The Bodwad Sarvajanik Co-Op. Education Society Ltd., Bodwad

Arts, Commerce and Science College, Bodwad.

Question Bank

Class:- S.Y. B.Sc. **Sem.:-IV**

Subject:- Physics **Paper Name:- Optics and Laser**

---

1. **Which of the following is the combination that is used in the formation of achromatic lenses?**
   a. 1 convex and 1 plane mirror
   b. 2 convex lenses
   c. **1 convex and 1 concave lens**
   d. 2 concave lenses

2. **How does magnifying power change for an objective lens if the focal length of the objective lens is increased?**
   a. **The microscope will decrease but for the telescope, it will increase**
   b. The microscope will increase but for the telescope, it decreases
   c. The microscope and telescope will increase
   d. The microscope and telescope will decrease

3. **What is the power of the combination of lenses, if two thin lenses of focal length f_1 and f_2 are in contact and coaxial?**
   a. $f_1 - f_2 / f_1 f_2$
   b. $f_2 f_1$
   c. $\sqrt{f_1 / f_2}$
   d. $\mathbf{f_1 + f_2 / f_1 f_2}$

4. **The image formed by the convex mirror is $1n$ times the object and has a focal length f. What is the distance of object from the mirror?**
   a. (n + 1)f
   b. **(n – 1)f**
   c. $(n+1n)f$
   d. $(n-1n)f$

5. **Rainbow is an example of which phenomenon?**
   a. Refraction and scattering
   b. Refraction and total internal reflection
   c. Dispersion and reflection
   d. **Dispersion and total internal reflection**

6. **Lens is made up of…….**
   a. **Glass or transparent Plastic**
   b. Wood
   c. Metal
   d. Opaque plastic
7. **The equivalent focal length (f) for two thin lenses separated by distance 'X' is given by…**
   a. $\frac{1}{f} = \frac{1}{f1} + \frac{1}{f1} + \frac{x}{f1f2}$
   b. $\frac{1}{f} = \frac{1}{f1} - \frac{1}{f1} - \frac{x}{f1f2}$
   c. $\boldsymbol{\frac{1}{f} = \frac{1}{f1} + \frac{1}{f1} - \frac{x}{f1f2}}$
   d. $\frac{1}{f} = \frac{1}{f1} - \frac{1}{f1} + \frac{x}{f1f2}$
8. **Power of lens is**
   a. Inversely proportional to 1/f
   b. Directly proportional to f
   c. Independent of f
   d. **Inversely proportional to f**
9. **When two thin lenses are put in contact the focal length of combination is_____**
   a. $f = \frac{f1f2}{f1-f2}$
   b. $f = \frac{f1-f2}{f1+f2}$
   c. $f = \frac{f1+f2}{f1-f2}$
   d. $\boldsymbol{f = \frac{f1f2}{f1+f2}}$
10. **Spherical aberration arises due to_____**
   a. Meeting of marginal rays and paraxial rays at same point
   b. **Failure of meeting of marginal rays and paraxial rays at same point**
   c. Detective material use to manufacture the lens
   d. None of these.
11. **For cross lens , $\frac{R1}{R2}$**
   a. $\frac{1}{6}$
   b. $\boldsymbol{-\frac{1}{6}}$
   c. $\frac{1}{9}$

d. $-\frac{1}{9}$

12. The condition for achromatism of two thin lenses of same material separated by finite distance "X" is…

a. $\boldsymbol{x = \frac{f1-f2}{2}}$

b. $\frac{w1f2+w2f1}{w1+w2}$

c. $\frac{1}{f} = \frac{1}{f1} + \frac{1}{f2} - \frac{x}{f1f2}$

d. $\frac{1}{f1} + \frac{1}{f2} = 0$

13. Intensity of light at a point is directly proportional to_____

a. Amplitude (a)

b. **[Amplitude(a)]^2**

c. Wavelength (λ)

d. $(\lambda)^2$

14. For constructive interference pattern, the path difference between two monochromatic light waves should be _____

a. $n\lambda$ $(2n+1)\lambda$

b. $(2n+1)\lambda/2$

c. $n\lambda/2$

d. $\mathbf{n\lambda}$

15. To get bright fringes in the interference pattern of the reflected system from parallel sided thin film, the path difference must be_____

a. Odd multiple of λ

b. $\mathbf{Odd\ multiple\ of\ \lambda/2}$

c. Even multiple of $\lambda/2$

d. Even multiple of λ

16. Newton's ring are examples of _____

a. Fringes of equal inclination

b. Fringes of unequal thickness

c. Fringes of unequal inclination

d. **Fringes of unequal thickness**

17. Fringes obtained in wedge shaped thin film are___

a. quare
b. Straight
c. Elliptical
d. **Circular**

18. **The phenomenon of bending of light round the corners and edges of an obstacle to spread light waves into a geometric shadow of object is called…….**
    a. Polarization
    b. Interference
    c. Scattering
    d. **Diffraction**

19. **In Fresnel type diffraction pattern either source of light or screen or both are at distance from the obstacle.**
    a. **Finite**
    b. Infinite
    c. Zero
    d. None of above

20. **In Fraunhofer diffraction the incident and diffracted wave fronts are……..**
    a. Not plane
    b. Spherical
    c. Cylindrical
    d. **Plane**

21. **In Fresnel diffraction the incident and diffracted wave fronts are……..**
    a. Plane
    b. Circular
    c. Elliptical
    d. **Divergent**

22. **In fresnel's half period zone theory, radii of half period zones are proportional to the square root of the natural number, while area of each zone is….**
    a. Zero
    b. One
    c. **Constant**
    d. None of the above

23. The Fraunhofer diffraction the centre of diffraction pattern is always…..

a. **Dark**

b. Bright

c. Bright or dark

d. Blue

24. Diffraction occurs only if the size of obstacle is comparable with the ……..of the light source used.

a. Velocity

b. **Wavelength**

c. Displacement

d. Acceleration

25. When light passes close to the edges of the aperture, there is a little deviation from its path called as ……of light.

a. Reflection

b. Rectilinear propagation

c. Interference

d. **Polarization**

26. The angle between plane of polarization and plane of vibration is……..

a. 360^0

b. $\mathbf{90^0}$

c. 240^0

d. 180^0

27. Polarimeter is a device used to measure ……of a substance.

a. Diffraction

b. Polarization

c. Interference

d. **Optical activity**

28. μ=tan θ, where symbols have their usual meaning, is……..

a. Malus law

b. Law of refraction

c. **Brewster's law**

d. Law of polarization

29. In positive crystals……..

a. **e-ray travels slower than o-ray**

b. e-ray travels faster than o-ray

c. e-ray and o-ray travels with same speed

d. e-ray and o-ray do not travel

30. Velocity of ordinary rays in negative crystal is …….. then extra ordinary rays.

a. **Less**

b. Greater

c. Equal

d. Negligible

31. The specific rotation is given by S=……., where symbol have their usual meanings.

a. $\frac{\theta l}{c}$

b. $\frac{\theta}{\boldsymbol{lc}}$

c. $\frac{lc}{\theta}$

d. $\frac{l\theta}{c}$

32. Which of the following is a four level LASER ?

a. CO_2

b. Ruby laser

c. He-Ne laser

d. None of these

33. What does the acronym LASER stand for?

a. Light absorption by stimulated emission of radiation

b. **Light amplification by stimulated emission of radiation**

c. Light alteration by stimulated emission of radiation

d. None of these

34. He-Ne laser is a type of ……

a. Solid laser

b. Liquid laser

c. **Gas laser**

d. Diod laser

35. Laser is source of highly ……. light.

a. **Coherent**
b. Divergent
c. Non coherent
d. none of these.

36. The He-Ne laser operates at a wavelength of……

a. 540nm
b. **632nm**
c. 690nm
d. 717nm

37. Potential energy source for inducing fusion reaction is……

a. X- ray
b. **Laser**
c. Ultraviolet
d. Microwave

38. Principle of laser is…….

a. Spontaneous absorption
b. Stimulated emission
c. Induced emission
d. **Both b and c.**

39. The population inversion process is observed due to the existence of……

a. **Metastable state**
b. Excited state
c. Ground state
d. None of these

40. In lasing action, the spontaneous emission does not depend on …….

a. The number of atoms presents in the excited state
b. **The intensity of incident light**
c. Both a and b
d. None of these.

41. In lasing action, the light amplification is done due to……

a. **Stimulated emission**

b. Spontaneous emission

c. Absorption

d. None of these.

42. Which of the following is not true for laser?

a. Extremely intense light

b. Perfectly monochromatic

c. Coherent

d. **Divergent**

43. The light from a laser source is monochromatic because all the photons…..

a. Are in phase

b. **Have same energy**

c. Have same amplitude

d. Are in the same direction.

44. In population inversion process the number of atoms in metastable state is comparison to the ground state is……..

a. Smaller

b. **Greater**

c. Equal

d. None of these.

45. He- Ne laser is…….

a. Liquid state

b. Solid state

c. **Gaseous state**

d. None of these.

46. At which ratio He-Ne gas is used in He-Ne laser?

a. 1:1

b. **10:1**

c. 9:9

d. 5:5