

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034



B.Sc. DEGREE EXAMINATION – PHYSICS

FIRST SEMESTER – APRIL 2023

PH 1503 – PROPERTIES OF MATTER & ACOUSTICS

Date: 06-05-2023

Dept. No.

Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

PART – A

Q. No. Answer ALL questions (10 x 2 = 20 Marks)

- 1 State Hooke's law.
- 2 Define Poisson's ratio.
- 3 What are adhesive and cohesive forces?
- 4 Define surface tension of a liquid. What are its dimensions?
- 5 Write the principle of vacuum pump.
- 6 Give any two properties of transverse waves.
- 7 What are beats?
- 8 Explain SHM.
- 9 What are ultrasonic waves? Give its frequency range.
- 10 Define "absorption co-efficient of a material" and "reverberation time".

PART – B

Answer any FOUR questions (4 x 7.5 = 30 Marks)

- 11 Obtain an expression for the twisting couple of a cylinder.
- 12 How can the co-efficient of viscosities of two liquids be compared using Oswald viscometer?
- 13 a) Define coefficient of viscosity.
b) Discuss Meyer's modification of Poiseuille's formula for the flow of a gas. (2+5.5)
- 14 Obtain an expression for excess pressure inside a curved liquid surface.
- 15 Derive the differential equation for simple harmonic motion and obtain its solution. Represent simple harmonic motion graphically.
- 16 Discuss any three applications of Ultrasonics.

PART – C

Answer any FOUR questions

(4 x 12.5 = 50 Marks)

- 17 a) Define the three types of elastic moduli.
b) Obtain the relation connecting them. **(2.5+10)**
- 18 Explain the principle and working of Knudsen gauge and discuss the advantages.
- 19 a) Derive Poiseuille's formula for the rate of flow of liquid through a capillary tube.
b) Discuss the effect of temperature and pressure on viscosity. **(10+2.5)**
- 20 What is Doppler effect? Find an expression for the change in frequency when both the source of sound and the observer are in motion.
- 21 a) Describe the piezoelectric method of producing ultrasonic waves.
b) List out the properties of ultrasonic waves. **(7.5+5)**
- 22 Write a note on the factors affecting acoustics of buildings.
