



UTTARAKHAND OPEN UNIVERSITY, HALDWANI (NAINITAL)

**M.Sc. First Year Chemistry***Last Date of Submission:**15 May, 2015***Course Title: Physical Chemistry****Course Code: CHE503****Year: 2014-15****Maximum Marks: 40 Marks****Section 'A'**

Section 'A' contains 08 short answer type questions of 5 marks each. Learners are required to answer 4 questions only. Answers of short answer-type questions must be restricted to 250 words approximately.

Briefly discuss the following:

1. Describe corrosion with examples.
2. Derive the Schrodinger's wave equation.
3. State the following:
  - (a) Hamiltonian operator?
  - (b) Joule Thomson Effect.
4. What do you understand by the term fugacity? What will be the value of fugacity of the real gas above its Boyle temperature.
5. Write a note on Basic Quantum Chemistry.
6. Write a short note on:
  - (a) Transport number.
  - (b) Hydrogen Electrode
7. What is the liquid junction potential? Explain the method to determine liquid junction potential.
8. What is First order of reaction? Derive Integrated rate Law equation for first order of reaction.

**Section 'B'**

Section 'B' contains 04 long answer-type questions of 10 marks each. Learners are required to answer 02 questions only.

1. Write down the Eigen function and Eigen values of a particle in a one dimensional box. Calculate the normalization constant.

2. (a) Describe the first order perturbation theory.  
(b) What is overvoltage?  
(c) State the different form of Third law of Thermodynamics.  
(d) Discuss transition state theory of reaction rates.
3. Derive Debye-Huckel- Onsagar equation and its verification.
4. Discuss the following:
  - (a) Derive the Arrhenius equation.
  - (b) Discuss transition state theory of reaction rates.
  - (c) Derive Carnot Cycle.

