

D 140646

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Name.....

Reg. No.....

**SECOND SEMESTER M.Sc. (CBCSS) REGULAR/SUPPLEMENTARY DEGREE
EXAMINATION, APRIL 2026**

Chemistry

CHE2C08—ELECTRO CHEMISTRY, SOLID STATE CHEMISTRY AND STATISTICAL
THERMODYNAMICS

(2019 Admission onwards)

Time : Three Hours

Maximum Weightage : 30

Part A*Answer any **eight** questions.**Each question carries a weightage 1.*

1. Write electrode reactions for H_2-O_2 fuel cell under alkaline condition.
2. Devise an electrochemical cell in which the reaction $AgCl_{(s)} \rightarrow Ag^+ + Cl^-$ is taking place.
3. Write Gouy chaapmann model of electrical double layer.
4. Write Ilkovic equation. Explain its significance.
5. Explain with example 'glide plane'.
6. Explain the term 'birefringence'.
7. Distinguish between micro state and macro state.
8. The ortho para ratio of H_2 is 3 : 1. Explain.
9. Calculate the characteristic temperature of HCl. The fundamental vibrational frequency is 2990 cm^{-1} .
10. Electrons never follow Maxwell-Boltzman statistics. Why ?

(8 × 1 = 8 weightage)

Part B*Answer any **six** questions.**Each question carries a weightage 2.*

11. Calculate the mean ionic activity coefficient of $CaCl_2$ in 0.01 molal aqueous $CaCl_2$ solution at 25°C . $A = 0.509$.
12. Discuss the working of $N_c - cd$ secondary cell.
13. Write Butler-volmer equation. Transform into Tafel equation. Explain the significance of slope and intercept of a Tafel plot.

Turn over

14. Draw stereographic projection for a monoclinic system. Discuss.
15. Briefly discuss the working of a the stage laser.
16. How would you calculate equilibrium constant of a reaction from molecular parameters ? Discuss.
17. Derive an equation to find the vibrational contribution towards heat capacity of a gas.
18. Calculate the absolute entropy of He at 0°C. and 1 atm. pressure.

(6 × 2 = 12 weightage)

Part C

Answer any two questions.

Each question carries a weightage 5.

19. Derive Maxwell-Boltzmann distribution law. Discuss.
20. Briefly discuss Bose-Einstein condensation.
21. Write a brief account of the theories of superconductivity.
22. Briefly discuss Debye's theory of heat capacity of solids.

(2 × 5 = 10 weightage)