

Wave Optics

NEET previous year questions · Physics

3 questions from the official papers: NEET 2026 (2), NEET 2020 (1). Each is followed by its answer and a worked solution written by BrainIt. Generated on 23 October 2026.



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1. NEET 2026 · Q17

In Young's double slit experiment, using monochromatic light of wavelength λ , the intensity of light at a point on the screen where the path difference is λ , is K units. The intensity of light at a point where the path difference is $\frac{\lambda}{3}$ will be

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

Answer (1)

Sol. The interference intensity follows $I =$

$I_0 \cos^2 \left(\frac{\Delta\phi}{2} \right)$. A path difference of λ gives $\Delta\phi = 2\pi$, so $I = I_0 = K$, i.e. $I_0 = K$. For a path difference $\lambda/3$, $\Delta\phi = \frac{2\pi}{3}$, giving $I = I_0 \cos^2 \left(\frac{\pi}{3} \right) = \frac{I_0}{4} = \frac{K}{4}$ (option (1)). The other choices ignore the $\cos^2$ dependence on phase.

2. NEET 2026 · Q20

In interference and diffraction, the light energy is redistributed. If it reduces in one region, producing a dark fringe, it increases in another region, producing a bright fringe. Evaluate the following statements and choose the correct answer:

Statement I: As there is no gain or loss of energy, these phenomena are consistent with the principle of conservation of energy.

Statement II: Diffraction and interference are characteristics exhibited only by light waves.

- (1) I is true and II is also true
(2) I is false, but II is true
(3) I is true, but II is false
(4) Both I and II are false

Answer (3)

Sol. Interference and diffraction only redistribute light energy, so darkening of one region is compensated by brightening of another, keeping total energy unchanged. This makes statement I consistent with conservation of energy, i.e. Statement I is true. However, interference and diffraction are general wave phenomena shown by sound, water and other waves, not only light, so statement II is false. Hence 'I true, II false' (option (3)).

3. NEET 2020 · Q172

In Young's double slit experiment, if the separation between coherent sources is halved and the distance of the screen from the coherent sources is doubled, then the fringe width becomes :

- (1) half (2) four times
(3) one-fourth (4) double

Answer (2)

Sol. The fringe width β is given by $\beta = \frac{\lambda D}{d}$, where λ is the wavelength, D is the distance to the screen, and d is the separation between the slits. If d is halved and D is doubled, β becomes $\beta' = \frac{\lambda(2D)}{\frac{d}{2}} = 4\beta$.

Therefore, the fringe width becomes four times.
Chapter: Wave Optics.

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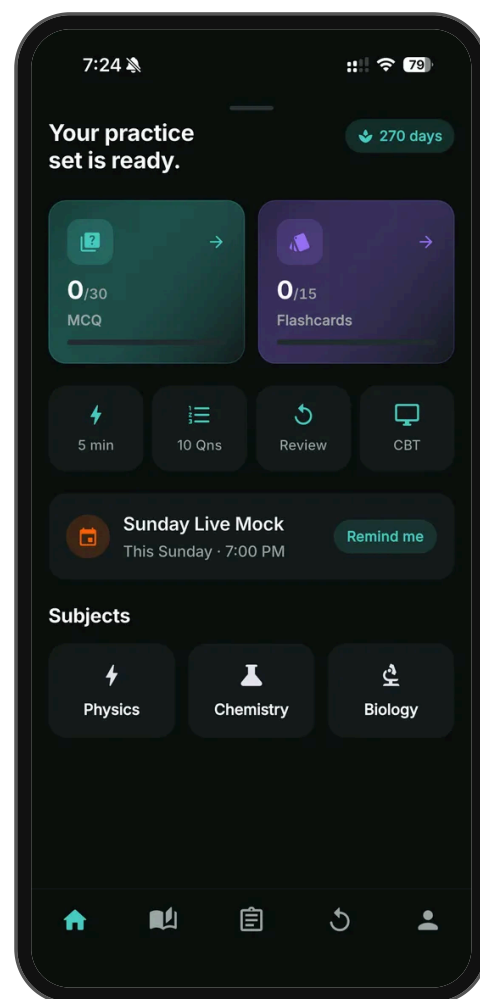
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