LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIRST SEMESTER – **NOVEMBER 2017**

17/16UPH1MC01 – PROPERTIES OF MATTER AND ACOUSTICS

Date: 06-11-2017   Dept. No.   Max. : 100 Marks
Time: 01:00-04:00

PART-A (10 x 2 = 20 marks)
Answer ALL questions

1. State Hook's law.

2. Define bending moment.

3. Distinguish between streamline and turbulent motions.

4. State Torricelli's theorem.

5. What are molecular forces?

6. Illustrate obtuse and acute angles of contact.

7. Distinguish between transverse and longitudinal waves.

8. State Doppler effect.

9. What is meant by Bel and decibel?

10. Mention any two applications of Ultrasonic waves?

PART-B (4 x 7.5 = 30 marks)
Answer ANY FOUR questions

11. Define Poisson ratio. Obtain relation between elastic constants and Poisson ratio.   **(2 + 5.5)**

12. Describe the Koenig method to determine the young's modulus by non-uniform bending.

13. State and explain the Bernoulli's theorem. Explain any one application.

14. (i) Obtain an expression for excess pressure inside a curved liquid surface.

    (ii) What would be the excess pressure inside soap bubble of 4 mm radius over that of the atmosphere? S.T of soap solution is taken as 70 x 10^{-3} Nm^{-1}.   **(5+2.5)**

15. Define SHM. Obtain the differential equation of SHM. Also show the graphical representation of SHM.

16. State piezoelectric effect. Explain the construction and operation of a piezoelectric oscillator to produce Ultrasonic waves.

PART-C (4 x 12.5 = 50 marks)
Answer ANY FOUR questions

17. (a) Obtain an expression for bending moment of a rectangular beam. **(5 + 7.5)**

    (b) Describe an experiment to determine the young modulus of a cantilever.

18. (a) Deduce Poiseuille's relation for rate of flow of liquid **(7 + 5.5)**

    (b) Explain the working principle of an Oswald viscometer.

19. Differentiate between surface tension and interfacial surface tension. Also describe the drop weight

    method to determine the interfacial surface tension of a liquid.

20. (a) Describe the Jaeger's method to determine the surface tension of liquid.

    (b) Write a note on the variation of surface tension with temperature. **(7 + 5.5)**

21. Obtain the general equation of simple harmonic waves. Derive expressions for wave velocity and

    particle velocity and relate them.

22. i) Define reverberation time. Deduce Sabine formula for determination of reverberation time.

    ii)A hall of volume 5000 m^3 is found to have a reverberation time of 1.3 s. The sound absorbing

    surface of the hall has an area of 1550 m^2. Calculate the average absorption coefficient.

    (2+ 5.5+5)

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