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Name: ....

Reg.No: ....

SECOND SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2024
(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. Write equations for the activity of the following electrolytes in terms of molal concentration 'm' and mean ionic activity coefficient. (i) $LaCl_3$ (ii) $CuSO_4$

2. Discuss electrical double layer.

3. Explain the advantages of overvoltage in electrodeposition and corrosion of metals.

4. Define symmetry opertion and symmetry element

5. Write Hermann-Maugin notation for a) D_{4h}, b) O_h

6. Explain intrinsic semiconductivity.

7. Derive the relation between enthalpy and partition function.

8. Comment on the electronic partiton function of NO.

9. Distinguish between bosons and fermions.

10. What is thermionic emission?

11. Differentiate between macrostate and microstate using an example.

12. What are the assumptions of Fermi-Dirac statistics?

(8 × 1 = 8 Weightage)

Section B

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

13. Write a note on different types of reference electrodes.

14. Discuss the electrode reactions of Ni-Cd and Ni-MH cells. Give it's advantages and limitations.

15. Write a note on Bragg's equation and it applicatons

16. Explain mechanism of luminescence with suitable examples

17. Explain various types of magnetic properties

18. What is the relation between thermodynamic probability and third law of thermodynamics?

19. How does Einstein's theory explain the variation of C_v with temperature?

(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. 1) The catalytic theory. 2) The slow discharge theory. 3) The electrochemical theories

22. Explain in detail the electrical and thermal 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)

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