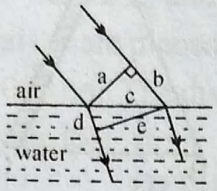
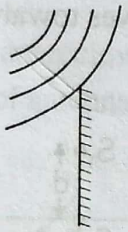
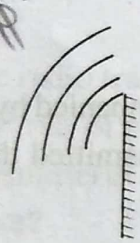
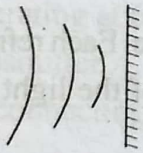
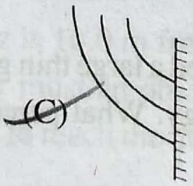
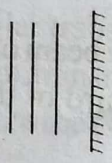
1. Figure shows plane waves refracted from air to water using Huygen's principle (where a, b, c, d, e are lengths on the diagram). The refractive index of water wrt air is the ratio :-



(A) a/e (B) b/e (C) b/d (D) d/b

2. Spherical wavefronts shown in figure, strike a plane mirror. Reflected wavefronts will be as shown in



(A)  (B)  (C)  (D) 

3. Two beams of light having intensifies I and $4I$ interfere to produce a fringe pattern on a screen. The phase difference between the beams is $\pi/2$ at point A and π at point B. Then the difference between the resultant intensities at A and B is : **[IIT-JEE (Scr.) 2001]**

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

4. In a young 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 **[IIT-JEE (Scr.) 2001]**

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

5. Two coherent monochromatic light beams of intensities I and $4I$ are superposed. The maximum and minimum possible intensities in the resulting beam are :

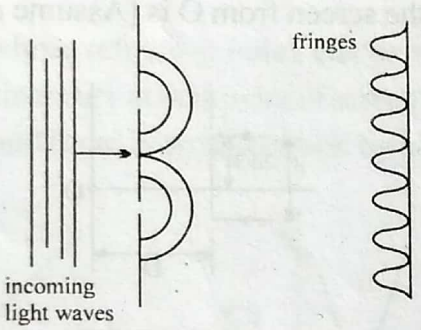
(A) $5I$ and I (B) 5I and 3I (C) $9I$ and I (D) $9I$ and $3I$

6. When light is refracted into a denser medium,
(A) its wavelength and frequency both increase
(B) its wavelength increases but frequency remains unchanged
(C) its wavelength decreases but frequency remains unchanged
(D) its wavelength and frequency both decrease.

7. In YDSE how many maxima can be obtained on the screen if wavelength of light used is 200nm and $d = 700$ nm:
(A) 12 (B) 7 (C) 18 (D) none of these

8. In a YDSE, the central bright fringe can be identified :
(A) as it has greater intensity than the other bright fringes.
(B) as it is wider than the other bright fringes.
(C) as it is narrower than the other bright fringes.
(D) by using white light instead of single wavelength light.

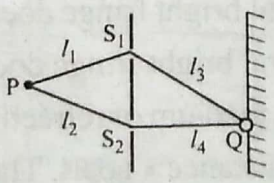
9. In a Young's double slit experiment, green light is incident on the two slits. The interference pattern is observed on a screen. Which of the following changes would cause the observed fringes to be more closely spaced?



(A) Reducing the separation between the slits
(B) Using blue light instead of green light
(C) Used red light instead of green light
(D) Moving the light source further away from the slits.

10. In Young's double slit experiment, the wavelength of red light is 7800 Å and that of blue light is 5200 Å. The value of n for which n^{th} bright band due to red light coincides with $(n + 1)^{th}$ bright band due to blue light, is :
(A) 1 (B) 2 (C) 3 (D) 4

11. Two identical narrow slits S_1 and S_2 are illuminated by light of wavelength λ from a point source P. If, as shown in the diagram, the light is then allowed to fall on a screen, and if n is a positive integer, the condition for destructive interference at Q is :-



(A) $(\ell_1 - \ell_2) = (2n + 1)\lambda/2$
(B) $(\ell_3 - \ell_4) = (2n + 1)\lambda/2$
(C) $(\ell_1 + \ell_2) - (\ell_3 + \ell_4) = n\lambda$
(D) $(\ell_1 + \ell_3) - (\ell_2 + \ell_4) = (2n + 1)\lambda/2$

12. In Young's double slit experiment, the two slits act as coherent sources of equal amplitude A and wavelength λ. In another experiment with the same setup the two slits are sources of equal amplitude A and wavelength λ but are incoherent. The ratio of the average intensity of light at the midpoint of the screen in the first case to that in the second case is :-

(A) 1 : 1 (B) 2 : 1 (C) 4 : 1 (D) none of these

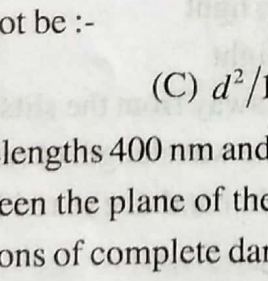
13. In a Young's double slit experiment, a small detector measures an intensity of illumination of I units at the centre of the fringe pattern. If one of the two (identical) slits is now covered, the measured intensity will be :-

(A) 2I (B) I (C) I/4 (D) I/2

14. In a Young's double slit experiment D equals the distance of screen and d is the separation between the slit. The distance of the nearest point to the central maximum where the intensity is same as that due to a single slit, is equal to :-

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

15. In the figure shown if a parallel beam of white light is incident on the plane of the slits then the distance of the white spot on the screen from O is [Assume $d << D$, $\lambda << d$]



(A) 0 (B) $d/2$ (C) $d/3$ (D) $d/6$

16. In the above question if the light incident is monochromatic and point O is a maxima, then the wavelength of the light incident cannot be :-

(A) $d^2/3D$ (B) $d^2/6D$ (C) $d^2/12D$ (D) $d^2/18D$

17. 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 1 m. The minimum distance between two successive regions of complete darkness is :- **[IIT-JEE' 2004 (Scr)]**

(A) 4 mm (B) 5.6 mm (C) 14 mm (D) 28 mm

18. In Young's double slit arrangement, water is filled in the space between screen and slits. Then :

(A) fringe pattern shifts upwards but fringe width remains unchanged.

(B) fringe width decreases and central bright fringe shifts upwards.

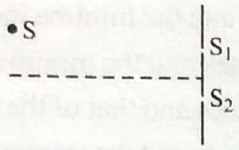
(C) fringe width increases and central bright fringe does not shift.

(D) fringe width decreases and central bright fringe does not shift.

19. Light of wavelength λ in air enters a medium of refractive index μ. Two points in this medium, lying along the path of this light, are at a distance x apart. The phase difference between these points is :

(A) $\frac{2\pi\mu x}{\lambda}$ (B) $\frac{2\pi x}{\mu\lambda}$ (C) $\frac{2\pi(\mu-1)x}{\lambda}$ (D) $\frac{2\pi x}{(\mu-1)\lambda}$

20. In YDSE, the source placed symmetrically with respect to the slit is now moved parallel to the plane of the slits so that it is closer to the upper slit, as shown. Then,

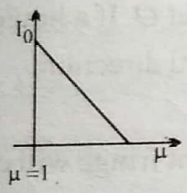


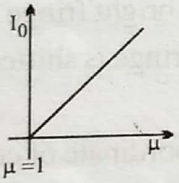
(A) the fringe width will increase and fringe pattern will shift down.
(B) the fringe width will remain same but fringe pattern will shift up.
(C) the fringe width will decrease and fringe pattern will shift down.
(D) the fringe width will remain same but fringe pattern will shift down.

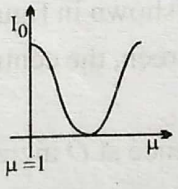
21. In the ideal double–slit experiment, when a glass–plate (refractive index 1.5) of thickness t is introduced in the path of one of the interfering beams (wavelength λ), the intensity at the position where the central maximum occurred previously remains unchanged. The minimum thickness of the glass–plate is :– **[IIT-JEE 2002]**

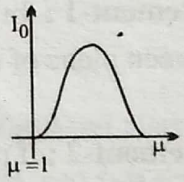
(A) 2λ (B) $\frac{2\lambda}{3}$ (C) $\frac{\lambda}{3}$ (D) λ

22. In a YDSE experiment if a slab whose refractive index can be varied is placed in front of one of the slits then the variation of resultant intensity at mid-point of screen with μ ($\mu \geq 1$)will be best represented by [Assume slits of equal width and there is no absorption by slab]

(A) 

(B) 

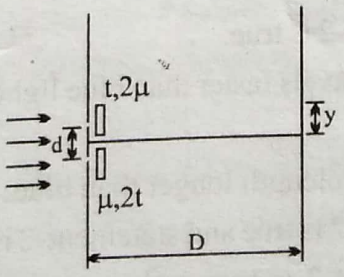
(C) 

(D) 

23. In a Young's double-slit experiment, let A and B be the two slits. Films of thicknesses t_A and t_B and refractive indices μ_A and μ_B, are placed in front of A and B respectively. If $\mu_A t_A = \mu_B t_B$, the central maximum will :

(A) not shift
(B) shift towards A
(C) shift towards B
(D) option (B), if $t_B > t_A$; option (C) if $t_B < t_A$

24. In the YDSE shown the two slits are covered with thin sheets having thickness t & $2t$ and refractive index 2μ and μ. Find the position (y) of central maxima



(A) zero (B) $\frac{tD}{d}$ (C) $-\frac{tD}{d}$ (D) None

25. In a double slit experiment, when the width of one slit is made twice as wide as the other in compared to normal YDSE having slits of equal width. Then, in the interference pattern **[IIT-JEE(Scr.) 2000]**

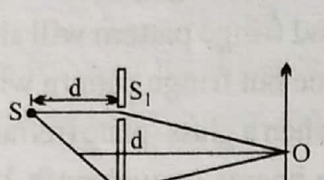
(A) the intensities of both the maxima and the minima increase.

(B) the intensity of the maxima increases and the minima has zero intensity.

(C) the intensity of the maxima decreases and that of the minima increases.

(D) the intensity of the maxima decreases and the minima has zero intensity.

26. To make the central fringe at the centre O, a mica sheet of refractive index 1.5 is introduced. Choose the correct statements (s).



(A) The thickness of sheet is $2(\sqrt{2}-1)d$ in front of S_1.

(B) The thickness of sheet is $(\sqrt{2}-1)d$ in front of S_2.

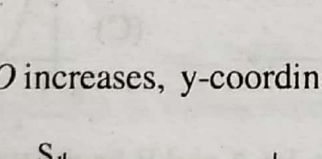
(C) The thickness of sheet is $2\sqrt{2}d$ in front of S_1.

(D) The thickness of sheet is $(2\sqrt{2}-1)d$ in front of S_1.

27. **Statement-1 :** In YDSE, as shown in figure, central bright fringe is formed at O. If a liquid is filled between plane of slits and screen, the central bright fringe is shifted in upward direction.

and

Statement-2 : If path difference at O increases, y-coordinate of central bright fringe will change.



(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.

(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.

(C) Statement-1 is true, statement-2 is false.

(D) Statement-1 is false, statement-2 is true.

28. **Statement-1 :** In glass, red light travels faster than blue light.

and

Statement-2 : Red light has a wavelength longer than blue.

(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.

(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.

(C) Statement-1 is true, statement-2 is false.

(D) Statement-1 is false, statement-2 is true.

29. **Statement-1 :**In standard YDSE set up with visible light, the position on screen where phase difference is zero appears bright.

and

Statement-2 : In YDSE set up magnitude of electromagnetic field at central bright fringe is not varying with time.

(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.

(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.

(C) Statement-1 is true, statement-2 is false.

(D) Statement-1 is false, statement-2 is true.

30. **Statement-1 :**In YDSE, the spacing between any two successive points having intensity half of the maximum intensity is same.

and

Statement-2 : The intensity on the screen in YDSE varies uniformly with distance from central maximum.

(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.

(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.

(C) Statement-1 is true, statement-2 is false.

(D) Statement-1 is false, statement-2 is true.

31. In a double slit experiment, the separation between the slits is $d = 0.25$ cm and the distance of the screen D = 100 cm from the slits. If the wavelength of light used is $\lambda = 6000\text{Å}$ and I_0 is the intensity of the central bright fringe, the intensity at a distance $x = 4 \times 10^{-5}$ m from the central maxima is :-

(A) I_0 (B) $I_0/2$ (C) $3I_0/4$ (D) $I_0/3$

32. Imagine a Young's double slit interference experiment performed with waves associated with fast moving electrons produced from an electron gun. The distance between successive maxima will decrease the most if :-

(A) the accelerating voltage in the electron gun is decreased

(B) the accelerating voltage is increased and the distance of the screen from the slits is decreased

(C) the distance of the screen from the slits is increased.

(D) the distance between the slits is decreased.

33. Two monochromatic and coherent point sources of light are placed at a certain distance from each other in the horizontal plane. The locus of all those points in the horizontal plane which have constructive interference will be

(A) a hyperbola (B) family of hyperbolas

(C) family of straight lines (D) family of parabolas