



**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**

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

**SECOND SEMESTER – APRIL 2013**

**PH 2505 - MECHANICS & STATISTICAL PHYSICS**

Date: 30/04/2013  
Time: 9:00 - 12:00

Dept. No.

Max. : 100 Marks

**PART – A**

**Answer ALL questions:**

**(10 x 2 = 20)**

1. Define radius of gyration.
2. State Bernoulli's theorem.
3. State De Alembert's principle.
4. Define phase space.
5. What is transport phenomena?
6. How does temperature affect the thermal conductivity of gases?
7. State Joule Thomson cooling effect.
8. Define entropy.
9. What is the total number of macrostates of a thermodynamic system consisting of n particles?
10. State the limitations of Maxwell Boltzmann statistics.

**PART – B**

**Answer ANY FOUR questions:**

**(4x 7.5 =30)**

11. Define centre of suspension and centre of oscillation of a compound pendulum. Derive an expression for the time period of oscillation of the pendulum.
12. Derive Hamiltonian's equation of motion.
13. Show that the viscosity of a gas is proportional to the square root of temperature.
14. Derive Clausius Clapeyron's latent heat equation and discuss the effect of pressure on the boiling and melting point of matter.
15. Obtain an expression for mean, rms and most probable speeds of molecules of a gas.

**PART – C**

**Answer ANY FOUR questions:**

**(4 x 12.5 = 50)**

16. Derive an expression for time period of bifilar pendulum with non parallel threads.
17. Derive Lagrange's equation using D'Alembert's principle.
18. Obtain an expression for mean free path of a gas.
19. Derive Meyer's relation for the case of real and Van der Waal's gases.
20. State Maxwell Boltzmann energy distribution law. Derive an expression for the total internal energy and specific heat at constant volume for an ideal gas.

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