

24P213

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Name :

Reg. No :

SECOND SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2025

(CBCSS-PG)

(Regular/Supplementary/Improvement)

CC19P CHE2 C08 - ELECTROCHEMISTRY, SOLID STATE CHEMISTRY, AND STATISTICAL THERMODYNAMICS

(Chemistry)

(2019 Admission onwards)

Time: 3 Hours

Maximum: 30 Weightage

Section A

Answer any *eight* questions. Each question carries 1 weightage.

1. "The concentration term is replaced by ionic strength in the case of electrolytes" why?
2. Give the relationship between current density and overvoltage.
3. Illustrate the diagram and explain the experimental determination of overvoltage.
4. What is meant by crystal system?
5. Explain the term systematic absences in crystallography.
6. How does band theory distinguish semiconductors from insulators and conductors.
7. Explain the third law of thermodynamics using the concept of thermodynamic probability.
8. Derive the relation between partition functions of individual particles of a system of ideal gas and molecular partition function.
9. What are the assumptions of Bose- Einstein statistics?
10. What is thermionic emission?
11. State and explain debye-falkenhagen effect.
12. What is Sterling's approximation? What is its importance in statistical thermodynamics?

(8 × 1 = 8 Weightage)

Section B

Answer any *four* questions. Each question carries 3 weightage.

13. Relate Einstein's theory of heat capacity of solids with experimental observations.
14. write a note on different types of reference electrodes.
15. Derive an equation for the primary salt effect.
16. Show that fivefold axis is not possible in in crystals.

17. Define Hall effect. Explain how Hall effect can be used to determine the conductivity of semiconductors.
18. Write a note on different type of superconductors.
19. Derive the expression for vibrational partition function.

(4 × 3 = 12 Weightage)

Section C

Answer any *two* questions. Each question carries 5 weightage.

20. write a note on four types of fuel cells and give its advantages and limitations.
21. Discuss briefly the theory of polarography.
22. Write a brief account of the magnetic properties of solids
23. Explain thermodynamic probability using an example. Derive its relation to entropy. How does this relation explain the third law of thermodynamics?

(2 × 5 = 10 Weightage)
