M.Sc. DEGREE (C.S.S.) EXAMINATION, JUNE 2016

Fourth Semester

Faculty of Science

Branch III : Chemistry—Pure Chemistry

CH 4E 03—ADVANCED PHYSICAL CHEMISTRY

(2012 Admissions—Regular)

Time : Three Hours   Maximum Weight : 30

Section A

Answer any **ten** *questions.*
Each question carries a weight of 1.

1. What is meant by mesomorphic state ?

2. What is collision diameter ?

3. What is meant by solubility product principle ?

4. Write a note on fluorescence sensing.

5. What is the principle of Atomic Absorption Spectroscopy AAS ?

6. Write the space groups of a monoclinic system.

7. What are the transport properties of gases ?

8. Give Hermann—Mauguin symbols.

9. Write a note on abnormal ionic conductance.

10. Derive Bragg's equation.

11. What do you mean by Debye-Falkenhagen effect ?

12. What is decomposition potential ?

13. What is the role of supporting electrolyte ?

$$(10 \times 1 = 10)$$

Section B

Answer any **five** *questions.*
Each question carries a weight of 2.

14. Briefly explain theories of liquid crystals.

15. Derive the equations for average, RMS and most probable velocities.

16. Write a note on Novel fluorophores.

Turn over

17. Briefly describe Drude and Nernst's electrostriction model.

18. Prove that a crystal can have only $n = 1, 2, 3, 4, 6$ fold axis of rotational symmetry.

19. Give the importance of Wierl's equation in diffraction studies.

20. What are the advantages of coulometry ?

21. Explain the inter ionic effects use to derive DHO equation.

$(5 \times 2 = 10)$

Section C

Answer any two questions.
Each question carries a weight of 5.

22. Derive Debye Huckel Onsager equation.

23. (i) Discuss the applications of Amperometry in qualitative analysis of anions and cations in solution.

    (ii) Explain : (a) Residual current ; (b) Migration current ; (c) diffusion current ; (d) limiting current density.

24. (i) Derive Maxwell's law of distribution of velocities.

    (ii) Explain transport properties of a gas with reference to viscocity and thermal conductivity.

25. Briefly explain the instrumentation in Fluorescence spectroscopy.

$(2 \times 5 = 10)$