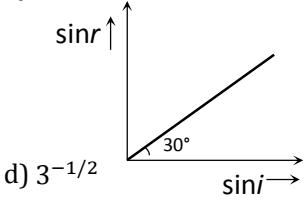# RAY OPTICS

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MOST IMP MCQs on RAY OPTICS for CBSE | JEE | NEET 2025

1. A convex lens of focal length 30 cm produces 5 times magnified real image of an object. What is the object distance?

a) 36 cm
b) 25 cm
c) 30 cm
d) 150 cm

2. Light travels in two media A and B with speeds $1.8 \times 10^8 ms^{-1}$ and $2.4 \times 10^8 ms^{-1}$ respectively. Then the critical angle between them is

a) $\sin^{-1}\left(\frac{2}{3}\right)$
b) $\tan^{-1}\left(\frac{3}{4}\right)$
c) $\tan^{-1}\left(\frac{2}{3}\right)$
d) $\sin^{-1}\left(\frac{3}{4}\right)$

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

a) $f_1 > f_2$
b) $f_1 < f_2$
c) $f_1 = f_2$
d) $f_1 \le f_2$

4. An astronomical telescope has an angular magnification of magnitude 5 for distant objects. The separation between the objective and the eye-piece is 36 cm and the final image is formed at infinity. The focal length f_0 of the objective and the focal length f_e of the eye-piece are

a) $f_0 = 45$ cm and $f_e = -9$ cm
b) $f_0 = -7.2$ cm and $f_e = 5$ cm
c) $f_0 = 50$ cm and $f_e = 10$ cm
d) $f_0 = 30$ cm and $f_e = 6$ cm

5. A convex lens is placed between object and a screen. The size of object is 3 cm and an image of height 9 cm is obtained on the screen. When the lens is displaced to a new position, what will be the size of image on the screen?

a) 2 cm
b) 6 cm
c) 4 cm
d) 1 cm

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

a) $d = 10$ cm
b) $d = \frac{20}{3}$ cm
c) $d = 40$ cm
d) $d = 20$ cm

7. A beam of monochromatic blue light of wavelength 4200 Å in air travels in water ($\mu = 4/3$). Its wavelength in water will be

a) 2800 Å
b) 5600 Å
c) 3150 Å
d) 4000 Å

8. Refractive index of a medium is μ. The incidence angle is twice that of refracting angle. The angle of incidence is

a) $\cos^{-1}\left(\frac{\mu}{2}\right)$
b) $\sin^{-1}\left(\frac{\mu}{2}\right)$
c) $2\cos^{-1}\left(\frac{\mu}{2}\right)$
d) $\sin^{-1}\mu$

9. In an equilateral prism if incident angle is 45° then minimum deviation is

a) 30°
b) 60°
c) 45°
d) 90°

10. An object is placed at a distance of $10cm$ from a convex lens of power $5D$. Find the position of the image
    a) $-20\ cm$ b) $30\ cm$ c) $20\ cm$ d) $-30\ cm$

11. If eye is kept at a depth h inside water of refractive index and viewed outside, then the diameter of the circle through which the outer objects become visible, will be
    a) $\dfrac{h}{\sqrt{\mu^2 - 1}}$ b) $\dfrac{h}{\sqrt{\mu^2 + 1}}$ c) $\dfrac{2h}{\sqrt{\mu^2 - 1}}$ d) $\dfrac{h}{\sqrt{\mu^2}}$

12. A ray of light passes an equilateral prism such that an angle of incidence is equal to the angle of emergence and the latter is equal to $\frac{3}{4}$ th the angle of prism. The angle of deviation is
    a) $45°$ b) $39°$ c) $20°$ d) $30°$

13. What will be the colour of sky as seen from the earth, if there were no atmosphere
    a) Black   b) Blue   c) Orange   d) Red

14. To get three images of a single object, one should have two plane mirrors at an angel of
    a) $60°$ b) $90°$ c) $120°$ d) $30°$

15. A medium shows relation between i and r as shown. If speed of light in the medium is nc then value of n is

    a) 1.5   b) 2   c) 2^{-1} d) $3^{-1/2}$

16. How much water should be filled in a container $21\ cm$ in height, so that it appears half filled when viewed from the top of the container (given that $\mu_\omega = 4/3$)
    a) $8.0\ cm$ b) $10.5\ cm$ c) $12.0\ cm$ d) None of the above

17. In a compound microscope, the intermediate image is
    a) Virtual erect and magnified   b) Real, erect and magnified
    c) Real, inverted and magnified   d) Virtual, erect and reduced

18. If the critical angle for total internal reflection from a medium to vacuum is $30°$, the velocity of light in the medium is
    a) $3 \times 10^8\ m/s$ b) $1.5 \times 10^8\ m/s$ c) $6 \times 10^8\ m/s$ d) $\sqrt{3} \times 10^8\ m/s$

19. The focal length of the objective and the eye-piece of a microscope are 4 mm and 25 mm respectively. If the final image is formed at infinity and the length of the tube is 16 cm, then the magnifying power of microscope will be
    a) -337.5 b) -3.75 c) 3.375 d) 33.75

20. A beaker containing a liquid appears to be half when it is actually two third full. The refractive index of liquid
    a) $7/6$ b) $6/5$ c) $3/2$ d) $4/3$

21. The resolving power of a telescope depends on
    a) Focal length of eye lens   b) Focal length of objective lens
    c) Length of the telescope   d) Diameter of the objective lens

22. When light travels from one medium to the other of which the refractive index is different, then which of the following will change
a) Frequency, wavelength and velocity
b) Frequency and wavelength
c) Frequency and velocity
d) Wavelength and velocity

23. Two thin lenses of focal length 20 cm and 25 cm are in contact. The effective power of the combination is
a) 4.5 D
b) 18 D
c) 45 D
d) 9 D

24. The focal lengths of the objective and the eye piece of telescope are 100 cm and 10 cm respectively. The magnification of the telescope when final image is formed at infinity is
a) 0.1
b) 10
c) 100
d) ∞

25. A ray of light incident normally on one face of a right angled isosceles prism. It them grazes the hypotenuse. The refractive index of the material of the prism is
a) 1.33
b) 1.414
c) 1.5
d) 1.732
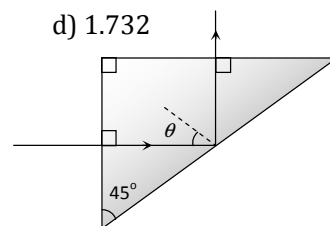
26. A triangular prism of glass is shown in the figure. A ray incident normally to one face is totally reflected, if $\theta = 45°$.
The index of refraction of glass is

a) Less than 1.41
b) Equal to 1.41
c) Greater than 1.41
d) None

27. The communication using optical fibres is based on the principle of
a) Total internal reflection
b) Brewster angle
c) Polarization
d) Resonance

28. A bi-convex lens made of glass (refractive index 1.5) is put in a liquid of refractive index 1.7. Its focal length will
a) Decrease and change sign
b) Increase and change sign
c) Decrease and remain of the same sign
d) Increase and remain of the same sign

29. The position of final image formed by the given lens combination from the third lens will be at a distance of
$[f_1 = +10 \text{ cm}, f_2 = -10 \text{ cm}, f_3 = +30 \text{ cm}]$
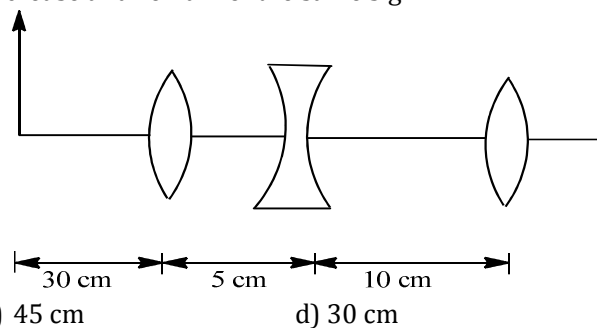

a) 15 cm
b) Infinity
c) 45 cm
d) 30 cm

30. A cut diamond sparkles because of its
a) Hardness
b) High refractive index
c) Emission of light by the diamond
d) Absorption of light by the diamond

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

a) $\dfrac{f}{2}$
b) f
c) $\dfrac{3}{2}f$
d) $2f$

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

a) $\dfrac{1}{\sqrt{2}}$ b) $\sqrt{3}$ c) $\dfrac{\sqrt{3}}{2}$ d) $\dfrac{3}{2}$

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

a) $h/4$ b) $h/3$ c) $h/2$ d) h

34. An astronomical telescope of ten-fold angular magnification has a length of 44 cm. The focal length of the objective is

a) 4 cm b) 40 cm c) 44 cm d) 440 cm

35. Large aperture of telescope are used for

a) Large image b) Greater resolution
c) Reducing lens aberration d) Ease of manufacture

36. A plano-concave lens is made up of glass of refractive index 1.5 and the radius of the curvature of its curved face is 100 cm. What is the power of the lens?

a) + 0.5 D b) −0.5 D c) −2 D d) +2 D

37. When sunlight is incident on a prism, it produces a spectrum due to

a) Interference b) Diffraction c) T.I.R. d) Variation in speed of different colors in prism

38. Two lenses of power +12 and −2 dioptres are placed in contact. What will the focal length of combination

a) 10 cm b) 12.5 cm c) 16.6 cm d) 8.33 cm

39. The time required for the light to pass through a glass slab (refractive index =1.5) of thickness 4mm is...($c = 3 \times 10^8$ ms^{-1},speed of light in free space).

a) 2×10^{-5} s b) 2×10^{11} s c) 2×10^{-11} s d) 10^{-11}s

40. Which one of the following spherical lenses will have zero power? The radii of curvature of the surfaces of the lenses are as given in the diagrams

a) R_1 R_2 b) R ∞ c) R R d) R ∞
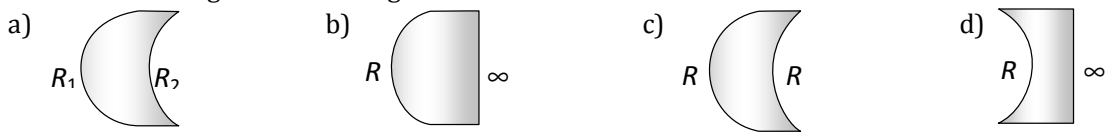
Q.No	Answer		Q.No	Answer		Q.No	Answer		Q.No	Answer
1	a		11	c		21	d		31	d
2	d		12	d		22	d		32	b
3	a		13	a		23	d		33	c
4	d		14	b		24	b		34	b
5	d		15	d		25	b		35	b
6	d		16	c		26	c		36	b
7	c		17	c		27	a		37	d
8	c		18	b		28	b		38	a
9	a		19	a		29	d		39	c
10	a		20	d		30	b		40	c