SECOND SEMESTER M.Sc. DEGREE EXAMINATION, MAY-2017

(Regular/Supplementary/Improvement)

(CUCSS - PG)

CC 15P CH2 C08 - ELECTROCHEMISTRY, SOLID STATE CHEMISTRY AND STATISTICAL THERMODYNAMICS

(Chemistry)

(2015 Admission Onwards)

Time: Three Hours Maximum: 36 Weightage

Section A

(Answer ***all*** questions. Each question has **1** weightage)

1. What are secondary cells? Give two examples.
2. State the assumptions in Debye-Huckel theory.
3. How is diffusion coefficient related to ionic mobility?
4. Calculate the ionic strength of an aqueous solution of 0.001 molal $CuSO_4$.
5. Explain the term 'birefringence'.
6. Write Hermann-Maugin notation for a) D_{3d} b)C_{4v} point groups.
7. What are glide planes and screw axis in crystal symmetry?
8. What is Hall effect? Mention its applications.
9. What is meant by characteristic vibrational temperature?
10. What is Debye's T^3 law?
11. Derive an expression for internal energy in terms of molecular partition function.
12. Find the symmetry number for benzene.

(12x1=12 weightage)

Section B

(Answer ***any eight*** questions. Each question carries **2** weightage)

13. Write Debye-Huckel limiting law. Suggest one method to verify the law.
14. What are the different types of Fuel cells? Give a brief account.
15. What are the factors contributing to over voltage? Discuss.
16. Give a brief account of optical properties of solids.
17. Explain briefly the working of a laser.
18. Write Ilkovic equation. Discuss its importance.
19. Draw stereographic projection for triclinic system. Discuss.
20. Discuss of Cooper theory of superconductivity.

21. Obtain the rotational contribution to heat capacity for a diatomic gas.
22. Show that all particles obey Maxwell Boltzmann statistics under dilute system conditions.
23. Write a note on the different types of ensembles.
24. Derive Maxwell- Boltzmann distribution law.

(8x2=16 weightage)

Section C

(Answer ***any two*** questions. Each question carries **4** weightage)

25. Describe the principles of polarography.
26. Discuss Debye's theory of heat capacity of solids.
27. Derive Bose-Einstein distribution law. Apply Bose-Einstein statistics to a collection of He nuclei and explain Bose-Einstein condensation.
28. Write a brief account of the magnetic properties of solids.

(2x4=8 weightage)

****