9. For total internal reflection to take place, the angle of incidence i and the refractive index μ of the medium must satisfy the inequality **[MP PET 1994]**

(1) $\frac{1}{\sin i} < \mu$ (2) $\frac{1}{\sin i} > \mu$

(3) $\sin i < \mu$ (4) $\sin i > \mu$

10. Total internal reflection of light is possible when light enters from **[CPMT 1973; MP PMT 1994]**

(1) Air to glass (2) Vacuum to air

(3) Air to water (4) Water to air

11. Total internal reflection of a ray of light is possible when the (i_c = critical angle, i = angle of incidence) **[NCERT 1977; MP PMT 1994]**

(1) Ray goes from denser medium to rarer medium and $i < i_c$

(2) Ray goes from denser medium to rarer medium and $i > i_c$

(3) Ray goes from rarer medium to denser medium and $i > i_c$

(4) Ray goes from rarer medium to denser medium and $i < i_c$

12. A diver at a depth of 12*m* in water ($\mu = 4/3$) sees the sky in a cone of semi-vertical angle **[KCET 1999; Pb. PMT 2002; MP PMT 1995, 2003]**

(1) $\sin^{-1}(4/3)$ (2) $\tan^{-1}(4/3)$

(3) $\sin^{-1}(3/4)$ (4) 90°

13. Critical angle is that angle of incidence in the denser medium for which the angle of refraction in rarer medium is **[MP PMT 1996]**

(1) 0° (2) 57°

(3) 90° (4) 180°

14. The critical angle for diamond (refractive index = 2) is **[MP PET 2003]**

(1) About 20° (2) 60°

(3) 45° (4) 30°

15. The reason for shining of air bubble in water is **[MP PET 1997; KCET 1999]**

(1) Diffraction of light

(2) Dispersion of light

(3) Scattering of light

(4) Total internal reflection of light

16. With respect to air critical angle in a medium for light of red colour [λ_1] is θ. Other facts remaining same, critical angle for light of yellow colour [λ_2] will be **[MP PET 1999]**

(1) θ (2) More than θ

(3) Less than θ (4) $\frac{\theta\lambda_1}{\lambda_2}$

17. 'Mirage' is a phenomenon due to **[AIIMS 1998; MP PET 2002; AFMC 2003]**

(1) Reflection of light

(2) Refraction of light

(3) Total internal reflection of light

(4) Diffraction of light

18. A ray of light travelling in a transparent medium falls on a surface separating the medium from air at an angle of incidence of 45°. The ray undergoes total internal reflection. If n is the refractive index of the medium with respect to air, select the possible value (s) of n from the following **[IIT-JEE 1998]**

(1) 1.3 (2) 1.4

(3) 1.5 (4) 1.6

19. When a ray of light emerges from a block of glass, the critical angle is **[KCET 1994]**

(1) Equal to the angle of reflection

(2) The angle between the refracted ray and the normal

(3) The angle of incidence for which the refracted ray travels along the glass-air boundary

(4) The angle of incidence

20. The phenomenon utilised in an optical fibre is **[KCET 1994; AMU 1995; CBSE PMT 2001; DCE 1999, 2000, 01, 02; AIEEE 2002]**

(1) Refraction (2) Interference

(3) Polarization (4) Total internal reflection

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

[RPMT 1996]

(1) $\sin^{-1}\frac{4}{5}$ (2) $\sin^{-1}\frac{5}{4}$

(3) $\sin^{-1}\frac{1}{2}$ (4) $\sin^{-1}\frac{2}{1}$

22. Total internal reflection is possible when light rays travel

[RPMT 1999]

(1) Air to water (2) Air to glass

(3) Glass to water (4) Water to glass

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

[Roorkee 1999]

(1) 15^o (b 30^o

(3) 45^o (4) 60^o

24. A ray of light propagates from glass (refractive index = 3/2) to water (refractive index = 4/3). The value of the critical angle **[JIPMER 1999; UPSEAT 2001; MP PMT 2000, 03]**

(1) $\sin^{-1}(1/2)$ (2) $\sin^{-1}\left(\frac{\sqrt{8}}{9}\right)$

(3) $\sin^{-1}(8/9)$ (4) $\sin^{-1}(5/7)$

25. Relation between critical angles of water and glass is

[CBSE PMT 2000; Pb. PET 2000; CPMT 2001]

(1) $C_w > C_g$ (2) $C_w < C_g$

(3) $C_w = C_g$ (4) $C_w = C_g = 0$

26. If critical angle for a material to air is 30^o, the refractive index of the material will be

[MP PET 2001]

(1) 1.0 (2) 1.5

(3) 2.0 (4) 2.5

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

[MP PET 1991; Kerala PET 2002; Pb. PET 2003]

(1) 49^o to the horizontal (2) 90^o with the vertical

(3) 49^o to the vertical (4) Along the horizontal

28. Optical fibres are related with

(1) Communication (2) Light

(3) Computer (4) None of these

29. Brilliance of diamond is due to

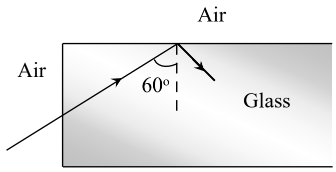
[AIIMS 2002; MP PMT 2003]

(1) Shape (2) Cutting

(3) Reflection (4) Total internal reflection

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

[Orissa JEE 2002]



(1) 3.33 μsec

(2) 6.67 μsec

(3) 5.77 μsec

(4) 3.85 μsec

31. Light wave enters from medium 1 to medium 2. Its velocity in 2nd medium is double from 1st. For total internal reflection the angle of incidence must be greater than **[CPMT 2002]**

(1) 30^o (2) 60^o

(3) 45^o (4) 90^o

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

[AIEEE 2003]

(1) Optical fibres may have homogeneous core with a suitable cladding

(2) Optical fibres can be of graded refractive index

(3) Optical fibres are subject to electromagnetic interference from outside

(4) Optical fibres have extremely low transmission loss

33. The critical angle for a medium is 60^o. The refractive index of the medium is

[MP PMT 2004]

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

(3) $\sqrt{3}$ **[AFMC 2002]** (4) $\frac{\sqrt{3}}{2}$

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

[MP PMT 2004]

(1) $\sin^{-1}\left(\frac{1}{\sqrt{\mu}}\right)$ (2) 90^o

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

35. 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

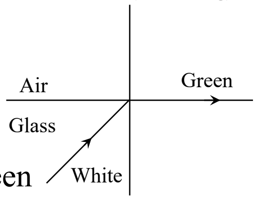
[IIT-JEE (Screening) 2004]

(1) Yellow, orange, red

(2) Violet, indigo, blue

(3) All colours

(4) All colours except green



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

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

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

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

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

[UPSEAT 2004]

(1) (i) and (iii) (2) (i) and (iv)

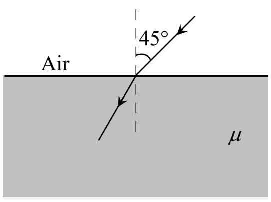
(3) (ii) and (iii) (4) (ii) and (iv)

37. In the figure shown, for an angle of incidence 45^o, at the top surface, what is the minimum refractive index needed for total internal reflection at vertical face **[DCE 2002]**

(1) $\frac{\sqrt{2}+1}{2}$

(b $\sqrt{\frac{3}{2}}$

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



(4) $\sqrt{2}+1$

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

[DCE 2002]

(1) $v(1-\cos\theta)$ (b $v/\sin\theta$

(3) $v/\cos\theta$ (4) $v(1-\sin\theta)$

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

[MH CET 2003]

(1) $\tan^{-1}\left(\frac{t_1}{t_2}\right)$ (2) $\sin^{-1}\left(\frac{t_1}{t_2}\right)$

(3) $\sin^{-1}\left(\frac{10t_1}{t_2}\right)$ (4) $\tan^{-1}\left(\frac{10t_1}{t_2}\right)$

40. The critical angle of a medium with respect to air is 45^o. The refractive index of medium is

[MH CET 2003]

(1) 1.41 (2) 1.2

(3) 1.5 (4) 2

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

[AIIMS 2004]

(1) Refraction (2) Reflection

(3) Total internal reflection (4) Dispersion

42. A normally incident ray reflected at an angle of 90^o. The value of critical angle is

[RPMT 1996]

(1) 45^o (b 90^o

(3) 65^o (4) 43.2^o

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

[RPMT 2001]

(1) 90^o (b Greater than critical angle

(3) Equal to critical angle (4) 0^o

44. A fish looking up through the water sees the outside world contained in a circular horizon. If the refractive index of water is $\frac{4}{3}$ and the fish is

12 cm below the surface, the radius of this circle in cm is

[NCERT 1980; KCET 2002; AIEEE 2005; CPMT 2005]

(1) $36\sqrt{5}$ (2) $4\sqrt{5}$

(3) $36\sqrt{7}$ (4) $36/\sqrt{7}$

45. A point source of light is placed 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

[CBSE PMT 1994; JIPMER 2001, 02]

(1) 2 m (b 6 m

(3) 4 m (4) 3 m

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

[Kerala PMT 2005]

(1) 3.0 cm (2) 4.0 cm

(3) 4.5 cm (4) 5.0 cm

Refraction at Curved Surface

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

[MP PMT 1989]

(1) 40 cm (2) 20 cm

(3) 80 cm (4) 30 cm

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

(1) $\frac{mx}{(m+1)^2}$ (2) $\frac{mx}{(m-1)^2}$

(3) $\frac{(m+1)^2}{m}x$ (4) $\frac{(m-1)^2}{m}x$

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

[CPMT 1989; MP PET 1997; KCET 1998]

(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 $\frac{3I}{4}$

4. A lens of power + 2 diopters is placed in contact with a lens of power – 1 diopter. The combination will behave like

(1) A convergent lens of focal length 50 cm

(2) A divergent lens of focal length 100 cm

(3) A convergent lens of focal length 100 cm

(4) A convergent lens of focal length 200 cm

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

[IIT-JEE 1982; AFMC 1997; CBSE PMT 2000; RPMT 2003]

(1) – 1.5 D (2) – 6.5 D

(3) + 6.5 D (4) + 6.67 D

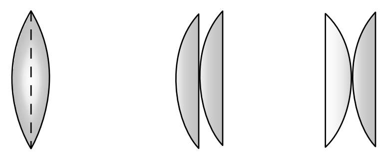
6. Two lenses are placed in contact with each other and the focal length of combination is 80 cm. If the focal length of one is 20 cm, then the power of the other will be

[NCERT 1981]

(1) 1.66 D (2) 4.00 D

(3) –1.00 D (4) – 3.75 D

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



(1) 2 : 2 : 1 (b 1 : 1 : 1

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

8. Two lenses of power +12 and – 2 diopters are placed in contact. What will the focal length of combination

[MP PET 1990; MNR 1987; MH CET (Med.) 2001; UPSEAT 2000; Pb. PMT 2003]

(1) 10 *cm* (2) 12.5 *cm*

(3) 16.6 *cm* (4) 8.33 *cm*

9. A concave and convex lens have the same focal length of 20 cm and are put into contact to form a lens combination. The combination is used to view an object of 5 *cm* length kept at 20 cm from the lens combination. As compared to the object, the image will be [CPMT 1986; RPMT 1997]

(1) Magnified and inverted

(2) Reduced and erect

(3) Of the same size as the object and erect

(4) Of the same size as the object but inverted

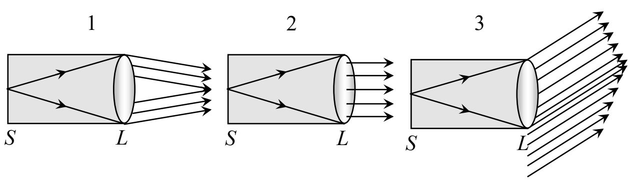
10. If in a plano-convex lens, the radius of curvature of the convex surface is 10 *cm* and the focal length of the lens is 30 *cm*, then the refractive index of the material of lens will be

[CPMT 1986; MNR 1988; MP PMT 2002; UPSEAT 2000]

(1) 1.5 (2) 1.66

(3) 1.33 (4) 3

11. The slit of a collimator is illuminated by a source as shown in the adjoining figures. The distance between the slit *S* and the collimating lens *L* is equal to the focal length of the lens. The correct direction of the emergent beam will be as shown in figure [CPMT 1986]



(1) 1 (2) 3

(3) 2 (4) None of the figures

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

[IIT-JEE 1986; SCRA 1994; MP PET 1996; MP PMT 2004; BHU 1998, 05]

(1) Half the image will disappear

(2) Complete image will be formed of same intensity

(3) Half image will be formed of same intensity

(4) Complete image will be formed of decreased intensity

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

[CPMT 1972; 1988]

(1) Zero (2) Infinity

(3) 10 *cm* (4) 20 *cm*

14. A convex lens of focal length 84 *cm* is in contact with a concave lens of focal length 12 *cm*. The power of combination (in diopters) is [MP PET 1991]

(1) 25/24 (2) 25/18

(3) – 50/7 (4) + 50/7

15. A convex lens makes a real image 4 *cm* long on a screen. When the lens is shifted to a new position without disturbing the object, we again get a real image on the screen which is 16 *cm* tall. The length of the object must be [MP PET 1991]

(1) 1/4 *cm* (2) 8 *cm*

(3) 12 *cm* (4) 20 *cm*

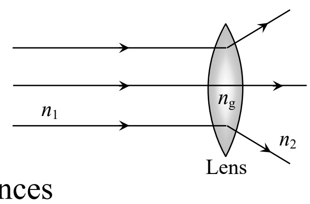
16. A glass convex lens $(\mu_g = 1.5)$ has a focal length of $8\,cm$ when placed in air. What would be the focal length of the lens when it is immersed in water ($\mu_w = 1.33$)

[BHU 1994; MP PMT 1996]

(1) 2 *m* (2) 4 *cm*

(3) 16 *cm* (4) 32 *cm*

17. The ray diagram could be correct [CPMT 1988]



(1) If $n_1 = n_2 = n_g$

(2) If $n_1 = n_2$ and $n_1 < n_g$

(3) If $n_1 = n_2$ and $n_1 > n_g$

(4) Under no circumstances

18. A thin convex lens of refractive index 1.5 has a focal length of 15 *cm* in air. When the lens is placed in liquid of refractive index 4/3 , its focal length will be [CPMT 1974, 77; MP PMT 1992]

(1) 15 *cm* (2) 10 *cm*

(3) 30 *cm* (4) 60 *cm*

19. A glass lens is placed in a medium in which it is found to behave like a glass plate. Refractive index of the medium will be [CPMT 1981, 84, 85]

(1) Greater than the refractive index of glass

(2) Smaller than the refractive index of glass

(3) Equal to refractive index of glass

(4) No case will be possible from above

20. If I_1 and I_2 be the size of the images respectively for the two positions of lens in the displacement method, then the size of the object is given by [CPMT 1988]

(1) I_1 / I_2 (2) $I_1 \times I_2$

(3) $\sqrt{I_1 \times I_2}$ (4) $\sqrt{I_1 / I_2}$

21. A convex lens of crown glass (n=1.525) will behave as a divergent lens if immersed in [CPMT 1984]

(1) Water (n =1.33)

(2) In a medium of n = 1.525

(3) Carbon disulphide n =1.66

(4) It cannot act as a divergent lens

22. A divergent lens will produce [CPMT 1984]

(1) Always a virtual image

(2) Always real image

(3) Sometimes real and sometimes virtual

(4) None of the above

23. The minimum distance between an object and its real image formed by a convex lens is [CPMT 1973; JIPMER 1997]

(1) 1.5 f (2) 2 f

(3) 2.5 f (4) 4 f

24. An object is placed at a distance of 20 *cm* from a convex lens of focal length 10 *cm*. The image is formed on the other side of the lens at a distance [CPMT 1971; RPET 2003]

(1) 20 *cm* (2) 10 *cm*

(3) 40 *cm* (4) 30 *cm*

25. Two thin lenses, one of focal length + 60 *cm* and the other of focal length – 20 *cm* are put in contact. The combined focal length is [CPMT 1973, 89; BVP 2003]

(1) + 15 *cm* (2) – 15 *cm*

(3) + 30 *cm* (4) –30 *cm*

26. A double convex lens of focal length 20 *cm* is made of glass of refractive index 3 / 2. When placed completely in water $({}_a\mu_w = 4/3)$, its focal length will be [CBSE PMT 1990; MP PMT/PET 1998]

(1) 80 *cm* (2) 15 *cm*

(3) 17.7 *cm* (4) 22.5 *cm*

27. Two thin lenses of focal lengths 20 *cm* and 25 *cm* are placed in contact convex. The effective power of the combination is [CBSE PMT 1990; RPMT 2001]

(1) 45 *dioptres* (2) 9 *dioptres*

(3) 1/9 *dioptre* (4) 6 *dioptres*

28. An object is placed at a distance of $f/2$ from a convex lens. The image will be [CPMT 1974, 89]

(1) At one of the foci, virtual and double its size

(2) At 3*f* / 2, real and inverted

(3) At 2*f*, virtual and erect

(4) None of these

29. A double convex thin lens made of glass (refractive index μ = 1.5) has both radii of curvature of magnitude 20 *cm*. Incident light rays parallel to the axis of the lens will converge at a distance *L* such that [MNR 1991; MP PET 1996; UPSEAT 2000; Pb PET 2004]

(1) *L* = 20 *cm* (2) *L* = 10 *cm*

(3) *L* = 40 *cm* (4) *L* = 20 / 3 *cm*

30. A lens behaves as a converging lens in air and a diverging lens in water. The refractive index of the material is [CPMT 1991; NCERT 1979; BHU 2005]

(1) Equal to unity (2) Equal to 1.33

(3) Between unity and 1.33 (4) Greater than 1.33

31. A biconvex lens forms a real image of an object placed perpendicular to its principal axis.

Suppose the radii of curvature of the lens tend to infinity. Then the image would

[MP PET 1994]

(1) Disappear

(2) Remain as real image still

(3) Be virtual and of the same size as the object

(4) Suffer from aberrations

32. The radius of curvature of convex surface of a thin plano-convex lens is 15 *cm* and refractive index of its material is 1.6. The power of the lens will be **[MP PMT 1994]**

(1) $+1\,D$ (2) $-2\,D$

(3) $+3\,D$ (4) $+4\,D$

33. Focal length of a convex lens will be maximum for

[MP PMT 1994]

(1) Blue light (2) Yellow light

(3) Green light (4) Red light

34. A lens is placed between a source of light and a wall. It forms images of area A_1 and A_2 on the wall for its two different positions. The area of the source or light is

[CBSE PMT 1995]

(1) $\frac{A_1 + A_2}{2}$ (2) $\left[\frac{1}{A_1} + \frac{1}{A_2}\right]^{-1}$

(3) $\sqrt{A_1 A_2}$ (4) $\left[\frac{\sqrt{A_1} + \sqrt{A_2}}{2}\right]^2$

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

[MP PET 2003]

(1) $\frac{3}{2}\,m$ (b $\frac{1}{4}\,m$

(3) 4 *m* (4) $\frac{1}{8}\,m$

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

[AIIMS 1995]

(1) $30\,cm, -60\,cm$ (2) $20\,cm, -30\,cm$

(3) $15\,cm, -20\,cm$ (4) $12\,cm, -15\,cm$

37. An achromatic combination of lenses is formed by joining

[BHU 1995; Pb. PMT 2000, 04]

(1) 2 convex lenses

(2) 2 concave lenses

(3) 1 convex lens and 1 concave lens

(4) Convex lens and plane mirror

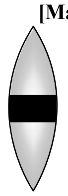
38. A plano convex lens $(f = 20\,cm)$ is silvered at plane surface. Now *f* will be **[BHU 1995; DPMT 2001; MP PMT 2005]**

(1) 20 *cm* (2) 40 *cm*

(3) 30 cm (4) 10 *cm*

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

[Manipal MEE 1995; KCET 2001]



(1) No image will be formed by the remaining portion of the lens

(2) The full image will be formed but it will be less bright

(3) The central portion of the image will be missing

(4) There will be two images each produced by one of the exposed portions of the lens

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

[IIT JEE 1995]

(1) A convex mirror of suitable focal length

(2) A concave mirror of suitable focal length

(3) A concave lens of suitable focal length

(4) A convex lens of suitable focal length less than 0.25 *m*

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

[AFMC 1995]

(1) 150 *cm* (2) 60 *cm*

(3) 30 *cm* (4) 40 *cm*

42. A convex lens forms a real image of a point object placed on its principal axis. If the upper half of the lens is painted black, the image will

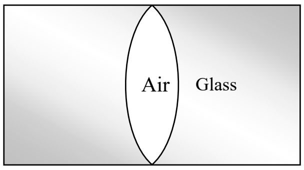
[MP PET 1995]

(1) Be shifted downwards (2)Be shifted upwards

(3) Not be shifted (4) Shift on the principal axis

43. In the figure, an air lens of radii of curvature 10 *cm* (R_1 = R_2 = 10 *cm*) is cut in a cylinder of glass $(\mu = 1.5)$. The focal length and the nature of the lens is

[MP PET 1995; Pb. PET 2000]



(1) 15 *cm*, concave
(2) 15 *cm*, convex
(3) ∞, neither concave nor convex
(4) 0, concave

44. A lens (focal length 50 *cm*) forms the image of a distant object which subtends an angle of 1 *milliradian* at the lens. What is the size of the image **[MP PMT 1995]**

(1) 5 *mm* (2) 1 *mm*
(3) 0.5 *mm* (4) 0.1 *mm*

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

[MP PMT 1995, 2003]

(1) 6 *cm* (2) 12 *cm*
(3) 24 *cm* (4) 30 *cm*

46. Two thin lenses of focal lengths f_1 and f_2 are in contact and coaxial. The combination is equivalent to a single lens of power **[MP PET 1996, 98;**

MP PMT 1998; DCE 2000; UP SEAT 2005]

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

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

[RPET 2003]

(1) *R*/ 2 (2) *R*
(3) 2*R* (4) 1.5 *R*

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

(1) $\omega_1 f_1 = \omega_2 f_2$ (2) $\omega_1 f_2 + \omega_2 f_1 = 0$
(3) $\omega_1 + f_1 = \omega_2 + f_2$ (4) $\omega_1 - f_1 = \omega_2 - f_2$

49. The dispersive powers of glasses of lenses used in an achromatic pair are in the ratio 5 : 3. If the focal length of the concave lens is 15 *cm*, then the nature and focal length of the other lens would be **[MP PET 1997]**

(1) Convex, 9 *cm* (2) Concave, 9 *cm*
(3) Convex, 25 *cm* (4) Concave, 25 *cm*

50. A thin double convex lens has radii of curvature each of magnitude 40 *cm* and is made of glass with refractive index 1.65. Its focal length is nearly **[MP PMT 1997]**

(1) 20 *cm* (2) 31 *cm*
(3) 35 *cm* (4) 50 *cm*

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

[MP PMT/PET 1998]

(1) Plane mirror
(2) Convex mirror of focal length 2 f
(3) Concave mirror of focal length $f/2$
(4) None of the above

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

[MP PET 1999; DPMT 2000]

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

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

[MP PET 1999]

(1) $-\frac{fn'(n-1)}{n'-n}$ (2) $-\frac{f(n'-n)}{n'(n-1)}$
(3) $-\frac{n'(n-1)}{f(n'-n)}$ (4) $\frac{fn'n}{n-n'}$

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

[MP PET 1999]

(1) 4.5 *cm* (2) 3.0 *cm*

(3) 0.75 *cm* (4) 0.5 *cm*

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

[MP PMT 1999]

(1) 2 *D* (2) 3 *D*

(3) 4 *D* (4) 5 *D*

56. A plane 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

[CBSE PMT 1999; Pb. PMT 1999; BHU 2001; Very Similar to BHU 2003]

(1) 50 *cm* (2) 100 *cm*

(3) 200 *cm* (4) 400 *cm*

57. A concave lens of glass, refractive index 1.5, has both surfaces of same radius of curvature *R*. On immersion in a medium of refractive index 1.75, it will behave as a

[IIT-JEE 1999]

(1) Convergent lens of focal length 3.5 *R*

(2) Convergent lens of focal length 3.0 *R*

(3) Divergent lens of focal length 3.5 *R*

(4) Divergent lens of focal length 3.0 *R*

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

[CPMT 1999; JIPMER 2000]

(1) 1 *D* (2) – 1 *D*

(3) 0.5 *D* (4) – 0.5 *D*

59. A double convex lens is made of glass of refractive index 1.5. If its focal length is 30 cm, then radius of curvature of each of its curved surface is [Bihar CEET 1995]

(1) 10 *cm* (2) 15 *cm*

(3) 18 *cm* (4) None of these

60. A thin lens made of glass of refractive index 1.5 has a front surface + 11 *D* power and back surface – 6 *D*. If this lens is submerged in a liquid of refractive index 1.6, the resulting power of the lens is [SCRA 1994]

(1) – 0.5 *D* (2) + 0.5 *D*

(3) – 0.625 *D* (4) + 0.625 *D*

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

[SCRA 1994]

(1) 5 *cm* (b 10 *cm*

(3) 15 *cm* (4) 20 *cm*

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

[SCRA 1994]

(1) ≈ 3 *dioptres* (2) ≈ 5 *dioptres*

(3) ≈ 7 *diopters* (4) ≈ 9 *diopters*

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

[SCRA 1994]

(1) 6.5 *cm* (2) 8.0 *cm*

(3) 9.5 *cm* (4) 10.0 *cm*

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

[RPET 1997]

(1) 2 f (2) $f/2$

(3) $-f/2$ (4) – 2 f

65. A biconvex lens with equal radii curvature has refractive index 1.6 and focal length 10 *cm*. Its radius of curvature will be

[MP PET 2003]

(1) 20 *cm* (2) 16 *cm*

(3) 10 *cm* (4) 12 *cm*

66. A convex lens [RPMT 1997]

(1) Converges light rays

(2) Diverges light rays

(3) Form real images always

(4) Always forms virtual images

67. The focal length of a combination of lenses formed with lenses having powers of + 2.50 *D* and – 3.75 *D* will be

[RPMT 1997]

(1) – 20 *cm* (2) – 40 *cm*

(3) – 60 *cm* (4) – 80 *cm*

68. Focal length of a converging lens in air is *R*. If it is dipped in water of refractive index 1.33, then its focal length will be around (Refractive index of lens material is 1.5) **[RPMT 1997; EAMCET (Med.) 1995]**

(1) *R* (2) 2*R*

(3) 4*R* (4) *R* / 2

69. Focal length of a convex lens of refractive index 1.5 is 2 *cm*. Focal length of lens when immersed in a liquid of refractive index of 1.25 will be **[CBSE PMT 1993]**

(1) 10 *cm* (2) 2.5 *cm*

(3) 5 *cm* (4) 7.5 *cm*

70. The focal length of a convex lens depends upon **[AFMC 1994]**

(1) Frequency of the light ray

(2) Wavelength of the light ray

(3) Both (1) and (2)

(4) None of these

71. 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 **[CBSE PMT 1996; AFMC 2002]**

(1) + 6.5*D* (2) – 6.5 *D*

(3) + 7.5 *D* (4) – 0.75 *D*

72. f_v and f_r are the focal lengths of a convex lens for violet and red light respectively and F_v and F_r are the focal lengths of a concave lens for violet and red light respectively, then **[CBSE PMT 1996]**

(1) $f_v < f_r$ and $F_v > F_r$ (b $f_v < f_R$ and $F_v < F_r$

(3) $f_c > f_r$ and $F_v > F_r$ (4) $f_v > f_r$ and $F_v < F_r$

73. If a lens is cut into two pieces perpendicular to the principal axis and only one part is used, the intensity of the image **[CPMT 1996]**

(1) Remains same (2) $\frac{1}{2}$ times

(3) 2 times (4) Infinite

74. A convex lens of focal length f produces an image $\frac{1}{n}$ times than that of the size of the object. The distance of the object from the lens is **[BHU 1997; JIPMER 2001, 02]**

(1) nf (2) $\frac{f}{n}$

(3) $(n+1)f$ (4) $(n-1)f$

75. Two thin lenses whose powers are +2*D* and –4*D* respectively combine, then the power of combination is **[AFMC 1998; CPMT 1996; Very Similar to BHU 2004]**

(1) – 2*D* (2) + 2*D*

(3) – 4*D* (4) + 4*D*

76. A substance is behaving as convex lens in air and concave in water, then its refractive index is **[BHU 1998]**

(1) Smaller than air

(2) Greater than both air and water

(3) Greater than air but less than water

(4) Almost equal to water

77. A concave lens of focal length 20 *cm* placed in contact with a plane mirror acts as a **[SCRA 1998]**

(1) Convex mirror of focal length 10 *cm*

(2) Concave mirror of focal length 40 *cm*

(3) Concave mirror of focal length 60 *cm*

(4) Concave mirror of focal length 10 *cm*

78. A convex lens is used to form real image of an object on a screen. It is observed that even when the positions of the object and that screen are fixed there are two positions of the lens to form real images. If the heights of the images are 4 *cm* and 9 *cm* respectively, the height of the object is **[AMU (Med.) 1999]**

(1) 2.25 *cm* (b 6.00 *cm*

(3) 6.50 *cm* (4) 36.00 *cm*

79. A convex lens of power + 6*D* is placed in contact with a concave lens of power – 4*D*. What is the nature and focal length of the combination **[AMU (Engg.) 1999]**

(1) Concave, 25 *cm* (2) Convex, 50 *cm*

(3) Concave, 20 *cm* (4) Convex, 100 *cm*

80. A double convex lens of glass of $\mu = 1.5$ has radius of curvature of each of its surface is 0.2 *m*. The power of the lens is

(1) + 10 *dioptres* (2) – 10 *dioptres*

(3) – 5 *dioptres* (4) +5 *dioptres*

81. A lens of focal power 0.5 *D* is

(1) A convex lens of focal length 0.5 *m*

(2) A concave lens of focal length 0.5 *m*

(3) A convex lens of focal length 2 *m*

(4) A concave lens of focal length 2 *m*

82. A lens which has focal length of 4 *cm* and refractive index of 1.4 is immersed in a liquid of refractive index 1.6, then the focal length will be **[RPMT 1999]**

(1) – 12.8 *cm* (2) 32 *cm*

(3) 12.8 *cm* (4) – 32 *cm*

83. A convex lens has 9 *cm* focal length and a concave lens has – 18 *cm* focal length. The focal length of the combination in contact will be **[RPMT 1999]**

(1) 9 *cm* (2) – 18 *cm*

(3) – 9 *cm* (4) 18 *cm*

84. A double convex thin lens made of glass of refractive index 1.6 has radii of curvature 15 *cm* each. The focal length of this lens when immersed in a liquid of refractive index 1.63 is

(1) – 407 *cm* (2) 250 *cm*

(3) 125 *cm* (4) 25 *cm*

85. A lens of power + 2 *diopters* is placed in contact with a lens of power – 1 *diopoter*. The combination will behave like **[UPSEAT 2000]**

(1) A divergent lens of focal length 50 *cm*

(2) A convergent lens of focal length 50 *cm*

(3) A convergent lens of focal length 100 *cm*

(4) A divergent lens of focal length 100 *cm*

86. Chromatic aberration of lens can be corrected by **[AFMC 2000]**

(1) Reducing its aperature

(2) Proper polishing of its two surfaces

(3) Suitably combining it with another lens

(4) Providing different suitable curvature to its two surfaces **[JIPMER 1999]**

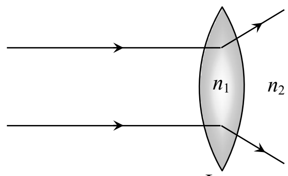
87. The relation between n_1 and n_2, if behaviour of light rays is as shown in figure is **[JIPMER 1999]**

(1) $n_1 >> n_2$

(b $n_2 > n_1$

(3) $n_1 > n_2$

(4) $n_1 = n_2$



88. A candle placed 25 *cm* from a lens, forms an image on a screen placed 75 *cm* on the other end of the lens. The focal length and type of the lens should be **[KCET 2000]**

(1) + 18.75 *cm* and convex lens

(2) – 18.75 *cm* and concave lens

(3) + 20.25 *cm* and convex lens

(4) – 20.25 *cm* and concave lens

89. We combined a convex lens of focal length f_1 and concave lens of focal lengths f_2 and their combined focal length was *F*. The combination of these lenses will behave like a concave lens, if **[KCET 2000]**

(1) $f_1 > f_2$ (2) $f_1 < f_2$

(3) $f_1 = f_2$ (4) $f_1 \le f_2$

90. **[UPSEAT 2000; Pb. PET 2004]** In a plano-convex lens the radius of curvature of the convex lens is 10 *cm*. If the plane side is polished, then the focal length will be (Refractive index = 1.5) **[CBSE PMT 2000; BHU 2004]**

(1) 10.5 *cm* (b 10 *cm*

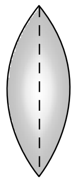
(3) 5.5 *cm* (4) 5 *cm*

91. 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 **[MP PMT 2000]**

(1) 7.5 *cm* (2) 15.0 *cm*

(3) 75 *cm* (4) 5.0 *cm*

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



(1) $\frac{f}{2}$

(2) f

(3) $\frac{3}{2}f$

(4) $2f$

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

(a) 8 *cm*

(2) 16 *cm*

(3) Between 8 *cm* and 16 *cm*

(4) Less than 8 *cm*

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

(1) A concave lens (f = 18 *cm*)

(2) A convex lens (f = 18 *cm*)

(3) A convex lens (f = 6 *cm*)

(4) A concave lens (f = 6 *cm*)

95. A convex lens forms a real image of an object for its two different positions on a screen. If height of the image in both the cases be 8 *cm* and 2 *cm*, then height of the object is **[KCET 2000, 01]**

(1) 16 *cm* (2) 8 *cm*

(3) 4 *cm* (4) 2 *cm*

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

(1) – 16 *D* (2) + 16 *D*

(3) – 6 *D* (4) + 6 *D*

97. The unit of focal power of a lens is **[KCET 2001]**

(1) Watt (2) Horse power

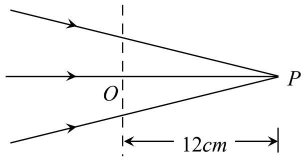
(3) Dioptre (4) Lux

98. A thin lens made of glass of refractive index μ = 1.5 has a focal length equal to 12 *cm* in air. It is now immersed in water $\left(\mu = \frac{4}{3}\right)$. Its new focal length is **[UPSEAT 2002]**

(1) 48 *cm* (2) 36 *cm*

(3) 24 *cm* (4) 12 *cm*

99. Figure given below shows a beam of light converging at point *P*. When a convex lens of focal length 16 *cm* **[MP PMT 2000]** 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



(1) 12 *cm*

(2) 24 *cm*

(3) 36 *cm*

(4) 48 *cm*

[UPSEAT 2001]

100. If two + 5 *D* lenses are mounted at some distance apart, the equivalent power will always be negative if the distance is **[UPSEAT 2002]**

(1) Greater than 40 *cm* (2) Equal to 40 *cm*

(3) Equal to 10 *cm* (4) Less than 10 *cm*

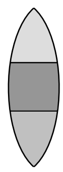
[AMU (Engg.) 2001]

101. A convex lens produces a real image *m* times the size of the object. What will be the distance of the object from the lens **[JIPMER 2002]**

(1) $\left(\frac{m+1}{m}\right)f$ (2) $(m-1)f$

(3) $\left(\frac{m-1}{m}\right)f$ (4) $\frac{m+1}{f}$

102. 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 **[KCET 2002]**



(1) 1

(2) 5 **[MP PMT 2001]**

(3) 4

(4) 3

103. An object is placed 12 *cm* to the left of a converging lens of focal length 8 *cm*. Another converging lens of 6 *cm* focal length is placed at a distance of 30 *cm* to the right of the first lens. The second lens will produce **[KCET 2002]**

(1) No image (2) A virtual enlarged image

(3) A real enlarged image (4) A real smaller image

104. If 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 **[AFMC 2002]**

(1) + 6.5 *D* (2) – 6.5 *D*

(3) + 7.5 *D* (4) – 0.75 *D*

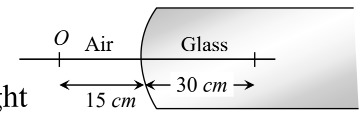
105. A point object *O* is placed in front of a glass rod having spherical end of radius of curvature 30 *cm*. The image would be formed at

(1) 30 *cm* left

(2) Infinity

(3) 1 *cm* to the right

(4) 18 *cm* to the left



106. The focal length of lens of refractive index 1.5 in air is 30 *cm*. When it is immersed in a liquid of refractive index $\frac{4}{3}$, then its focal length in liquid will be **[BHU 2002]**

(1) 30 *cm* (2) 60 *cm*

(3) 120 *cm* (4) 240 *cm*

107. Two thin lenses of focal lengths f_1 and f_2 are in contact. The focal length of this combination is **[MP PET 2002]**

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

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

108. 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

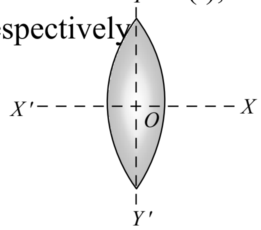
(1) Become infinite

(2) Become small, but non–zero

(3) Remain unchanged

(4) Become zero

109. 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 **[CBSE PMT 2003]**

(1) $f' = 2f, f'' = f$ (2) $f' = f, f'' = f$

(3) $f' = 2f, f'' = 2f$ **[Orissa JEE 2002]** (4) $f' = f, f'' = 2f$

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

(1) 5 *mm* (2) 4.36 *mm*

(3) 7 *mm* (4) None of these

111. The chromatic Aberration in lenses becomes due to **[CPMT 2003]**

(1) Disimilarity of main axis of rays

(2) Disimilarity of radii of curvature

(3) Variation of focal length of lenses with wavelength

(4) None of these

112. If aperture of lens is halved then image will be **[AFMC 2**

(1) No effect on size

(2) Intensity of image decreases

(3) Both (1) and (2)

(4) None of these

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

(1) In water **[CBSE PMT 2003]** (2) In oil

(3) In both (1) and (2) (4) None of these

114. An achromatic combination of lenses produces **[KCET 1993; JIPMER 1997]**

(1) Coloured images

(2) Highly enlarged image

(3) Images in black and white

(4) Images unaffected by variation of refractive index with wavelength

115. In a parallel beam of white light is incident on a converging lens, the colour which is brought to focus nearest to the lens is

(1) Violet (2) Red

(3) The mean colour (4) All the colours together

116. A magnifying glass is to be used at the fixed object distance of 1 *inch*. If it is to produce an erect image magnified 5 *times* its focal length should be **[MP PMT 1990]**

(1) 0.2 *inch* (2) 0.8 *inch*
(3) 1.25 *inch* (4) 5 *inch*

117. A film projector magnifies a 100 cm^2 film strip on a screen. If the linear magnification is 4, the area of magnified film on the screen is **[NCERT 1980; CPMT 1977, 91; MP PET 1985, 89; RPMT 2001; BCEC 2005]**

(1) 1600 cm^2 (2) 400 cm^2
(3) 800 cm^2 (4) 200 cm^2

118. An object placed 10 *cm* in front of a lens has an image 20 *cm* behind the lens. What is the power of the lens (in *dioptres*) **[MP PMT 1995]**

(1) 1.5 (2) 3.0
(3) – 15.0 (4) + 15.0

119. 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 **[KCET 2004]**

(1) The focal point shifts away from the lens by a small distance
(2) The focus remains undisturbed
(3) The focus shifts to infinity
(4) The focal point shifts towards the lens by a small distance

120. A thin plano-convex lens acts like a concave mirror of focal length 0.2 *m* when silvered from its plane surface. The refractive index of the material of the lens is 1.5. The radius of curvature of the convex surface of the lens will be **[KCET 2004]**

(1) 0.4 *m* (b 0.2 *m*
(3) 0.1 *m* (4) 0.75 *m*

121. A point object is placed at the center of a glass sphere of radius 6 *cm* and refractive index 1.5. The distance of the virtual image from the surface of the sphere is **[IIT-JEE (Screening) 2004]**

(1) 2 *cm* (2) 4 *cm*
(3) 6 *cm* (4) 12 *cm*

122. In order to obtain a real image of magnification 2 using a converging lens of focal length 20 *cm*, where should an object be placed **[AFMC 2004]**

(1) 50 *cm* (2) 30 *cm*
(3) – 50 *cm* (4) – 30 *cm*

123. A plano-convex lens of refractive index 1.5 and radius of curvature 30 *cm* is silvered at the curved surface. Now this lens has been used to form the image of an object. At what distance from this lens an object be placed in order to have a real image of the size of the object **[AIEEE 2004]**

(1) 20 *cm* (2) 30 *cm*
(3) 60 *cm* (4) 80 *cm*

124. A double convex lens $(R_1 = R_2 = 10\,cm)$ $(\mu = 1.5)$ having focal length equal to the focal length of a concave mirror. The radius of curvature of the concave mirror is **[Orssia PMT 2004]**

(1) 10 *cm* (b 20 *cm*
(3) 40 *cm* (4) 15 *cm*

125. At what distance from a convex lens of focal length 30 *cm*, an object should be placed so that the size of the image be 1/2 of the object **[J&K CET 2004]**

(1) 30 *cm* (2) 60 *cm*
(3) 15 *cm* (4) 90 *cm*

126. A plano-convex lens is made of refractive index of 1.6. The radius of curvature of the curved surface is 60 *cm*. The focal length of the lens is **[Pb. PET 2000]**

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

127. The radius of the convex surface of plano-convex lens is 20 *cm* and the refractive index of the material of the lens is 1.5. The focal length of the lens is **[CPMT 2004]**

(1) 30 *cm* (2) 50 *cm*

(3) 20 *cm* (4) 40 *cm*

128. A combination of two thin convex lenses of focal length 0.3 *m* and 0.1 *m* will have minimum spherical and chromatic aberrations if the distance between them is **[UPSEE 2004]**

(1) 0.1 *m* (b 0.2 *m*

(3) 0.3 *m* (4) 0.4 *m*

129. A bi-convex lens made of glass (refractive index 1.5) is put in a liquid of refractive index 1.7. Its focal length will **[UPSEAT 2004]**

(1) Decrease and change sign

(b Increase and change sign

(3) Decrease and remain of the same sign

(4) Increase and remain of the same sign

130. Spherical aberration in a lens **[UPSEAT 2004]**

(1) Is minimum when most of the deviation is at the first surface

(2) Is minimum when most of the deviation is at the second surface

(3) Is minimum when the total deviation is equally distributed over the two surface

(4) Does not depend on the above consideration

131. The focal lengths of convex lens for red and blue light are 100 *cm* and 96.8 *cm* respectively. The dispersive power of material of lens is **[Pb. PET 2003]**

(1) 0.325 (b 0.0325

(3) 0.98 (4) 0.968

132. The power of an achromatic convergent lens of two lenses is + 2*D*. The power of convex lens is + 5*D*. The ratio of dispersive power of convex and concave lens will be **[Pb. PET 2003]**

(1) 5 : 3 (b 3 : 5

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

133. The focal lengths for violet, green and red light rays are f_V, f_G and f_R respectively. Which of the following is the true relationship **[BHU 2004; CBSE PMT 1997]**

(1) $f_R < f_G < f_V$ (b $f_V < f_G < f_R$

(3) $f_G < f_R < f_V$ (4) $f_G < f_V < f_R$

134. Two lenses of power + 12 and – 2 diopters are placed in contact. The combined focal length of the combination will be **[Pb. PET 2004]**

(1) 8.33 *cm* (2) 1.66 *cm*

(3) 12.5 *cm* (4) 10 *cm*

135. When light rays from the sun fall on a convex lens along a direction parallel to its axis **[MP PMT 2004]**

(1) Focal length for all colours is the same

(b Focal length for violet colour is the shortest

(3) Focal length for yellow colour is the longest

(4) Focal length for red colour is the shortest

136. A convex lens is in contact with concave lens. The magnitude of the ratio of their focal length is 2/3. Their equivalent focal length is 30 *cm*. What are their individual focal lengths **[IIT-JEE (Screening) 2005]**

(1) – 75, 50 (2) – 10, 15

(3) 75, 50 (4) – 15, 10

137. A thin glass (refractive index 1.5) lens has optical power of $-5D$ in air. It's optical power in a liquid medium with refractive index 1.6 will be **[AIEEE 2005]**

(1) 25 *D* (2) – 25 *D*

(3) 1 *D* (4) None of these

138. The plane faces of two identical plano-convex lenses each having focal length of 40 *cm* are pressed against each other to form a usual convex lens. The distance from this lens, at which an object must be placed to obtain a real, inverted image with magnification one is **[NCERT 1980; CPMT 1981; MP PMT 1999; UPSEAT 1999]**

(1) 80 *cm* (b 40 *cm*

(3) 20 *cm* (4) 162 *cm*

139. If two lenses of +5 diopters are mounted at some distance apart, the equivalent power will always be negative if the distance is **[BCECE 2005]**

(1) Greater than 40 *cm* (2) Equal to 40 *cm*

(3) Equal to 10 *cm* (4) Less than 10 *cm*

140. A concave lens and a convex lens have same focal length of 20 *cm* and both put in contact this combination is used to view an object 5 *cm* long kept at 20 *cm* from the lens combination. As compared to object the image will be **[CPMT 2005]**

(1) Magnified and inverted
(b Reduced and erect
(3) Of the same size and erect
(4) Of the same size and inverted

141. The focal length of the field lens (which is an achromatic combination of two lenses) of telescope is 90 *cm*. The dispersive powers of the two lenses in the combination are 0.024 and 0.036. The focal lengths of two lenses are **[CPMT 2005]**

(1) 30 *cm* and 60 *cm* (b 30 *cm* and – 45 *cm*
(3) 45 *cm* and 90 *cm* (4) 15 *cm* and 45 *cm*

142. A combination of two thin lenses of the same material with focal lengths f_1 and f_2, arranged on a common axis minimizes chromatic aberration, if the distance between them is **[EAMCET 2005]**

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

143. If the focal length of a double convex lens for red light is f_R, its focal length for the violet light is **[EAMCET 2005]**

(1) f_R (2) Greater than f_R
(3) Less than f_R (4) $2f_R$

144. A thin equiconvex lens is made of glass of refractive index 1.5 and its focal length is 0.2 *m*, if it acts as a concave lens of 0.5 *m* focal length when dipped in a liquid, the refractive index of the liquid is **[EAMCET 2005]**

(1) $\frac{17}{8}$ (2) $\frac{15}{8}$
(3) $\frac{13}{8}$ (4) $\frac{9}{8}$

145. The dispersive power of the material of lens of focal length 20 *cm* is 0.08. The longitudinal chromatic aberration of the lens is **[EAMCET 2005]**

(1) 0.08 *cm* (2) 0.08/20 *cm*
(3) 1.6 *cm* (4) 0.16 *cm*

Prism Theory & Dispersion of Light

1. Which source is associated with a line emission spectrum **[MP PET/PMT 1988; CBSE PMT 1993]**

(1) Electric fire (2) Neon street sign
(3) Red traffic light (4) Sun

2. Formula for dispersive power is (where symbols have their usual meanings) **[MP PMT/PET 1988]**

or

If the refractive indices of crown glass for red, yellow and violet colours are respectively μ_r, μ_y and μ_v, then the dispersive power of this glass would be **[MP PMT 1996]**

(1) $\frac{\mu_v-\mu_y}{\mu_r-1}$ (2) $\frac{\mu_v-\mu_r}{\mu_y-1}$
(3) $\frac{\mu_v-\mu_y}{\mu_y-\mu_r}$ (4) $\frac{\mu_v-\mu_r}{\mu_y}-1$

3. The critical angle between an equilateral prism and air is 45°. If the incident ray is perpendicular to the refracting surface, then **[MP PMT 1986]**

(1) After deviation it will emerge from the second refracting surface
(2) It is totally reflected on the second surface and emerges out perpendicularly from third surface in air
(3) It is totally reflected from the second and third refracting surfaces and finally emerges out from the first surface
(4) It is totally reflected from all the three sides of prism and never emerges out

4. When white light passes through a glass prism, one gets spectrum on the other side of the prism. In the emergent beam, the ray which is deviating least is or

Deviation by a prism is lowest for
[MP PMT 1997]
(1) Violet ray (2) Green ray
(3) Red ray (4) Yellow ray

5. We use flint glass prism to disperse polychromatic light because light of different colours
[MP PET 1993]
(1) Travel with same speed
(2) Travel with same speed but deviate differently due to the shape of the prism
(3) Have different anisotropic properties while travelling through the prism
(4) Travel with different speeds

6. 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° 36' = 0.75)
[MP PMT/PET 1988]
(1) 18° 36' (2) 20° 30'
(3) 18° (4) 22°1'

7. Fraunhofer lines are obtained in
[CPMT 1973; MP PMT 1989; MP PMT 2004]
(1) Solar spectrum
(2) The spectrum obtained from neon lamp
(3) Spectrum from a discharge tube
(4) None of the above

8. When light rays are incident on a prism at an angle of 45°, the minimum deviation is obtained. If refractive index of the material of prism is $\sqrt{2}$, then the angle of prism will be
[MP PMT 1986]
(1) 30° (2) 40°
(3) 50° (4) 60°

9. A spectrum is formed by a prism of dispersive power 'ω'. If the angle of deviation is 'δ', then the angular dispersion is
[MP PMT 1989]
(1) ω / δ (2) δ / ω
(3) $1/\omega\delta$ (4) $\omega\delta$

10. Light from sodium lamp is passed through cold sodium vapours, the spectrum of transmitted light consists of
[MP PET 1989; RPMT 2001]
(1) A line at 5890 Å (2) A line at 5896 Å
(3) Sodium doublet lines (4)No spectral features

11. Angle of minimum deviation for a prism of refractive index 1.5 is equal to the angle of prism. The angle of prism is (cos 41° = 0.75)
[MP PET/PMT 1988]
(1) 62° (2) 41°
(3) 82° (4) 31°

12. In the formation of primary rainbow, the sunlight rays emerge at minimum deviation from rain-drop after
[MP PET 1989]
(1) One internal reflection and one refraction
(2) One internal reflection and two refractions
(3) Two internal reflections and one refraction
(4) Two internal reflections and two refractions

13. Dispersive power depends upon
[RPMT 1997]
(1) The shape of prism (2) Material of prism
(3) Angle of prism (4) Height of the prism

14. When white light passes through the achromatic combination of prisms, then what is observed
[MP PMT 1989]
(1) Only deviation (2) Only dispersion
(3) Deviation and dispersion (4) None of the above

15. The dispersion for a medium of wavelength λ is D, then the dispersion for the wavelength 2λ will be
[MP PET 1989]
(1) $D/8$ (2) $D/4$
(3) $D/2$ (4) D

16. The refractive index of a prism for a monochromatic wave is $\sqrt{2}$ and its refracting angle is 60°. For minimum deviation, the angle of incidence will be
[MNR 1998; MP PMT 1989, 92, 2002; CPMT 1993, 2004]
(1) 30° (2) 45°
(3) 60° (4) 75°

17. The ratio of angle of minimum deviation of a prism in air and when dipped in water will be ($_a\mu_g = 3/2$ and $_a\mu_w = 4/3$)

(1) 1/8 (2) 1/2
(3) 3/4 (4) 1/4

18. The respective angles of the flint and crown glass prisms are A' and A. They are to be used for dispersion without deviation, then the ratio of their angles A'/A will be **[MP PMT 1989]**

(1) $-\frac{(\mu_y - 1)}{(\mu_y' - 1)}$ (2) $\frac{(\mu_y' - 1)}{(\mu_y - 1)}$
(3) $(\mu_y' - 1)$ (4) $(\mu_y - 1)$

19. The number of wavelengths in the visible spectrum **[MP PMT 1989]**

(1) 4000 (2) 6000
(3) 2000 (4) Infinite

20. The black lines in the solar spectrum during solar eclipse can be explained by **[MP PMT 1989]**

(1) Planck's law (2) Kirchoff's law
(3) Boltzmann's law (4) Solar disturbances

21. The dispersive power is maximum for the material

(1) Flint glass (2) Crown glass
(3) Mixture of both (4) None of the above

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

(1) Equal to $2C$ (2) Less than $2C$
(3) More than $2C$ (4) None of the above

23. A parallel beam of monochromatic light is incident at one surface of a equilateral prism. Angle of incidence is 55° and angle of emergence is 46°. The angle of minimum deviation will be **[DPMT 1999]**

(1) Less than 41° (2) Equal to 41°
(3) More than 41° (4) None of the above

24. The spectrum of light emitted by a glowing solid is

(1) Continuous spectrum (2) Line spectrum
(3) Band spectrum (4) Absorption spectrum

25. Light rays from a source are incident on a glass prism of index of refraction μ and angle of prism α. At near normal incidence, the angle of deviation of the emerging rays is **[MP PMT 1993]**

(1) $(\mu - 2)\alpha$ (2) $(\mu - 1)\alpha$
(3) $(\mu + 1)\alpha$ (4) $(\mu + 2)\alpha$

26. Which of the following element was discovered by study of Fraunhofer lines

(1) Hydrogen (2) Oxygen
(3) Helium (4) Ozone

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

(1) Becomes inverted (2) Becomes broader
(3) Becomes distinct (4) Becomes intensive

28. Our eye is most sensitive for which of the following wavelength

(1) 4500 Å
(2) 5500 Å
(3) 6500 Å
(4) Equally sensitive for all wave lengths of visible spectrum

29. Three prisms of crown glass, each have angle of prism 9° and two prisms of flint glass are used to make direct vision spectroscope. What will be the angle of flint glass prisms if μ for flint is 1.60 and μ for crown glass is 1.53

(1) 11.9° (2) 16.0°
(3) 15.3° (4) 9.11°

30. 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 **[MP PET/PMT 1988]**

(1) 0.034 and 0.064 (2) 0.064 and 0.034
(3) 1.00 and 0.064 (4) 0.034 and 1.0

31. The minimum temperature of a body at which it emits light is
(1) 1200°C (2) 1000°C
(3) 500°C (4) 200°C

32. Band spectrum is obtained when the source emitting light is in the form of **or**
Band spectrum is characteristic of
[CPMT 1988; MP PET 1994; DCE 2004; MP PET 2005]
(1) Atoms (b Molecules
(3) Plasma (4) None of the above

33. Flint glass prism is joined by a crown glass prism to produce dispersion without deviation. The refractive indices of these for mean rays are 1.602 and 1.500 respectively. Angle of prism of flint prism is 10°, then the angle of prism for crown prism will be
[DPMT 2001]
(1) 12°2.4' (2) 12°4’
(3) 1.24° (4) 12°

34. 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
[EAMCET (Engg.) 1995; MH CET 1999; CPMT 2000]
(1) 30° (2) 60°
(3) 50° (4) 100°

35. In the position of minimum deviation when a ray of yellow light passes through the prism, then its angle of incidence is
[MP PMT 1989; RPMT 1997]
(1) Less than the emergent angle
(2) Greater than the emergent angle
(3) Sum of angle of incidence and emergent angle is 90°
(4) Equal to the emergent angle

36. 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
(1) Green (2) Brown
(3) White (4) Violet

37. The fine powder of a coloured glass is seen as
(1) Coloured (2) White
(3) That of the glass colour (4) Black

38. When a white light passes through a hollow prism, then
[MP PMT 1987]
(1) There is no dispersion and no deviation
(2) Dispersion but no deviation
(3) Deviation but no dispersion
(4) There is dispersion and deviation both

39. The light ray is incidence at angle of 60° on a prism of angle 45°. When the light ray falls on the other surface at 90°, the refractive index of the material of prism μ and the angle of deviation δ are given by
[DPMT 2001]
(1) $\mu = \sqrt{2}, \delta = 30^o$ (2) $\mu = 1.5, \delta = 15^o$
(3) $\mu = \frac{\sqrt{3}}{2}, \delta = 30^o$ (4) $\mu = \sqrt{\frac{3}{2}}, \delta = 15^o$

40. In dispersion without deviation
(1) The emergent rays of all the colours are parallel to the incident ray
(2) Yellow coloured ray is parallel to the incident ray
(3) Only red coloured ray is parallel to the incident ray
(4) All the rays are parallel, but not parallel to the incident ray

41. Deviation of 5° is observed from a prism whose angle is small and whose refractive index is 1.5. The angle of prism is
[MP PET 1990; Similar to Pb. PMT 2003]
(1) 7.5° (2) 10°
(3) 5° (4) 3.3°

42. The refractive indices of violet and red light are 1.54 and 1.52 respectively. If the angle of prism is 10°, then the angular dispersion is **[MP PMT 1990]**

(1) 0.02 (2) 0.2

(3) 3.06 (4) 30.6

43. 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 **[MP PET 1990, 92]**

(1) $\sqrt{2}$ (2) 2

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

44. If the refractive indices of a prism for red, yellow and violet colours be 1.61, 1.63 and 1.65 respectively, then the dispersive power of the prism will be **[MP PET 1991; DPMT 1999]**

(1) $\frac{1.65-1.62}{1.61-1}$ (2) $\frac{1.62-1.61}{1.65-1}$

(3) $\frac{1.65-1.61}{1.63-1}$ (4) $\frac{1.65-1.63}{1.61-1}$

45. The minimum deviation produced by a hollow prism filled with a certain liquid is found to be 30°. The light ray is also found to be refracted at angle of 30°. The refractive index of the liquid is **[MP PET 1991]**

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

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

46. Minimum deviation is observed with a prism having angle of prism *A*, angle of deviation δ, angle of incidence *i* and angle of emergence *e*. We then have generally **[MP PET 1991]**

(1) $i > e$ (2) $i < e$

(3) $i = e$ (4) $i = e = \delta$

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 **[MP PMT 1991, 92; IIT-JEE 1990; MP PET 1995, 99; UPSEAT 2001; RPMT 2004]**

(1) 2.6° (2) 3°

(3) 4° (4) 5.33°

48. An achromatic prism is made by combining two prisms $P_1(\mu_v = 1.523, \mu_r = 1.515)$ and $P_2(\mu_v = 1.666, \mu_r = 1.650)$; where μ represents the refractive index. If the angle of the prism P_1 is 10°, then the angle of the prism P_2 will be **[MP PMT 1991]**

(1) 5° (2) 7.8°

(3) 10.6° (4) 20°

49. Angle of a prism is 30° and its refractive index is $\sqrt{2}$ and one of the surface is silvered. At what angle of incidence, a ray should be incident on one surface so that after reflection from the silvered surface, it retraces its path **[MP PMT 1991; UPSEAT 2001; CBSE PMT 2004]**

(1) 30° (2) 60°

(3) 45° (4) $\sin^{-1}\sqrt{1.5}$

50. For a material, the refractive indices for red, violet and yellow colour light are respectively 1.52, 1.64 and 1.60. The dispersive power of the material is **[MP PMT 1991]**

(1) 2 (2) 0.45

(3) 0.2 (4) 0.045

51. Band spectrum is produced by **[CPMT 1978]**

(1) *H* (2) *He*

(3) H_2 (4) *Na*

52. The band spectra (characteristic of molecular species) is due to emission of radiation **[CPMT 1982, 90]**

(1) Gaseous state (2) Liquid state

(3) Solid state (4) All of three states

53. Line spectrum was first of all theoretically explained by

(1) Swan (2) Fraunhofer

(3) Kirchoff (4) Bohr

54. The spectrum of iodine gas under white light will be

(1) Only violet

(2) Bright lines

(3) Only red lines

(4) Some black bands in continuous spectrum

55. Continuous spectrum is not due to

(1) Hydrogen flame (2) Electric bulb

(3) Kerosene oil lamp flame (4) Candle flame

56. Fraunhofer lines are produced by

(1) The element present in the photosphere of sun

(2) The elements present in the chromosphere of the sun

(3) The vapour of the element present in the chromosphere of the sun

(4) The carbon dioxide present in the atmosphere

57. A medium is said to be dispersive, if [MP PMT 1990]

(1) Light of different wavelengths propagate at different speeds

(2) Light of different wavelengths propagate at same speed but has different frequencies

(3) Light is gradually bent rather than sharply refracted at an interface between the medium and air

(4) Light is never totally internally reflected

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

[EAMCET 1990; MP PMT 1990]

(1) Normal to the face through which it emerges

(2) Inclined at 30° to the face through which it emerges

(3) Inclined at 60° to the face through which it emerges

(4) None of these

59. In a thin prism of glass (refractive index 1.5), which of the following relations between the angle of minimum deviations δ_m and angle of refraction r will be correct

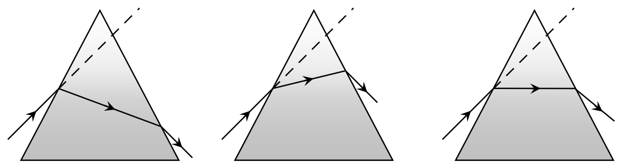
[MP PMT 1990]

(1) $\delta_m = r$ (2) $\delta_m = 1.5\,r$

(3) $\delta_m = 2r$ (4) $\delta_m = \frac{r}{2}$

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

[CPMT 1989]



(1) (2) (3)

(1) 1 (2) 2

(3) 3 (4) None of these

61. Dispersion can take place for

[MP PET 1992]

(1) Transverse waves only but not for longitudinal waves

(2) Longitudinal waves only but not for transverse waves

(3) Both transverse and longitudinal waves

(4) Neither transverse nor longitudinal waves

62. Emission spectrum of CO_2 gas

[MP PET 1992]

(1) Is a line spectrum

(b Is a band spectrum

(3) Is a continuous spectrum

(4) Does not fall in the visible region

63. 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

[MNR 1988; MP PMT 1999; Roorkee 2000; UPSEAT 2000; MP PET 2005]

(1) 45° (2) 39°

(3) 20° (4) 30°

64. The true statement is

(1) The order of colours in the primary and the secondary rainbows is the same

(2) The intensity of colours in the primary and the secondary rainbows is the same

(3) The intensity of light in the primary rainbow is greater and the order of colours is the same than the secondary rainbow

(4) The intensity of light for different colours in primary rainbow is greater and the order of colours is reverse than the secondary rainbow

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

[MP PMT 1992]

(1) Black (2) Blue

(3) Orange (4) Red

66. When light emitted by a white hot solid is passed through a sodium flame, the spectrum of the emergent light will show

[MP PMT 1992]

(1) The D_1 and D_2 bright yellow lines of sodium

(2) Two dark lines in the yellow region

(3) All colours from violet to red

(4) No colours at all

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

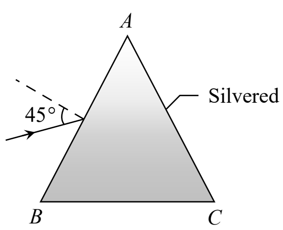
[MP PMT 1992; EAMCET 2001]

(1) 1.5

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

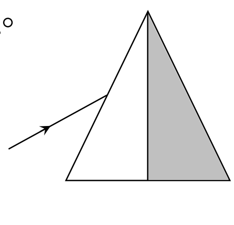
(3) $\sqrt{2}$

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



68. A light ray is incident upon a prism in minimum deviation position and suffers a deviation of 34°. If the shaded half of the prism is knocked off, the ray will **[MP PMT 1992]**

(1) Suffer a deviation of 34°



(2) Suffer a deviation of 68°

(3) Suffer a deviation of 17°

(4) Not come out of the prism

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

[EAMCET 1983]

(1) 30° (2) 45°

(3) 60° (4) 0°

70. Three glass prisms A, B and C of same refractive index are placed in contact with each other as shown in figure, with no air gap between the prisms. Monochromatic ray of light OP passes through the prism assembly and emerges as QR. The conditions of minimum deviation is satisfied in the prisms

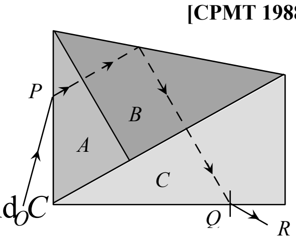
[CPMT 1988]

(1) A and C

(2) B and C

(3) A and B

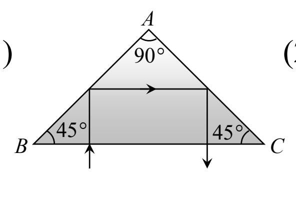
(4) In all prisms A, B and C



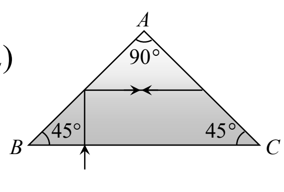
71. The refractive index of a material of a prism of angles 45°– 45° – 90° is 1.5. The path of the ray of light incident normally on the hypotenuse side is shown in

[EAMCET 1985]

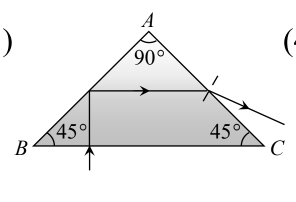
(1)



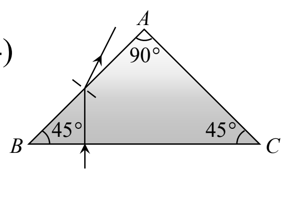
(2)



(3)



(4)



72. At the time of total solar eclipse, the spectrum of solar radiation would be [MP PMT 1990; RPMT 2004]

(1) A large number of dark Fraunhofer lines

(2) A less number of dark Fraunhofer lines

(3) No lines at all

(4) All Fraunhofer lines changed into brilliant colours

73. Angle of deviation (δ) by a prism (refractive index = μ and supposing the angle of prism A to be small) can be given by [MP PMT 1994]

(1) $\delta = (\mu - 1)A$ (2) $\delta = (\mu + 1)A$

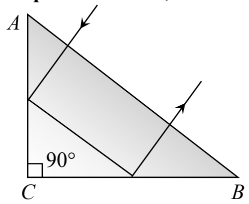
(3) $\delta = \frac{\sin\frac{A+\delta}{2}}{\sin\frac{A}{2}}$ (4) $\delta = \frac{\mu - 1}{\mu + 1}A$

74. 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 [AIIMS 1995]

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

(3) $\frac{1}{2}\cos A$ (4) $\tan A$

75. A ray of light incident normally on an isosceles right angled prism travels as shown in the figure. The least value of the refractive index of the prism must be [Manipal MEE 1995; BHU 2003]



(1) $\sqrt{2}$

(2) $\sqrt{3}$

(3) 1.5

(4) 2.0

76. When seen in green light, the saffron and green portions of our National Flag will appear to be [Manipal MEE 1995]

(1) Black

(2) Black and green respectively

(3) Green

(4) Green and yellow respectively

77. At sun rise or sunset, the sun looks more red than at mid-day because [AFMC 1995; Similar to DCE 2003]

(1) The sun is hottest at these times

(2) Of the scattering of light

(3) Of the effects of refraction

(4) Of the effects of diffraction

78. Line spectrum contains information about [MP PET 1995]

(1) The atoms of the prism

(2) The atoms of the source

(3) The molecules of the source

(4) The atoms as well as molecules of the source

79. Missing lines in a continuous spectrum reveal [MP PET 1995]

(1) Defects of the observing instrument

(2) Absence of some elements in the light source

(3) Presence in the light source of hot vapours of some elements

(4) Presence of cool vapours of some elements around the light source

80. A source emits light of wavelength 4700Å, 5400 Å and 6500 Å. The light passes through red glass before being tested by a spectrometer. Which wavelength is seen in the spectrum [MP PMT 1995]

(1) 6500 Å (2) 5400 Å

(3) 4700 Å (4) All the above

81. A ray passes through a prism of angle 60° in minimum deviation position and suffers a deviation of 30°. What is the angle of incidence on the prism [MP PMT 1995; Pb. PMT 2001; RPMT 2003]

(1) 30° (2) 45°

(3) 60° (4) 90°

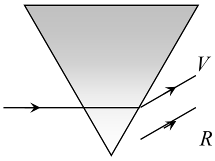
82. When light of wavelength λ is incident on an equilateral prism kept in its minimum deviation position, it is found that the angle of deviation equals the angle of the prism itself. The refractive index of the material of the prism for the wavelength λ is, then [Haryana CEE 1996]

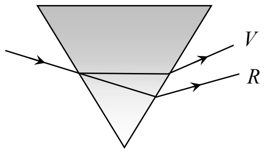
(1) $\sqrt{3}$ (2) $\frac{\sqrt{3}}{2}$

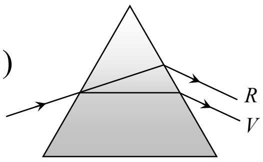
(3) 2　　　(4) $\sqrt{2}$

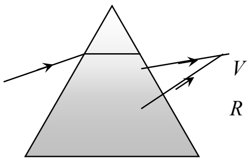
83. Which of the following diagrams, shows correctly the dispersion of white light by a prism

[NSEP 1994; MP PET 1996]

(1) 

(2) 

(3) 

(4) 

84. A neon sign does not produce

[MP PET 1996; UPSEAT 2004]

(1) Line spectrum

(2) An emission spectrum

(3) An absorption spectrum

(4) Photons

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

(1) 0.0276　　　(2) 0.276

(3) 2.76　　　(4) 0.106

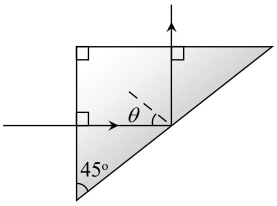
86. A triangular prism of glass is shown in the figure. A ray incident normally to one face is totally reflected, if $\theta = 45^o$. The index of refraction of glass is **[AIEEE 2004]**

(1) Less than 1.41

(2) Equal to 1.41

(3) Greater than 1.41

(4) None of the above



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

(1) Absorption has larger value

(2) Absorption has smaller value

(3) They are equal

(4) No relation

88. White light is passed through a prism whose angle is 5°. If the refractive indices for rays of red and blue colour are respectively 1.64 and 1.66, the angle of deviation between the two colours will be **[MP PET 1997]**

(1) 0.1 *degree*　　　(2) 0.2 *degree*

(3) 0.3 *degree*　　　(4) 0.4 *degree*

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

[MP PMT 1997]

(1) Bunsen burner flame

(2) The sun

(3) Tube light

(4) Hot filament of an electric bulb

90. A thin prism P_1 with angle 6° and made from glass of refractive index 1.54 is combined with another thin prism P_2 of refractive index 1.72 to produce dispersion without deviation. The angle of prism P_2 will be **[MP PMT 1999]**

(1) 5° 24'　　　(2) 4° 30'

(3) 6°　　　(4) 8°

91. If the refractive index of a material of equilateral prism is $\sqrt{3}$, then angle of minimum deviation of the prism is

[CBSE PMT 1999; Pb. PMT 2004; MH CET 2004]

(1) 30°　　　(2) 45°

(3) 60°　　　(4) 75°

92. The splitting of white light into several colours on passing through a glass prism is due to **[CPMT 1999]**

(1) Refraction　　　(2) Reflection

(3) Interference　　　(4) Diffraction

93. A white screen illuminated by green and red light appears to be **[KCET 1994; RPMT 1997]**

(1) Green　　　(2) Red

(3) Yellow　　　(4) White

94. Dark lines on solar spectrum are due to

[EAMCET (Engg.) 1995]

(1) Lack of certain elements

(2) Black body radiation

(3) Absorption of certain wavelengths by outer layers

(4) Scattering

95. Line spectra are due to **[EAMCET (Med.) 1995]**

(1) Hot solids

(2) Atoms in gaseous state

(3) Molecules in gaseous state

(4) Liquid at low temperature

96. The path of a refracted ray of light in a prism is parallel to the base of the prism only when the **[SCRA 1994]**

(1) Light is of a particular wavelength

(2) Ray is incident normally at one face

(3) Ray undergoes minimum deviation

(4) Prism is made of a particular type of glass

97. For a medium, refractive indices for violet, red and yellow are 1.62, 1.52 and 1.55 respectively, then dispersive power of medium will be **[RPET 1997]**

(1) 0.65 (2) 0.22

(3) 0.18 (4) 0.02

98. Two lenses having $f_1 : f_2 = 2 : 3$ has combination to make no dispersion. Find the ratio of dispersive power of glasses used **[RPMT 1997]**

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

(3) 4 : 9 (4) 9 : 4

99. If refractive index of red, violet and yellow lights are 1.42, 1.62 and 1.50 respectively for a medium. Its dispersive power will be **[RPMT 1997]**

(1) 0.4 (2) 0.3

(3) 0.2 (4) 0.1

100. A ray is incident at an angle of incidence *i* on one surface of a prism of small angle *A* and emerges normally from the opposite surface. If the refractive index of the material of the prism is μ, the angle of incidence *i* is nearly equal to **[CBSE PMT 1992]**

(1) A / μ (2) $A / 2\mu$

(3) μA (4) $\mu A / 2$

101. Fraunhofer spectrum is a **[KCET 1993, 94; RPET 1997; MP PET 1997, 2001; JIPMER 2000; AIIMS 2001]**

(1) Line absorption spectrum

(2) Band absorption spectrum

(3) Line emission spectrum

(4) Band emission spectrum

102. The angle of a prism is 60° and its refractive index is $\sqrt{2}$. The angle of minimum deviation suffered by a ray of light in passing through it is **[MP PET 2003]**

(1) About 20° (2) 30°

(3) 60° (4) 45°

103. Colour of the sky is blue due to **[CPMT 1996, 99; AFMC 1993; AIIMS 1999; AIEEE 2002; BCECE 2003; BHU 2004]**

(1) Scattering of light (2) Total internal reflection

(3) Total emission (4) None of the above

104. Which of the following spectrum have all the frequencies from high to low frequency range **[CPMT 1996]**

(1) Band spectrum (2) Continuous spectrum

(3) Line spectrum (4) Discontinuous spectrum

105. Stars are not visible in the day time because **[JIPMER 1997]**

(1) Stars hide behind the sun

(2) Stars do not reflect sun rays during day

(3) Stars vanish during the day

(4) Atmosphere scatters sunlight into a blanket of extreme brightness through which faint stars cannot be visible

106. Which of the following colours suffers maximum deviation in a prism **[KCET 1998; DPMT 2000]**

(1) Yellow (2) Blue

(3) Green (4) Orange

107. If a thin prism of glass is dipped into water then minimum deviation (with respect to air) of light produced by prism will be left $\left({}_a\mu_g = \frac{3}{2} \text{ and } {}_a\mu_w = \frac{4}{3}\right)$ **[UPSEAT 1999]**

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

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

108. 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

(1) 0.20° (2) 0.10°

(3) 0.40° (4) 1°

109. The refractive index of the material of the prism for violet colour is 1.69 and that for red is 1.65. If the refractive index for mean colour is 1.66, the dispersive power of the material of the prism **[JIPMER 1999]**

(1) 0.66 (2) 0.06

(3) 0.65 (4) 0.69

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

[KCET (Engg.) 1999]

(1) 0.268 (2) 0.368

(3) 0.468 (4) 0.568

111. Dispersion of light is due to

(1) Wavelength (2) Intensity of light

(3) Density of medium (4) None of these

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

[CPMT 1999, MH CET 2000]

(1) 1.231 (2) 1.820

(3) 1.503 (4) 1.414

113. Which of the prism is used to see infrared spectrum of light

[RPMT 2000]

(1) Rock Salt (2) Nicol

(3) Flint (4) Crown

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

(1) High density of prism material

(2) Because μ is different for different λ

(3) Diffraction of light

(4) Velocity changes for different frequencies

115. The dispersive powers of crown and flint glasses are 0.02 and 0.04 respectively. In an achromatic combination of lenses the focal length of flint glass lens is 40 *cm*. The focal **[UPSEAT 1999]** length of crown glass lens will be

(1) – 20 *cm* (2) + 20 *cm*

(3) – 10 *cm* (4) + 10 *cm*

116. When a ray of light is incident normally on one refracting surface of an equilateral prism (Refractive index of the material of the prism = 1.5 **[EAMCET (Med.) 2000]**

(1) Emerging ray is deviated by 30°

(2) Emerging ray is deviated by 45°

(3) Emerging ray just grazes the second refracting surface

(4) The ray undergoes total internal reflection at the second refracting surface

117. Consider the following two statements A and B and identify the correct choice in the given answers

[EAMCET (Engg.) 2000]

A : Line spectra is due to atoms in gaseous state **[DCE 1999]**

B : Band spectra is due to molecules

(1) Both A and B are false

(2) A is true and B is false

(3) A is false and B is true

(4) Both A and B are true

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

[EAMCET (Engg.) 2000]

(1) 0° (2) 30°

(3) 45° (4) 60°

119. The angle of prism is 5° and its refractive indices for red and violet colours are 1.5 and 1.6 respectively. **[DCE 2000]** The angular dispersion produced by the prism is **[MP PMT 2000]**

(1) 7.75^o (2) 5^o

(3) 0.5^o (4) 0.17^o

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

[KCET 1999; AFMC 2001]

(1) 1 : 1 (2) 2 : 1

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

121. The nature of sun's spectrum is

[MP PET 2000; MP PMT 2001]

(1) Continuous spectrum with absorption lines

(2) Line spectrum

(3) The spectrum of the helium atom

(4) Band spectrum

122. A ray of light is incident normally on one of the face of a prism of angle 30^o and refractive index $\sqrt{2}$. The angle of deviation will be

(1) 26^o (2) 0^o

(3) 23^o (4) 15^o

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

(1) 80^o (2) 70^o

(3) 60^o (4) 50^o

124. The spectrum obtained from an electric lamp or red hot heater is **[BHU 2001; Pb. PET 2003]**

(1) Line spectrum (2) Band spectrum

(3) Absorption spectrum (4) Continuous spectrum

125. When a glass prism of refracting angle 60^o is immersed in a liquid its angle of minimum deviation is 30^o. The critical angle of glass with respect to the liquid medium is **[EAMCET 2001]**

(1) 42^o (2) 45^o

(3) 50^o (4) 52^o

126. Three prisms 1, 2 and 3 have the prism angle $A = 60^o$, 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

[MP PMT 2001]

(1) $\delta_3 > \delta_2 > \delta_1$ (2) $\delta_1 > \delta_2 > \delta_3$

(3) $\delta_1 = \delta_2 = \delta_3$ (4) $\delta_2 > \delta_1 > \delta_3$

127. Which one of the following alternative is FALSE for a prism placed in a position of minimum deviation **[MP PET 2001]**

(1) $i_1 = i_2$ (2) $r_1 = r_2$

(3) $i_1 = r_1$ (4) All of these

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

[EAMCET 2001]

(1) $\sqrt{\omega d} + \sqrt{\omega' d'} = 0$ (2) $\omega' d + \omega d = 0$

(3) $\omega d + \omega' d' = 0$ **[KCET 2000]** (4) $(\omega d)^2 + (\omega' d')^2 = 0$

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

[CBSE PMT 2001] **[Pb. PMT 2002]**

(1) 15^o (2) 75^o

(3) 60^o (4) 30^o

130. The solar spectrum during a complete solar eclipse is

[Kerala PET 2002]

(1) Continuous (2) Emission line

(3) Dark line (4) Dark band

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

(1) Refraction (2) Reflection

(3) Scattering (4) Dispersion

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

Orissa JEE 2002; MP PET 2003; KCET 2004]

(1) Dispersion only

(2) Only total internal reflection
(3) Dispersion and total internal reflection
(4) None of these

133. The Cauchy's dispersion formula is **[AIIMS 2002]**
(1) $n = A + B\lambda^{-2} + C\lambda^{-4}$ (2) $n = A + B\lambda^{2} + C\lambda^{-4}$
(3) $n = A + B\lambda^{-2} + C\lambda^{4}$ (4) $n = A + B\lambda^{2} + C\lambda^{4}$

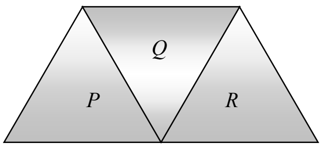
134. A prism of refractive index μ and angle A is placed in the minimum deviation position. If the angle of minimum deviation is A, then the value of A in terms of μ is

[EAMCET 2003]

(1) $\sin^{-1}\left(\frac{\mu}{2}\right)$ (2) $\sin^{-1}\sqrt{\frac{\mu-1}{2}}$
(3) $2\cos^{-1}\left(\frac{\mu}{2}\right)$ (4) $\cos^{-1}\left(\frac{\mu}{2}\right)$

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

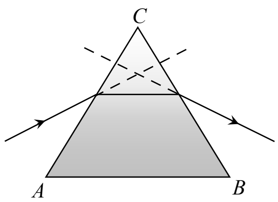
[IIT-JEE (Screening) 2001; KCET 2003]



(1) Greater deviation
(2) Same deviation
(3) No deviation
(4) Total internal reflection

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

[Orissa JEE 2003]



(1) A
(2) B
(3) C
(4) D

137. A prism of refractive index $\sqrt{2}$ has a refracting angle of 60°. At what angle a ray must be incident on it so that it suffers a minimum deviation **[BHU 2003; MP PMT 2005]**
(1) 45° (2) 60°
(3) 90° (4) 180°

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

[CPMT 1986]

(1) In the glass slab and prism
(2) In the lens and solid sphere
(3) Only in prism
(4) In all the four

139. A parallel beam of white light falls on a convex lens. Images of blue, yellow and red light are formed on other side of the lens at a distance of 0.20 *m*, 0.205 *m* and 0.214 *m* respectively. The dispersive power of the material of the lens will be **[MP PMT 1991]**
(1) 619/1000 (2) 9/200
(3) 14/205 (4) 5/214

140. The refractive index of the material of the prism for violet colour is 1.69 and that for red is 1.65. If the refractive index for mean colour is 1.66, the dispersive power of the material of the prism **[JIPMER 1999]**
(1) 0.66 (b 0.06
(3) 0.65 (4) 0.69

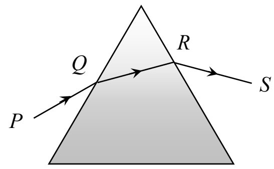
141. If the angle of prism is 60^o and the angle of minimum deviation is 40^o, the angle of refraction will be

[MP PMT 2004]

(1) 30^o (2) 60^o
(3) 100^o (4) 120^o

142. The refractive index of a particular material is 1.67 for blue light, 1.65 for yellow light and 1.63 for red light. The dispersive power of the material is .... **[KCET 2004]**
(1) 0.0615 (2) 0.024
(3) 0.031 (4) 1.60

143. 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 **[IIT-JEE (Screening) 2004]**



(1) PQ is horizontal
(2) QR is horizontal

(3) RS is horizontal

(4) Either PQ or RS is horizontal

144. A beam of light composed of red and green ray is incident obliquely at a point on the face of rectangular glass slab. When coming out on the opposite parallel face, the red and green ray emerge from **[CBSE PMT 2004]**

(1) Two points propagating in two different directions

(2) Two points propagating in two parallel directions

(3) One point propagating in two different directions

(4) One point propagating in the same directions

145. White light is passed through a prism .... colour shows minimum deviation **[Orissa PMT 2004]**

(1) Red (2) Violet

(3) Yellow (4) Green

146. A ray of monochromatic light suffers minimum deviation of 38^o while passing through a prism of refracting angle 60^o. Refractive index of the prism material is **[Pb. PET 2001]**

(1) 1.5 (2) 1.3

(3) 0.8 (4) 2.4

147. A ray incident a 15^o on one refracting surface of a prism of angle 60^o, suffers a deviation of 55^o. What is the angle of emergence **[DCE 2002]**

(1) 95^o (2) 45^o

(3) 30^o (4) None of these