

Prayas JEE (2025)

Physics

Wave Optics

DPP: 2

- Q1** If two waves represented by $y_1 = 4 \sin \omega t$ and $y_2 = 3 \sin(\omega t + \frac{\pi}{3})$ interfere at a point, the amplitude of the resulting wave will be about

(A) 7 (B) 6
(C) 5 (D) 3.5

Q2 If an interference pattern have maximum and minimum intensities in 36 : 1 ratio then what will be the ratio of amplitudes

(A) 1 : 1 (B) 7 : 4
(C) 4 : 7 (D) 7 : 5

Q3 Two waves $y_1 = A_1 \sin(\omega t - \beta_1)$ and $y_2 = A_2 \sin(\omega t - \beta_2)$ superimpose to form a resultant wave whose amplitude is

(A) $\sqrt{A_1^2 + A_2^2 + 2A_1A_2 \cos(\beta_1 - \beta_2)}$
(B) $\sqrt{A_1^2 + A_2^2 + 2A_1A_2 \sin(\beta_1 - \beta_2)}$
(C) $A_1 + A_2$
(D) $|A_1 + A_2|$

Q4 Two coherent sources have intensity ratio of 100 : 1, and are used for obtaining the phenomenon of interference. Then the ratio of maximum and minimum intensity will be

(A) 100 : 1 (B) 121 : 81
(C) 1 : 1 (D) 5 : 1

Q5 In YDSE how many maxima can be obtained on the screen if wavelength of light used is 200 nm and $d = 700$ nm

(A) 12 (B) 7
(C) 18 (D) None of these

Q6 Which of the following is not essential for two sources of light in Young's double slit experiment to produce a sustained interference?

(A) Equal wavelength
(B) Equal intensity
- (C) Constant phase relationship
(D) Equal frequency

Q7 In Young's double slit experiment, the locus of the point P lying in a plane with a constant path difference between the two interfering waves is

(A) a hyperbola
(B) a straight line
(C) an ellipse
(D) a parabola

Q8 In young's double slit experiment how many maxims can be obtained on a screen (including the central maximum) on both sides of the central fringe if $\lambda = 2000\text{\AA}$ and $d = 7000\text{\AA}$

(A) 12 (B) 7
(C) 18 (D) 4

Q9 In a YDSE: $D = 1$ m, $d = 1$ mm and $\lambda = 500$ nm. The distance of 1000th maxima from the central maxima is:

(A) 0.5 m
(B) 0.577 m
(C) 0.495 m
(D) does not exist

Q10 In Young's double slit experiment, carried out with light of wavelength $\lambda = 5000 \text{ \AA}$, the distance between the slits is 0.2 mm and the screen is at 200 cm from the slits. The central maximum is at $x = 0$. The third maximum will be at x equal to.

(A) 1.67 cm
(B) 1.5 cm
(C) 0.5 cm
(D) 5.0 cm

Q11 In youngs double slit experiment, the distance between two slits is made three times

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then the fringe width will become

- (A) 9 times (B) 1/9 times
(C) 3 times (D) 1/3 times

- Q12** Yellow light emitted by sodium lamp in Youngs double slit experiment is replaced by monochromatic blue light of the same intensity:
- (A) Fringe width will decrease.
(B) Fringe width will increase.
(C) Fringe width will remain unchanged.

(D) Fringes will become less intense.

- Q13** If yellow light in the Young's double slit experiment is replaced by red light, the fringe width will
- (A) Decrease
(B) Remain unaffected
(C) Increase
(D) First increase and then decrease



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