

63174

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Name.....

Reg. No.....

SECOND SEMESTER M.Sc. DEGREE EXAMINATION, JUNE 2014

(CUCSS)

Chemistry

CH 2C 05—PHYSICAL CHEMISTRY—I

(2010 Admissions)

Time : Three Hours

Maximum : 36 Weightage

Section A

Answer all questions.

Each question carries a weightage of 1.

1. What is Debye Falkenhagen effect ?
2. Write equation for the activity of the following types of electrolytes in terms of molal concentration and mean ionic activity coefficient :  
(a)  $\text{MX}_3$  ; (b)  $\text{M}_2\text{X}_3$ .
3. Explain the term "Concentration polarization".
4. Define half-wave potential. Explain its significance.
5. Write Hermann-Maugon notation for the following :—  
(a)  $\text{C}_{3v}$  ; (b)  $\text{D}_{4h}$ .
6. Explain with example "glide plane".
7. Explain the term "Brellouin zone".
8. Distinguish between Ferromagnetism and Antiferromagnetism with one example for each.
9. Define Coulomb operator. Explain its significance.
10. What is GTO ? Write one example.
11. Explain with example "bioluminescence".
12. What are the factors affecting nuclear stability ? Explain.
13. Name two IR sources used in spectroscopy.
14. What is the role of "interferometer" in FTIR ? Explain.

(14 × 1 = 14 weightage)

Turn over

**Section B**

Answer any **seven** questions.  
Each question carries a weightage of 2.

15. "Single ion activity coefficient cannot be determined experimentally." Justify the statement.
16. Write Debye Hückel limiting law. Suggest one method to verify the law.
17. What are the advantages of "dropping mercury electrode" in polarography? Discuss.
18. Show that 5-fold axis of rotation cannot exist in solids.
19. Draw stereographic projection for a monoclinic system. Explain.
20. Briefly explain Hartree Fock SCF method.
21. Derive Stern-Volmer equation.
22. Explain the working of a scintillation counter.
23. Briefly explain the detecting system in NMR spectrometer.
24. Discuss briefly "compound nucleus theory of nuclear reactions".

(7 × 2 = 14 weight)

**Section C**

Answer any **two** questions.  
Each question carries a weightage of 4.

25. Derive Debye Hückel Onsager equation.
26. Write a brief account of high temperature superconductors.
27. Briefly discuss the instrumentation in FTIR.
28. Discuss the kinetics of photochemical dimerization of anthracene.

(2 × 4 = 8 weight)