

- Q.1. A cube, when moved along one of its faces at very high speed will look like a
- a) Rectangle b) Rectangular parallelepiped c) Sphere  
d) cube
- Q.2. The rest mass of a photon of energy  $E$  is
- a) zero b)  $Ec^2$  c)  $E/c^2$  d) None of above
- Q.3. Which of the following relation is not valid according to the theory of relativity
- a)  $\vec{F} = m\vec{a}$  b)  $\vec{F} = \frac{d\vec{p}}{dt}$  c)  $\vec{p} = m\vec{v}$  d)  $\Delta p = \vec{F} \cdot t$
- Q.4. In Newtonian mechanics, which of the following characteristic of a particle is same in all the inertial frames
- a) Speed b) velocity c) Momentum d) Impulse.
- Q.5. Special theory of relativity deals with the events in the frames of reference which move with constant
- a) Speed b) velocity c) acceleration d) momentum
- Q.6. Michelson-Morley experiment to detect the presence of ether is based on the phenomenon of
- a) interference b) diffraction c) acceleration d) momentum
- Q.7. A beam of light moves along right with speed  $C$ . If the earth also moves along right with speed  $v$ , then the speed of beam of light relative to earth is
- a)  $C$  b)  $C+v$  c)  $C-v$  d)  $\sqrt{C^2 - v^2}$

Q. 8. Of the two twin brothers, one goes on a relativistic tour and comes back. The brother on tour will  
a) become younger b) becomes older c) will be of same age d) None of these

Q. 9. The postulates of special theory of relativity are applicable to

- a) stationary frame b) accelerated frame c) inertial frame d) none of these.

Q. 10. An pair production which phenomenon occur

- a) mass is converted into energy b) energy is converted to mass c) two photons are produced  
d) two electrons are annihilated.

Q. 11. Which of the following are coherent sources

- a) A 60W and 40W bulbs b) Two bulbs each of 40W  
c) Two halves of a 60W bulb d) Two virtual source obtained by biprism

Q. 12. Which of the following does not support the wave nature of light

- a) Interference b) diffraction c) polarization d) photoelectric effect

Q. 13. Two sources of light are said to be coherent if waves produced by them have the same

- a) wavelength b) amplitude c) wavelength and constant phase difference d) amplitude and wavelength

Q. 14. If Young's double slit experiment is performed in water

- a) the fringe width will decrease b) the fringe width will increase c) the fringe width will remain unchanged d) there will be no fringe.

Q.15. When light wave suffers reflection at the interface between glass and air, the change of phase of the reflected wave is equal to

- a) zero    b)  $\pi/2$     c)  $\pi$     d)  $2\pi$

Q.16. Interference takes place in

- a) longitudinal waves    b) transverse waves    c) electromagnetic waves    d) all of the above waves

Q.17. In Newton's ring experiment, bright and dark rings are obtained using sodium light. If the entire set-up is dipped into water the diameters of rings

- a) increases    b) decreases    c) remains unchanged    d) fringe patterns disappears.

Q.18. If the source of light used in Young's double slit experiment is changed from red to violet

- a) the fringes will become brighter    b) consecutive fringes will come closer    c) the intensity of minima will increase    d) the central bright will become a dark fringe

Q.19. When a drop of oil is spread on a water surface it displays beautiful colours in daylight because

- a) dispersion of light    b) reflection of light    c) polarization of light    d) interference of light

Q.20. A thin transparent sheet is placed in front of a Young's double slit. The fringe width will

- a) increase    b) decrease    c) remain same    d) become non-uniform

Q.21. Light is

- a) wave phenomenon    b) particle phenomenon    c) both particle and wave phenomenon    d) none of these

- Q.22. The conditions for obtaining Fraunhofer diffraction from a single slit is that the light wavefront incident on the slit should be
- a) spherical b) cylindrical c) elliptical d) planar
- Q.23. Monochromatic light of wavelength  $\lambda$ , is incident normally on a diffraction grating consisting of alternate opaque strips of width (a) and transparent strips of width (b). The angle between the emerging zero-order and first-order spectra depends on
- a) a, b &  $\lambda$  b) a & b only c) b &  $\lambda$  only d) a &  $\lambda$  only
- Q.24. If  $N$  is the total number of rulings on the grating,  $n$  is order of spectrum and  $\lambda$  is wavelength of light used, then resolving power of grating is given by
- a)  $Nn\lambda$  b)  $Nn$  c)  $N\lambda/n$  d)  $N/n$
- Q.25. The wavelength of light can be experimentally found using
- a) ripple tank b) diffraction grating c) plane mirror d) glass prism
- Q.26. Dispersive power of grating can be defined as
- a) increase of angle of refraction with respect to change in wavelength  
 b) increase of angle of incidence with respect to change in wavelength  
 c) increase of angle of diffraction with respect to change in wavelength  
 d) none of these.
- Q.27. According to Rayleigh's criterion of resolution, the two spectral lines are just resolved if the intensity at the dip in the middle is
- a)  $1/n^2$  times the intensity at either of the maxima b)  $6/n^2$  times the intensity at either of maxima  
 c)  $8/n^2$  times the intensity at either of maxima d)  $10/n^2$  times the intensity at either of maxima.
- Q.28. Diffraction pattern is obtained using a beam of blue light. What happens if red light is used in place of blue light
- a) bands become broader and apart b) bands become narrower and crowded  
 c) No change d) bands disappear

Q.29. Polarization cannot take place in

- a) X-rays b) light waves c) radiowaves d) sound waves

Q.30. When elliptical polarised light, after passing through quarter wave plate, is observed through a rotating Nicol, the emergent light would have shown

- a) the variation of intensity with minimum not zero  
b) no variation in intensity c) the variation of intensity with minimum zero  
d) the intensity of incident and emergent light is same

Q.31. The planes of vibration and polarisation are

- a) orthogonal b) parallel c) non-existent d) none of the above

Q.32. One of the devices to produce plane polarised light is

- a) Nicol prism b) a crystal c) a biprism d) a half wave plate

Q.33. Polarisation of light proves the

- a) corpuscular nature of light b) quantum nature of light  
c) transverse wave nature of light d) longitudinal wave nature of light

Q.34. If the light is polarised by reflection, then the angle between reflected and refracted light is

- a)  $\pi$  b)  $\pi/2$  c)  $2\pi$  d)  $\pi/4$

Q.35. When a plane polarised light is incident on a quarter wave plate with its vibrations making an angle of  $45^\circ$  with the optic axis, the emergent light is

- a) elliptical polarised b) plane polarised c) a mixture of elliptical & circular polarised  
d) circular polarised

Q.36. A calcite crystal is placed over a dot on a piece of paper and rotated. On seeing through the calcite one will see

- a) one dot only b) one dot rotating about the other  
c) two rotating dots d) two - stationary dots

Q.37. When a ray of unpolarized light is incident in a direction perpendicular to the optic axis of a calcite crystal then O-ray & E-ray travel

- a) along the different directions with same velocity
- b) along the same direction with same velocity
- c) along the same direction with different velocity
- d) along the different directions with different velocity

Q.38. When a plane polarized light is parallel through a half wave plate, the emergent light is

- a) plane polarized
- b) circular polarized
- c) elliptical polarized
- d) a mixture of elliptically and circularly polarized

Q.39. Which of the following is the active medium for the Ruby Laser

- a)  $\text{Cr}_2\text{O}_3$
- b)  $\text{Al}_2\text{O}_3$
- c) Chromium atoms
- d) Chromium ion

Q.40. Ratio of probabilities of spontaneous emission and stimulated emission

- a) independent of frequency  $\nu$
- b) proportional to frequency  $\nu$
- c) proportional  $\nu^3$
- d) proportional to  $\nu^2$

Q.41. The population inversion in He-Ne laser is produced by

- a) chemical excitation
- b) photon excitation
- c) chemical reaction
- d) anelastic atomic collision

Q.42. Order of wavelength of He-Ne laser is

- a)  $6328 \text{ \AA}$
- b)  $6382 \text{ \AA}$
- c)  $5328 \text{ \AA}$
- d)  $7328 \text{ \AA}$

Q.43. A laser beam consists

- a) light material particle
- b) electrons
- c) highly coherent photon
- d) cosmic rays

Q.44. A laser beam is monochromatic. It means it has

- a) single frequency
- b) narrow width
- c) wide width
- d) several wavelengths.

Q. 45. Recording & reconstruction of hologram involves the phenomenon of

- a) reflection & interference respectively
- b) interference & diffraction respectively
- c) interference & refraction respectively
- d) diffraction & polarisation respectively

Q. 46. In the process of recording of hologram

- a) amplitude variation of object wave is recorded
- b) amplitude & phase variation of object wave is recorded
- c) amplitude, phase & frequency variation of object wave is recorded
- d) none of the above

Q. 47. The resolution of holographic plate is

- a) same as photographic film
- b) less than photographic film
- c) more than 150 times of photographic film
- d) none of the above

Q. 48. The diameter of core for single mode fibre is

- a) 5-8  $\mu\text{m}$
- b) 20-30  $\mu\text{m}$
- c) 50-100  $\mu\text{m}$
- d) none of the above

Q. 49. Light travels in optical fibre based on the principle of

- a) total internal reflection
- b) polarization
- c) diffraction
- d) refraction

Q. 50. The numerical aperture of an optical fibre depends on:

- a) core refractive index
- b) critical angle
- c) None of the above
- d) both of the above

Keys: →

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