

## 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)  $\sqrt{A_1^2 + A_2^2 + 2A_1 A_2 \cos(\beta_1 - \beta_2)}$   
 (B)  $\sqrt{A_1^2 + A_2^2 + 2A_1 A_2 \sin(\beta_1 - \beta_2)}$   
 (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 maxima 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 1000<sup>th</sup> 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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## Answer Key

Q1 (B)

Q2 (D)

Q3 (A)

Q4 (B)

Q5 (B)

Q6 (B)

Q7 (A)

Q8 (B)

Q9 (B)

Q10 (B)

Q11 (D)

Q12 (A)

Q13 (C)



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