CBSE NCERT Based Chapter wise Questions (2025-2026)

Class-XII

Subject: Physics

Chapter Name : *Wave Optics* (Chapter : 7)

Total : 07 Marks (expected) [MCQ(2)-1 Mark, SA(1)-2 Marks, LA(1)-3 Marks]

Level - 2(Higher Order)

MCQ Type Questions :

1. Unpolarised light of intensity I is incident on a polariser and the emerging light strikes a second polarizing filter with its axis at 45° to that of the first. Then the intensity of the emerging beam and its state of polarization.

Ⓐ $\frac{I}{4}$ and parallel to second filter Ⓑ $\frac{I}{4}$ and perpendicular to second filter

Ⓒ $\frac{I}{8}$ and parallel to second filter Ⓓ $\frac{I}{8}$ and perpendicular to second filter

2. Two coherent sources of different intensities send waves that interfere. The ratio of maximum to minimum intensity is 25. The intensity ratio of the sources is :

Ⓐ 25 : 1 Ⓑ 5 : 1 Ⓒ 9 : 4 Ⓓ 625 : 1

3. The path difference between two interfering waves at a point on the screen is $\frac{\lambda}{6}$ from central maximum. The ratio of intensity at this point and that at the central fringe will be :

Ⓐ 0.75 Ⓑ 7.5 Ⓒ 85.3 Ⓓ 853

4. The fringe width is at a distance of 0.5 m from the slits in young's experiment for light wavelength 6000A is 0.048 cm. The fringe width at the same distane for λ = 5000A will be equal to

Ⓐ 0.04 cm Ⓑ 0.6 cm Ⓒ 0.15 cm Ⓓ 0.55 cm

5. A plate of thickness t made of material of refractive index μ is placed in front of one of the slits in a double slit experiment. What should be the minimum thickness t which will make the intensity at the centre of the fringe pattern zero?

Ⓐ $(\mu - 1)\frac{\lambda}{2}$ Ⓑ $(\mu - 1)\lambda$ Ⓒ $\frac{\lambda}{2(\mu - 1)}$ Ⓓ $\frac{\lambda}{(\mu - 1)}$

6. The maximum intensity in Young's double slit experiment is I_0. Distance between the slits experiment is I_0. Distance between the slits is $d = 5\lambda$, where λ is the wavelength of monochromatic light used in the experiment. What will be the intensity of light in front of one of the slits on a screen at a distance

Ⓐ $\frac{I_0}{2}$ Ⓑ $\frac{I_0}{4}$ Ⓒ I_0 Ⓓ $\frac{3}{4}I_0$

7. In Young's double slit experiment, the two slits act as coherent sources of equal amplitude A and wavelength λ. In another experiment with the same set up the two slits are of equal amplitude A and wavelength λ but are incoherent. The ratio of the intensity of light at the mid-point of the screen in the first case to that in the second case is

Ⓐ 1 : 2 Ⓑ 2 : 1 Ⓒ 4 : 1 Ⓓ 1 : 1

8. In a two slit experiment with monochromatic light fringes are obtained on a screen placed at some distance from the slits. If the screen is moved by 5×10^{-2} m towards the slits, the change in fringe width is 3×10^{-5} m. If separation between the slits is 10^{-3} m, the wavelength of light used is

Ⓐ 6000 A Ⓑ 5000 A Ⓒ 3000 A Ⓓ 4500 A

9. A parallel beam of light is incident on a liquid surface such that the wave front makes an angle 30° with the surface and has a width of $\sqrt{3}$ m, the width of the refracted beam is $({}_a\mu_L = \sqrt{3})$

Ⓐ 3 m Ⓑ $\sqrt{3}$ m Ⓒ $\frac{\sqrt{11}}{3}$ Ⓓ $\sqrt{\frac{11}{3}}$ m

Very Short Answer Type Questions (2 marks)

10. Light wave can be polarised while sound waves can not. Why?

11. What is the polarising angle of a medium of refractive index $\sqrt{3}$.

12. Why is interference pattern not detected when the two coherent sources are far apart?

13. Why does the intensity of the secondary maximum become less as compared to the central maximum?

14. When a wave undergoes reflection at a denser medium, what happens to its phase?

15. Why are coherent sources necessary to produce a sustained interference pattern.

Short Answer Type Questions (3 marks)

16. In Young double slit experiment the intensity at centre of screen is *I*. If one of the slits is closed, find the intensity at centre.

17. In YDSE, the fringe width is found to be β, if the centre apparatus is immersed in a liquid of refractive index μ, find the new fringe width.

18. If two sources have a randomly varying phase difference $\phi(t)$, find the resultant intensity.

19. In YDSE, two slits are separated by 2 mm and the screen is placed one meter away. When a light of wavelength 500 mm is used. Find the fringe separation?

ANSWER

1. Ⓐ	**5.** Ⓒ	**9.** Ⓓ	**13.**	**17.** $\frac{\beta}{\mu}$
2. Ⓒ	**6.** Ⓐ	**10.**	**14.**	**18.** $2I_0$
3. Ⓐ	**7.** Ⓑ	**11.**	**15.**	**19.** 0.25 mm
4. Ⓐ	**8.** Ⓐ	**12.**	**16.** $\frac{I}{4}$	