UTTARAKHAND OPEN UNIVERSITY, HALDWANI (NAINITAL)
उत्तराखंड मुक्त विश्वविद्यालय, हल्द्वानी (नैनीताल)

M.Sc.First Year Chemistry

Last Date of Submission: ***15 May, 2014***

Course Title: Physical Chemistry
Course Code: CHE503
Year: 2013-14 **Maximum Marks: 40 Marks**

Section 'A'

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

Briefly discuss the following:

1. Dwerive to Hamiltanian operator for a one Dimensional Harmonic Oscillator.
2. Discuss the shape of various orbitals.
3. State the following:
   (a) Statement of First law of Thermodynamics and its limitation?
   (b) Jule Thomson Effect.
4. What is liquid Junction potential? How do youeliminate liquid junction potential?
5. Explain Hammett equation.
6. Derive the following derivation:
   (a) C_P-C_v= R
   (b) Determination of Transport number
7. What is Ionic Strength? Calculate the strength of (a) 0.04 mole $K_2S_2O_8$ and (b) 0.05 mole of $Al_2(So_4)$.
8. What is First order of reaction? Derive Intregrated rate lao equation for first order of reaction.

Section 'B'

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

1. What are the limitations of Second law of Thermodynamics? State and Explain Thied law of Thermodynamics.
2. (a) What is operator? State Hamiltonian operator.
   (b) What is Born-oppenheimer approximation?
   (c) Explain the term States of system and state function.
   (d) Explain Hydrogen electrode.
3. Derive Debye-Huckel- Onsagar equation and its verification.
4. Discuss the following:
   (a) Discuss the mechanism of Enzyme catalysis.
   (b) Joblonsky diagram.
   (c) Derive Carnot Cycle.