LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIFTH SEMESTER – **APRIL 2023**

UPH 5502 – THERMAL PHYSICS

Date: 03-05-2023 Dept. No. Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

PART-A

Answer All Questions **(10 x 2 = 20 marks)**

1. Give the kinetic interpretation of temperature.
2. State the principle of equipartition of energy.
3. Write a note on mean free path.
4. What are quasi - static and non-quasi static processes?
5. Define adiabatic lapse rate.
6. State Clausis statement of secons law of thermodynamics.
7. Write the physical significance of entropy.
8. Give the energy equations derived from Maxwell's thermodynamical relations.
9. Define Helmholtz energy.
10. Write the conditions of stable equilibrium for an (a) isothermal – isochoric system (b) isothermal–isobaric system.

PART-B

Answer any FOUR Questions **(4x 7.5 = 30 marks)**

11. Derive the expresstion for pressure excerted by an ideal gas on the walls of a container.
12. State and explain Zeroth law of thermodynamics and hence give an interpretation for the concept of temperature.
13. Explain the first law of thermodynamics and mention its limitations.
14. Derive the heat capacity equation using Maxwell's thermodynamical relations.
15. Explain thermodynamical mnemonic diagrams with proper illustrations.
16. Using parametric eqaution of state obtain the expresion for the change in pressure of a hydrostatic system.

PART-C

Answer any FOUR Questions **(4x 12.5 = 50 marks)**

17. Deduce the Maxwell's law of distribution of molecular speeds in a perfect gas.
18. Derive and discuss the Vander waal's equation of state of a real gas.
19. Describe Carnot's cycle with neat diagram and derive an expresstion for the efficiency of an ideal heat engine.
20. Derive the four Maxwell's thermodynamical relations.
21. Derive first order Clausius –Clapeyron equation.
22. Derive all the three TdS equations. What is the importance of the TdS equations.

$$$$$$$