



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

M.Sc. CHEMISTRY (MSCCH-12)

ASSIGNMENT- FIRST YEAR

Last Date of Submission: 15 May

जमा करने की अन्तिम तिथि: 15 मई

Cosourse Title: Physical Chemistry

Course code: CHE503

Year: 2012-13

Maximum Marks : 40

Section 'A'

भाग क

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. What is Schrodinger Wave equation ? How it is derived? Give also the interpretation of ψ .

Or

Discuss the important postulates of quantum mechanics

2. What is a molecular orbital? Also write a short note on LCAO approximation.

3. Derive the Kirchoff's equation . Calculate ΔH° at 85°C for the reaction-



substance	$\text{Fe}_2\text{O}_3(\text{s})$	$\text{Fe}(\text{s})$	$\text{H}_2\text{O}(\text{l})$	$\text{H}_2(\text{g})$
$C_p^\circ, \text{cal./deg/mole}$	25.0	6.1	18.0	6.9

4. Discuss Carnot cycle and cyclic transformations. And give various statements of Second law of Thermodynamics.
5. Write short notes on- i) Nernst Equation ii) Transport number iii) Hydrogen electrode
iv) Liquid junction potential
6. Derive Debye – Huckel – Onsagar equation.
7. Discuss transition state theory of reaction rates.
8. What is effect of structure on reactivity? Derive Hammet equation. Why Taft had to propose his equation ?

Section 'B'

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

1. Derive the Hamiltonian for hydrogen like atoms. What are various quantum numbers? Discuss the shapes of various orbitals.

2. Derive Maxwell's relations. Why are they called fundamental equations of thermodynamics? Discuss the properties of the free energy function 'G' .
3. What is corrosion? Mention different forms of corrosion. Write in detail the protective coatings. method for protecting the metal from corrosion under the head i) Metallic coatings and metal cladding ii) non-metallic coatings iii) Organic coatings.
4. Derive a rate law for i) opposing reactions ii) parallel reactions and iii) consecutive reactions.