JEE 2023

Wave Optics

DPP-03

1. Two coherent point sources s_1 and s_2 vibrating in phase emit light of wavelength λ. The separation between the sources is 2λ. The smallest distance from s_2 on a line passing through s_2 and perpendicular to s_1s_2, where a minimum of intensity occurs is

(1) $\frac{7\lambda}{12}$ (2) $\frac{15\lambda}{4}$

(3) $\frac{\lambda}{2}$ (4) $\frac{3\lambda}{4}$

2. In the interference pattern, energy is

(1) Created at the position of maxima

(2) Destroyed at the position of minima

(3) Conserved but is redistributed

(4) None of the above

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

(1) 12 (2) 7

(3) 18 (4) None of these

4. In Young's double slit experiment, the minimum amplitude is obtained when the phase difference of super-imposing waves is (where n = 1, 2, 3, ...)

(1) zero (2) $(2n - 1)\pi$

(3) $n\pi$ (4) $(n + 1)\pi$

5. In Young's double-slit experiment, an interference pattern is obtained on a screen by a light of wavelength 6000 Å, coming from the coherent sources S_1 and S_2. At certain point P on the screen third dark fringe is formed. Then the path difference $S_1P - S_2P$ in microns is

(1) 0.75 (2) 1.5

(3) 3.0 (4) 4.5

6. In Young double slit experiment, when two light waves form third minimum, they have

(1) Phase difference of 3π

(2) Phase difference of $\frac{5\pi}{2}$

(3) Path difference of 3λ

(4) Path difference of $\frac{5\lambda}{2}$

7. Two slits separated by a distance of 1mm are illuminated with red light of wavelength 6.5×10^{-7} m. The interference fringes are observed on a screen placed 1m from the slits. The distance between third dark fringe & the fifth bright fringe is equal to.

(1) .65 mm (2) 1.63 mm

(3) 3.25 mm (4) 4.87 mm.

8. In a Young's experiment, two coherent sources are placed 0.90 mm apart and the fringes are observed one metre away. If it produces the second dark fringe at a distance of 1mm from the central fringe, the wavelength of monochromatic light used would be.

(1) 60×10^{-4} cm (2) 10×10^{-4} cm

(3) 10×10^{-5} cm (4) 6×10^{-5} cm

9. The young's double slits experiment is performed with blue and with green light of wavelength 4360 Å and 5460 Å respectively. It x is the distance of the 4th maxima from the central one, then

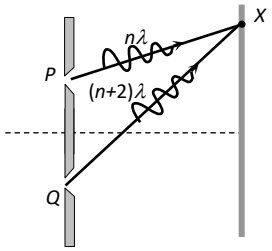
(1) $x_{blue} = x_{green}$

(2) $x_{blue} > x_{green}$

(3) $x_{blue} < x_{green}$

(4) x_{blue}/x_{green} = 5460/4300

10. The figure shows a double slit experiment P and Q are the slits. The path lengths PX and QX are $n\lambda$ and $(n + 2)\lambda$ respectively, where n is a whole number and λ is the wavelength. Taking the central fringe as zero, what is formed at X



(1) First bright

(2) First dark

(3) Second bright

(4) Second dark

Answer Key

1.	**(1)**	**6.**	**(4)**
2.	**(3)**	**7.**	**(2)**
3.	**(2)**	**8.**	**(4)**
4.	**(2)**	**9.**	**(3)**
5.	**(2)**	**10.**	**(3)**