(FOR THE CANDIDATES ADMITTED DURING THE ACADEMIC YEAR 2024-25 ONLY)

SUBJECT CODE 24UMS3A3 / 24UCY3A4

REG.NO.

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

END-OF-SEMESTER EXAMINATIONS : NOVEMBER – 2025

B.Sc. –MATHEMATICS/CHEMISTRY **MAXIMUM MARKS: 75**

SEMESTER: III **TIME : 3 HOURS**

PART – III

PHYSICS FOR MATHEMATICS AND CHEMISTRY PAPER-I

SECTION – A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS. (K1)

1. The ratio between shear stress and shear strain is called……..
   a) Young's modulus b) Rigidity modulus
   c) Poisson's ratio d) bulk modulus
2. Compound pendulum is used to determine…….
   a) Young's modulus b) Rigidity modulus
   c) acceleration due to gravity d) bulk modulus
3. Which unit is used in reverberation time……..
   a) decibel b) echo c) Sabine d) sec
4. Laser is obtained due to……..
   a) Scattering of photons b) spontaneous emission
   c) stimulated emission before population inversion
   d) stimulated emission after population inversion
5. The refractive index of core of a optical fiber is……
   a) equal to 1
   b) less than that of cladding material
   c) greater than that of cladding e material
   d) equal to the refractive index of cladding material

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

6. What is torque?
7. Define the term moment of inertia. Write the expression for moment of inertia of a disc.
8. List any two applications of ultrasonic waves?
9. What is population inversion?
10. Define numerical aperture.

(CONTD …. 2)

SECTION – B (5 X 5 = 25 MARKS)

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

(K3)

11. a) What is torque ? Deduce the expression for Torque per unit twist.

(OR)

b) Derive the expression for the bending moment with diagram.

12. a) State and explain the Kepler's law of planetary motion about period of revolution

(OR)

b) Describe the perpendicular and parallel axes theorems.

13. a) What is reverberation? Discuss it with expression for reverberation time.

(OR)

b) List any five industrial applications of ultrasonic waves.

14. a) What are Einestein coefficients? Explain

(OR)

b) Describe the construction and working of a semiconductor laser

15. a) What is optical fiber? Give its construction details.

(OR)

b) Give a note on Fibr optic sensor.

SECTION – C (5 X 8 = 40 MARKS)

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

(K4 (Or) K5)

16. a) Define the following
i) Youngs modudus (E) ii) Rigidity modulus(G)
iii) Bulk modulus(K) and establish the relation between them.
Discuss the limits to the value of $\gamma = (3K-2G)/(6K+2G)$

(OR)

b) Describe an experimental method to determine Youngs modulus of a beam by uniform bending method.

17. a) Determine the gravitational potential and field due to a spherical shell.

(OR)

b) Describe an experimental setup and method of determination of g using compound pendulum.

18. a) What are the factors affecting a Good auditorium? Discuss the factors affecting of acoustics of building and remedies .

(OR)

b) Describe a method to produce Ultrasonic waves using piezoelectric crystals with diagram. Discuss the advantages and disadvantages.

19. a) Describe the construction and working of a CO_2 laser device. Explain its pumbing scheme with energy level diagram

(OR)

b) List the applications of LASER in industry and medical field with explanation.

20. a) Explain the propagation of light through optical fiber with the definition of critical angle.

(OR)

b) What are known as single mode and multimode fibers? Classify them and explain their propagations ability and method of propagation.

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