OPEN STUDENT FOUNDATION
Physics (Class 12)
PRACTICE SHEET DAY 10

CHAPTER 10 | Date : 27/02/24

Section A

- **Write the answer of the following questions. [Each carries 1 Mark]** **[10]**

1. Using Huygen's principle explain reflection of plane wave.
2. Explain Huygens principle for plane wavefront.
3. A parallel beam of light of wavelength 500 nm falls on a narrow slit and the resulting diffraction pattern is observed on a screen 1 m away. It is observed that the first minimum is at a distance of 2.5 mm from the centre of screen. Find the width of the slit.
4. In a double-slit experiment the angular width of a fringe is found to be 0.2° on a screen placed 1 m away. The wavelength of light used is 600 nm. What will be the angular width of the fringe if the entire experiment apparatus is immersed in water ? Take refractive index of water to be $\frac{4}{3}$.
5. A beam of light consisting of two wavelengths 6000 Å and 4000 Å is used to obtain interference fringes in a Young's double-slit experiment.
   (a) Find the distance of the third dark fringe on the screen from the central maximum for wavelength 6000 Å.
   (b) What is the least distance from the central maximum where bright fringes due to both the wavelengths coincide ? (Distance between two slits = 0.1 mm. Take D = 100 cm)
6. The distance between the two slits in Young's experiment is 0.1 mm. The perpendicular distance between the slits and the screen is 1.5 m. The wavelength of the incident light is 6000 Å. Calculate the distance between third bright and fifth dark fringes obtained on the screen.
7. For diffraction by a single slit obtain the conditions of maxima and minima in terms of path difference.
8. In Young's double-slit experiment using monochromatic light of wavelength λ, the intensity of light at a point on the screen where path difference is λ, is K units. What is the intensity of light at a point where path difference is $\frac{\lambda}{3}$?
9. Obtain the conditions for constructive interference and destructive interference.
10. Explain the refraction of a plane wavefront with a thin convex lens.

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Section [A] : 1 Marks Questions					
No	Ans	Chap	Sec	Que	Universal_QueId
1.	-	Chap 10	S7	1.1	QP23P11B1211_P2C10S7Q1.1
2.	-	Chap 10	S7	2	QP23P11B1211_P2C10S7Q2
3.	-	Chap 10	S7	4	QP23P11B1211_P2C10S7Q4
4.	-	Chap 10	S7	5	QP23P11B1211_P2C10S7Q5
5.	-	Chap 10	S7	6	QP23P11B1211_P2C10S7Q6
6.	-	Chap 10	S7	7.1	QP23P11B1211_P2C10S7Q7.1
7.	-	Chap 10	S7	8	QP23P11B1211_P2C10S7Q8
8.	-	Chap 10	S8	18	QP23P11B1211_P2C10S8Q18
9.	-	Chap 10	S8	19	QP23P11B1211_P2C10S8Q19
10.	-	Chap 10	S9	13	QP23P11B1211_P2C10S9Q13

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➠ Try Yourself

2. Explain Huygens principle for plane wavefront.

➠ Try Yourself

3. A parallel beam of light of wavelength 500 nm falls on a narrow slit and the resulting diffraction pattern is observed on a screen 1 m away. It is observed that the first minimum is at a distance of 2.5 mm from the centre of screen. Find the width of the slit.

➠ d = 0.2 mm

4. In a double-slit experiment the angular width of a fringe is found to be 0.2° on a screen placed 1 m away. The wavelength of light used is 600 nm. What will be the angular width of the fringe if the entire experiment apparatus is immersed in water ? Take refractive index of water to be $\frac{4}{3}$.

➠ $\theta = 0.15°$

5. A beam of light consisting of two wavelengths 6000 Å and 4000 Å is used to obtain interference fringes in a Young's double-slit experiment.
   (a) Find the distance of the third dark fringe on the screen from the central maximum for wavelength 6000 Å.
   (b) What is the least distance from the central maximum where bright fringes due to both the wavelengths coincide ? (Distance between two slits = 0.1 mm. Take D = 100 cm)

➠ Try Yourself

6. The distance between the two slits in Young's experiment is 0.1 mm. The perpendicular distance between the slits and the screen is 1.5 m. The wavelength of the incident light is 6000 Å. Calculate the distance between third bright and fifth dark fringes obtained on the screen.

➠ 13.50 cm

7. For diffraction by a single slit obtain the conditions of maxima and minima in terms of path difference.

➠ Try Yourself

8. In Young's double-slit experiment using monochromatic light of wavelength λ, the intensity of light at a point on the screen where path difference is λ, is K units. What is the intensity of light at a point where path difference is $\frac{\lambda}{3}$?

➠ Try Yourself

9. Obtain the conditions for constructive interference and destructive interference.

➠ Try Yourself

10. Explain the refraction of a plane wavefront with a thin convex lens.

➠ Try Yourself