

B.Sc. Semester - 4 (NEP-2020) Examination**March/April-2025****PHY: Fundamental Concepts of Thermodynamics (Major-9)****Time: 2:00 Hours****Marks: 50****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate marks.

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- Que-1 Answer any 2 out of 3 following questions. (10)
1. Derive Mayer's formula.
 2. Discuss work done during isothermal and adiabatic processes.
 3. Discuss the Carnot's cycle.
- Que-2 Answer any 2 out of 3 following questions. (10)
1. Explain the entropy change in reversible processes.
 2. Discuss the T-S diagram.
 3. Discuss the relation between entropy and disorder. Also write the applications of entropy principle.
- Que-3 Answer any 2 out of 3 following questions. (10)
1. Discuss the Stefan Boltzmann law.
 2. Explain the distribution of energy in blackbody spectrum.
 3. Discuss the Kirchoff's law and its application.
- Que-4 Answer any 2 out of 3 following questions. (10)
1. Derive the heat capacity equation.
 2. Define thermodynamic potentials. Discuss Gibbs function.
 3. Derive general expression of Maxwell's thermodynamic relation and derive four fundamental thermodynamic relations from it.
- Que-5 Answer any 5 out of 8 following questions. (10)
1. Write the statement of zeroth and first law of thermodynamics.
 2. Discuss any four thermodynamics processes.
 3. Derive the entropy change in adiabatic process.
 4. What is entropy? Give the expression and unit for entropy.
 5. Explain in brief the three ways of heat transfer from one body to another.
 6. Discuss in brief: Rayleigh-Jeans law.
 7. Explain Helmholtz free energy in brief.
 8. Write Clausius Clapeyron and TdS equations.
