



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

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

**THIRD SEMESTER – NOVEMBER 2017**

**PH 3505 – THERMODYNAMICS**

Date: 07-11-2017

Dept. No.

Max. : 100 Marks

Time: 09:00-12:00

**PART – A**

**Answer ALL the questions:**

**(10 x 2 = 20 Marks)**

1. Write the expression for pressure exerted by a gas.
2. What is Brownian motion?
3. Write the equation of state for an ideal gas in an adiabatic process.
4. What is meant by regenerative cooling?
5. Define enthalpy.
6. State second law of thermodynamics.
7. Write Gibbs-Helmholtz equation.
8. Define latent heat of vapourisation.
9. What are microstates and macrostates?
10. How many ways can 2 particles be distributed among 3 states according to M-B statistics?

**PART – B**

**Answer any FOUR questions:**

**(4 x 7.5 = 30 Marks)**

11. Derive the expression for coefficient of thermal conductivity of a gas.
12. Describe the Onne's experimental method to liquefy Helium.
13. (a) Explain intensive and extensive variables.  
(b) Define (i) coefficient of cubical expansion and (ii) adiabatic compressibility.
14. What is Joule-Kelvin effect? Derive the expression for Joule-Kelvin coefficient.
15. Define Phase space. Obtain the relation connecting entropy and thermodynamic probability.

**PART – C**

**Answer any FOUR questions:**

**(4 x 12.5 = 50 Marks)**

16. Derive Maxwell's velocity distribution law.
17. (a) Describe with experimental arrangement, Clement and Desormes method of determining  $\gamma$ .  
(b) Calculate  $\gamma$  for a gas of  $\rho = 12.45 / \text{m}^3$  and  $v = 8.3 / \text{s}$ .
18. (a) Derive Clausius - Clayperon latent heat equation.  
(b) Establish Clausius inequality for a cyclic process.
19. Derive Maxwell's thermodynamic relations.
20. (a) Deduce Planck's law of black body radiation.  
(b) Obtain Wien's law and Rayleigh-Jeans law from Planck's law.

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