Topic :- WAVE OPTICS

1. A parallel beam of light of wavelength 6000Å gets diffracted by a single silt of width 0.3 mm. The angular position of the first minima of diffracted light is
   a) 6×10^{-3} rad   b) 1.8×10^{-3} rad   c) 3×10^{-3} rad   d) 2×10^{-3} rad

2. A circular disc is placed in front of a narrow source. When the point of observation is at a distance of $1\ meter$ from the disc, then the disc covers first HPZ. The intensity at this point is I_0. The intensity at a point distance $25\ cm$ from the disc will be (If ratio of consecutive amplitude of HPZ is 0.9)
   a) $I_1 = 0.531 I_0$ b) $I_1 = 0.053 I_0$ c) $I_1 = 53 I_0$ d) $I_1 = 5.03 I_0$

3. 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) $\sin^{-1}(\lambda/4d)$

4. An electromagnetic wave going through vacuum is described by $E = E_0 \sin(kx - \omega t); B = B_0 \sin(kx - \omega t)$. Which of the following equations is true
   a) $E_0 k = B_0 \omega$ b) $E_0 \omega = B_0 k$ c) $E_0 B_0 = \omega k$ d) None of these

5. To observe diffraction, the size of an aperture
   a) Should be of the same orders wavelength should be much larger than the wavelength
   b) Should be much larger than the wavelength
   c) Have no relation to wavelength
   d) Should be exactly $\lambda/2$

6. Wave which cannot travel in vacuum is
   a) X-rays   b) Infrasonic   c) Ultraviolet   d) Radiowaves

7. The fringe width in Young's double slit experiment increases when
   a) Wavelength increases
   b) Distance between the slits increases
   c) Distance between the source and screen decreases
   d) The width of the slits increases

8. Two beams of light will not give rise to an interference pattern, if
   a) They are coherent
   b) They have the same wavelength
   c) They are linearly polarized perpendicular to each other
   d) They are not monochromatic

9. In a YDSE bi-chromatic light of wavelengths $400\ nm$ and $560\ nm$ are used. The distance between the slits is 0.1 mm and the distance between the plane of the slits and the screen is $1m$. The minimum distance between two successive regions of complete darkness is
   a) $4\ mm$ b) $5.6\ mm$ c) $14\ mm$ d) $28\ mm$

10. The ratio of maximum and minimum intensities of two sources is 4 :1. The ratio of their amplitudes is
    a) $1 : 3$ b) $3 : 1$ c) $1 : 9$ d) $1 : 16$

11. The wave theory of light was given by
    a) Maxwell   b) Planck   c) Huygen   d) Young

12. Interference fringes are being produced on screen XY by the slits S_1 and S_2. In figure, the correct fringe locus is
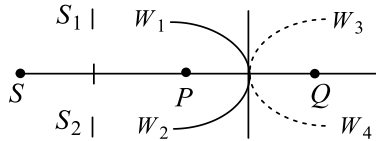
a) PQ   b) W_1W_2 c) W_3W_4 d) XY

13. The width of a single slit if the first minimum is observed at an angle 2° with a light of wavelength 6980Å
   a) 0.2 mm   b) 2×10^{-5} mm   c) 2×10^5 mm   d) 2 mm

14. In Young's double slit experiment, a mica slit of thickness t and refractive index μ is introduced in the ray from the first source S_1. By how much distance the fringes pattern will be displaced
   a) $\dfrac{d}{D}(\mu - 1)t$ b) $\dfrac{D}{d}(\mu - 1)t$ c) $\dfrac{d}{(\mu - 1)D}$ d) $\dfrac{D}{d}(\mu - 1)$

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

16. When two coherent monochromatic beams of intensity I and $9I$ interface, the possible maximum and minimum intensities of the resulting beam are
   a) $9I$ and I b) $9I$ and $4I$ c) $16I$ and $4I$ d) $16I$ and I

17. Maxwell's equations describe the fundamental laws of
   a) Electricity only   b) Magnetism only   c) Mechanics only   d) Both (a) and (b)

18. If we observe the single slit Frunhofer diffraction with wavelength λ and slit width e, the width of the central maxima is 2θ. On decreasing the slit width for the same λ
   a) θ increases
   b) θ remains unchanged
   c) θ decreases
   d) θ increases or decreases depending on the intensity of light

19. In Young's double slit experiment, the distance between slits is 0.0344 mm. The wavelength of light used is 600 mm. what is the angular width of a fringe formed on a distant screen?
   a) 1°   b) 2°   c) 3°   d) 4°

20. A point source of electromagnetic radiation has an average power output of $800\ W$. The maximum value of electric field at a distance $4.0\ m$ from the source is
   a) $64.7\ V/m$ b) $57.8\ V/m$ c) $56.72\ V/m$ d) $54.77\ V/m$