

Reg. No. :

Name :

Second Semester M.Sc. Degree Examination, November 2023

Chemistry/Analytical Chemistry/Applied Chemistry/Polymer Chemistry

CH 223/CL 223/CA 223/PC 223 : PHYSICAL CHEMISTRY II

**(Chemistry/Analytical Chemistry/Applied Chemistry : 2016-2019
Admission/Polymer Chemistry : 2018-2019 Admission)**

Time : 3 Hours

Max. Marks : 75

SECTION – A

Answer **any two** among (a), (b) and (c) from each question. Each sub-division carries **2** marks.

1. (a) Write the Schrödinger equation in polar coordinates.
(b) Write the phi and theta equations of non-rigid rotator.
(c) What is HFSCF method?
2. (a) What are overtones?
(b) State mutual exclusion principle.
(c) State Frank-Condon principle.
3. (a) What is meant by predissociation?
(b) Explain Onsager reciprocal relation.
(c) Draw the graphical representation of a 2 component system.

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4. (a) What is isothermal evaporation?
(b) What is meant by microstates?
(c) What are strong and weak electrolytes?
5. (a) What is osmotic coefficient?
(b) What is electrocapillarity?
(c) What is over voltage?

(10 × 2 = 20 Marks)

SECTION – B

Answer either (a) or (b) from each question. **Each** question carries **5** marks.

6. (a) How can you solve multi electron system via HFSCF method?
(b) Solve the theta and phi equations of a rigid rotor.
7. (a) Explain different types of over voltage.
(b) Explain liquid junction potential.
8. (a) Explain Bose-Einstein statistics.
(b) What is the difference between thermal diffusion and thermal osmosis?
9. (a) Write the basic principle behind Raman spectra.
(b) Explain the finger print region in IR spectra.
10. (a) Explain spherical harmonics.
(b) State and explain Le-Chatelier Bra(u)wn principle.

(5 × 5 = 25 Marks)

SECTION – C

Answer **any three** questions. **Each** question carries **10** marks.

11. (a) Solve particle in a ring and obtain the Eigen values.
(b) What are radial and angular functions?
12. (a) Explain the instrumental set up for microwave spectra.
(b) Explain the vibrational spectra of an anharmonic oscillator with selection rules.
13. (a) What are phenomenological relations?
(b) Explain the double salt formation.
14. Explain Fermi Dirac statistics.
15. Explain the Debye-Hückel theory for strong electrolytes.

(3 × 10 = 30 Marks)
