

Prayas JEE (2025)

Physics

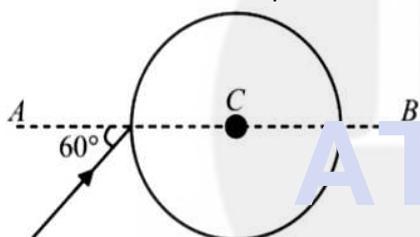
Ray Optics

DPP: 9

Q1 A clock hung on a wall has marks instead of numbers on its dial. On the opposite wall there is a mirror, and the image of the clock in the mirror if read, indicates the time as 8 : 20. What is the time in the clock?

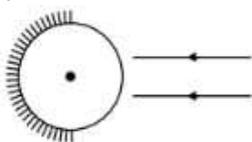
- (A) 3 : 40 (B) 4 : 40
(C) 5 : 20 (D) 4 : 20

Q2 A ray of light falls on a transparent sphere with center at C as shown in figure. The ray emerges from the sphere parallel to line AB . The refractive index of the sphere is



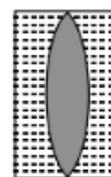
- (A) $\sqrt{2}$ (B) $\sqrt{3}$
(C) $3/2$ (D) $1/2$

Q3 A glass sphere of index 1.5 and radius 40 cm has half its hemispherical surface silvered. The point where a parallel beam of light, coming along a diameter, will focus (or appear to) after coming out of sphere, will be:



- (A) 100 cm to the left of centre
(B) 160 cm to the right of centre
(C) 50 cm to the left of centre
(D) 60 cm to the left of centre

Q4 As shown in figure, a convergent lens is placed inside a cell filled with liquid. The lens has focal length +20 cm when in air and its material has refractive index 1.50 . If the liquid has refractive index 1.60 , the focal length of the system is



- (A) +80 cm
(B) -80 cm
(C) -24 cm
(D) -100 cm

Q5 A convex lens A of focal length 20 cm and a concave lens B of focal length 5 cm are kept along the same axis with a distance d between them as shown in figure. If a parallel beam falling on A emerges parallel from B , then d is equal to



- (A) 15 (B) 20
(C) 22.5 (D) 25

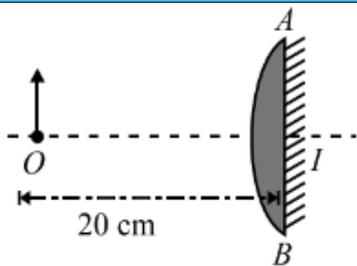
Q6 A point object is placed at a distance of 20 cm from a thin plano-convex lens of focal length 15 cm. If the plane surface is silvered, the image will form at



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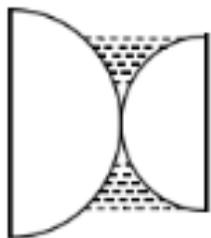
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- (A) 60 cm from left of AB
- (B) 30 cm from left of AB
- (C) 12 cm from left of AB
- (D) 60 cm from right of AB

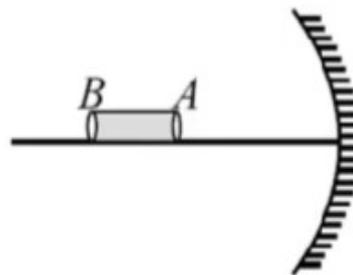
Q7 The plano-convex lenses each of focal length 10 cm and R.I $\frac{3}{2}$ are placed as shown. Water of (R.I. $=\frac{4}{3}$) is filled between them. The whole arrangement is in air. The optical power of the system in Diopters is



- (A) 6.67
- (B) -6.67
- (C) 3.33
- (D) -3.33

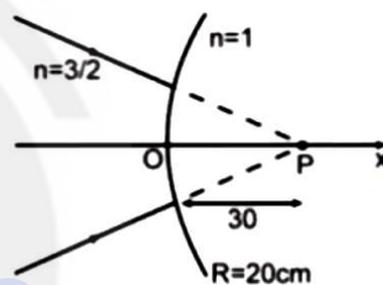
Q8 Find the distance from a convex mirror, of focal length 60 cm where an object of height 12 cm should be placed so that its image is produced at 35 cm from mirror. Also find the height of image.

Q9 Focal length of concave mirror is 25 cm, An object AB of length 5 cm is placed horizontally on the axis of the mirror such that the end A near to the mirror at a distance 0.5 m from the pole of the mirror. Determine the position and size of the image.



Q10 A tower 100 m tall at a distance of 3 km is seen through a telescope having objective of focal length 140 cm and eye piece of focal length 5 cm. What is the size final image if it is at 25 cm from the eye?

Q11 The image for the converging beam after refraction through the curved surface is formed at:



- (A) $x = 10$ cm
- (B) $x = \frac{40}{3}$ cm
- (C) $x = -\frac{40}{3}$ cm
- (D) $x = \frac{180}{7}$ cm



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Answer Key

Q1 A
Q2 B
Q3 D
Q4 D
Q5 A
Q6 C

Q7 A
Q8 $u=84\text{ cm}, h=12\text{ cm}$
Q9 25 cm
Q10 28 cm
Q11 A



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