



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – PHYSICS

FIRST SEMESTER – APRIL 2017

16UPH1MC01- PROPERTIES OF MATTER AND ACOUSTICS

Date: 19-04-2017
09:00-12:00

Dept. No.

Max. : 100 Marks

PART – A

Answer ALL questions:

(10x2=20 marks)

1. Define Poisson's ratio.
2. Explain the term neutral axis in a bar.
3. Distinguish streamline and turbulent motions of a liquid.
4. Write down the unit and dimensions of viscosity.
5. Define the terms molecular range and sphere of influence.
6. An air bubble of radius 0.1mm is situated just below the surface of water. Calculate the excess pressure inside the bubble. S.T. of water=0.072 N/m.
7. Define a plane progressive wave.
8. Explain an organ pipe with its types.
9. What are ultrasonic waves?
10. Define absorption coefficient.

PART – B

Answer any FOUR questions:

(4x7.5=30 marks)

11. Derive the expression for the depression at the loaded end of a cantilever.
12. a) How the coefficient of viscosities of two liquids are compared using Ostwald viscometer
b) What are the advantages of Ostwald viscometer. **(5+2.5)**
13. Brief any five characteristics of a stationary wave.
14. Discuss any five applications of ultrasonic waves.
15. Discuss how the angle of contact of mercury is determined.
16. a) How the absorption coefficient of a material is measured. **(5+2.5)**
b) A hall of volume 5500m³ is found to have a reverberation time of 2.3 sec. The sound absorbing surface of the hall has an area of 750 m². Calculate the average absorption coefficient.

PART – C

Answer any FOUR questions:

(4x12.5=50 marks)

17. Give the theory and experimental method for determining the rigidity modulus of a wire using torsion pendulum. **(5+7.5)**

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

b) Discuss Mayor's modification of Poiseuille's formula for the flow of gas through a capillary tube. **(8.5+4)**

19. a) Describe Jaeger's method of studying the variation of surface tension of water with temperature.

b) Discuss the advantages and disadvantages of the method. **(7.5+5)**

20. a) Explain Doppler effect.

b) Find an expression for the change in frequency of a note when both the source of sound and the observer are in motion. **(2.5+10)**

21. Discuss the salient points associated with good acoustics of an auditorium.

22. a) Define reverberation time and obtain Sabines's formula for it.

b) Explain its significance. **(10+2.5)**
