

KAMARAJ COLLEGE (Autonomous)

Accredited with A+ Grade by NAAC

(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)

THOOTHUKUDI – 628 003

(5 Pages)

Reg. No:

Question Code No : 25001207

Sub Code : 24UMPH11

UG Degree - End Semester Examinations, November 2025

B.Sc. PHYSICS

First Semester

Properties of Matter and Acoustics

(For those who joined in July 2024 onwards)

Time : 3 Hours

Maximum : 75 Marks

PART – A (10 × 1 = 10 Marks)

Answer ALL Questions

Choose the correct answer:

1. The unit of Young's modulus in MKS system is

(a) Nm

(b) N/m²

(c) N/m

(d) Nm²

2. The ratio of lateral stress to longitudinal strain of the material is related to

(a) Young's modulus

(b) Bulk modulus

- (c) Rigidity modulus (d) Poisson's ratio
3. In uniform bending the radius of curvature
- (a) Remains Constant (b) Will change
(c) Zero (d) Infinite
4. If the length of the cantilever is doubled the depression at the loaded end will be
- (a) Doubled (b) Quadrupled
(c) Eight times (d) Sixteen times increased
increased
5. The dimension of surface tension is
- (a) MT^{-2} (b) MLT^{-2}
(c) $ML^{-1}T^{-2}$ (d) MT^2
6. Angle of contact of pure water with clean glass is
- (a) 0° (b) 90°
(c) 180° (d) 72°
7. The period of SHM is
- (a) $2\pi\omega$ (b) $2\pi/\omega$
(c) $\omega/2\pi$ (d) 2π
8. According to law of tension fundamental frequency is directly proportional to the
- (a) Square root of T (b) $1/T$

(c) T (d) T²

9. Intensity of sound is expressed in

(a) W/m² (b) W/m

(c) Wm (d) Wm²

10. Ultrasonic waves

(a) Can travel at the speed of 3×10^8 m/s

(b) Cannot travel in vacuum

(c) Can diffract light in vacuum

(d) None of the above

PART - B (5 X 5 = 25 Marks)

Answer ALL Questions choosing either (a) or (b).

Answer should not exceed 250 words.

11. (a) Define the terms stress, strain and Hooke's law.

(OR)

(b) Find the expression for the work done in twisting a wire.

12. (a) Obtain the expression for bending moment of a beam.

(OR)

(b) What is meant by uniform bending? and explain.

13. (a) Define surface tension. Give suitable example.

(OR)

(b) Give an account of the variation of viscosity with temperature.

14. (a) Explain damped harmonic vibration.

(OR)

(b) State the laws of transverse vibrations of strings.

15. (a) Give a brief account of measurement of sound.

(OR)

(b) Mention any three applications of ultrasonic waves.

PART - C (5 X 8 = 40 Marks)

Answer ALL Questions choosing either (a) or (b).

Answer should not exceed 500 words.

16. (a) Derive the relation between elastic constants

(OR)

(b) Obtain the expression for the rigidity modulus of a wire using torsion pendulum.

17. (a) What is cantilever? Derive the expression for the depression at the loaded end of cantilever.

(OR)

(b) Derive an expression for elevation at the middle of a beam subjected to uniform bending.

18. (a) Obtain an expression for the excess of pressure inside the curved liquid surface.

(OR)

(b) Derive Poiseuille's formula for the rate of flow of liquid through a horizontal capillary tube.

19. (a) Give the theory of forced vibration and obtain the condition for resonance.

(OR)

(b) Describe the experiment to determine A.C frequency of a tuning fork by using sonometer

20. (a) Elaborate the production of ultrasonic waves by piezo electric effect method.

(OR)

(b) Outline an essay about the factors affecting acoustics of buildings.