SINGLE CORRECT OPTION TYPE

1. Two light beams produce interference pattern to give maximum and minima on the screen. If the intensities of the light beams are in the ratio 9:4 then the ratio of intensities of maxima and minima is _______.
(A) 3:2 (B) 2:3 (C) 25:1 (D) 9:1

2. The maximum number of possible interference maxima for slit separation equal to twice the wavelength in young's double slit experiment is ________
(A) infinite (B) five (C) three (D) zero

3. In double slit experiment, the distance between two slits is 0.6 mm and these are illuminated with light of wavelength 4800 Å. The angular width of dark fringe on the screen at a distance 120 cm from slits will be ________
(A) 8×10^{-4}rad (B) 6×10^{-4}rad (C) 4×10^{-4}rad (D) 16×10^{-4}rad

4. Find the angular separation between the consecutive bright fringes in a young's double slit experiment with blue-green light of wave length 500 nm. The separation between the slits is 2.0×10^{-3}m.
(A) $14°$ (B) $1.4°$ (C) $0.14°$ (D) $0.014°$

5. A plane monochromate light wave falls normally on a diaphragm with two narrow slits separated by 2.5 mm. The fringe pattern is formed on a screen 100 cm behind the diaphragm. By what distance will these fringes be displaced, when one of the slits is covered by a glass plate $(\mu = 1.5)$ of thickness $10\mu m$?
(A) 2 mm (B) 1 mm (C) 3 mm (D) 4 mm

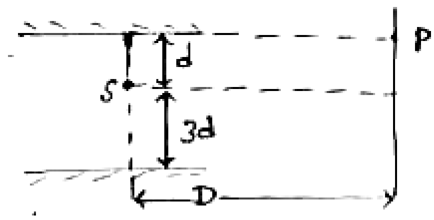
6. A flake of glass of index of refraction 1.6 is placed over one of the openings of double slit apparatus. There is a displacement of the interference pattern through eight successive maxima towards the side where the flake was placed. If the wavelength of the light used is $\lambda = 540$nm. Calculate the thickness of the flake?
(A) 2×10^{-3}mm (B) 4×10^{-3}mm (C) 6×10^{-3}mm (D) 7.2×10^{-3}mm

7. The two coherent sources of equal intensity produce maximum intensity of 100 units at a point. If the intensity of one of the sources is reduced by 50% by reducing its width then the intensity of light at the same point will be _________.
(A) 90 (B) 89 (C) 67 (D) 72.85

8. Two waves of light in air have the same wavelength and are initially in phase. Then they travel through plastic layers with thicknesses of $L_1 = 3.5$mm and $L_2 = 5.0$mm and indices of refraction $n_1 = 1.7$ and $n_2 = 1.25$ as shown in figure. The rays later arrive at a common point. The longest wavelength of light for which constructive interference occurs at the point is _____________.

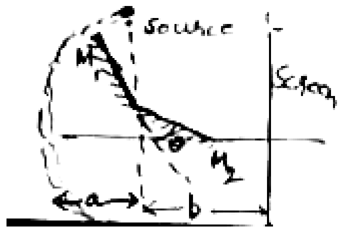
(A) $0.8\mu m$ (B) $1.2\mu m$ (C) $\frac{1}{7}\mu m$ (D) $2.9\mu m$

9. Consider the optical system shown in figure, the point source of light 'S' is having wavelength equal to 'λ'. The light is reaching screen only after reflection. For point 'p' to be 2nd maxima. The value of 'λ' would be ________ ($D >> d$ and $d >> \lambda$)



(A) $\frac{12d^2}{D}$ (B) $\frac{6d^2}{D}$ (C) $\frac{3d^2}{D}$ (D) $\frac{24d^2}{D}$

10. Two plane mirrors are inclined by small angle $'\theta'$. The distance of slit from mirror is $'a'$ and distance of screen from mirror is $'b'$. If $'\lambda'$ is the wavelength of light used find the fringe width.



(A) $\beta = \frac{(a+b)\lambda}{2a\theta}$ (B) $\beta = \frac{(a-b)\lambda}{2a\theta}$ (C) $\beta = \frac{\lambda(a+b)}{2\theta}$ (D) $\beta = \frac{\lambda(a-b)}{2\theta}$

11. White light is used to illuminate the two slits in a young's double-slit experiment. The separation between slits is $'b'$ and the screen is at a distance $d(>>b)$ from the slit. At a point on the screen directly in front of one of the slits, certain wavelengths are missing. Some of these missing wavelengths are ______

(A) $\lambda = \frac{b^2}{d}$ (B) $\lambda = \frac{2b^2}{d}$ (C) $\lambda = \frac{b^2}{3d}$ (D) $\lambda = \frac{2b^2}{3d}$

12. At two points P and Q on a screen in youngs double slit experiment, waves from slit s_1 and s_2 have a path different of "o" and $\frac{"\lambda"}{4}$ respectively. The ratio of intensities at $'P'$ and $'Q'$ will be _________.

(A) 4:1 (B) 3:2 (C) 2:1 (D) $\sqrt{2}:1$

13. In a young's double slit experiment, slits are separated by 0.5 mm, and the screen is placed 150 cm away. A beam of light consisting of two wavelengths 650 nm and 520 nm, is used to obtain interference fringes on the screen. The least distance from the common central maximum to the point where the bright fringes due to both the wavelengths coincide is _________.

(A) 15.6 m (B) 1.56 mm (C) 7.8 mm (D) 9.75 mm

14. Two beams of light having intensities I and 4 I interfere to produce a fringe pattern on a screen. The phase difference between the beam is $\frac{p}{2}$ at point A and p at point B. Then the difference between the resultant intensities at A and B is ________.

(A) 2 I (B) 4 I (C) 5 I (D) 7 I

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

(A) 12 (B) 18 (C) 24 (D) 30

16. A beam of light of wave length 600 nm, from a distant source, falls on a single slit 1 mm wide and a resulting diffraction pattern is observed on a screen 2 m away. The distance between the first dark fringes on either side of central bright fringe is ________

(A) 1.2 cm (B) 1.2 mm (C) 2.4 cm (D) 2.4 mm

17. The maximum intensity in young's double slit experiment is I_o. Distance between the slits is $d = 5\lambda$, where λ is the wavelength of monochromatic light used in the experiment. What will be the intensity of light in front of one of the slits on a screen at a distance $D = 10d$?

(A) $\frac{I_o}{2}$ (B) $\frac{3I_o}{4}$ (C) I_o (D) $\frac{I_o}{4}$

18. Two coherent point sources s_1 and s_2 vibrating in phase emit light of wavelength λ. The separation between the sources is 2λ. The smallest distance from s_2 on a line passing through s_2 and perpendicular to s_1s_2. Where a minimum of intensity occurs is ______.

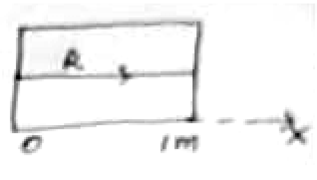
(A) $\frac{7\lambda}{12}$ (B) $\frac{15\lambda}{4}$ (C) $\frac{\lambda}{2}$ (D) $\frac{3\lambda}{4}$

19. A beam of light consisting of two wavelengths 450 nm and 750 nm is used to obtain interference fringes in young's double slit experiment. The separation between the slits is 1.0 mm and the distance between the plane of the slits and the screen is 100 cm. The least distance from the central maximum where the bright fringes due to both the wavelengths coincide is ________.
(A) 2.00 mm (B) 2.25 mm (C) 2.50 mm (D) 2.75 mm

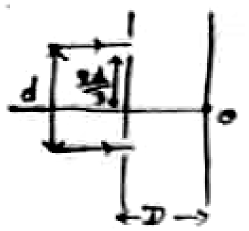
20. Young's double slit experiment is made in a liquid. The 10th bright fringe in liquid lies where 6th dark fringe lies in vacuum. The refractive index of the liquid is approximately __________
(A) 1.8 (B) 1.54 (C) 1.67 (D) 1.2

INTEGER TYPE

21. The figure shows a transparent slab of length 1m placed in air whose refractive index in direction varies as $\mu = 1 + x^2 \left(0 \le x \le 1\right)$. The optical path length of ray 'R' is $\frac{4}{p}$. Find 'p' ____________.



22. In the figure shown if a parallel beam of white light is incident is on the plane of the slits then the distance of the white spot on the screen from 'o' is $\frac{'d'}{R}$. Find 'R'? $\left(d << D; \lambda << d\right)$



23. A broad source of light of wavelength 680 nm illuminates normally two glass plates 120 mm long that meet at one end and are separated by a wire 0.048 mm in diameter at the other end. The number of bright fringer formed over the 120 mm distance is $47 \times s$. Find 's'.

24. The distance between two slits in a YDSE apparatus is 3 mm. The distance of the screen from the slits is 1m. Microwaves of wavelength 1 mm are incident on the plane of the slits normally. The distance of the first maxima on the screen from the central maxima is $\frac{p}{\sqrt{2}}$. Find 'p'.

25. A lens $\left(\mu = 1.5\right)$ is coated with a thin film of refractive index 1.2 in order to reduce the reflection from its surface at $\lambda = 4800$ Å. The minimum thickness of the film which will minimize the intensity of the reflected light is $\frac{25}{3(k)} \times 10^{-7}$m. Find 'k'.

KEY

1.	C	**2.**	B	**3.**	A	**4.**	D	**5.**	A
6.	D	**7.**	D	**8.**	B	**9.**	B	**10.**	A
11.	A,C	**12.**	C	**13.**	C	**14.**	B	**15.**	C
16.	D	**17.**	A	**18.**	A	**19.**	B	**20.**	A
21.	3	**22.**	6	**23.**	3	**24.**	5	**25.**	8

❇ *Wish You all the Best* ❇