LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIRST SEMESTER – NOVEMBER 2012

# PH 1503/1502/1501/1500 - PROPERTIES OF MATTER & ACOUSTICS

 Date : 08/11/2012 Dept. No. Max. : 100 Marks

 Time : 1:00 - 4:00

**PART – A**

 **Answer ALL questions: [ 10 x 2 = 20]**

1. Explain the shess – shrain graph law.
2. State the difference between uniform and non-uniform bending.
3. Define coefficient of viscosity of a liquid and give its dimension.
4. How does temperature affect viscosity?
5. How is the surface energy of a liquid related to its surface tension?
6. Give two examples where theory of surface tension is in action.
7. Show the standing wave pattern for the first harmonic of an open ended organ pipe diagrammatically.
8. What is the difference between transverse and longitudinal waves? Are sound waves in air transverse or longitudinal?
9. Give the principle of magnetostriction method of producing ultrasonics.
10. What are the factors affecting the acoustic quality of a building?

**PART – B**

**Answer any FOUR questions: [ 4 x 7.5 = 30]**

1. Compare the loads required to produce equal depressions for two beams made of the same material and having the same lengths and weight with only difference being one has circular cross section while the other has square cross section.
2. Describe the Quinke’s method of determining the surface tension of Mercury.
3. Write a note on (a) Rotary oil pump and (b) Mercury diffusion pump.
4. Discuss the phenomenon of sharpness of resonance and show how it depends upon the damping factor.
5. Derive Sabine’s formula for reverberation time.

**PART – C**

**Answer any FOUR questions. [ 4 x 12.5 = 50]**

1. a) Derive the expression for the depression of the loaded end of a cantilever.

 b) Hence derive the expression for the depression of a beam subjected to non – uniform bending.

 ( 7+5.5 )

17. a) Derive the expression for coefficient of viscosity by Poiseuille’s flow using method of

 dimensions.

 b) How is the formula used to compare the coefficients of viscosity of two liquids using Ostwald

 Viscometer?

 ( 7+5.5 )

 18. a) Explain with theory the Jaegar’s method of determining the surface tension of a liquid.

 b) Write a note on variation of surface tension of a liquid with temperature.

 ( 9+3.5 )

 19. a) What is Doppler effect?

 b) Derive expressions for the apparent frequency of a note when

 (i) Observer is at rest and source is in motion (ii) observer is in motion and source is at rest

 and (iii) observer and source are in motion.

 ( 2+10.5 )

 20. a) What is Piezo electric effect?

 b) Describe the method of producing ultrasonics using Piezo electric effect.

 c) List any three properties of ultrasonics.

 ( 2+7.5+3 )

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