LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION –**PHYSICS**

THIRD SEMESTER – **APRIL 2018**

PH 3503 / PH 3505– THERMODYNAMICS

Date: 07-05-2018 Dept. No. Max. : 100 Marks

Time: 01:00-04:00

PART-A

Answer ALL the questions: (10x2=20 Marks)

1. State the principle of equipartition of energy.
2. Find the rms velocity of the oxygen molecules at 27°C.
3. Define regenerative cooling.
4. What is super fluidity?
5. State first law of thermodynamics.
6. Define entropy.
7. What are Helmholtz and Gibbs functions? Relate them.
8. What is Joule –Kelvin effect?
9. Define phase space.
10. State Rayleigh – Jeans law.

PART-B

Answer Any Four questions: (4x7.5=30Marks)

11. Define mean free path and derive an expression for it. **(2.0 + 5.5)**

12. Explain Andrew's experiment on liquefaction of CO_2 with suitable diagram. **(7.5)**

13. Show that entropy remains constant in a reversible process but increases in an irreversible process. **(3.5+4.0)**

14. Explain Temperature -Entropy diagram for Carnot engine and also derive the expression for its efficiency. **(3.5+4.0)**

15. (a) Define microstate and macrostate. **(2.0)**

(b) Explain thermodynamic probability and relate it with entropy. **(5.5)**

16. Derive Maxwell's velocity distribution law.

PART-C

Answer Any Four questions: **(4x12.5=50)**

17. Deduce expressions for coefficient of viscosity of gases and coefficient of diffusion on the basis of transport phenomenon. **(5.0+7.5)**

18. (a) Explain Linde's process of liquefying air with suitable diagram. **(7.5)**

    (b) Explain the properties of Helium II. **(5.0)**

19. (a) Deduce Clausious –ClaperonLatern heat equation. **(7.5)**

    (b) Derive an expression for Clausious inequality. **(5.0)**

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20. Derive Maxwell's thermodynamical equations.

21. Obtain the Bose-Einstein distribution function for an ideal Bose gas.

22. a) Derive Mayer's relation for a reversible adiabatic and isothermal processes.

    b) Describe Clement and Desorme's method of determining C_p/C_v.

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