



Dnyansagar Coaching Classes, A'nagar

Std. - XII

Sub- Physics-II

MHT-CET

(Wave Theory Of Light)

Time - 45 min.

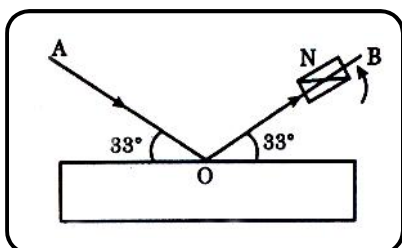
Max Marks - 50

- 1) A calcite crystal is placed over an ink dot on a piece of white paper. The crystal is now rotated. On seeing through the crystal one finds :
 - a) Only one dot
 - b) Two stationary dots
 - c) Two rotating dots
 - d) One stationary and one rotating dot
- 2) When a polaroid is rotated , the intensity of light does not vary. The incident light might be
 - a) Completely polarised
 - b) Partially plane polarised
 - c) Unpolarised
 - d) None of the above
- 3) If the polarising angle of diamond is 67° . What is the approximate critical angle of diamond ?
 - a) 17°
 - b) 22°
 - c) 34°
 - d) 45°
- 4) If the wavelength of light changes approximately by 900 \AA on entering another medium , then its frequency will change by :
 - a) zero
 - b) $1.5 \times 10^{14} \text{ Hz}$
 - c) $2.7 \times 10^{14} \text{ Hz}$
 - d) $3.3 \times 10^{14} \text{ Hz}$
- 5) The polarising angle of glass is :
 - a) The same for different kinds of glass
 - b) Different for different kinds of glass
 - c) The same for lights of all colours
 - d) Same for different colours of light
- 6) When light is incident on a transparent surface at the polarising angle , which of the following is completing polarised:
 - a) Reflected light
 - b) Refracted light
 - c) Both reflected as well as refracted light
 - d) Neither reflected nor refracted light.
- 7) When a plane polarised light is passed through an analyser and analyser is rotated through 90° , the intensity of emerging light :
 - a) Varies between maximum and minimum
 - b) Becomes zero
 - c) Does not ray
 - d) Varies between maximum and zero
- 8) Polarisation of light establishes :
 - (a) Corpuscular theory of the light
 - (b) Quantum nature of the light
 - (c) Transverse nature of the light
 - (d) All the three
- 9) The fact that light polarised establishes that light :
 - a) Travel in the form of particles
 - b) Is an electromagnetic waves
 - c) Is a transverse waves
 - d) Is a longitudinal wave
- 10) The polariser is used to
 - a) Reduce intensity of light
 - b) Produce dispersion of light
 - c) Increase intensity of light
 - d) Produce unpolarised light

- 11) Which does not show polarisation ?
- Longitudinal waves in gas
 - Transverse waves in gas
 - Both (a) and (b)
 - None of the above
- 12) Huygen's wave theory of light can not explain :
- Diffraction
 - Interference
 - Polarisation
 - Photo - electric effect
- 13) When a ray of light goes from a denser into a rarer medium :
- The wavelength of light is decreased
 - The frequency of light is increased
 - The speed of light is increased.
 - The light undergoes a phase change of π
- 14) A beam of monochromatic light is incident on glass at the polarising angle. Then :
- The reflected light is completely polarised
 - The reflected light is increased
 - The speed of light is increased
 - The refracted light is completely un polarised
- 15) Which of the following does not change when a photon enters glass from air ?
- Momentum
 - Velocity
 - Wavelength
 - Energy
- 16) In double refraction , in general we get two refracted ways for one incident ray. Here :
- Both the refracted rays are plain polarised
 - One refracted ray is plain polarised but other is not
 - Neither is polarised
 - One refracted ray is completely plain polarised, the other is partially polarised.
- 17) We prefer polaroid sunglasses because they :
- Reduce the intensity of light
 - Have soothing colours
 - Are cheaper
 - Can change colours
- 18) The speed of wave in a medium is 760 m/s. If 3600 waves pass through a point in a medium in 2 minute s, its wavelength is :
- 41.5 m
 - 25.3 m
 - 57.2 m
 - 13.8 m
- 19) Yellow light has wavelength 600 nm in air. What is the wavelength of yellow light in water. Refractive index of water = 4/3:
- 600 nm
 - 450 nm
 - 300 nm
 - 800 nm
- 20) Double refraction of light is shown by
- Quartz and calcite only
 - Calcite only
 - Calcite and ice only
 - Calcite, ice and quartz
- 21) In Huygen's wave theory, the locus of all the points in the same state of vibration is called :
- Half period zone
 - Vibrator
 - Wavefront
 - Ray
- 22) What is the phase difference between electric and magnetic field vectors in the electromagnetic waves ?
- Zero
 - $\frac{\pi}{4}$
 - $\frac{\pi}{2}$
 - π

- 23) Ordinary light incident on a glass slab at the polarising angle, suffers a deviation of 22° . The value of angle of refraction in glass in this case is :
- a) 56° b) 68°
c) 34° d) 22°
- 24) Two points A and B is situated at the same distance from a source of light, but in opposite direction from it. The phase difference between the light wave passing through A and B will be
- a) Zero b) $\frac{\pi}{2}$
c) π d) None of these
- 25) A glass slab of thickness 8 cm contains the same number of waves as 10 cm of water when both are transversed by the same monochromatic light. If the refractive index of water is $\frac{4}{3}$, the refractive index of glass is :
- a) $\frac{5}{4}$ b) $\frac{3}{2}$
c) $\frac{5}{3}$ d) $\frac{16}{15}$
- 26) In a vacuum, light travels at a speed of $3 \times 10^8 \text{ ms}^{-1}$. What is the speed of light in glass of refractive index = 1.5 ?
- a) $1.5 \times 10^8 \text{ ms}^{-1}$ b) $2 \times 10^8 \text{ ms}^{-1}$
c) $3 \times 10^8 \text{ ms}^{-1}$ d) $4.5 \times 10^8 \text{ ms}^{-1}$
- 27) The branch of optics dealing with the formation of images using the concept of straight line propagation is called
- a) Corpuscular optics
b) Physical optics
c) Geometrical optics
d) Quantum optics
- 28) The refractive index is equal to the tangent of the angle of polarisation. It is called :
- a) Brewster's law b) Malu's law
c) Bragg's law d) Grimaldi's law
- 29) Ray optics is valid when characteristics dimensions are :
- a) Of the same order as wavelength of light
b) Much smaller than the wavelength of light
c) Much larger than the wavelength of light
d) Of the order of 1 min
- 30) Though quantum theory of light can explain a number of phenomenon observed with light, it is necessary to retain the wave nature of light to explain the phenomenon of :
- a) Photo electric effect
b) Diffraction
c) Compton effect
d) Black body radiation
- 31) No longitudinal wave will show :
- a) Interference b) Diffraction
c) TIR d) Polarisation
- 32) A ray of light is incident on the surface of a glass plate at an angle of incidence equal to Brewster's angle Φ . If μ represents the refractive index of glass with respect to air, then the angle between reflected and refracted rays is :
- a) $90^\circ + \Phi$
b) $\sin^{-1}(\mu \cos \Phi)$
c) 90°
d) $90^\circ : \sin^{-1}\left(\frac{\sin \Phi}{\mu}\right)$
- 33) The critical angle of certain medium is $\sin^{-1}\frac{3}{5}$. The polarising angle of the medium is :
- a) $\sin^{-1}\left(\frac{4}{5}\right)$ b) $\tan^{-1}\left(\frac{5}{3}\right)$
c) $\tan^{-1}\left(\frac{3}{4}\right)$ d) $\tan^{-1}\left(\frac{4}{3}\right)$

- 34) A beam of light AO is incident on a glass slab ($n = 1.54$) in a direction as shown in the given figure. The reflected ray OB is passed through a nicol prism, on viewing through nicol prism we find on rotating the prism that :



- a) The intensity is reduced down to zero and remains zero
 b) The intensity reduces down somewhat and rises again
 c) There is no change in intensity
 d) The intensity gradually reduces to zero and then again increases
- 35) Which of the following can not be polarised ?
 a) Radio waves b) β - rays
 c) Infra red rays d) γ - rays
- 36) Both the particle and wave aspects of the wave aspects of light appear to be used in :
 a) Photoelectric
 b) Gamma emission
 c) Interference
 d) Classical mechanics
- 37) Light travels with a speed of $2 \times 10^8 \text{ m}^{-1}$ in crown glass of refractive index 1.5. What is the speed of light in dense flint glass of refractive index 1.8 ?
 a) $1.33 \times 10^8 \text{ ms}^{-1}$ b) $1.67 \times 10^8 \text{ ms}^{-1}$
 c) $2.0 \times 10^8 \text{ ms}^{-1}$ d) $3.0 \times 10^8 \text{ ms}^{-1}$

- 38) Frequency of radio waves corresponding to 10 metre wavelength is

- a) $3.4 \times 10^{-8} \text{ Hz}$ b) $3.4 \times 10^{-7} \text{ Hz}$
 c) $3 \times 10^7 \text{ Hz}$ d) $3 \times 10^9 \text{ Hz}$

- 39) The line along which the light travels and the plane of polarisation are inclined to each other at :

a) $\frac{\pi}{4}$

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

c) $\frac{3\pi}{4}$

- d) None of the above

- 40) Time taken by sunlight to pass through a window of thickness 4 mm whose refractive index is $(3/2)$ is :

- a) $2 \times 10^{-4} \text{ sec}$ b) $2 \times 10^8 \text{ sec}$
 c) $2 \times 10^{-11} \text{ sec}$ d) $2 \times 10^{11} \text{ sec}$

- 41) Light travels through a glass plate of thickness t and refractive index μ . If c is the velocity of light in vacuum, the time taken by the light to travel this thickness of glass is :

(a) $t / (\mu c)$ (b) $t \mu c$

c) $\frac{\mu t}{c}$ (d) $\frac{tc}{\mu}$

- 42) At noon the overhead sun appears of normal size, because of through atmosphere :

- a) Polarisation of light
 b) Normal incidence of light
 c) Interference of light
 d) Reflection of light

- 43) A ray of light propagation from glass ($\mu_g = 1.5$) to water ($\mu_w = \frac{4}{3}$).
The value of critical angle is :
- a) $\sin^{-1}\left(\frac{1}{2}\right)$ b) $\sin^{-1}\left(\frac{\sqrt{8}}{9}\right)$
c) $\sin^{-1}\left(\frac{8}{9}\right)$ d) $\sin^{-1}\left(\frac{5}{7}\right)$
- 44) The refraction index of a certain glass is 1.5 for light having wavelength of 6000 Å in vacuum. The wavelength of this light when it passes through glass is :
- a) 4000 Å⁰ b) 6000 Å⁰
c) 9000 Å⁰ d) 15000 Å⁰
- 45) A beam of monochromatic light enters from vacuum into a medium of refractive index n . The ratio of the wavelength of the incident and refracted wave is :
- a) $n:1$ b) $n^2:1$
c) $1:n$ d) $1:n^2$
- 46) The velocity of light in medium is 1.5×10^8 m/sec. The critical angle C for a ray going from this medium into air is :
- a) 30° b) 45°
c) 60° d) 90°
- 47) The number of waves in a 4 - cm thick strip of glass is the same as in 5 - cm water, when the same monochromatic light travels in them. If the refractive index of water is $\frac{4}{3}$, the refractive index of glass will be :
- a) $\frac{3}{5}$ b) $\frac{5}{3}$
c) $\frac{15}{12}$ d) $\frac{12}{15}$
- 48) An air bubble inside a glass slab ($n = 1.5$) appears at 6 cm when seen from one side and at 4 cm when seen from the other side. The thickness of the slab is :
- a) 20 cm b) 15 cm
c) 10 cm d) None of these
- 49) Velocity of light in glass is 2×10^8 m/s. Refractive index of glass μ_g is 1.5. Velocity of light in liquid is 2.5×10^8 m/s. Refractive index of liquid with respect to air (μ_l) is :
- a) 0.64 (b) 0.80
c) 1.20 (d) 1.44
- 50) Monochromatic light is refracted from air into the glass of refractive index μ . The ratio of the wavelength of incident and refracted waves is :
- a) $1:\mu$ (b) $1:\mu^2$
c) $\mu:1$ (d) $1:1$
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Sub- Physics-II

(Wave Theory Of Light - Answersheet)

Max Marks - 50

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|-------|-------|
| 1. d | 26. b |
| 2. c | 27. c |
| 3. b | 28. a |
| 4. a | 29. c |
| 5. b | 30. b |
| 6. a | 31. d |
| 7. d | 32. c |
| 8. c | 33. b |
| 9. c | 34. d |
| 10. a | 35. b |
| 11. a | 36. d |
| 12. d | 37. b |
| 13. c | 38. c |
| 14. a | 39. d |
| 15. d | 40. d |
| 16. a | 41. c |
| 17. a | 42. b |
| 18. b | 43. b |
| 19. b | 44. a |
| 20. d | 45. a |
| 21. c | 46. a |
| 22. a | 47. b |
| 23. c | 48. b |
| 24. c | 49. c |
| 25. c | 50. c |

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