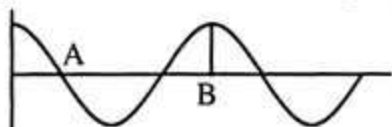
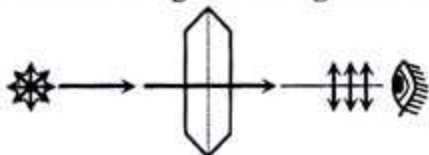


Chapter Seven : Physical Optics

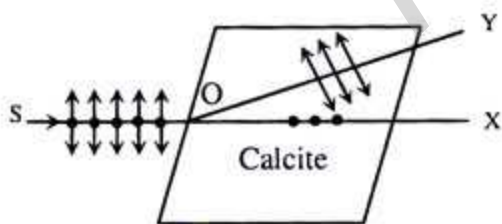
1. Which one is correct if the velocity of light in vacuum is c ? [Ctg.B.-17]
 - (a) $c = \sqrt{\epsilon_0 \mu_0}$
 - (b) $c = \frac{1}{\sqrt{\epsilon_0 \mu_0}}$
 - (c) $c = \sqrt{\frac{\epsilon_0}{\mu_0}}$
 - (d) $c = \sqrt{\frac{\mu_0}{\epsilon_0}}$
2. Which one is not an electromagnetic wave? [J. B.-15]
 - (a) Visible light
 - (b) X-ray
 - (c) Gamma-ray
 - (d) Alpha ray
3. At which angle the velocity of electromagnetic wave will be with each \vec{E} and \vec{B} ? [J. B.-15]
 - (a) 0°
 - (b) 45°
 - (c) 90°
 - (d) 180°
4. In whose experiment the existence of ether was proved wrong?
 - (a) Young
 - (b) Michaelson-Morley
 - (c) Einstein
 - (d) Galileo
5. Which of the following has the greatest wavelength value in electromagnetic spectrum? [J. B.-15]
 - (a) X-ray
 - (b) Ultraviolet ray
 - (c) Infrared ray
 - (d) Visible light
6. Which one is correct for three colours? [J. B.-15]
 - (a) $\lambda_R > \lambda_B > \lambda_V$
 - (b) $\lambda_R < \lambda_V < \lambda_B$
 - (c) $\lambda_V > \lambda_R < \lambda_B$
 - (d) $\lambda_V > \lambda_R < \lambda_V$
7. Which one of the following cannot be explained by Huygens' wave principle?
 - (a) Refraction
 - (b) Interference
 - (c) Diffraction
 - (d) Polarisation
8. If two light waves of equal wavelengths are emitted from two sources of the same phase or specific phase difference they are called—
 - (a) secondary source
 - (b) main source
 - (c) coherent source
 - (d) none of them
9. Interference is a type of— [D. B.-15]
 - (a) refraction
 - (b) polarisation
 - (c) diffraction
 - (d) superposition
10. Oil seems colourful in water- this supports which phenomenon of light? [S. B.-17]
 - (a) Diffraction
 - (b) Interference
 - (c) Polarisation
 - (d) Refraction
11. Which of the following relations is correct if the frequencies of yellow, orange and red light are respectively ν_y , ν_o & ν_r ? [All Board-18]
 - (a) $\nu_r > \nu_o > \nu_y$
 - (b) $\nu_y > \nu_o > \nu_r$
 - (c) $\nu_o > \nu_y > \nu_r$
 - (d) $\nu_o > \nu_r > \nu_y$
12. Path difference is how many times of phase difference? [B. B.-15]
 - (a) $2\pi/\lambda$
 - (b) π/λ
 - (c) λ/π
 - (d) $\lambda/2\pi$
13. 

In the figure, if the wave moves from point A to
- point B then what will be the phase difference? [B. B.-16]
 - (a) $\frac{\pi}{2}$
 - (b) π
 - (c) $\frac{3\pi}{2}$
 - (d) 2π
14. The path difference between two points in a wave is $\frac{\lambda}{2}$, what is the phase difference between those points? [J. B.-15]
 - (a) π
 - (b) $\frac{\pi}{2}$
 - (c) $\frac{\pi}{4}$
 - (d) $\frac{\pi}{8}$
15. The path difference between two points in a wave is $\frac{\lambda}{4}$. What is the phase difference between those points? [D. B.-17]
 - (a) $\frac{\pi}{2}$
 - (b) π
 - (c) 2π
 - (d) 8π
16. The phase difference between two points in a wave is $\pi/2$. What is the path difference between those points? [Dj.B.-16; D.B.-15]
 - (a) λ
 - (b) $\frac{\lambda}{2}$
 - (c) $\frac{\lambda}{4}$
 - (d) $\frac{2\lambda}{3}$
17. What will happen to the fringe width if the distance between two slits in Young's double slit experiment increases gradually?
 - (a) increase gradually
 - (b) decrease gradually
 - (c) remain unchanged
 - (d) will increase first and then decrease
18. What is the path difference of two bright fringes side by side in Young's double slit experiment? [Ctg.B.-16]
 - (a) 2λ
 - (b) λ
 - (c) $\frac{\lambda}{2}$
 - (d) $\frac{\lambda}{4}$
19. Which one is the phase difference in case of constructive interference?
 - (a) $\frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \dots$
 - (b) $0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}, \dots$
 - (c) $0, \pi, 2\pi, 3\pi, \dots$
 - (d) $\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \dots$
20. Two straight and parallel slits are located at a distance a . A fringe is created on the screen situated at a distance D from the slits when they are illuminated by a monochromatic light. Each fringe width is x and a & D are doubled. Width of new fringe— [Ctg.B.-15]
 - (a) $\frac{1}{2}x$
 - (b) $4x$
 - (c) $2x$
 - (d) $1x$
21. In Fraunhofer's class of diffraction light rays and wavefronts are respectively—[B. B.-15]
 - (a) Converging & spherical
 - (b) Divergent & spherical
 - (c) Parallel & plane
 - (d) Parallel & balloon shaped

22. The phenomenon of bending of light while passing through a slit can be explained by which of the followings? [J. B.-17]
- (a) Particle principle (b) Wave principle
(c) Duality principle (d) Quantum theory (b)
23. Principle minima for the diffraction of single slit – [Dj. B.-15]
- (a) $a \sin \theta = (2n) \frac{\lambda}{2}$ (b) $a \sin \theta = (2n + 1) \frac{\lambda}{2}$
(c) $d \sin \theta = (2n) \frac{\lambda}{2}$ (d) $d \sin \theta = (2n + 1) \frac{\lambda}{2}$ (a)
24. If the phase difference between two points in a wave is 3π then its path difference is– [All Board-18]
- (a) $\frac{\lambda}{2}$ (b) λ
(c) $\frac{3\lambda}{2}$ (d) 2λ (c)
25. The process by which the transverse nature of light wave is known as– [Dj. B.-17]
- (a) Refraction (b) Diffraction
(c) Polarisation (d) Interference (b)
26. Which of the following phenomena of light does not get affected by any change in medium? [R. B.-15]
- (a) Refraction (b) Interference
(c) Polarisation (d) Diffraction (c)
27. The phenomenon of light in the figure is called– [D. B.-15, 16]



- (a) Diffraction (b) Polarisation
(c) Interference (d) Superposition (b)
28. The process of confining the vibration of light in a specific plane is called– [R. B.-17]
- (a) Interference (b) Diffraction
(c) Polarisation (d) Refraction (c)
29. What does the ray 'OY' in the figure indicate? [C. B.-15]



- (a) Reflected (b) Refracted
(c) Ordinary (d) Extraordinary (b)
30. For which incident angle of unpolarized light incident on glass, the reflected ray will be polarised?
- (a) 75° (b) 57°
(c) 35° (d) 27° (b)
31. Constructive interference at any point will be created when superposition of two light waves with equal

frequency and equal amplitude emitting from two coherent sources if – [C. B.-17]

- i. The waves combine at same phase
ii. The path difference of both the waves is even multiple of $\lambda/2$
iii. The phase difference of both the waves is the simple multiple of π

Which of the following is correct?

- (a) i & ii (b) i & iii
(c) ii & iii (d) i, ii & iii (d)

32. Grating is used– [B. B.-15]

- i. For determining the wavelength of light
ii. To separate two spectrum lines of the same wavelength
iii. To determine the rate of change in diffraction angle with respect to wavelength

Which of the following is correct?

- (a) i & ii (b) ii & iii
(c) i & iii (d) i, ii & iii (d)

33. In case of interference dark fringe will be created when– [S. B.-15]

- i. The phase difference is the odd multiple of π
ii. The waves will combine at same phase
iii. Intensity is the lowest

Which of the following is correct?

- (a) i & ii (b) i & iii
(c) ii & iii (d) i, ii & iii (b)

34. Electromagnetic wave–

- i. Travels in vacuum
ii. Acceleration also radiates from dynamic charge
iii. Wave with very fast speed

Which of the following is correct?

- (a) i & ii (b) ii & iii
(c) i & iii (d) i, ii & iii (d)

35. The difference between two fringes in Young's double slit experiment depend–

- i. On the wavelength of the light used
ii. On the distance between the screen and the slits
iii. On the distance between the two slits

Which of the following is correct?

- (a) i & ii (b) i & iii
(c) ii & iii (d) i, ii & iii (d)

36. Fraunhofer's class of diffraction can be created—

- i. by grating ii. by single slit
iii. by double slit

Which of the following is correct?

- (a) i & ii (b) i & iii
(c) ii & iii (d) i, ii & iii (d)

37. Conditions of interference–

- i. Both the sources should be fine and small
ii. Both the sources should be coherent
iii. The sources should be placed close to each other

Which of the following is correct?

- (a) i & ii (b) i & iii
(c) ii & iii (d) i, ii & iii (d)

Answer the two following questions from the stem given below:

The distance between the two slits in Young's double slit experiment $d = 2$ mm. Distance of the screen from the slits $D = 10^4$ mm. Fringe width $x = 0.3$ mm. [C. B. -15]

38. What is the wavelength of the light used?

- (a) 5.9×10^{-7} m (b) 1.2×10^{-7} m
 (c) 5.9×10^{-7} mm (d) 1.5×10^{-7} mm

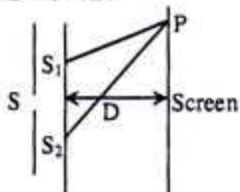
(b)

39. It is not possible to increase D arbitrarily because—

- (a) fringe brightness increases
 (b) fringes change location
 (c) fringe brightness decreases
 (d) fringes overlap with each other

(c)

Answer the questions 40-42:



The figure indicates the arrangement for Young's double slit experiment.

40. According to the stem constructive interference will be created at point P if the phase difference of the two emitted waves from the sources S_1, S_2 is—

- (a) $\frac{3\pi}{2}$ (b) 2π
 (c) π (d) $\frac{\pi}{2}$

(b)

41. If the distance between the sources S_1 & S_2 is made half and the value of D is doubled then the width of the fringe interference formed will be ___ of the former value.

- (a) Half (b) Double
 (c) Equal (d) Four times

(d)

42. How will it affect the fringe width of interference if the above experiment is done in water instead of air? Width—

- (a) will decrease
 (b) remain the same
 (c) will increase
 (d) will only increase at the centre

(a)

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