1. **nth bright fringe of red light $(\lambda_1 = 7500\text{Å})$ coincides with $(n + 1)$th bright fringe of green light $(\lambda = 6000\text{Å})$. The value of n =?**

   1. 4 2. 5
   3. 3 4. 2

2.

The interference pattern is obtained with two coherent light sources of intensity ratio n. In the interference pattern, the ratio $\frac{I_{max}-I_{min}}{I_{max}+I_{min}}$ will be

1. $\frac{\sqrt{n}}{n+1}$
2. $\frac{2\sqrt{n}}{n+1}$
3. $\frac{\sqrt{n}}{(n+1)^2}$
4. $\frac{2\sqrt{n}}{(n+1)^2}$

3.

In a double slit experiment, the two slits are 1 mm apart and the screen is placed 1 m away. A monochromatic light of wavelength 500 nm is used. What will be the width of each slit for obtaining ten maxima of double slit within the central maxima of single slit pattern?

(a)0.2 mm

(b)0.1 mm

(c)0.5 mm

(d)0.02 mm

4.

Two slits in Youngs experiment have widths in the ratio 1:25.The ratio of intensity at the maxima and minima in the interference pattern I_{max}/I_{min} is

(a)9/4

(b)121/49

(c)49/121

(d)4/9

5.

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

(a) 1.2cm

(b) 1.2mm

(c) 2.4cm

(d) 2.4mm

6.

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

(1) $5I$ and I

(2) $5I$ and $3I$

(3) $9I$ and I

(4) $9I$ and $3I$

7.

If the amplitude ratio of two sources producing interference is 3 : 5, the ratio of intensities at maxima and minima is

(1) 25 : 16

(2) 5 : 3

(3) 16 : 1

(4) 25 : 9

8.

For constructive interference to take place between two monochromatic light waves of wavelength λ, the path difference should be

(1) $\left(2n-1\right)\frac{\lambda}{4}$

(2) $\left(2n-1\right)\frac{\lambda}{2}$

(3) $n\lambda$

(d) $\left(2n+1\right)\frac{\lambda}{2}$

9.

Ray diverging from a point source from a wave front that is

(1) Cylindrical

(2) Spherical

(3) Plane

(4) Cubical

10.

Two waves are represented by the equations $y_1 = a\sin\omega t$ and $y_2 = a\cos\omega t$. The first wave

(1) Leads the second by π

(2) Lags the second by π

(3) Leads the second by $\frac{\pi}{2}$

(4) Lags the second by $\frac{\pi}{2}$

11.

In Young's double slit experiment, if the slit widths are in the ratio 1 : 9, then the ratio of the intensity at minima to that at maxima will be

(1) 1

(2) 1/9

(3) 1/4

(4) 1/3

12.

The Young's experiment is performed with the lights of blue (λ = 4360 Å) and green colour (λ = 5460 Å), If the distance of the 4th fringe from the centre is *x*, then

(1) *x* (Blue) = *x* (Green)

(2) *x* (Blue)> *x* (Green)

(3) *x* (Blue) < *x* (Green)

(4) $\frac{x(Blue)}{x(Green)} = \frac{5460}{4360}$

13.

In Young's double slit experiment, if *L* is the distance between the slits and the screen upon which interference pattern is observed, *x* is the average distance between the adjacent fringes and *d* being the slit separation. The wavelength of light is given by

(1) $\frac{xd}{L}$

(2) $\frac{xL}{d}$

(3) $\frac{Ld}{x}$

(4) $\frac{1}{Ldx}$

14.

In two separate set - ups of the Young's double slit experiment, fringes of equal width are observed when lights of wavelengths in the ratio 1 : 2 are used. If the ratio of the slit separation in the two cases is 2 : 1, the ratio of the distances between the plane of the slits and the screen in the two set - ups is

(1) 4 : 1

(2) 1 : 1

(3) 1 : 4

(4) 2 : 1

15.

The slits in a Young's double slit experiment have equal widths and the source is placed symmetrically relative to the slits. The intensity at the central fringes is I_0. If one of the slits is closed, the intensity at this point will be

(1) I_0

(2) $I_0 / 4$

(3) $I_0 / 2$

(4) $4I_0$

16.

In Young's double slit experiment, 62 fringes are seen in visible region for sodium light of wavelength 5893 Å. If violet light of wavelength 4358 Å is used in place of sodium light, then number of fringes seen will be

(1) 54

(2) 64

(3) 74

(4) 84

17.

In Young's double slit experiment, the distance between the two slits is 0.1 *mm* and the wavelength of light used is 4×10^{-7} m. If the width of the fringe on the screen is 4 *mm*, the distance between screen and slit is

(1) 0.1 *mm*

(2) 1 *cm*

(3) 0.1 *cm*

(4) 1 *m*

18.

In Young's double slit experiment using sodium light (λ = 5898 Å), 92 fringes are seen. If given colour (λ = 5461 Å) is used, how many fringes will be seen

(1) 62

(2) 67

(3) 85

(4) 99

19.

A slit of width *a* is illuminated by white light. For red light (λ = 6500 Å), the first minima is obtained at θ = 30°. Then the value of *a* will be

(1) 3250 Å

(2) 6.5×10^{-4} mm

(3) 1.24 *microns*

(4) 2.6×10^{-4} cm

20.

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

(1) 1.2 *mm*

(2) 1.2 *cm*

(3) 2.4 *cm*

(4) 2.4 *mm*

21.

A parallel monochromatic beam of light is incident normally on a narrow slit. A diffraction pattern is formed on a screen placed perpendicular to the direction of incident beam. At the first maximum of the diffraction pattern the phase difference between the rays coming from the edges of the slit is

(1) 0

(2) $\frac{\pi}{2}$

(3) π

(4) 2π

22.

The angle of polarisation for any medium is 60^o, what will be critical angle for this

(1) $\sin^{-1}\sqrt{3}$

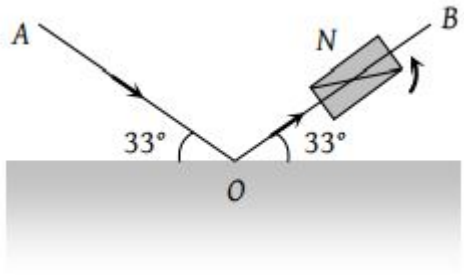
(2) $\tan^{-1}\sqrt{3}$

(3) $\cos^{-1}\sqrt{3}$

(4) $\sin^{-1}\frac{1}{\sqrt{3}}$

23.

A beam of light *AO* is incident on a glass slab (μ = 1.54) in a direction as shown in figure. The reflected ray *OB* is passed through a Nicol prism on viewing through a Nicole prism, we find on rotating the prism that



(1) The intensity is reduced down to zero and remains zero

(2) The intensity reduces down some what and rises again

(3) There is no change in intensity

(4) The intensity gradually reduces to zero and then again increases

24.

In the propagation of electromagnetic waves the angle between the direction of propagation and plane of polarisation is

(1) 0^o

(2) 45^o

(3) 90^o

(4) 180^o

25.

A light has amplitude *A* and angle between analyser and polariser is 60°. Light is reflected by analyser has amplitude

(1) $A\sqrt{2}$

(2) $A/\sqrt{2}$

(3) $\sqrt{3}A/2$

(4) $A/2$

26.

When an unpolarized light of intensity I_0 is incident on a polarizing sheet, the intensity of the light which does not get transmitted is

(1) Zero

(2) I_0

(3) $\frac{1}{2}I_0$

(3) $\frac{1}{4}I_0$

27.

When the angle of incidence on a material is 60°, the reflected light is completely polarized. The velocity of the refracted ray inside the material is (in ms^{-1})

(1) 3×10^8

(2) $\left(\frac{3}{\sqrt{2}}\right) \times 10^8$

(3) $\sqrt{3} \times 10^8$

(4) 0.5×10^8

28.

Two polaroids are placed in the path of unpolarized beam of intensity I_0 such that no light is emitted from the second polaroid. If a third polaroid whose polarization axis makes an angle θ with the polarization axis of first polaroid, is placed between these polaroids then the intensity of light emerging from the last polaroid will be

(1) $\left(\frac{I_0}{8}\right)\sin^2 2\theta$

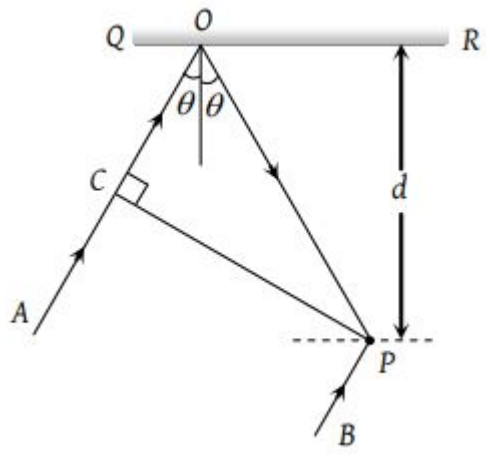
(2) $\left(\frac{I_0}{4}\right)\sin^2 2\theta$

(3) $\left(\frac{I_0}{2}\right)\cos^4 \theta$

(4) $I_0 \cos^4 \theta$

29.

In the adjacent diagram, CP represents a wavefront and *AO* & *BP*, the corresponding two rays. Find the condition on θ for constructive interference at *P* between the ray *BP* and reflected ray *OP*



(1) $\cos\theta = 3\lambda/2d$

(2) $\cos\theta = \lambda/4d$

(3) $\sec\theta - \cos\theta = \lambda/d$

(4) $\sec\theta - \cos\theta = 4\lambda/d$

30.

In Young's double slit experiment intensity at a point is (1/4) of the maximum intensity. Angular position of this point is

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

(2) $\sin^{-1}(\lambda/2d)$

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

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

31.

A beam of electron is used in an *YDSE* experiment. The slit width is d. When the velocity of electron is increased, then

(1) No interference is observed

(2) Fringe width increases

(3) Fringe width decreases

(4) Fringe width remains same

32.

In X-rays diffraction experiment distance between atomic lattice planes of diffraction, grafting is 2.8×10^{-10}m, then the maximum wavelength of X-rays (in meter) is

1. 2.5×10^{-10}
2. 5.6×10^{-10}
3. 4×10^{-10}

4. 4.6 x 10^{-10}

33.

The diameter of the human eye lens is 2 mm. What will be the minimum distance between two points to resolve them, which are situated at a distance of 50 m from the eye? The wavelength of light is 5000 $\mathring{A}$.

1. 2.32m
2. 4.28 mm
3. 1.25 cm
4. 12.48 cm

34.

Two periodic waves of intensities I_1 and I_2 pass through a region at the same time in the same direction. The sum of the maximum and minimum intensities is

1. $2(I_1 + I_2)$
2. $I_1 + I_2$
3. $\left(\sqrt{I_1} + \sqrt{I_2}\right)^2$
4. $\left(\sqrt{I_1} - \sqrt{I_2}\right)^2$

35.

A lens having focal length fand aperture of diameter d forms an intensity I. Aperture of diameter $\frac{d}{2}$ in the central region of lens is covered by a black paper. The focal length of lens and intensity of image now will be respectively

1. $\frac{f}{2}$ *and* $\frac{I}{2}$
2. f and $\frac{l}{2}$
3. $\frac{3f}{4}$ *and* $\frac{I}{2}$
4. f and $\frac{3l}{4}$

36.

In Young's double-slit experiment, the slits are 2 mm apart and are illuminated by photons of two wavelengths λ_1 = 12000 Å and λ_2 = 10000 Å. At what minimum distance from the common central bright fringe on the screen 2 m from the slit will a bright fringe from one interference pattern coincide with a bright fringe from the other?

1. 8 mm
2. 6 mm
3. 4 mm
4. 3 mm

37.

In Young's double-slit experiment, the intensity of light at a point on the screen where the path difference is λ is K, (λ being the wavelength of light used). The intensity at a point where the path difference is $\lambda/4$ will be

1. K
2. K/4
3. K/2
4. zero

38.

For a parallel beam of monochromatic light of wavelength 'λ', diffraction is produced by a single slit whose width 'a' is of the order of the wavelength of the light. If 'D' is the distance of the screen from the slit, the width of the central maxima will be

1. $\frac{D\lambda}{a}$
2. $\frac{Da}{\lambda}$
3. $\frac{2Da}{\lambda}$
4. $\frac{2D\lambda}{a}$

39.

In a double-slit experiment, the two slits are 1 mm apart and the screen is placed I m away A monochromatic light of wave. length 500 nm is used. What will be the width of each slit for obtaining 10 maxima of double-slit within the central maxima of a single-slit pattern?

1. 0.1 mm
2. 0.5 mm
3. 0.02 mm
4. 0.2 mm

40.

Two slits in Young's experiment have a width in the ratio 1:25. The ratio of intensity t the maxima and minima in the interference pattern $\frac{I_{max}}{I_{min}}$ is

1. $\frac{4}{9}$
2. $\frac{9}{4}$
3. $\frac{121}{49}$

4. $\frac{40}{121}$

41.

In a diffraction pattern due to a single slit of width a, the first minimum is observed at an angle 30° when the light of wavelength 5000 Å is incident on the slit. The first secondary maximum is observed at an angle of

1. $\sin^{-1}\left(\frac{1}{2}\right)$
2. $\sin^{-1}\left(\frac{3}{4}\right)$
3. $\sin^{-1}\left(\frac{1}{4}\right)$
4. $\sin^{-1}\left(\frac{2}{3}\right)$

42.

The intensity of the maximum in Young's double-slit experiment is I_0. Distance between two slits is d = 5λ, where λ is the wavelength of light used in the experiment. What will be the intensity in front of one of the slits on the screen placed at a distance D = 10d?

1. $\frac{3}{4}I_0$
2. $\frac{I_0}{2}$
3. I_0
4. $\frac{I_0}{4}$

43.

The interference pattern is obtained with, two coherent light sources of intensity ratio n. In the interference pattern, the ratio $\frac{I_{max}-I_{min}}{I_{max}+I_{min}}$ will be

1. $\frac{2\sqrt{n}}{n+1}$
2. $\frac{\sqrt{n}}{(n+1)^2}$
3. $\frac{2\sqrt{n}}{(n+1)^2}$
4. $\frac{\sqrt{n}}{n+1}$

44.

Two polaroids P_1 and $P_2$are placed With their axis perpendicular
to each other. Unpolarised light I_0 is incident on P_1. A third polaroid P_3 is kept in between P_1 and P_2 such that its axis makes an angle 45° with P_1 .The intensity of transmitted light through P_2 is

1. $\frac{I_0}{4}$
2. $\frac{I_0}{8}$
3. $\frac{I_0}{16}$
4. $\frac{I_0}{2}$

45.

Unpolarised light is incident from the air on a plane surface of a material of refractive index 'μ'. At a particular angle of incident 'i', it is found that the reflected and refracted rays are perpendicular to each other. Which of the following options is correct for this statement?

1. $i = \sin^{-1}\left(\frac{1}{\mu}\right)$
2. The reflected light is polarised with its electric vector perpendicular to the plane of incidence
3. The reflected light is polarised with its electric vector parallel to the plane of incidence
4. $i = \tan^{-1}\left(\frac{1}{\mu}\right)$

Fill OMR Sheet