Wave Optics Important Questions With Answers

NEET Physics 2023

1. When diameter of objective of an astronomical telescope is doubled, its limit of resolution is
   a) doubled b) quadrapled **c) halved** d) unaffected
2. Image formed by a convex lens is virtual and erect when the object is placed
   a) at F **b) between F and the lens** c) beyond 2F d) at 2F
3. A beaker containing a liquid appears to be half full when it is actually one third full.The refractive index of liquid is
   a) 7/6 **b) 6/5** c) 3/2 d) 5/4
4. The source of light is moving towards observer with relative velocity of 3 kms^{-1}. The fractional change in frequency of light observed is
   a) 3×10^{-3} b) 3×10^{-5} **c) 10^{-5}** d) None of these
5. What happens, if the monochromatic light used in Young's double slit experiment is replaced by white light?
   a) No fringes are observed b) All bright fringes become while
   c) All bright fringes have colour between violet and red
   d) Only the central fringe is white and all other fringes are coloured.
6. In going from a rarer to a denser medium, light loses some speed. What happens to energy carried by the light waves?
   a) decreases b) increases **c) remains the same** d) none of the above
7. For any position of an object, image formed in a convex mirror is
   a) virtual b) erect c) smaller in size **d) as far behind the mirror as the object is in front**
8. Wavelength of light frequency 100Hz is
   a) 2×10^6 m **b) 3×10^6 m** c) 4×10^6 m d) 5×10^6 m
9. In Huygens' wave theory, the locus of all points in the same state of vibration is called
   a) a half period zone b) oscillator **c) a wavefronts** d) a ray
10. In Young's double-slit experiment, the intensity is I at a point, where the path difference is $\frac{\lambda}{6}$ (λ - wavelength of light used). If 10 denotes the maximum intensity then $\frac{I}{I_0}$ is equal to
    a) $\frac{\sqrt{3}}{2}$ b) $\frac{1}{2}$ **c)** $\frac{3}{4}$ d) $\frac{1}{\sqrt{2}}$
11. Consider sunlight incident on a slit of width 10^4A. The image seen through the slit shall darkness as observed through the polaroid
    a) Be a fine sharp slit white in colour at the centre
    b) A bright slit white at the centre diffusing to zero intensities at the edges
    c) A bright slit white at the centre diffusing to regions of different colours
    d) only be a diffused slit white in colour
12. The speed of light is
    a) less in denser medium b) more in denser medium c) independent of the optical density of the medium
    d) none of the above

13. In order to increase the magnifying power of a microscope
    a) The focal powers of the objective and the eye piece should be large
    b) Objective should have small focal length and the eyepiece should have large focal lenght.
    c) Both should have large focal lengths
    d) The objective should have large focal length and eyepiece should have small focal length
14. Refractive index of glass w.r.t. water is 9/8. What is the speed of light in water? Given speed of light in glass is $2 \times 10^8\ m/s$.
    a) $2 \times 10^8\ m/s$ b) $3 \times 10^8\ m/s$ **c)** $2.25 \times 10^8\ m/s$ d) none of these
15. In all optical instruments, we use
    a) ray optics b) wave optics c) physical optics d) none of these
16. The wavefront due to a source situated at infinity is
    a) spherical b) cylindrical **c) planar** d) circular
17. Two distinct light bulbs as sources
    a) can produce an interference pattern **b) cannot produce a sustained interference pattern**
    c) can produce an interference pattern, if they produce light of same frequency
    d) can produce an interference pattern onlywhen the light produced by them is monochromatic in nature
18. Polarisation of light proves
    a) corpuscular nature of light b) quantum nature of light. **c) transverse wave nature of light**
    d) longitudinal wave nature of light.
19. The image formed by a convex lens is
    a) Always virtual b) Always real c) Always inverted **d) May virtual or real**
20. Which of the following cannot be polarized?
    a) X-rays b) radio waves **c) sound waves** d) light waves
21. The image of a distant object as seen through an astronomical telescope is
    a) Erect **b) Inverted** c) Perverted d) None of these
22. To get three images of a single object, t one should have two plane mirrors at an angle of:
    a) 60° **b) 90°** c) 120° d) 30°
23. According to Huygens' principle, light is a form of
    a) particle b) rays **c) wave** d) radiation
24. If a lens is cut into two pieces perpendicular to the principal axis and only one part is used, the new focal length
    a) Remains same b) Becomes 1/2 time **c) Becomes 2 time** d) Infinite
25. A laser beam is coherent because it contains
    a) waves of several wavelengths. b) incoherent waves of a single wavelength.
    c) coherent waves of several wavelengths **d) coherent waves of a single wavelength.**
26. f_r for green f_g and for blue f_b which statement is correct?
    a) $f_r < f_g$ **b)** $\mathbf{f_g < f_r}$ c) $f_b \geq f_r$ d) none of these
27. The number of images observable between two parallel plane mirrors is
    a) 2 b) 4 c) 11 **d) Infinite**
28. An interference pattern is observed by Young's double slit experiment. If now the separation between coherent sources is halved and the distance of screen from coherent sources is doubled, the new fringe width
    a) becomes double b) becomes one-fourth c) remains the same **d) becomes four times**
29. Which one of the following phenomena confirms that light waves are transverse?
    a) interference b) diffraction c) dispersion **d) polarization**
30. The relation governing refraction of light from rarer to denser medium at a spherical refracting surface is

a) $-\frac{\mu_1}{u}+\frac{\mu_2}{v}=\frac{\mu_2-\mu_1}{R}$ b) $\frac{\mu_1}{u}+\frac{\mu_2}{v}=\frac{\mu_2-\mu_1}{R}$ c) $\frac{\mu_1}{u}-\frac{\mu_2}{v}=\frac{\mu_2-\mu_1}{R}$ d) none of these

31. A prism has a refracting angle of 60^0.When a ray is incident at 50^0, it suffers minimum deviation (δ_m) is
a) 45^0 b) 60^0 c) 55^0 **d) 40^0**

32. The Doppler effect is produced if
a) the source is in motion b) the detector is in motion **c) Both (a) and (b)** d) None of the above

33. The phenomenon of interference is based on
a) conservation of momentum **b) conservation of energy.** c) conservation of momentum and energy
d) quantum nature of light

34. What should be the slit width to obtain 10 maxima of the double slit pattern within the central maxima of the single slit pattern of slit width 0.4 mm?
a) 0.4 mm **b) 0.2 mm** c) 0.6 mm d) 0.8 mm

35. A real image of half the size is obtained in a concave spherical mirror with a radius of curvature of 40cm. The distance of object and its image will be
a) 30cm and 60cm **b) 60cm and 30cm** c) 15cm and 30cm d) 30cm and 15cm

36. The ratio of the speed of an object to the speed of its real image of magnification m in the case of a convex mirror is
a) $-\frac{1}{m^2}$ b) m^2 c) -xm d) $\frac{1}{m}$

37. Consider the diffraction pattern for a small pinhole. As the size of the hole is increased
a) The size decrease b) The intensity increase c) The size increase **d) The intensity decrease**

38. An astronomical telescope has a large aperture to
a) Reduce spherical aberration **b) Have high resolution** c) Increase span of observation
d) Have low dispersion

39. The lens used for correcting myopia is
a) concave b) convex c) Plano concave d) none of these

40. If two mirrors are kept at 6° to each other, then the number of image formed by them is
a) 5 b) 6 c) 7 d) 8

41. The angle of polarisation (Brewster's angle) for an incident light when it is incident on a surface of refractive index (n) will be)
a) $\sin^{-1}(n)$ **b)** $\tan^{-1}(n)$ c) $\cos^{-1}(n)$ d) $\tan^{-1}\left(\frac{1}{n}\right)$

42. Two thin lenses of power P_1 and P_2 are placed and a distance d apart.The power of the combination is:
a) $P_1 + P_2$ b) $P_1 - P_2$ **c) $P_1 + P_2 - dP_1 P_2$** d) $d(P_1 + P_2)-P_1P_2$

43. Ray diverging from a point source on a wavefront are
a) cylindrical **b) spherical** c) plane d) cubical

44. In the context of Doppler effect in light, the term red shift signifies
a) decrease in frequency b) increase in frequency c) decrease in intensity d) increase in intensity

45. Two lenses of focal lengths 20 cm and -40 cm are held in contact. The image of an object all infinity will be formed by the combination at
a) ∞ b) 20 cm **c) 40 cm** d) 60 cm

46. In a young's double slit experiment, the source is white light. One of the holes is covered by a red filter and another by a blue filter. In this case
a) There shall be alternate interference pattern of red and blue
b) There shall be alternate interference pattern of red distinct from that for blue
c) There shall be no interference fringes
d) There shall be alternate interference pattern of red mixing with one for blue

47. Total internal reflection takes place when light is incident
    a) on a concave mirror b) from air on a plan glass surface at a certain given angle
    c) from air on a plan surface at any angle **d) from inside glass placed in water at a certain given angle**

48. What is the refractive index of a medium in which light travels with a speed of $2 \times 10^8 \ m/s$?
    a) 3/2 b) 2/3 c) 1 d) none of these

49. If a glass rod is immersed in a liquid of the same refractive index, then it will
    a) look bent **b) disappear** c) look longer d) none of these

50. Huygens' principle of secondary wavelets may be used to
    a) find the velocity of light in vacuum. b) explain the particle's behaviour of light
    c) find the new position of a wavefront d) explain photoelectric effect