DPP
DAILY PRACTICE PROBLEMS

Class : XIIth   Subject : PHYSICS
Date :   DPP No. : 4

Topic :- WAVE OPTICS

1. The Young's double slit experiment is performed with blue and with green light of wavelength 4360 Å and 5460 Å respectively. If x is the distance of 4th maxima from the central one, then
   a) x(blue) $= x$(green)   b) x(blue) $> x$(green)
   c) x(blue) $< x$(green)   d) x(blue)$/x$(green) $= 5400/4360$

2. Frequency of wave is $6 \times 10^{15} Hz$. The wave is
   a) Radiowave   b) Microwave   c) X-ray   d) None of these

3. In young's double slit experiment $\frac{d}{D} = 10^{-4}$ ($d =$ distance between slits, $D =$ distance of screen from the slits). At a point P on the screen resultant intensity is equal to the intensity due to the individual slit I_0. Then the distance of point P from the central maximum is ($\lambda = 6000$ Å)
   a) 0.5 mm   b) 2 mm   c) 1 mm   d) 4 mm

4. A beam of electron is used in an $YDSE$ experiment. The slit width is d. When the velocity of electron is increased, then
   a) No interference is observed   b) Fringe width increases
   c) Fringe width decreases   d) Fringe width remains same

5. Light waves travel in vacuum along the y – axis. Which of the following may represent the wavefront?
   a) $y =$ constant   b) $x =$ constant   c) $z =$ constant   d) $x + y + z =$ constant

6. In Young's double slit experiment distance between source is 1 mm and distance between the screen and source is 1m. If the fringe width on the screen is 0.06 cm, then λ is
   a) 6000 Å   b) 4000 Å   c) 1200 Å   d) 2400 Å

7. Two waves of same frequency and same amplitude from two monochromatic source are allowed to superpose at a certain point. If in once case the phase difference is 0° and in other case is $\pi/2$, the ratio of the intensities in the two cases will be
   a) 1:1   b) 2:1   c) 4:1   d) None of these

8. In an interference pattern produced by two identical slits, the intensity at the slit of the central maximum is I. The intensity at the same spot when either if the slits is closed is I_0. Therefore
   a) $I = I_0$
   b) $I = 2I_0$
   c) $I = 4I_0$
   d) I and I_0 are not related to each other

9. Red light of wavelength 625 nm is incident normally on an optical diffraction grating with 2×10^5 lines/m. Including central principal maxima, how many maxima may be observed on a screen which is far from the grating

   a) 15   b) 17   c) 8   d) 16

10. In Young's double slit experiment, 12 fringes are obtained to be formed in a certain segment of the screen when light of wavelength 600 mm is used. If the wavelength of light is changed to 400 mm, number of fringes observed in the same segment of the screen is given by

    a) 12   b) 18   c) 24   d) 30

11. In a biprism experiment, 5th dark fringe is obtained at a point. If a thin transparent film is placed in the path of one of waves, then 7th bright fringes is obtained at the same point. The thickness of the film in terms of wavelength l and refractive index μ will be

    a) $\dfrac{1.5\lambda}{(\mu-1)}$ b) $1.5(\mu-1)\lambda$ c) $2.5(\mu-1)\lambda$ d) $\dfrac{2.5\lambda}{(\mu-1)}$

12. An astronaut floating freely in space decides to use his flash light as a rocket. He shines a 10 $watt$ light beam in a fixed direction so that he acquires momentum in the opposite direction. If his mass is 80 kg, how long must he need to reach a velocity of 1 ms^{-1}

    a) 9 s b) $2.4 \times 10^3 \ s$ c) $2.4 \times 10^6 \ s$ d) $2.4 \times 10^9 \ s$

13. In Young's double slit experiment if monochromatic light used is replaced by white light, then
    a) No fringes are observed
    b) Only central fringe is white, all other fringes are coloured
    c) All bright fringes become white
    d) All bright fringes have colours between violet and red

14. A single slit of width d is illuminated by violet light of wavelength 400 nm and the width of the diffraction patter is measured as y. When half of the slit width is covered and illuminated by yellow light of wavelength 600 nm, the width of the diffraction pattern is
    a) The pattern vanishes and the width is zero
    b) $y/3$
    c) 3y
    d) None of the above

15. 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

16. 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 $5 \times 10^{-2} m$ towards slits, the change in fringe width is $10^{-3} m$ Then the wavelength of light used is (given that distance between the slits is $0.03 mm$)

    a) 4000 Å   b) 4500 Å   c) 5000 Å   d) 6000 Å

17. Electromagnetic waves are transverse in nature is evident by
    a) Polarization   b) Interference   c) Reflection   d) Diffraction

18. A polarizer is used to
    a) Reduce intensity of light   b) Produce polarized light
    c) Increase intensity of light   d) Produce unpolarised light

19. In case of linearly polarized light, the magnitude of the electric field vector
    a) Does not change with time
    b) Varies periodically with time
    c) Increases and decreases linearly with time
    d) Is parallel to the direction of propagation
20. In young's double slit experiment, the intensity of the maxima is I. If the width of each slit is doubled, the intensity if the maxima will be
    a) $I/2$ b) $2I$ c) $4I$ d) I