

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 : 2400121

Sub Code : 24UMPH11

UG Degree - End Semester Examinations, November 2024

First Semester

B.Sc. PHYSICS

Major - 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. Volume strain = ----- x linear strain
 - (a) 3
 - (b) 4
 - (c) 2
 - (d) 1
2. The work done in twisting a wire is stored up in the

wire as ----- energy

- (a) Potential (b) Kinetic
- (c) Mechanical (d) volume

3. In uniform bending the radius of curvature remains as

- (a) Constant (b) Change
- (c) Zero (d) Alter

4. The geometric moment (AK^2) of inertia for a rectangular beam of breadth b , and depth d is

- (a) $bd^3/12$ (b) $\pi r^2/4$
- (c) $\pi r^2/2$ (d) $bd^3/6$

5. SI unit of surface tension is

- (a) N/m (b) N/m^2
- (c) Nm (d) Nm^2

6. The force of attraction between different kinds of molecule is

- (a) Cohesive force (b) Adhesive force
- (c) Spring force (d) Tension force

7. ----- Oscillations reduce in magnitude with time.

- (a) Forced (b) Free
- (c) Damped (d) Both free and forced

8. According to law of tension fundamental frequency is directly proportional to the

- (a) Square root of T (b) $1/T$
- (c) T (d) T^2

9. Loudness or intensity depends not upon the following factors

- (a) Surface area (b) Amplitude
- (c) Density of the medium (d) Vacuum

10. Which of the following method is commonly used in the production of ultrasonic waves

- | | |
|-----------------------------|-----------------------------|
| (a) piezoelectric effect | (b) electrostatic induction |
| (c) magnetostriction effect | (d) magnetic induction |

PART – B (5X5=25 Marks)

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

Answer should not exceed 250 words.

11. (a) Write about the various types of elastic moduli.

(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) Compare and contrast uniform bending and non uniform bending.

13. (a) Differentiate stream line and turbulent flow.

(OR)

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

14. (a) Write a note on Lissajous figure.

(OR)

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

15. (a) Write a note on intensity of sound.

(OR)

(b) Give any three applications of ultrasonic waves.

PART C – (5 × 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) Arrive an expression for torsional couple per unit twist.

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

(OR)

(b) What is meant by uniform bending? Derive an expression for elevation of the bent beam.

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

(OR)

(b) Interpret Poiseuille's formula for the rate of flow of liquid in a capillary tube.

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

(OR)

(b) Explain the determination of A.C frequency of vibrating string using sonometer.

20. (a) Express the production of ultrasonic waves by magnetostriction method.

(OR)

(b) Outline an essay about the factors affecting acoustic bulidings.