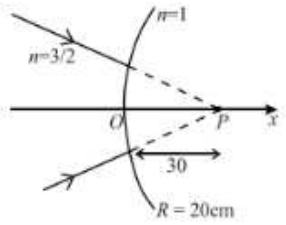
Prayas JEE (2025)

Physics

Ray Optics

DPP: 4

Q1 The image for the converging beam after refraction through the curved surface (in the given figure) is formed at



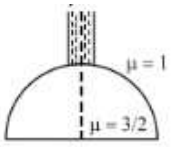
(A) $x = 40\ \text{cm}$

(B) $x = \frac{40}{3}\ \text{cm}$

(C) $x = -\frac{40}{3}\ \text{cm}$

(D) $x = \frac{180}{7}\ \text{cm}$

Q2 A beam of diameter d is incident on a glass hemisphere as shown in the figure. If the radius of curvature of the hemisphere is very large in comparison to d, then the diameter of the beam at the base of the hemisphere will be



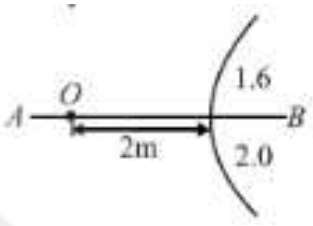
(A) $\frac{3}{4}d$

(B) d

(C) $\frac{d}{3}$

(D) $\frac{2}{3}d$

Q3 In the figure shown a point object O is placed in air. A spherical boundary of radius of curvature $1.0\ \text{m}$separates two media. AB is principal axis. The refractive index above AB is 1.6 and below AB is 2.0. The separation between the images formed due to refraction at spherical surface is:



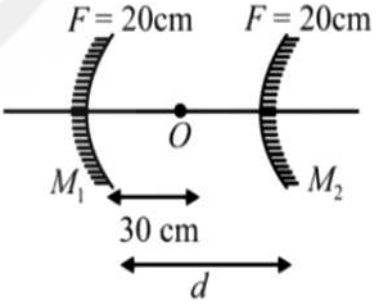
(A) $12\ \text{m}$

(B) $20\ \text{m}$

(C) $14\ \text{m}$

(D) $10\ \text{m}$

Q4 In the figure shown, O is the object at a distance of $30\ \text{cm}$ from M_1. If the image coincides with the object after two reflections, one from each mirror, find the distance between the two mirrors.



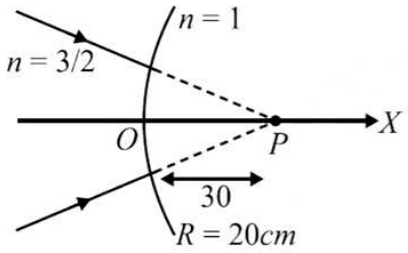
(A) $40\ \text{cm}$

(B) $60\ \text{cm}$

(C) $100\ \text{cm}$

(D) $50\ \text{cm}$

Q5 The image for the converging beam after refraction through the curved surface is formed at



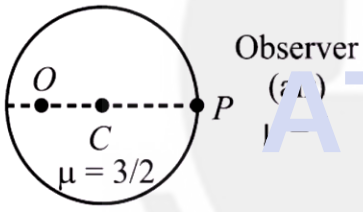
(A) $x = 40\ \text{cm}$

(B) $x = \frac{40}{3}\ \text{cm}$

(C) $x = -\frac{40}{3}\ \text{cm}$

(D) $x = \frac{180}{7}\ \text{cm}$

Q6 In a spherical paper weight $(R = 10\ \text{cm})$ made of glass of refractive index $\mu = \frac{3}{2}$, an object is embedded at a distance $5\ \text{cm}$ from its centre. What is the apparent position of the object when seen from the opposite side (see figure)?



(A) $10\ \text{cm}$ behind centre

(B) $10\ \text{cm}$ behind P

(C) $15\ \text{cm}$ behind centre

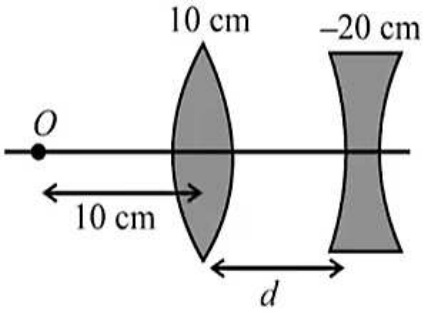
(D) $5\ \text{cm}$ behind P

Q7 The magnification of an object placed in front of a convex lens of focal length $20\ \text{cm}$ is +2 . To obtain a magnification of -2 , the object will has to be moved a distance equal to

(A) 10 cm (B) 20 cm

(C) 30 cm (D) 40 cm

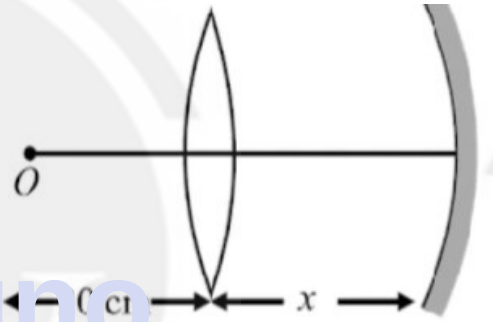
Q8 What should be the value of distance d so that final image is formed on the object itself. (focal lengths of the lenses are written on the lenses).



(A) 10 cm (B) 20 cm

(C) 5 cm (D) None of these

Q9 A point object O is placed at a distance of $20\ \text{cm}$ from a convex lens of focal length $10\ \text{cm}$ as shown in figure. At what distance x from the lens should a concave mirror of focal length $60\ \text{cm}$, be placed so that final image coincides with the object-



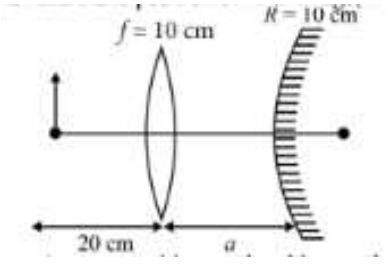
(A) $10\ \text{cm}$

(B) $40\ \text{cm}$

(C) $20\ \text{cm}$

(D) final image can never coincide with the object in the given conditions

Q10 Find nature and position of final image, if $a = 20\ \text{cm}$



(A) At same position, real and inverted

(B) At same position, virtual and inverted

(C) At same position, virtual and erect

(D) At same position, real and upright

Answer Key

Q1	A
Q2	D
Q3	A
Q4	D
Q5	A
Q6	A
Q7	B
Q8	A
Q9	C
Q10	A

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