

19001697



19001697



Reg. No.....

Name.....

M.Sc. DEGREE (C.S.S.) EXAMINATION, JUNE 2019

Second Semester

Faculty of Science

Branch II : Physics–(A)–Pure Physics

PH 2C 07—THERMODYNAMICS AND STATISTICAL MECHANICS

(2012 Admission onwards)

Time : Three Hours

Maximum Weight : 30

Part A (Short Answer Type Questions)

*Answer any **six** questions.*

Each question carries weight 1.

1. Explain the physical significance of entropy.
2. Represent Carnot's cycle on TS diagram.
3. How entropy is related to disorder ? Explain.
4. What is meant by canonical ensemble ?
5. State and explain equipartition theorem.
6. Explain Rayleigh-Jeans theory for radiation.
7. State the modifications for Einstein's model.
8. What is grand potential ? Explain.
9. Bring out the phase separation in mixtures.
10. Explain order parameter.

(6 × 1 = 6)

Part B

*Answer any **four** questions.*

Each question carries weight 2.

11. Discuss the increase in the entropy in a reversible process.
12. Obtain the thermodynamics for a single particle in a one dimensional box.
13. Bring out the symmetric and anti symmetric wave functions for identical particles.

Turn over





19001697

14. Discuss the conditions for chemical equilibrium with variable number of particles.
15. Obtain the thermodynamic properties of a Fermi gas.
16. Deduce critical exponents.

(4 × 2 = 8)

Part C

Answer all questions.

Each question carries weight 4.

17. (a) Discuss the various thermodynamic quantities and obtain the Maxwell's relations.

Or

- (b) Describe MB distribution of particles. Differentiate it from FD distribution.

18. (a) Discuss the vibrational energy levels of a diatomic molecule along with canonical ensemble.

Or

- (b) Bring out the partition functions for bosons and fermions.

19. (a) Give a vivid picture of grand canonical ensemble.

Or

- (b) Discuss Debye model for vibrations of solids.

20. (a) Bring out the thermodynamics of phase transitions and arrive at the Clausius - Clapeyron equations.

Or

- (b) Describe one dimensional Ising model for phase transitions with salient features.

(4 × 4 = 16)

