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M.Sc. DEGREE (C.S.S.) EXAMINATION, MAY 2017

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.

- Give notes on Miller indices.
- 2. What is meant by most probable velocity?
- Define screw axis.
- What are pH sensors? Give example.
- 5. What are the disadvantages of AES?
- Write a note on the influence of pressure and temperature on conductance of ions.
- Write notes on Glide planes.
- 8. Write down Ilkovic equation and what are its letters stand for.
- 9. What is half wave potential?
- 10. Define mean free path and collision frequency. How do they vary with pressure and temperature?
- 11. What is liquid junction potential?
- 12. Write the Fourier transform of electron density function.
- Write a note on translational symmetry.

 $(10 \times 1 = 10)$

Section B

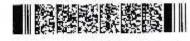
Answer any five questions.

Each question carries a weight of 2.

- Write Debye Huckel limiting law. Suggest one method to verify the law.
- 15. Show that 5-fold axis of rotation cannot exist in solids.

Turn over





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- 16. Briefly describe the methods of characterising crystal structure.
- 17. What are the advantages of "dropping mercury electrode" in polarography? Explain.
- 18. How does viscosity of a gas originate? Derive an expression for viscosity of a gas.
- 19. Write a note on sensing techniques based on collisional quenching.
- 20. Briefly describe the Chemistry of fuel cells with example.
- 21. Write a note on Flame emission spectroscopy.

 $(5 \times 2 = 10)$

Section C

Answer any **two** questions.

Each question carries a weight of 5.

- 22. Explain theories of over voltage
- 23. (i) What is the expression for structure factor, F (hkl) for (a) primitive cubic unit cell; (b) FCC lattice; (c) BCC lattice.
 - (ii) Comment on strong and weak reflections.
- 24. Briefly explain principle and instrumentation of AAS.
- 25. Discuss briefly polarographic method of chemical analysis.

 $(2 \times 5 = 10)$

