LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc.DEGREE EXAMINATION – **PHYSICS**

FIRST SEMESTER – **APRIL 2019**

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

Date: 03-04-2019   Dept. No.   Max. : 100 Marks

Time: 01:00-04:00

PART-A

Answer ALL the questions   **(10x2=20 Marks)**

1. What is Poisson's ratio?
2. State Hooke's law.
3. Define coefficient of viscosity.
4. State Torricelli's theorem.
5. How does surface tension of a liquid vary with temperature?
6. Define angle of contact.
7. What are transverse and longitudinal waves?
8. Mention any two properties of stationary waves.
9.   Define Intensity of sound.
10. What are Ultrasonic waves?

PART-B

Answer Any Four questions   **(4x7.5=30Marks)**

11. Obtain an expression for the twisting couple of a cylinder.

12. Explain the working of a Venturimeter.

13. Obtain an expression for the excess of pressure inside a spherical liquid drop and a spherical soap bubble.

14. Derive the general differential equation of SHM and sketch the graphical representation of SHM for displacement, velocity and acceleration versus displacement from the mean position.

15. Write a note on ultrasonic waves and any five of its properties.

16. A hall has a volume of $1500m^3$. Its total absorption is equivalent to $100m^2$ of open window. What will be the effect on the reverberation time, if the audience fills the hall and thereby increases the absorption by $100m^2$ of open window?

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PART-C

17. Derive the relation between the three modulii of elasticity.

18. (a) Derive the Poiseuilli's formula for the flow of a liquid through a capillary tube.

 (b) Explain Oswald's method of comparing the coefficients of viscosity of two liquids.

(7.5+5.0)

19. Describe the drop weight method to determine:

 (a) the surface tension of a liquid.

 (b) the interfacial surface tension between water and kerosene. **(7.5+5.0)**

20. Explain Doppler effect and derive an expression for the apparent frequency of the note for the

following cases.

 (a) Observer at rest and source in motion

 (b) Source at rest and observer in motion and

 (c) Both source and observer in relative motion **(6.5+6.0)**

21.(a) Derive Sabine's reverberation formula.

 (b) Discuss the factors affecting the acoustics of buildings. **(8.5+4.0)**

22.(a) Define flexural rigidity and internal bending moment of a beam.

 (b) Prove that for a cantilever of length l carrying a weight W at its free end, the depression at   the

free end is $\frac{Wl^3}{3YI}$ where the symbols have their usual meaning. **(4+8.5)**

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