Q.1   A liquid of refractive index 1.33 is placed between two identical plano-convex lenses, with refractive index 1.50. Two possible arrangements, P and Q are shown. The system is

P   Q

(A)Divergent in P, convergent in Q   (B)Convergent in P, divergent in Q
(C)Convergent in both   (D)Divergent in both

Q.2   For the lens arrangement shown in the figure, The effective focal length is−60 cm. The radii of curvature of the curved surfaces of plano-convex lenses are 12 cm each and refractive index of the material of the lens is 1.5. Find the refractive index of the liquid.
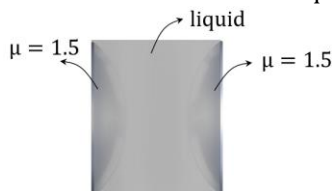
(A)1.33   (B)1.42   (C)1.53   (D)1.60

Q.3   Consider a coaxial system of two thin convex lenses of focal length f each separated by a distanced. The left column of the table below gives different possible conditions between dand f, and the right column represents the nature of the lens combination. Choose the correct alternative.

Condition	Nature
$d < 2f$	(P) Convex
$d = 2f$	(Q) Plane glass slab
$d > 2f$	(R) Concave

(A)$1 - P, 2 - R, 3 - Q$ (B)$1 - R, 2 - P, 3 - Q$
(C)$1 - P, 2 - Q, 3 - R$ (D)$1 - Q, 2 - P, 3 - R$

Q.4   When a bi - convex lens of glass having refractive index 1.47 is dipped in a liquid, it acts as a plane sheet of glass. This implies that the liquid must have refractive index
(A)Greater than that of glass   (B)Less than that of glass
(C)Equal to that of glass   (D)Less than one

Q.5   Two thin identical shape plano-convex lenses $L_1(\mu_1 = 1.4)$ and $L_2(\mu_2 = 1.5)$ with radius of curvature $R = 20$ cm have been arranged as shown in figure. A parallel beam of light is incident on the system of the lenses, the position of image formed with respect to the common optical center is:
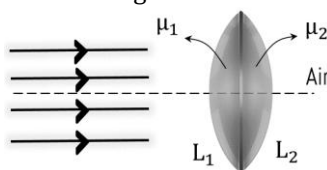
(A)$\frac{218}{10}$ cm   (B)$\frac{200}{9}$ cm   (C)$\frac{100}{7}$ cm   (D)$\frac{156}{5}$ cm

Q.6   In a lens displacement method, the distance between the object and screen is 70 cm, and the focal length of the lens is16 cm. Find the separation between the sharp image positions of the lens.
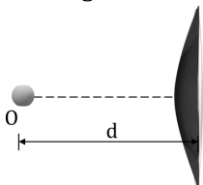
(A)20.4 cm   (B)30cm   (C)17.2cm   (D)42cm

Q.7   A plano-convex thin lens of focal length 10 cm is silvered at its plane surface. The distance d at which an object must be kept in order to get its image on itself is

O - - - - - - - - - - - - - -
|← d →|

(A)5 cm   (B)20cm   (C)10cm   (D)2.5cm

Q.8   The plane surface of a Plano- convex lens is silvered. If μ be the refractive index and R, the radius of curvature of curved surface, then the system will behave like a concave mirror of radius of curvature of

(A)μR   (B)$\frac{R}{\mu-1}$ (C)$\frac{R^2}{\mu}$ (D)$(\frac{\mu+1}{\mu-1})R$

Q.9   If a symmetrical bi-concave thin lens is cut into two identical halves, and they are placed in different arrangements as shown, then:
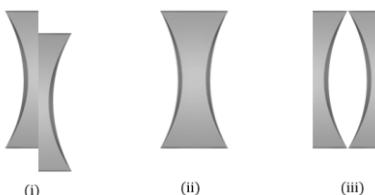
(i)   (ii)   (iii)

(A)Three images will be formed in case (i)
(B)Two images will be formed in case (ii)
(C)The ratio of focal lengths in (ii) and (iii) is 1
(D)The ratio of focal lengths in (ii) and (iii) is 2

Q.10   The optical axes of a convex and concave lens are separated by a distance 5 mm as shown in the figure. Find the coordinate of the final image formed by the combination if a parallel beam of light is incident on the convex lens. Origin is at the optical centre of the convex lens.

f = 20 cm   f = −10 cm

5 mm   Principle axis of concave lens

Principle axis of convex lens

|← 30 cm →|
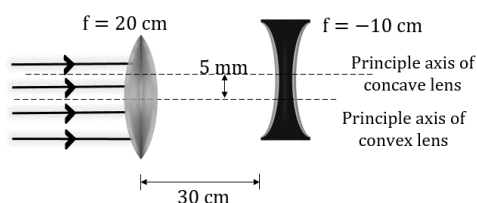
(A)$(25\ cm, 0.5\ mm)$ (B)$(25\ cm, 2.5\ mm)$
(C)$(25\ cm, -0.5\ mm)$ (D)$(50\ cm, -2.5\ mm)$

ANSWER KEY

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