DPP
DAILY PRACTICE PROBLEMS

Class : XIIth **Subject : PHYSICS**
Date : **DPP No. : 5**

Topic :-WAVE OPTICS

1. The speed of electromagnetic wave in vacuum depends upon the source of radiation
   a) Increases as we move from γ-rays to radio waves
   b) Decreases as we move from γ-rays to radio waves
   c) Is same for all of them
   d) None of these
2. In Young's double slit experiment the amplitudes of two sources are $3a$ and a respectively. The ratio of intensities of bright and dark fringes will be
   a) 3 : 1 b) 4 : 1 c) 2 : 1 d) 9 : 1
3. Illumination of the sun at noon is maximum because
   a) Scattering is reduced at noon
   b) Refraction of light is minimum at noon
   c) Rays are incident almost normally
   d) The sun is nearer to earth at noon
4. The intensity of gamma radiation from a given source is I. On passing through 36 mm of lead, it is reduced to $\frac{I}{8}$. The thickness of lead which will reduce the intensity to $\frac{I}{2}$ will be
   a) 18 mm b) 12 mm c) 6 mm d) 9 mm
5. The pressure exerted by an electromagnetic wave of intensity $I(watts/m^2)$ on a nonreflecting surface is [c is the velocity of light]
   a) Ic b) Ic^2 c) I/c d) I/c^2
6. In an interference experiment, third bright fringes are obtained at a point on the screen with a light of 700 nm. What should be the wavelength of the light source in order to obtain 5th bright fringe at the same point?
   a) 630 nm b) 500 nm c) 420 nm d) 750 nm
7. A slit of width a is illuminated with a monochromatic light of wavelength λ from a distant source and the diffraction pattern is observed on a screen placed at a distance D from the slit. To increase the width of the central maximum one should
   a) Decrease D
   b) Decrease a
   c) Decrease λ
   d) The width cannot be changed
8. Light from two coherent sources of the same amplitude A and wavelength λ illuminates the screen. The intensity of the central maximum is I_0. If the sources were incoherent, the intensity at the same point will be
   a) $4I_0$ b) $2I_0$ c) I_0 d) $\frac{I_0}{2}$
9. Two parallel slits 0.6 mm apart are illuminated by light source of wavelength 6000 Å. The distance between two consecutive dark fringes on a screen 1 m away from the slits is
   a) 1 mm b) 0.01 mm c) 0.1 m d) 10 m

10. As a result of interference of two coherent sources of light energy is
    a) Redistributed and the distribution does not very with time
    b) Increased
    c) Redistributed and that distribution changes with time
    d) Decreased
11. Which of the following statements indicates that light waves are transverse
    a) Light waves can travel in vacuum
    b) Light waves show interference
    c) Light waves can be polarized
    d) Light waves can be diffracted
12. Huygen's principle of secondary wavelets may be used to
    a) Find the velocity of light in vacuum
    b) Explain the particle behavior of light
    c) Find the new position of the wavefront
    d) Explain photoelectric effect
13. To demonstrate the phenomenon of interference, we require two sources which emit radiation
    a) Of the same frequency and having a definite phase relationship
    b) Of nearly the same frequency
    c) Of the same frequency
    d) Of different wavelengths
14. The electric and the magnetic field, associated with an *e*.m. wave propagating along the $+z$-axis, can be represented by
    a) $[\vec{E} = E_0\hat{j}, \vec{B} = B_0\hat{k}]$ b) $[\vec{E} = E_0\hat{j}, \vec{B} = B_0\hat{j}]$ c) $[\vec{E} = E_0\hat{k}, \vec{B} = B_0\hat{i}]$ d) $[\vec{E} = E_0\hat{j}, \vec{B} = B_0\hat{i}]$
15. In Young's double slit experiment with sodium vapour lamp of wavelength 589 nm and the slits 0.589 mm apart, the half angular width of the central maximum is
    a) $\sin^{-1}(0.01)$ b) $\sin^{-1}(0.0001)$ c) $\sin^{-1}(0.001)$ d) $\sin^{-1}(0.1)$
16. In Young's double slit experiment intensity at a point is $(1/4)$ of the maximum intensity. Angular position of this point is
    a) $\sin^{-1}(\lambda/d)$ b) $\sin^{-1}(\lambda/2d)$ c) $\sin^{-1}(\lambda/3d)$ d) $\sin^{-1}(\lambda/4d)$
17. If the separation between slits in Young's double slit experiment is reduced to $\frac{1}{3}rd$, the fringe width becomes n times. The value of n is
    a) 3 b) $\frac{1}{3}$ c) 9 d) $\frac{1}{9}$
18. Wave nature of light follows because
    a) Light rays travel in a straight line
    b) Light exhibits the phenomena of reflection and refraction
    c) Light exhibits the phenomena of interference
    d) Light causes the phenomena of photoelectric effect
19. Which radiation in sunlight, causes heating effect
    a) Ultraviolet b) Infrared c) Visible light d) All of these
20. In a given direction, the intensities of the scattered light by a scattering substance for two beams of light are in the ratio of 256 : 81. The ratio of the frequency of the first beam to the frequency of the second beam is
    a) 64 :127 b) 1 :2 c) 64 :27 d) None of these