PHYSICS

F.Sc / ICS – 1st Year

Practice Sheet Chapter 9

MCQs

1. In Young's double slit experiment, the separation between the slits is halved and distance between slits and screen doubled. The fringe width will:

   (a) Be doubled (b) Be quadrupled (c) Remain same (d) He halved

2. Fringe width observed in the Young's double slit experiment is β. If frequency of source is doubled the fringe width will be:

   (a) β (b) 2β (c) $\frac{\beta}{2}$ (d) $\frac{3\beta}{2}$

3. The ratio of the wavelength of two spectral lines if the 2nd order image of one line concides with the 3rd of the other line, both lines are examined by means of the same grating, is:

   (a) 1:4 (b) 1:5 (c) 2:3 (d) 3:2

4. A surface on which all points are in phase is called:

   (a) Equi potential surface (b) Ray (c) Wave front (d) None

5. What will be the colour of the sky as seen from the earth if there were no atmosphere?

   (a) Black (b) Blue (c) Orange (d) Red

6. The ratio of fringe width for bright and dark fringes is:

   (a) 1:2 (b) 2:1 (c) 1:4 (d) 1:1

7. If white light is used in Young's double slit experiment, central fringe is:

   (a) Red (b) Yellow (c) White (d) Blue

8. A light is incident normally on a grating which has 2500 lines/cm, the grating element is:

   (a) $\frac{1}{2500}cm$ (b) $\frac{1}{3500}cm$ (c) $\frac{1}{2500}cm^{-1}$ (d) None

9. Bragg's equation is:

   (a) $d\sin\theta = n\lambda$ (b) $2d\sin\theta = n\lambda$ (c) $2d\sin\theta = \lambda$ (d) $d\sin\theta = n$

10. As a plane wave front propagates, its radius of curvature:
    (a) Increase (b) Decrease
    (c) Remains infinity (d) First increases then decrease

11. When the moveable mirror a Michelson interferometer is moved at a distance of 0.5 mm, 2000 fringes are observed. The wavelength of light used is:
    (a) $5000\ \text{mm}$ (b) $5000\,\overset{0}{A}$ (c) $500\ \text{cm}$ (d) $2000\,\overset{0}{A}$

12. Light reaches the earth from sun in nearly:
    (a) Plane wave front (b) Cylindrical wave front
    (c) Spherical wave front (d) All of these

13. The fringe spacing in a double slit experiment can be increased by decreasing:
    (a) Wavelength of light (b) Width of slits
    (c) Slit separation (d) Distance between slit and the screen

14. If a point source of light is placed at the focus of a convex lens, the rays coming out of the lens will constitute:
    (a) Plane wavefronts (b) Cylindrical wavefronts
    (c) Spherical wavefronts (d) All of these

15. Two sodium lamps are used to produce sustained interference. Tick the correct statement:
    (a) They can produce
    (b) The can not produce
    (c) They can produce if intensity of light is high
    (d) They can produce if intensity of light is small

16. If the refractive index of a medium increases then the velocity of light through it:
    (a) Remains unchanged (b) Increases (c) Decreases (d) None of these

17. In Michelson interferometer, if the moveable mirror is moved through a distance of 8λ, then the number of fringes shifted are:
    (a) 4 (b) 8 (c) 16 (d) 32

18. Diffraction of X ray by crystals show that:
    (a) The intensity of x rays (b) X rays have very short wavelength
    (c) X rays are electromagnetic waves (d) X rays are just like visible light

19. Interference and diffraction of light support the:

(a) Particle nature of light (b) Transverse nature of light

(c) Longitudinal nature of light (d) Wave nature of light

20. In Young's double slit experiment fringe width is ω if distance between slits is doubled and distance of screen from slit is halved new fringe width will be:

(a) ω (b) 4ω (c) $\omega/4$ (d) $\omega 2$

21. When a wave passes from one medium to another, there is change in:

(a) Frequency and velocity (b) Frequency and wavelength

(c) Wavelength and velocity (d) Frequency wavelength and velocity

22. A polariod is being used as analyzer of plane polarized light. In one complete rotation of the crystal, the maximum intensities will be observed only:

(a) Once (b) Twice (c) Thrice (d) Data is inadequate

23. In Newton's rings the central spot appears dark due to:

(a) Phase change (b) Destructive interference

(c) Small eye piece of optical device (d) Both a and b

24. In double slit experiment, for light of which colour, the fringe width will be minimum?

(a) Violet (b) Red (c) Green (d) Yellow

25. Young's double slit experiment is being performed in air the fringe width is β. What shall be the fringe width if whole apparatus is immersed in a liquid of refractive index μ ?

(a) β (b) $\mu\beta$ (c) $\frac{\beta}{\mu}$ (d) 0

SHORT QUESTIONS

1. Define wavefront. Write its types.

2. State Huygen's principle.

3. Write down conditions for interference of light.

4. Under what conditions two or more sources of light behave as coherent sources?

5. How is the distance between interference fringes affected by the separation between the slits of Young's experiment? Can fringes disappear?

6. Can visible light produce interference fringes? Explain.

7. Could you obtain Newton's rings with transmitted light? If yes, would the pattern be different from that obtained with reflected light?

8. Why polaroid sunglasses are better than ordinary sunglasses?

LONG QUESTIONS

Q.1

(a) Explain Young's double slit experiment.

(b) Sodium light $(\lambda = 589\ \text{nm})$ is incident normally on a grating having 3000 lines per centimeter. What is the highest order of the spectrum obtained with this grating?