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JEE MAIN RAY OPTICS AND OPTICAL INSTRUMENTS — POWER AND COMBINATION OF THIN LENSES — PYQS

Max. Marks: 44 **Questions:** 11

Section A (MCQ) — 11 questions

Q.1 A thin biconvex lens is prepared from the glass (μ = 1.5) both curved surfaces of which have equal radii of 20 cm each. Left side surface of the lens is silvered from outside to make it reflecting. To have the position of image and object at the same place, the object should be placed, from the lens at a distance of _____ cm.

[JEE Main 2026 (Online) 8th April Evening Shift]

(1) 10 (2) 12.5 (3) 13 (4) 13.5

Scan or tap for the full solution

Q.2 A thin convex lens and a thin concave lens are kept in contact and are co-axial. Which of the following statements is correct for this combination of two lenses ? [JEE Main 2026 (Online) 5th April Evening Shift]

(1) behaves as concave lens if $|f_{convex}| > |f_{concave}|$

(2) behaves as concave lens if $|f_{convex}| < |f_{concave}|$

(3) behaves as convex lens if $|f_{convex}| > |f_{concave}|$

(4) Focal length of the lens system will change if the positions of two lenses are interchanged

Scan or tap for the full solution

Q.3 An object AB is placed 15 cm on the left of a convex lens P of focal length 10 cm. Another convex lens Q is now placed 15 cm right of lens P. If the focal length of lens Q is 15 cm, the final image is _____.

[JEE Main 2026 (Online) 5th April Evening Shift]

(1) virtual, formed at 7.5 cm right of lens Q, with a size bigger than that of AB

(2) real, formed at 7.5 cm right of lens Q, with a size same as that of AB

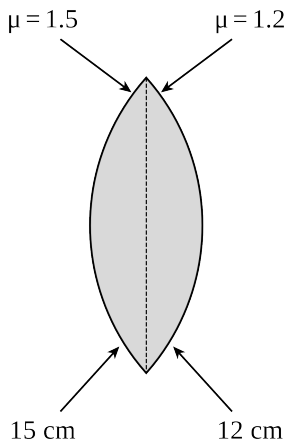
(3) formed at infinity.

(4) real, formed at 7 cm right of lens Q, with a size smaller than that of AB

Scan or tap for the full solution

Q.4 A biconvex lens is formed by using two thin planoconvex lenses, as shown in the figure. The refractive index and radius of curved surfaces are also mentioned in figure. When an object is placed on the left side of lens at a distance of 30 cm from the biconvex lens, the magnification of the image will be :

[JEE Main 2026 (Online) 28th January Evening Shift]



(1) −2 (2) −2.5 (3) +2.5 (4) +2

Scan or tap for the full solution

Q.5 A thin convex lens of focal length 5 cm and a thin concave lens of focal length 4 cm are combined together (without any gap) and this combination has magnification m_1 when an object is placed 10 cm before the convex lens. Keeping the positions of convex lens and object undisturbed a gap of 1 cm is introduced between the lenses by moving the concave lens away, which leads to a change in magnification of total lens system to m_2. The value of $\left|\frac{m_1}{m_2}\right|$ is _____ .

[JEE Main 2026 (Online) 22nd January Morning Shift]

(1) $\frac{25}{27}$ (2) $\frac{5}{6}$ (3) $\frac{5}{27}$ (4) $\frac{3}{2}$

Scan or tap for the full solution

Q.6 A convex lens of focal length 30 cm is placed in contact with a concave lens of focal length 20 cm. An object is placed at 20 cm to the left of this lens system. The distance of the image from the lens in cm is _____.

[JEE Main 2025 (Online) 8th April Evening Shift]

(1) $\frac{60}{7}$ (2) 15 (3) 45 (4) 30

Scan or tap for the full solution

Q.7 A concave-convex lens of refractive index 1.5 and the radii of curvature of its surfaces are 30 cm and 20 cm, respectively. The concave surface is upwards and is filled with a liquid of refractive index 1.3. The focal length of the liquid-glass combination will be

[JEE Main 2025 (Online) 8th April Evening Shift]

(1) $\frac{700}{11}$ cm (2) $\frac{600}{11}$ cm (3) $\frac{800}{11}$ cm (4) $\frac{500}{11}$ cm

Scan or tap for the full solution

Q.8 Two thin convex lenses of focal lengths 30 cm and 10 cm are placed coaxially, 10 cm apart. The power of this combination is:

[JEE Main 2025 (Online) 7th April Morning Shift]

(1) 5 D (2) 1 D (3) 20 D (4) 10 D

Scan or tap for the full solution

Q.9 What is the relative decrease in focal length of a lens for an increase in optical power by 0.1 D from 2.5 D ? ['D' stands for dioptre]

[JEE Main 2025 (Online) 24th January Morning Shift]

(1) 0.04 (2) 0.1 (3) 0.40 (4) 0.01

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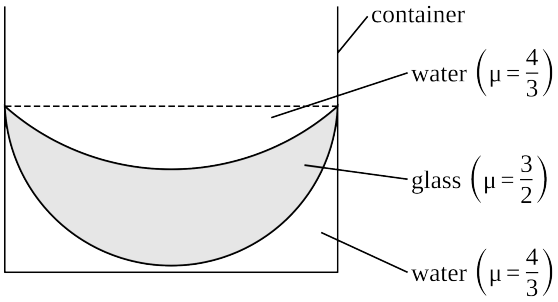
Q.10 In the diagram given below, there are three lenses formed. Considering negligible thickness of each of them as compared to $|R_1|$ and $|R_2|$, i.e., the radii of curvature for upper and lower surfaces of the glass lens, the power of the combination is

[JEE Main 2025 (Online) 22nd January Morning Shift]



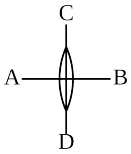
(1) $-\frac{1}{6}\left(\frac{1}{|R_1|} - \frac{1}{|R_2|}\right)$ (2) $-\frac{1}{6}\left(\frac{1}{|R_1|} + \frac{1}{|R_2|}\right)$

(3) $\frac{1}{6}\left(\frac{1}{|R_1|} + \frac{1}{|R_2|}\right)$ (4) $\frac{1}{6}\left(\frac{1}{|R_1|} - \frac{1}{|R_2|}\right)$

Scan or tap for the full solution

Q.11 A symmetric thin biconvex lens is cut into four equal parts by two planes AB and CD as shown in figure. If the power of original lens is 4D then the power of a part of the divided lens is

[JEE Main 2025 (Online) 22nd January Evening Shift]



(1) 2D (2) 8D (3) 4D (4) D

Scan or tap for the full solution

ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	1	1	2	1	2	2	2	4	1	1	1