LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **PHYSICS**

FIRST SEMESTER - APRIL 2022

16/17/18UPH1MC01 - PROPERTIES OF MATTER AND ACOUSTICS

Date: 24-06-2022	Dept. No.	Max. : 100 Marks
Time	04.00 DM	

Time: 01:00 PM - 04:00 PM

PART A

Q. No Answer ALL questions $(10 \times 2 = 20 \text{ Marks})$

- 1 Define Young's modulus of elasticity.
- 2 Distinguish between uniform and non-uniform bending.
- 3 State Torricelli's theorem.
- What is the effect of temperature on the viscosity of liquid?
- 5 What are cohesive and adhesive forces?
- 6 Define surface tension and give its unit.
- What are longitudinal and transverse waves?
- 8 Write any two properties of stationary waves.
- 9 Define bel and decibel.
- 10 Give any two applications of ultrasonics in industries.

PART B

Answer ANY FOUR questions

 $(4 \times 7.5 = 30 \text{ Marks})$

- Derive an expression for the moment of the couple required to twist one end of a cylinder when the other is fixed.
- Derive Poiseuille's formula for the rate of flow of liquid through a capillary tube.
- Obtain an expression for the excess of pressure inside a curved liquid surface.
- Write down the differential equation of simple harmonic motion and explain the graphical representation of SHM.
- What is a cantilever? Derive an expression for the depression produced at the loaded end of the cantilever.
- State piezoelectric effect. Explain the principle, construction and working of a piezoelectric oscillator to produce ultrasonic waves.

PART C

Answer ANY FOUR questions

 $(4 \times 12.5 = 50 \text{ Marks})$

- Obtain the relations connecting the three moduli of elasticity.
- Explain in detail the Rankine's method of determining the coefficient of viscosity of a gas.
- Differentiate between surface tension and interfacial surface tension. Also describe the drop weight method to determine the interfacial surface tension of a liquid.

20	State Doppler effect and find an expression for the change in frequency of a note (i) When the observer at rest and source in motion. (ii) When the source at rest and observer in motion.		
21	Explain in detail the Koenig's method of determining the young's modulus of elasticity by non-uniform bending.		
22	Define reverberation time. Derive Sabine's formula for reverberation time.		
	######		
			
	2		