

8/7/2019

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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





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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)

