A.V. Education Society's

Degloor College, Degloor (114)

FACULTY OF SCIENCE

Examination Summer-2020

Class: B.Sc. S.Y. **Semester : IV**

Name of Subject: *Physics* **Time :1 Hour**

Paper Title and NO.: *Optics and Lasers (VIII)* **Max. Marks: 40**

N.B. i) Attempt all questions

ii) All question carry equal marks

iii) Use OMR answer sheet

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1. There are …… cardinal points in all

   a) Four b) Three c) Five d) Six

2. Complex optical system has ……. Principal planes

   a) Six b) Two c) One d) Three

3. The distance between first focal point from first principal point is..

   a) First focal length b) First focal plane c) First focal point d) None

4. Which of the following eyepiece is free from spherical & chromatic aberrations?

   a) Huygens eyepiece only b) Ramsden eyepiece only

   c) Both Huygens and Ramsden eyepiece d) None of these

5. The equivalent focal length of Huygen's eyepiece is

   a) $F = \frac{3}{4}f$ b) $F = \frac{3}{2}f$ c) $F = \frac{f}{2}$ d) $F = \frac{2}{3}f$

6. The position of principal points of Huygen's eyepiece is

   a) $\alpha = 3f\ , \beta = -f$ b) $\alpha = -f, \beta = 3f$

   c) $\alpha = -3f, \beta = f$ d) $\alpha = \frac{f}{2}\ , \beta = -\frac{f}{2}$

7. The ratio of focal length of Huygen's plano-convex lens is

   a) 3 :1 b) 1:1 c)2:1 d)1:2

8. The equivalent focal length of Ramsden's eyepiece is

a) $F = \frac{3}{4}f$ b) $F = \frac{f}{4}$ c) $F = \frac{3}{2}f$ d) $F = \frac{4}{3}f$

9. Which of the following eyepiece is positive eyepiece?

a) Huygens eyepiece b) Ramsden eyepiece

c) Both Huygens and Ramsden eyepiece d) None

10. There are …… nodal points

a) Four b) Three c) One d) Two

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

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

a) $\lambda = \frac{D_{m+p}^2 - D_m^2}{8PR}$ b) $\lambda = \frac{D_{m+p}^2 - D_m^2}{2PR}$ c) $\lambda = \frac{D_{m+p}^2 - D_m^2}{PR}$ d) $\lambda = \frac{D_{m+p}^2 - D_m^2}{4PR}$

14. The wavelength of monochromatic light using Michelson interferometer is

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

15. The difference in wavelength between two neighbouring lines in Michelson interferometer is

a) $\lambda_1 - \lambda_2 = \frac{\lambda_1\lambda_2}{d}$ b) $\lambda_1 - \lambda_2 = \frac{\lambda_1\lambda_2}{2d}$ c) $\lambda_1 - \lambda_2 = \frac{d}{\lambda_1\lambda_2}$ d) None

16. Bending of light around the edges is called

a) Interference b) Diffraction c) Polarization d) Reflection

17. Thin film has thickness of the order of is..

a) 0.5 μm to 10 μm b) 10μm to 100μm

c) 5 μm to 500μm d) 100 μm 1000μm

18. To obtain Fraunhoffer's diffraction,

a) Wave front must be plane b) Source and screen should be at infinite distance

c) Lens is used between screen and slit d) All of these

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

a) $sin\theta_n = \frac{na}{2\lambda}$ b) $sin\theta_n = \frac{n\lambda}{a}$ c) $sin\theta_n = \frac{na}{4\lambda}$ d) $sin\theta_n = \frac{na}{3\lambda}$

20. Ability of optical instrument to produce distinctly separate images of closed object

a) Reflecting power b) Lens power c) Resolving power d) None

21. Resolving power of grating is

a) $\frac{d\lambda}{\lambda} = \text{nN}$ b) $\frac{\lambda}{d\lambda} = nN$ c) $\frac{\lambda}{d\lambda} = t.\frac{d\mu}{d\lambda}$ d) None

22. Resolving power of prism is

a) $\frac{\lambda}{d\lambda} = nN$ b) $\frac{d\lambda}{\lambda} = nN$ c) $\frac{\lambda}{d\lambda} = t.\frac{d\mu}{d\lambda}$ d) None

23. Restriction of light into single plane is called

a) Interference b) Diffraction c) Polarization d) Dispersion

24. Brewster's equation is

a) $\mu = tan\theta_B$ b) $\mu = sin\theta_B$ c) $\mu = cot\theta_B$ d) $\mu = \frac{1}{tan\theta_B}$

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 these

27. Polarization proves …

a) Light waves are transverse in nature b) Light waves are longitudinal in nature

c) Light waves are both transverse and longitudinal in nature d) None

28. Quarter wave plate produces path difference of - - - - - between e-ray & o-ray.

a) $\frac{\lambda}{2}$ b) $\frac{\lambda}{3}$ c) λ d) $\frac{\lambda}{4}$

29. Half wave plate produces path difference of - - - - -between e-ray & o-ray

a) $\frac{\lambda}{4}$ b) $\frac{\lambda}{3}$ c) $\frac{\lambda}{2}$ d) λ

30. Which of the following is/are Uniaxial materials

a) Calcite b) Tourmaline c) Quartz d) All of these

31. The LASER is acronym for

a) Light amplification through spontaneous emission of radiation

b) Light amplification through stimulated emission of radiation

c) Light accreditation through 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. Spontaneous emission is

a) controlled from outside b) Not controlled from outside

c)Resulting light is monochromatic d) All of these

36. 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

37. 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 these

38. Rubby LASER is

a) Liquid Laser b) Gas laser c) Solid state Laser d) All of these

39. He – Ne laser generates light of wavelength

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

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

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

ANSWER KEYS
MCQ QUESTION PAPER SET

SUBJECT: PHYSICS **CLASS: B.Sc. SECOND YEAR**
SEM -IV **PAPER-VII**
MAX.MARKS:40 **TIME DURATION:1 HR.**
TITLE: OPTICS AND LASERS

Q.NO.	ANS.
1	**D**
2	**B**
3	**A**
4	**A**
5	**B**
6	**A**
7	**A**
8	**C**
9	**B**
10	**D**

Q.NO.	ANS.
11	**A**
12	**D**
13	**D**
14	**A**
15	**B**
16	**B**
17	**A**
18	**D**
19	**B**
20	**C**

Q.NO.	**ANS.**
21	**B**
22	**C**
23	**C**
24	**A**
25	**A**
26	**B**
27	**A**
28	**D**
29	**C**
30	**D**

Q.NO.	**ANS.**
31	**B**
32	**D**
33	**B**
34	**C**
35	**A**
36	**D**
37	**B**
38	**C**
39	**B**
40	**B**