

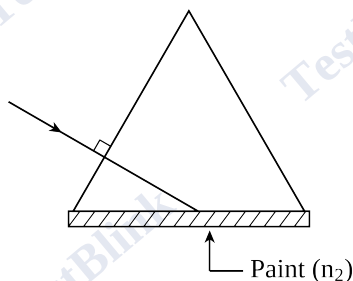
JEE MAIN RAY OPTICS AND OPTICAL INSTRUMENTS — TOTAL INTERNAL REFLECTION AND ITS APPLICATIONS (OPTICAL FIBRES, PRISMS) — PYQS

Max. Marks: 24
Questions: 6

Section A (MCQ) — 6 questions

- Q.1** One side of an equilateral prism is painted by a transparent material of refractive index n_2 . The refractive index of prism is 1.6. The minimum value of n_2 required for total internal reflection from painted face is _____.

[JEE Main 2026 (Online) 2nd April Evening Shift]



- (1) $\frac{3\sqrt{3}}{1.6}$ (2) $\sqrt{3}$ (3) $\frac{3.2}{\sqrt{3}}$ (4) $\frac{4\sqrt{3}}{5}$

Scan or tap for the full solution



- Q.2** Consider light travelling from a medium A to medium B separated by a plane interface. If the light undergoes total internal reflection during its travel from medium A to B and the speed of light in media A and B are 2.4×10^8 m/s and 2.7×10^8 m/s, respectively, then the value of critical angle is :

[JEE Main 2026 (Online) 23rd January Morning Shift]

- (1) $\cos^{-1}\left(\frac{8}{9}\right)$ (2) $\sin^{-1}\left(\frac{9}{8}\right)$
 (3) $\cot^{-1}\left(\frac{3}{\sqrt{13}}\right)$ (4) $\tan^{-1}\left(\frac{8}{\sqrt{17}}\right)$

Scan or tap for the full solution



- Q.3** A prism of angle 75° and refractive index $\sqrt{3}$ is coated with thin film of refractive index 1.5 only at the back exit surface. To have total internal reflection at the back exit surface the incident angle must be _____
 ($\sin 15^\circ = 0.25$ and $\sin 25^\circ = 0.43$)

[JEE Main 2026 (Online) 23rd January Evening Shift]

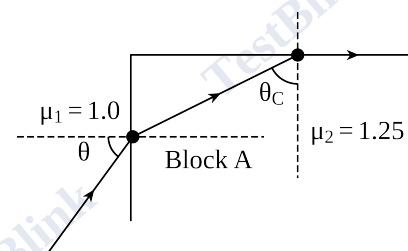
- (1) between 15° and 20° (2) 15°
 (3) $< 15^\circ$ (4) $> 25^\circ$

Scan or tap for the full solution



- Q.4** A transparent block A having refractive index $\mu = 1.25$ is surrounded by another medium of refractive index $\mu = 1.0$ as shown in the figure. A light ray is incident on the flat face of the block with incident angle θ as shown in the figure. What is the maximum value of θ for which light suffers total internal reflection at the top surface of the block?

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



- (1) $\tan^{-1}(4/3)$ (2) $\sin^{-1}(3/4)$
 (3) $\tan^{-1}(3/4)$ (4) $\cos^{-1}(3/4)$

Scan or tap for the full solution



- Q.5** At the interface between two materials having refractive indices n_1 and n_2 , the critical angle for reflection of an em wave is θ_{1C} . The n_2 material is replaced by another material having refractive index n_3 such that the critical angle at the interface between n_1 and n_3 materials is θ_{2C} . If $n_3 > n_2 > n_1$; $\frac{n_2}{n_3} = \frac{2}{5}$ and $\sin \theta_{2C} - \sin \theta_{1C} = \frac{1}{2}$, then θ_{1C} is :

[JEE Main 2025 (Online) 29th January Morning Shift]

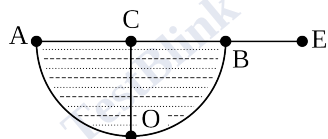
- (1) $\sin^{-1}\left(\frac{1}{6n_1}\right)$ (2) $\sin^{-1}\left(\frac{1}{3n_1}\right)$
 (3) $\sin^{-1}\left(\frac{5}{6n_1}\right)$ (4) $\sin^{-1}\left(\frac{2}{3n_1}\right)$

Scan or tap for the full solution



- Q.6** A hemispherical vessel is completely filled with a liquid of refractive index μ . A small coin is kept at the lowest point (O) of the vessel as shown in figure. The minimum value of the refractive index of the liquid so that a person can see the coin from point E (at the level of the vessel) is _____.

[JEE Main 2025 (Online) 28th January Morning Shift]



- (1) $\frac{3}{2}$ (2) $\frac{\sqrt{3}}{2}$ (3) $\sqrt{3}$ (4) $\sqrt{2}$

Scan or tap for the full solution



ANSWER KEY

Ques.	1	2	3	4	5	6	
Ans.	4	4	1, 2, 3	2	—	4	