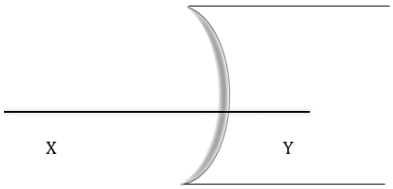
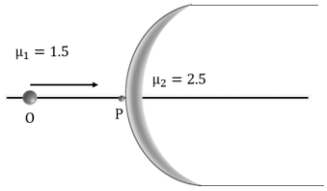
Q.1 A concave spherical surface of radius of curvature 10cm separates two mediums X and Y of refractive index $\frac{4}{3}$ and $\frac{3}{2}$ respectively. If the object is placed along principal axis in medium X then:



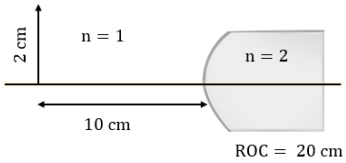
(A) Image is always real
(B) Image is real if the object distance is greater than 90 cm
(C) Image is always virtual
(D) Image is virtual if the object distance is less than 90 cm

Q.2 A convex spherical refracting surface of radius R separates a medium having refractive index 2.5 from a medium having refractive index 1.5. As an object (O) is moved towards the surface, from a point far away from the surface as shown in the figure, along the central axis, its image changes from real to virtual when it is at a distance x from the pole P of the surface. Find x.



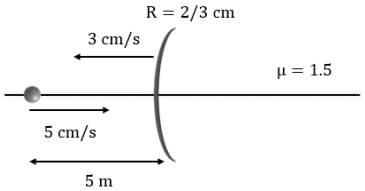
(A) $x = \frac{2R}{3}$ **(B)** $x = \frac{3R}{2}$ **(C)** $x = 2R$ **(D)** $x = R$

Q.3 An extended object of size 2 cm is placed at a distance of 10 cm in air (n = 1) from the pole on the principal axis of a spherical curved surface. The medium on the other side of the refracting surface has refractive index n = 2. Find the position, nature and size of the image formed after single refraction through the curved surface.



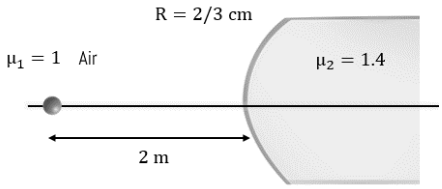
(A) 30 cm from pole in the medium having refractive index 1, virtual, erect and 4 cm in size.
(B) 40 cm from pole in the medium having refractive index 1, virtual, erect and 4 cm in size.
(C) 40 cm from pole in the medium having refractive index 1, real, inverted and 4 cm in size.
(D) 30 cm from pole in the medium having refractive index 1, real, inverted and 4 cm in size.

Q.4 An object lying at the distance of 5 cm from a spherical interface as shown in the figure, is moving with the velocity of 5 cm/s. If the interface is moving with a velocity of 3 cm/s, then calculate the velocity of the image formed by the spherical surface. (Assume that spherical interface always separates air and medium of refractive index 1.5)



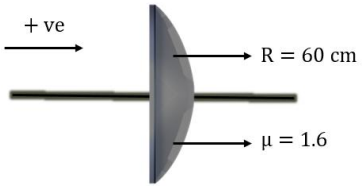
(A) 20 cm/s **(B)** 50cm/s **(C)** 45cm/s **(D)** 15cm/s

Q.5 An object is lying at a distance of 2 m from a spherical interface as shown in the figure. If the radius of the interface is $\frac{2}{3}$ m and refractive index of the medium is $\mu = 1.4$, calculate the magnification of the image formed by the interface.



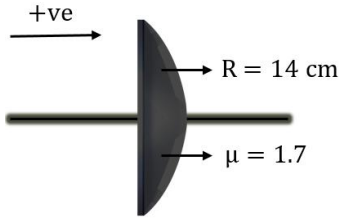
(A)2 **(B)**–2 **(C)**5 **(D)**–5

Q.6 A plano-convex lens is made of material of refractive index 1.6. The radius of curvature of the curved surface is 60 cm. The focal length of the lens is[Assume, surrounding medium to be air]



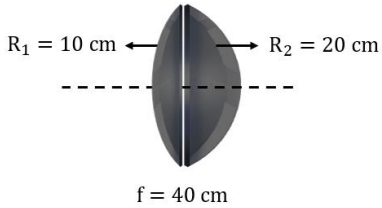
(A)200 cm **(B)**100cm **(C)**50cm **(D)**400cm

Q.7 For a plano convex lens the radius of curvature of the convex part is 14 cm. If the refractive index of the material of the lens is 1.7, calculate the focal length of the lens



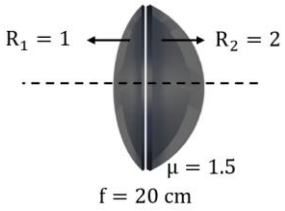
(A)10 cm **(B)**20cm **(C)**30cm **(D)**40cm

Q.8 A double convex lens has a focal length of 40 cm. If the radius of curvature of its refracting surfaces are 10 cmand 20 cm, find the refractive index of the material of the lens



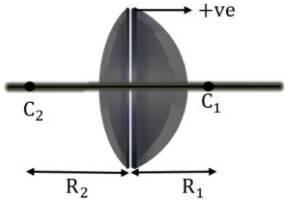
(A)$\frac{4}{3}$ **(B)**$\frac{5}{3}$ **(C)**$\frac{7}{5}$ **(D)**$\frac{7}{6}$

Q.9 The focal length of a bi-convex lens is 20 cm and its refractive index is 1.5. If the radii of curvatures of two surfaces of lens are in the ratio 1 : 2, then the value of the larger radius of curvature is (in cm) :



(A)10 **(B)**15 **(C)**20 **(D)**30

Q.10 A double convex lens has a focal length of 50 cm. The radius of curvature of one refracting surface is double the other. Find the radii of curvature, if the refractive index of the material of the lens is 2



(A)70 cm, 140 cm **(B)**62.5 cm, 125 cm **(C)**75 cm, 150 cm **(D)**25 cm, 50 cm

ANSWER KEY

Q.	1	2	3	4	5	6	7	8	9	10
Sol.	(C)	(B)	(B)	(C)	(D)	(B)	(B)	(D)	(D)	(C)