

# Prayas JEE (2025)

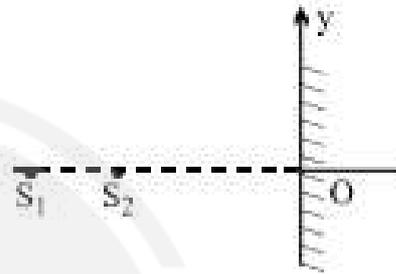
## Physics

DPP: 3

### Wave Optics

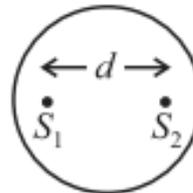
- Q1** If two sources are coherent, then the phase difference ( $\phi$ ) between the waves produced by them at any point
- (A) Will change with time and we will have stable positions of maxima and minima.
  - (B) Will not change with time and we have unstable positions of maxima and minima.
  - (C) Will not change with time and we will have stable positions of maxima and minima.
  - (D) Will change with time and we will have unstable positions of maxima and minima
- Q2** Two coherent sources must have the same
- (A) Amplitude
  - (B) Phase difference
  - (C) Frequency
  - (D) Both (B) and (C)
- Q3** For the sustained interference of light, the necessary condition is that the two sources should
- (A) Have constant phase difference
  - (B) Be narrow
  - (C) Be close to each other
  - (D) Of same amplitude
- Q4** Ratio of intensities of two light waves is given by 4 : 1. The ratio of the amplitudes of the waves is
- (A) 2 : 1
  - (B) 1 : 2
  - (C) 16 : 1
  - (D) 1 : 4
- Q5** 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
- Q6** Two point monochromatic and coherent sources of light of wavelength  $\lambda$  are placed on the

dotted line in front of an large screen. The source emit waves in phase with each other. The distance between  $S_1$  and  $S_2$  is  $d$  while their distance from the screen is much larger. Then, Which of the following is/are correct statement(s)?



- (A) If  $d = 7\lambda/2$ ,  $O$  will be a minima
- (B) If  $d = 4.3\lambda$ , there will be a total of 8 minima on  $y$  axis.
- (C) If  $d = \lambda$ ,  $O$  will be a maxima.
- (D) If  $d = \lambda$ , there will be only one maxima on the screen.

- Q7** Two coherent sources separated by distance  $d$  are radiating in phase having wavelength  $\lambda$ . A detector moves in a big circle around the two sources in the plane of the two sources. The angular position of  $n = 4$  interference maxima is given as



- (A)  $\sin^{-1} \frac{n\lambda}{d}$
- (B)  $\cos^{-1} \frac{4\lambda}{d}$
- (C)  $\tan^{-1} \frac{d}{4\lambda}$
- (D)  $\cos^{-1} \frac{\lambda}{4d}$

**Q8**



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Two beams of light having intensities  $I$  and  $4I$  interfere to produce a fringe pattern on a screen. The phase difference between the beams is  $\frac{\pi}{2}$  at point  $A$  and  $\pi$  at point  $B$ . Then the difference between the resultant intensities at  $A$  and  $B$  is

- (A)  $2I$                       (B)  $4I$   
(C)  $5I$                       (D)  $7I$

**Q9** In YDSE how many maxima can be obtained on the screen if wavelength of light used is

$200 \text{ nm}$  and  $d = 700 \text{ nm}$

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



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## Answer Key

Q1 (C)

Q2 (D)

Q3 (A)

Q4 (A)

Q5 (D)

Q6 (A, B, C, D)

Q7 (B)

Q8 (B)

Q9 (B)



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