

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2026**(Regular/Improvement/Supplementary)****PHYSICS****GPHY6B10T: THERMODYNAMICS****Time: 2 Hours****Maximum Marks: 60****SECTION A: Answer the following questions. Each carries two marks.****(Ceiling 20 marks)**

1. State and explain first law of thermodynamics.
2. Write down the Clausius-Clapeyron equation.
3. Compare the slopes of adiabatics and isothermals.
4. Draw a schematic diagram for Carnot refrigerator.
5. Define absolute zero on the thermodynamic scale.
6. State Carnot's Theorem and its corollary.
7. Discuss the term 'equation of state' in thermodynamics.
8. Explain isothermal compressibility.
9. What are extensive and intensive variables? Give examples.
10. Derive the expression for work done in changing the volume of a hydrostatic system.
11. What are the conditions for reversibility of a thermodynamic process?
12. Write a note on TS diagram.

SECTION B: Answer the following questions. Each carries five marks.**(Ceiling 30 marks)**

13. Imagine two systems: a system A in thermal contact with a system B, and the composite system is surrounded by adiabatic walls. Then, show that 'within an adiabatic boundary, the heat lost (or gained) by a system A is equal to the heat gained (or lost) by system B'.
14. Discuss the principle of increase of entropy.
15. Derive the equation of state for a quasi-static adiabatic process.
16. Describe the kinetic theory of ideal gas.
17. Explain how entropy and disorder are connected?
18. One mole of a gas at 127°C expands isothermally until its volume is doubled. Find the amount of work done.
19. Compare the properties of U and H for a hydrostatic system.

SECTION C: Answer any one question. The question carries ten marks.

20. Describe Carnot cycle and obtain an expression for thermal efficiency for an ideal heat engine.
21. Write Maxwell's thermodynamic relations and derive T dS equations.

(1 × 10 = 10 Marks)