

PART 1 - PHYSICS

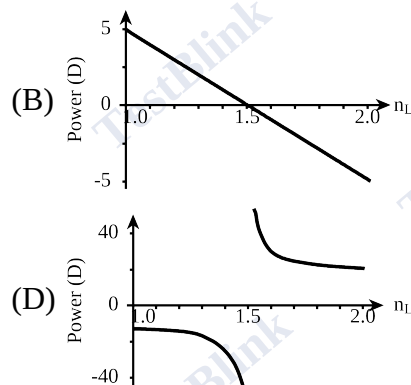
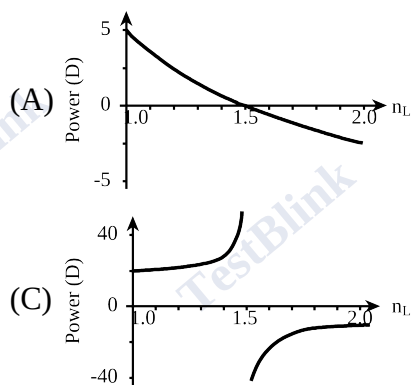
Topic : Ray optics and optical instruments

SECTION-A : (Maximum Marks : 24)

- This section contains **SIX** questions.
- Each question has **FOUR** options (A), (B), (C) and (D). **ONE OR MORE THAN ONE** of these four option(s) is(are) correct answer(s).
- For each question, choose the option(s) corresponding to (all) the correct answer(s).
- Answer to each question will be evaluated according to the following marking scheme :

Full Marks	: +4	ONLY if (all) the correct option(s) is(are) chosen;
Partial Marks	: +3	If all the four options are correct but ONLY three options are chosen;
Partial Marks	: +2	If three or more options are correct but ONLY two options are chosen, both of which are correct;
Partial Marks	: +1	If two or more options are correct but ONLY one option is chosen and it is a correct option;
Zero Marks	: 0	If none of the options is chosen (i.e. the question is unanswered);
Negative Marks	: -1	In all other cases.
- For example, in a question, if **(A), (B) and (D)** are the ONLY three options corresponding to correct answers, then choosing ONLY (A), (B) and (D) will get +4 marks; choosing ONLY (A) and (B) will get +2 marks; choosing ONLY (A) and (D) will get +2 marks; choosing ONLY (B) and (D) will get +2 marks; choosing ONLY (A) will get +1 mark; choosing ONLY (B) will get +1 mark; choosing ONLY (D) will get +1 mark; choosing no option (i.e. the question is unanswered) will get 0 marks; and choosing any other combination of options will get -1 marks.

1. A double convex lens made of glass of refractive index 1.5 and radii of curvature of the curved surfaces 20 cm each is immersed in a liquid of refractive index n_L . The correct plot showing the variation of the power, in the units of diopter (D), as a function of n_L is: [JEE Advanced 2026 Paper 1]



Scan or tap for the full solution



2. A beam of polychromatic light passes through a thin prism of prism angle 6° . The refractive index of the material of the prism varies with wavelength (λ) as $n(\lambda) = \alpha\lambda + \frac{\beta}{\lambda^2}$, where $\alpha = 3 \mu\text{m}^{-1}$ and $\beta = 0.096 \mu\text{m}^2$. If $\lambda_{\min}$ is the wavelength at which the angle of minimum deviation D_m is smallest, then the correct value of D_m at $\lambda_{\min}$ is [JEE Advanced 2026 Paper 2]

Space for Rough Work

(A) 6.4°

(B) 4.8°

(C) 3.2°

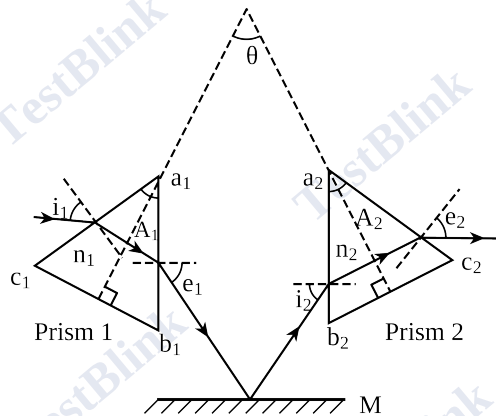
(D) 2.4°

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3. Consider two isosceles prisms 1 and 2 with prism angles A_1 and A_2 and refractive indices n_1 and n_2 , respectively, as shown in the figure. The faces a_1b_1 and a_2b_2 are parallel to each other and perpendicular to the mirror M. If a ray of light is incident on the face a_1c_1 and emerges from the face a_2c_2 , then the correct statement(s) is/are:

[JEE Advanced 2026 Paper 2]



(A) If both the prisms are at minimum deviation condition, then $\frac{n_2}{n_1} = \sin\left(\frac{A_1}{2}\right) / \sin\left(\frac{A_2}{2}\right)$.

(B) If prism 2 is at minimum deviation condition, then $\sin i_1 = n_2 \sin\left(\frac{A_2}{2}\right)$ is always true.

(C) If both the prisms 1 and 2 are thin and are at minimum deviation condition with angles of deviation δ_{m1} and δ_{m2} , respectively, then $\theta = \frac{\delta_{m1}}{2(n_1 - 1)} + \frac{\delta_{m2}}{2(n_2 - 1)}$.

(D) If prism 1 is at minimum deviation condition, then $\sin i_2 = n_1 \sin\left(\frac{A_1}{2}\right)$ is always true.

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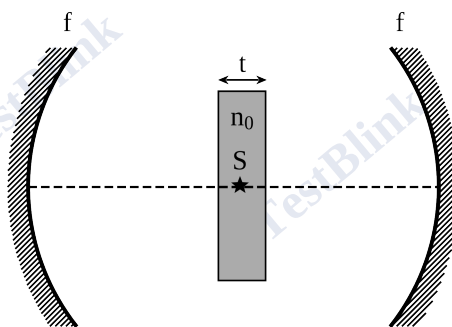


4. Two identical concave mirrors each of focal length f are facing each other as shown in the schematic diagram. The focal length f is much larger than the size of the mirrors. A glass slab of thickness t and refractive index n_0 is kept equidistant from the mirrors and perpendicular to their common principal axis. A monochromatic point light source S is embedded at the center of the slab on the principal axis, as shown in the schematic diagram. For the image to be formed on S itself, which of the following distances between the two mirrors is/are correct:

[JEE Advanced 2025 Paper 2]

Space for Rough Work

PYQSide



- (A) $4f + \left(1 - \frac{1}{n_0}\right)t$ (B) $2f + \left(1 - \frac{1}{n_0}\right)t$ (C) $4f + (n_0 - 1)t$ (D) $2f + (n_0 - 1)t$

Scan or tap for the full solution



5. A light ray is incident on the surface of a sphere of refractive index n at an angle of incidence θ_0 . The ray partially refracts into the sphere with angle of refraction ϕ_0 and then partly reflects from the back surface. The reflected ray then emerges out of the sphere after a partial refraction. The total angle of deviation of the emergent ray with respect to the incident ray is α . Match the quantities mentioned in **List-I** with their values in **List-II** and choose the correct option.

[JEE Advanced 2024 Paper 1]

List-I		List-II
P.	If $n = 2$ and $\alpha = 180^\circ$, then all the possible values of θ_0 will be	1. 30° and 0°
Q.	If $n = \sqrt{3}$ and $\alpha = 180^\circ$, then all the possible values of θ_0 will be	2. 60° and 0°
R.	If $n = \sqrt{3}$ and $\alpha = 180^\circ$, then all the possible values of ϕ_0 will be	3. 45° and 0°
S.	If $n = \sqrt{2}$ and $\theta_0 = 45^\circ$, then all the possible values of α will be	4. 150°
		5. 0°

- (A) $P \rightarrow 5; Q \rightarrow 2; R \rightarrow 1; S \rightarrow 4$ (B) $P \rightarrow 5; Q \rightarrow 1; R \rightarrow 2; S \rightarrow 4$
(C) $P \rightarrow 3; Q \rightarrow 2; R \rightarrow 1; S \rightarrow 4$ (D) $P \rightarrow 3; Q \rightarrow 1; R \rightarrow 2; S \rightarrow 5$

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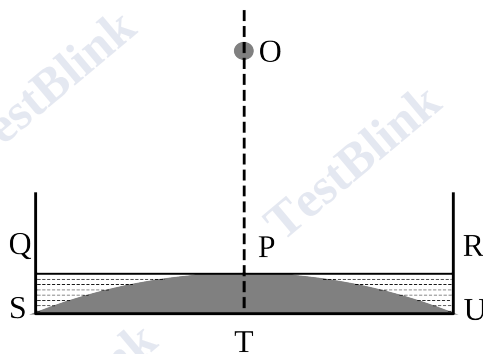


6. A glass beaker has a solid, plano-convex base of refractive index 1.60, as shown in the figure. The radius of curvature of the convex surface (SPU) is 9 cm, while the planar surface (STU) acts as a mirror. This beaker is filled with a liquid of refractive index n up to the level QPR. If the image of a point object O at a height of h (OT in the figure) is formed onto itself, then, which of the following option(s) is(are) correct?

[JEE Advanced 2024 Paper 1]

Space for Rough Work

PYQSide



- (A) For $n = 1.42$, $h = 50$ cm.
 (C) For $n = 1.45$, $h = 65$ cm.

- (B) For $n = 1.35$, $h = 36$ cm.
 (D) For $n = 1.48$, $h = 85$ cm.

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SECTION-B : (Maximum Marks : 4)

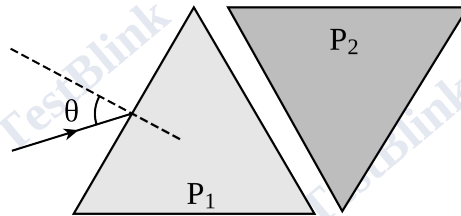
- This section contains **ONE** question.
- The answer to each question is a **NON-NEGATIVE INTEGER**.
- For each question, enter the correct integer corresponding to the answer in the place designated to enter the answer.
- Answer to each question will be evaluated according to the following marking scheme :

Full Marks : +4 If **ONLY** the correct answer is entered;

Zero Marks : 0 In all other cases.

7. Two equilateral-triangular prisms P_1 and P_2 are kept with their sides parallel to each other, in vacuum, as shown in the figure. A light ray enters prism P_1 at an angle of incidence θ such that the outgoing ray undergoes minimum deviation in prism P_2 . If the respective refractive indices of P_1 and P_2 are $\sqrt{\frac{3}{2}}$ and $\sqrt{3}$, then $\theta = \sin^{-1} \left[\sqrt{\frac{3}{2}} \sin \left(\frac{\pi}{\beta} \right) \right]$, where the value of β is _____.

[JEE Advanced 2024 Paper 2]



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JEE ADVANCED RAY OPTICS AND OPTICAL INSTRUMENTS — PYQS

Test Pattern : **JEE (Advanced)**

ANSWER KEY

SECTION-A

[illegible]

SECTION-B

[illegible]