GO0143

33. A thin prism having refracting angle 10° is made of glass of refractive index 1.42. This prism is combined with another thin prism of glass of refractive index 1.7. This combination produces dispersion without deviation. The refracting angle of second prism should be :-

(1) 6° (2) 8° (3) 10° (4) 4°

GO0144

NEET(UG) 2018

34. 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 :-

(1) 60° (2) 45° (3) 30° (4) zero

GO0146

35. An object is placed at a distance of 40 cm from a 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:-

(1) 30 cm away from the mirror
(2) 36 cm away from the mirror
(3) 30 cm towards the mirror
(4) 36 cm towards the mirror

GO0147

NEET(UG) 2019

36. Which colour of the light has the longest wavelength ?

(1) red (2) blue (3) green (4) violet

GO0207

37. Pick the **wrong** answer in the context with rainbow.

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

(2) The order of colours is reversed in the secondary rainbow.

(3) An observer can see a rainbow when his front is towards the sun.

(4) Rainbow is a combined effect of dispersion refraction and reflection sunlight.

GO0208

38. Two similar thin equi-convex 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 (μ = 1.5) as that of glass) then the equivalent focal length is F_2. The ratio $F_1 : F_2$ will be :

(1) 2 : 1 (2) 1 : 2 (3) 2 : 3 (4) 3 : 4

GO0209

39. 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?

(1) 180°

(2) 0°

(3) equal to angle of incidence

(4) 90°

GO0210

NEET(UG) 2019 (Odisha)

40. 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 :

(1) 0 (2) $\frac{P}{2}$ (3) $\frac{P}{4}$ (4) P

GO0211

41. 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 :

(1) 100 cm, 50 cm

(2) 25 cm, 50 cm

(3) 18.75 cm, 37.5 cm

(4) 50 cm, 100 cm

GO0212

NEET(UG) 2020

42. 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:

(1) $\frac{\mu A}{2}$ (2) $\frac{A}{2\mu}$

(3) $\frac{2A}{\mu}$ (4) μA

GO0213

NEET(UG) 2020 (COVID-19)

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

(1) focal length of the lens

(2) radius of curvature of the curved surface

(3) aperture of the lens

(4) refractive index of the material

GO0214

44. 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,

(1) $\frac{4}{3}$ (2) $\frac{9}{8}$

(3) $\frac{5}{3}$ (4) $\frac{3}{2}$

GO0215

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

(1) $-3f$ (2) $1.5f$

(3) $-1.5f$ (4) $3f$

GO0216

46. If the critical angle for total internal reflection from a medium to vacuum is 45°, then velocity of light in the medium is,

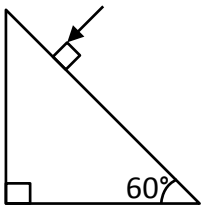
(1) 1.5×10^8 m/s (2) $\frac{3}{\sqrt{2}}\times10^8$ m/s

(3) $\sqrt{2}\times10^8$ m/s (4) 3×10^8 m/s

GO0217

NEET(UG) 2021

47. Find the value of the angle of emergence from the prism. Refractive index of the glass is $\sqrt{3}$.



(1) 60° (2) 30° (3) 45° (4) 90°

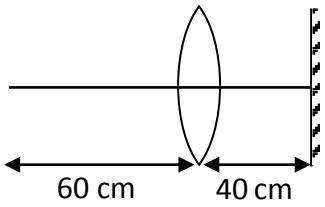
GO0218

48. A convex lens 'A' of focal length 20 cm and a concave lens 'B' of focal length 5 cm are kept along the same axis with a distance 'd' between them. If a parallel beam of light falling on 'A' leaves 'B' as a parallel beam, then the distance 'd' in cm will be :-

(1) 25 (2) 15 (3) 50 (4) 30

GO0219

49. A point object is placed at a distance of 60 cm from a convex lens of focal length 30 cm. If a plane mirror were put perpendicular to the principal axis of the lens and at a distance of 40 cm from it, the final image would be formed at a distance of :



(1) 20 cm from the lens, it would be a real image.

(2) 30 cm from the lens, it would be a real image.

(3) 30 cm from the plane mirror, it would be a virtual image.

(4) 20 cm from the plane mirror, it would be a virtual image.

GO0220

NEET(UG) 2021 (Paper-2)

50. An object moving at a speed 40 cm/s towards a concave mirror of focal length 20 cm. When the object is at distance 60 cm, the speed of image is

(1) 15 cm/s (2) 20 cm/s

(3) 10 cm/s (4) 5 cm/s

GO0221

51. A plano-convex lens made of material of refractive index 5/3 and of radius of curvature 40 cm is silvered on its plane surface. It will behave like a

(1) Concave mirror of focal length 12 cm

(2) Concave mirror of focal length 30 cm

(3) Convex mirror of focal length 12 cm

(4) Convex mirror of focal length 30 cm

GO0222

NEET(UG) 2022

52. A biconvex lens has radii of curvature, 20 cm each. if the refractive index of the material of the lens is 1.5, the power of the lens is :-

(1) +20 D (2) +5D

(3) infinity (4) +2D

GO0223

53. A light ray falls on a glass surface of refractive index $\sqrt{3}$, at an angle 60°. The angle between the refracted and reflected rays would be :

(1) 60° (2) 90° (3) 120° (4) 30°

GO0224

54. Two transparent media A and B are separated by a plane boundary. The speed of light in those media are 1.5×10^8 m/s and 2.0×10^8 m/s, respectively. The critical angle for a ray of light for these two media is:

(1) $\sin^{-1}(0.750)$ (2) $\tan^{-1}(0.500)$

(3) $\tan^{-1}(0.750)$ (4) $\sin^{-1}(0.500)$

GO0225

NEET(UG) 2022 (Overseas)

55. A concave lens of focal length, 25 cm is sandwiched between two convex lenses, each of focal length, 40 cm. The power in dioptre of the combined lens would be:

(1) 9 (2) 1 (3) 0.01 (4) 55

GO0226

56. A beam of light is incident vertically on a glass slab of thickness 1 cm, and refractive index 1.5. A fraction 'A' is reflected from the front surface while another fraction 'B' enters the slab and emerges after reflection from the back surface. Time delay between them is:

(1) 5×10^{-10} s (2) 10^{-11} s

(3) 5×10^{-11} s (4) 10^{-10} s

GO0227

Re-NEET(UG) 2022

57. During a cloudy day, a primary and a secondary rainbow may be created, then the :

(1) primary rainbow is due to double internal reflection and is formed above the secondary one.

(2) primary rainbow is due to double internal reflection and is formed below the secondary one.

(3) secondary rainbow is due to double internal reflection and is formed above the primary one.

(4) secondary rainbow is due to single internal reflection and is formed above the primary one.

GO0228

58. An astronomical refracting telescope is being used by an observer to observe planets in normal adjustment. The focal lengths of the objective and eye piece used in the construction of the telescope are 20 m and 2 cm respectively. Consider the following statements about the telescope :

(a) The distance between the objective and eye piece is 20.02 m

(b) The magnification of the telescope is (–) 1000

(c) The image of the planet is erect and diminished

(d) The aperture of eye piece is smaller than that of objective

The correct statements are :

(1) (a), (b) and (c) (2) (b), (c) and (d)

(3) (c), (d) and (a) (4) (a), (b) and (d)

GO0229

EXERCISE-II (Previous Year Questions) ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	1	4	4	2	2	4	4	2	1	2	3	3	1	3	2
Que.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	3	2	4	4	4	4	2	1	2	1	2	4	1	2	1
Que.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ans.	4	4	1	2	2	1	3	2	4	4	3	4	2	4	1
Que.	46	47	48	49	50	51	52	53	54	55	56	57	58		
Ans.	2	1	2	4	3	2	2	2	1	2	4	3	4		

EXERCISE-III (Analytical Questions) Master Your Understanding

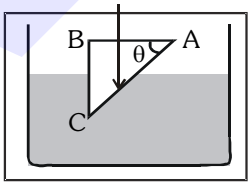
1. A man moves towards a plane mirror with a velocity v in a direction making an angle θ with the normal to the mirror. The magnitude of velocity of the image relative to man normal to mirror will be
(1) 2 v (2) 2 v cosθ
(3) 2 v sinθ (4) 2v/cosθ
GO0156

2. A virtual image three times the size of the object is obtained with a concave mirror of radius of curvature 36 cm. The distance of the object from the mirror is -
(1) 5 cm (2) 12 cm (3) 10 cm (4) 20 cm
GO0157

3. A convex mirror of focal length f produces an image (1/n)th of the size of the object. The distance of the object from the mirror is
(1) nf (2) f/n (3) (n + 1)f (4) (n - 1)f
GO0158

4. A microscope is focussed on a coin lying at the bottom of a beaker. The microscope is now raised up by 1 cm. To what depth should the water be poured into the beaker so that coin is again in the focus (Refractive index of water is 4/3)
(1) 1 cm (2) $\frac{4}{3}$ cm (3) 3 cm (4) 4 cm
GO0159

5. A glass prism (μ = 1.5) is dipped in water (μ = 4/3) as shown in figure. A light ray is incident normally on the surface AB. It reaches the surface BC after totally reflected, if
(1) sin θ > 8/9
(2) 2/3 < sin θ < 8/9
(3) sin θ ≤ 2/3
(4) It is not possible

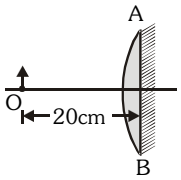


GO0160

6. A vessel is half filled with a liquid of refractive index μ. The other half of the vessel is filled with an immiscible liquid of refractive index 1.5μ. The apparent depth of vessel is 50% of the actual depth. The value of μ is
(1) 1.6 (2) 1.67 (3) 1.5 (4) 1.4
GO0161

7. A clear transparent glass sphere (μ = 1.5) of radius R is immersed in a liquid of refractive index 1.25. A parallel beam of light incident on it will converge to a point. The distance of this point from the centre will be
(1) – 3R (2) + 3R
(3) – R (4) + R
GO0162

8. A point object is placed at a distance of 20 cm from a thin plano-convex lens of focal length 15 cm. If the plane surface is silvered, the image will from at

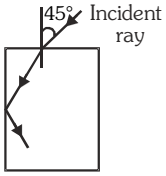


(1) 60 cm from left of AB
(2) 30 cm from left of AB
(3) 12 cm from left of AB
(4) 60 cm from right of AB
GO0163

9. A telescope consisting of objective of focal length 60cm and a single lens eye piece of focal length 5cm is focussed at a distant object in such a way that parallel rays emerge from the eye piece. If the object subtends an angle of 2° at the objective, then angular width of image will be.
(1) 10° (2) 24°
(3) 50° (4) $1/6^0$
GO0164

10. A film projector magnifies a film of area 100 square centimeter on screen. If linear magnification is 4 then area of magnified image on screen will be –
(1) 1600 sq.cm (2) 800 sq.cm
(3) 400 sq.cm (4) 200 sq.cm
GO0165

11. For the given incident ray as shown in figure, the condition of total internal reflection of this ray the minimum refractive index of prism will be :–



(1) $\frac{\sqrt{3}+1}{2}$ (2) $\frac{\sqrt{2}+1}{2}$ (3) $\sqrt{\frac{3}{2}}$ (4) $\sqrt{\frac{7}{6}}$
GO0166

12. A bulb is located on a wall. Its image is to be obtained on a parallel wall with the help of convex lens. If the distance between parallel walls is 'd' then required focal length of lens placed in between the walls is :–

(1) Only $\frac{d}{4}$

(2) Only $\frac{d}{2}$

(3) More than $\frac{d}{4}$ but less than $\frac{d}{2}$

(4) Less than or equal to $\frac{d}{4}$

GO0167

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

(1) Two different points propagating in parallel directions

(2) One point propagating in two different directions

(3) One point propagating in the same direction

(4) Two points propagating in two different non parallel directions

GO0168

14. A short linear object of length L lies on the axis of a spherical mirror of focal length f at a distance u from the mirror. Its image has an axial length L' equal to

(1) $L\left[\frac{f}{(u-f)}\right]^{1/2}$ (2) $L\left[\frac{u+f}{f}\right]^{1/2}$

(3) $L\left[\frac{u-f}{f}\right]^{2}$ (4) $L\left[\frac{f}{(u-f)}\right]^{2}$

GO0169

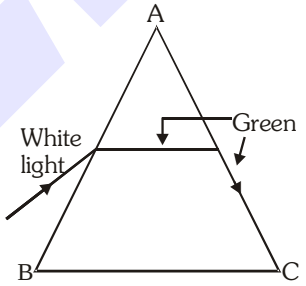
15. An object is placed at a distance of 10 cm from a co-axial combination of two lenses A and B in contact. The combination forms a real image three times the size of the object. If lens B is concave with a focal length of 30 cm, the nature and focal length of lens A is

(1) convex, 12 cm (2) concave, 12 cm

(3) convex, 6 cm (4) convex, 18 cm

GO0170

16. White light is incident on face AB of a glass prism. The path of the green component is shown in the figure. If the green light is just totally internally reflected at face AC as shown, the light emerging from face AC will contain



(1) yellow, orange and red colours

(2) violet, indigo and blue colours

(3) all colours

(4) all colours except green

GO0171

EXERCISE-III (Analytical Questions) ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	**2**	**2**	**4**	**4**	**1**	**2**	**2**	**3**	**2**	**1**	**3**	**4**	**1**	**4**	**3**
Que.	16														
Ans.	**1**														