



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – PHYSICS

FIRST SEMESTER – NOVEMBER 2023

UPH 1501 – PROPERTIES OF MATTER AND ACOUSTICS

Date: 01-11-2023

Dept. No.

Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

PART – A

Q.No	Answer ALL questions	(10 × 2 = 20 Marks)
1.	What is Hooke's law?	
2.	Define young modulus.	
3.	Differentiate stream line and turbulent motion of liquid.	
4.	Explain co-efficient of viscosity. Give its S.I unit.	
5.	Define surface tension of a liquid. What are its dimensions?	
6.	Define angle of contact.	
7.	Give any two properties of transverse waves.	
8.	Enumerate three properties of a sound?	
9.	Mention any two properties of longitudinal waves.	
10.	What are ultrasonic waves? Give its frequency range.	

PART B

	Answer any FOUR questions	(4 × 7.5= 30 Marks)
11.	Derive the expression for the period of oscillation a torsion pendulum	
12.	Explore Meyer's modification of Poiseuille's formula for the flow of a gas.	
13.	Explain Jaeger's method for determining the surface tension of a liquid.	
14.	Obtain the differential equation for Simple Harmonic Motion and explore its graphical representation.	
15.	Detail the generation of ultrasonic waves using a piezoelectric oscillator.	
16.	Derive an expression for the excess of pressure inside (i) a spherical soap bubble, (ii) a spherical liquid drop.	

PART C

	Answer any FOUR questions	(4 × 12.5= 50 Marks)
17.	Establish the relation among the three elastic constants.	
18.	Describe Bernoulli's theorem and its application	
19.	Explain the drop weight method experiment to determine the surface tension of a liquid.	
20.	State Doppler effect and derive an expression for the apparent frequency of the note for the following cases. (i) Observer at rest and source in motion (ii) Source at rest and observer in motion and	(4.5) (4)

	(iii) Both source and observer are in relative motion	(4)
21.	Discuss the factors, reverberation, resonance, echelon effect, focusing and reflection that affect the acoustics in hall and the remedies for them.	
22.	Highlight some applications of ultrasonic waves.	

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