Dept. of Physics

DEGLOOR COLLEGE , DEGLOOR

Sem IV Paper VIII

MCQ Practice set

1. Newton's formula is
   a) $x_1 x_2 = f_1 f_2$
   b) $\frac{x_1}{x_2} = \frac{f_1}{f_2}$
   c) $\frac{x_1}{f_1} = \frac{f_2}{x_2}$
   d) Both (a) & (c)
2. The formula for equivalent focal length of a coaxial system is
   a) $\boldsymbol{\frac{1}{f} = \frac{1}{f_1} + \frac{1}{f_2} - \frac{d}{f_1 f_2}}$
   b) $\frac{1}{f} = \frac{1}{f_1} - \frac{1}{f_2} + \frac{d}{f_1 f_2}$
   c) $\frac{1}{f} = \frac{1}{f_1} + \frac{1}{f_2} + \frac{d}{f_1 f_2}$
   d) None of the above
3. The value of 1st & 2nd principal point of an coaxial system resp. is
   a) $\alpha = \frac{fd}{f_1}$, $\beta = \frac{fd}{f_2}$
   b) $\boldsymbol{\alpha = \frac{fd}{f_2}, \beta = -\frac{fd}{f_1}}$
   c) $\alpha = -\frac{fd}{f_2}$, $\beta = \frac{fd}{f_1}$
   d) $\alpha = -\frac{fd}{f_1}, \beta = \frac{fd}{f_2}$
4. The value of 1st & 2nd focal point is
   a) $L_1F_1 = -f\left(1 - \frac{d}{f_2}\right), L_2F_2 = -f\left(1 - \frac{d}{f_1}\right)$
   b) $\boldsymbol{L_1F_1 = -f\left(1 - \frac{d}{f_2}\right), L_2F_2 = f\left(1 - \frac{d}{f_1}\right)}$
   c) $L_1F_1 = -f\left(1 + \frac{d}{f_1}\right)$, $L_2F_2 = f\left(1 + \frac{d}{f_1}\right)$

d) $L_1F_1 = f\left(1 + \frac{d}{f_1}\right), L_2F_2 = -f\left(1 + \frac{d}{f_1}\right)$

5. Which of the following eyepiece is free from spherical & chromatic aberrations?
   a) Huygen's eyepiece
   b) Ramsden's eyepiece
   c) Both of the above
   d) None of the above
6. The equivalent focal length of Huygen's eyepiece is
   a) $F = \frac{3}{4}f$
   b) $\boldsymbol{F = \frac{3}{2}f}$
   c) $F = \frac{f}{2}$
   d) $F = \frac{2}{3}f$
7. The position of principal points of Huygen's eyepiece is
   a) $\boldsymbol{\alpha = 3f, \beta = -f}$
   b) $\alpha = -f, \beta = 3f$
   c) $\alpha = -3f, \beta = f$
   d) $\alpha = \frac{f}{2}, \beta = -\frac{f}{2}$
8. The ratio of focal length of Huygen's plano-convex lens is
   a) 3 :1
   b) 1:1
   c) Both
   d) None of above
9. The equivalent focal length of Ramsden's eyepiece is
   a) $F = \frac{3}{4}f$
   b) $\boldsymbol{F = \frac{3}{2}f}$
   c) $F = \frac{f}{4}$
   d) $F = \frac{4}{3}f$
10. The position of principal points of Ramsden's eyepiece is
    a) $\boldsymbol{\alpha = \frac{f}{2}, \beta = -\frac{f}{2}}$
    b) $\alpha = 3f, \beta = -f$
    c) $\alpha = -\frac{f}{2}, \beta = \frac{f}{2}$

d) $\alpha = -3f, \beta = f$

11.Newton's rings are example of

a) Fringes of equal thickness
b) Fringes of unequal thickness
c) Fringes of variable thickness
d) None of the above

12.The radii of fringes of Newton's ring is proportional to

a) $\frac{1}{\sqrt{\lambda}}$
b) $\boldsymbol{\sqrt{\lambda}}$
c) λ
d) $\frac{1}{\lambda}$

13. The wavelength of sodium light using Newton's ring is

a) $\lambda = \frac{D_{m+p}^2 - D_m^2}{4PR}$
b) $\lambda = \frac{slope}{4R}$, slope = $\frac{D_{m+p}^2 - D_m^2}{P}$
c) Both (a) & (b)
d) None of above

14. The wavelength of monochromatic light using Michelson interferometer is

a) $\boldsymbol{\lambda = \frac{2d}{N}}$
b) $\lambda = \frac{2N}{d}$
c) $\lambda = \frac{d}{2N}$
d) $\lambda = \frac{d}{N}$

15. The difference in wavelength bet^n two neighbouring lines in Michelson interferometer is

a) $\lambda_1 - \lambda_2 = \frac{\lambda_1 \lambda_2}{d}$
b) $\boldsymbol{\lambda_1 - \lambda_2 = \frac{\lambda_1 \lambda_2}{2d}}$
c) $\lambda_1 - \lambda_2 = \frac{d}{\lambda_1 \lambda_2}$

d) None of above

16. Bending of light around the edges is called

a) Interference
b) Diffraction
c) Polarization
d) None of the above

17. In Fresnel's diffraction, source of light & screen are at

a) Finite distance
b) Infinite distance
c) Both
d) None of above

18. In Fraunhoffer's diffraction, source of light & screen are at

a) Finite distance
b) Infinite distance
c) Both
d) None of above

19. The position of minimum intensity due to single slit is given by

a) $sin\theta_n = \frac{(2n+1)\lambda}{2a}$
b) $\boldsymbol{sin\theta_n = \frac{n\lambda}{a}}$
c) $sin\theta_n = \frac{na}{\lambda}$
d) None of the above

20. The value of the grating constant (a+b) is

a) $\frac{15{,}000}{2.54}\ cm$
b) $\frac{10{,}000}{2.54}\ cm$
c) $\boldsymbol{\frac{2.54}{15{,}000}\ cm}$
d) $\frac{2.54}{10{,}000}\ cm$

21. Resolving power of grating is

a) $\frac{d\lambda}{\lambda} = nN$

b) $\boldsymbol{\frac{\lambda}{d\lambda} = nN}$

c) $\frac{\lambda}{d\lambda} = t.\frac{d\mu}{d\lambda}$

d) None of the above

22. Resolving power of prism is

a) $\frac{\lambda}{d\lambda} = nN$

b) $\frac{d\lambda}{\lambda} = nN$

c) $\boldsymbol{\frac{\lambda}{d\lambda} = t.\frac{d\mu}{d\lambda}}$

d) None of the above

23. Restriction of light into single plane is called

a) Interference

b) Diffraction

c) **Polarization**

d) None of the above

24. Brewster's equation is

a) $\boldsymbol{\mu = tan\theta_B}$

b) $\mu = sin\theta_B$

c) $\mu = cot\theta_B$

d) None of the above

25. According to Malus, intensity transmitted through analyser is proportional to

a) Square of sin$\boldsymbol{\theta}$

b) Square of cos$\boldsymbol{\theta}$

c) Square of tan$\boldsymbol{\theta}$

d) Square of cot $\boldsymbol{\theta}$

26. The ray which obeys Snell's law of refraction is known as

a) Extraordinary ray

b) Ordinary ray

c) Both of the above

d) None of the above

27. The ray which doesn't obey Snell's law of refraction is known as

a) Extraordinary ray

b) Ordinary ray

c) Both of the above

d) None of the above

28. Quarter wave plate produces path difference of - - - - - bet^{n} e-ray & o-ray.

a) $\frac{\lambda}{2}$

b) $\boldsymbol{\frac{\lambda}{4}}$

c) λ

d) None of above

29. Half wave plate produces path difference of - - - - -bet^{n} e-ray & o-ray

a) $\boldsymbol{\frac{\lambda}{2}}$

b) $\frac{\lambda}{4}$

c) λ

d) None of the above

30. The amount of rotation $\boldsymbol{\theta}$ is directly proportional to

a) $\frac{1}{l}$

b) $\boldsymbol{l}$

c) l^2

d) None of the above

31. The LASER is acronym for

a) Light amplification through spontaneous emission of radiation

b) Light amplification through stimulated emission of radiation

c) Light amplification through spontaneous & stimulated emission of radiation

d) None of the above

32. The different processes when photons travel through medium is

a) Absorption
b) Spontaneous emission
c) Stimulated emission
d) All of the above

33. The probability of absorption transition is

a) $P_{12}= B_{21}\rho(\upsilon)$
b) $P_{12}= B_{12}\rho(\upsilon)$
c) $P_{12}= A_{21}$
d) $P_{21}= B_{21}\rho(\upsilon)$

34. The probability of spontaneous emission transition is

a) $P_{12}= B_{21}\rho(\upsilon)$
b) $P_{12}= B_{12}\rho(\upsilon)$
c) $P_{21}= A_{21}$
d) $P_{21}= B_{21}\rho(\upsilon)$

35. The probability of stimulated transition is

a) $P_{21}= B_{21}\rho(\upsilon)$
b) $P_{21}= B_{21}$
c) $P_{21}= B_{21}\rho(\upsilon)$
d) $P_{21}= A_{21}$

36. The condition of population inversion is

a) $N_1>>N_2$
b) $N_2>>N_1$

c) $N_1 = N_2$
d) None of the above

37. He – Ne laser generates light of wavelength

a) 6428 A°
b) 6328 A°
c) 6028 A°
d) 6128 A°

38. Which of the following is the useful transition in He – Ne laser is

a) $E_6 \rightarrow E_3$
b) $E_2 \rightarrow E_1$
c) $E_6 \rightarrow E_5$
d) $E_5 \rightarrow E_4$

39. In diode laser, the n- type & p- type is formed resp. by

a) Zinc & GaAs
b) GaAs & Zinc
c) Only Zinc
d) Only GaAs

40. Important characteristics or properties of laser is

a) Directionality & negligible coherence
b) High intensity & monochromaticity
c) High degree of coherence
d) All of the above