LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION –**PHYSICS**

FIRST SEMESTER – **APRIL 2018**

17/16UPH1MC01– PROPERTIES OF MATTER AND ACOUSTICS

Date: 25-04-2018 Dept. No. Max. : 100 Marks

Time: 01:00-04:00

PART – A

Answer ALL questions: **(10x2=20)**

1. Show that the theoretical limiting values of Poisson's ratio are between -1 and 1/2.
2. State Hooke's law.
3. Define i) critical velocity and ii) terminal velocity
4. What is the effect of temperature on the viscosity of a liquid?
5. Define surface tension and surface energy.
6. State the equation of continuity for flow of a liquid.
7. Define simple harmonic motion.
8. State the difference between transverse and longitudinal waves.
9. Define "absorption co-efficient of a material" and "reverberation time".
10. What is reverberation?

PART – B

Answer ANY FOUR questions: **(4x7.5=30)**

11. a) Calculate the workdone in twisting a wire.

    b) Obtain an expression for the twisting couple of a cylinder **(2.5+5)**

12. a) State Bernoulli's theorm

    b) Describe the Venturimeter. Obtain the rate of flow of water through the pipe. **(2+5.5)**

13. a) Describe Jaeger's method for determining the surface tension of a liquid.

    b) Discuss the advantages of this method **(5+2.5)**

14. Distinguish between progressive and stationary wave.

15. a) What is piezoelectric effect?

    b) Describe Piezo-electric method to produce ultra sonic waves. **(2+5.5)**

16. Derive an expression for the depression at the free end of a cantilever.

PART – C

Answer ANY FOUR questions: **(4x12.5=50)**

17. Obtain an expression to find the internal bending moment of a beam. Use it to calculate the depression of the loaded end of a cantilever and determine the young's modulus of a given beam by non-uniform bending experiment.

18. a) Derive an expression for the rate of flow of a viscous fluid through a capillary tube.

    b) Discuss the Mayer's modification of Poiseuille's formula. **(8.5+4)**

19. a) What is angle of contact?

    b) Explain Quincke's method to determine the surface tension.

20. 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) both observer and source are in motion. **(2+10.5)**

21. Discuss the factors, reverberation, resonance, echelon effect, focusing and reflection that affect the acoustics in hall and the remedies for them.

22. a) Define the three types of elastic modulii.

    b) Obtain the relation connecting them. **(4.5+8)**

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