

(FOR THE CANDIDATES ADMITTED

SUBJECT CODE **23 UPS 508**

DURING THE ACADEMIC YEAR 2023-24 ONLY)

REG.NO.

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI

END-OF-SEMESTER EXAMINATIONS : NOVEMBER – 2025

B.Sc. – PHYSICS

MAXIMUM MARKS: 75

SEMESTER: V

TIME : 3 HOURS

PART – III

OPTICS AND SPECTROSCOPY

SECTION – A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS. (K1)

1. The region of spectrum of wave lengths shorter than violet is called.....
a) Ultraviolet b)Infrared c)Visible d) Invisible
2. In Optics, waves having a single frequency and wave length are calledwaves
a) Plane polarized b) Monochromatic c)Coherent d) Incoherent
3. In Brewster's law, if θ_p is the angle and μ is the refractive index of the medium, then $\mu = \dots\dots\dots$
a) $\tan \theta_p$ b) $\cos \theta_p$ c) $\sec \theta_p$ d) $\sin \theta_p$
4. When a molecule has all three moments of inertia is identical is called molecule
a) Linear b) Symmetric c) Spherical top d) Asymmetric tope
5. The Sine of the acceptance angle is called as
a) Refractive index b) Numerical aperture c)refraction d) none of these

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES. (K2)

6. Define dispersive power
7. What do you mean by Diffraction ?
8. Write any two production methods of linearly polarized light.
9. Write the lowest energy of simple harmonic oscillator.
10. Define population inversion.

SECTION – B

(5 X 5 = 25 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)

11. a) State and explain Fermat's principle of extreme path.

(OR)

- b) What are known as aberrations? Discuss chromatic aberration in lenses..

(CONTD 2)

12. a) Describe the Fresnel's biprism method of determination of wave length of light with theory.
- (OR)
- b) Describe an experimental setup to determine.
13. a) What is known as Brewster the thickness of a thin wise window? Explain with Brewster's law through Air Wedge method.
- b) Describe polarization using Nicol prism. Discuss the role of principal section and plane.
14. a) Explain the various rotation of the molecules
- (OR)
- b) Write any five applications of IR spectroscopy.
15. a) List the characteristics of LASER with explanation.
- (OR)
- b) Classify optical fibers and explain.

SECTION – C (5 X 8= 40 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.

16. a) Deduce the expression for longitudinal chromatic aberration for an object at infinity
- (OR)
- b) Discuss the condition for acromatism of two lenses placed in contact
17. a) Explain the dtermination of wave length of the light by Newton's rings method.
- (OR)
- b) Discuss the Fraunhoffer diffraction at a circular aperture.
18. a) Describe Fresnel's explanation of optical rotation.
- (OR)
- b) Describe the analysis of elliptically polarized light.
19. a) Obtain the expression for the energy of a diatomic molecule using simple harmonic oscillator.
- (OR)
- b) Describe principle and working of double beam spectrometer with schematic diagram.
20. a) Describe principle and working of He-Ne Laser.
- (OR)
- b) With a neat block diagram, explain the Fiber optic communication system.