



UTTARAKHAND OPEN UNIVERSITY, HALDWANI (NAINITAL)

M.Sc. First Year Chemistry*Last Date of Submission:**15 May, 2015***Course Title: Inorganic Chemistry****Course Code: CHE501****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. Explain in brief the thermodynamic stability and kinetic stability of metal complexes.
2. What is Point group symmetry? Give detail C_{3V} and D_{3d} Symmetry.
3. Determine the Point groups of the following molecules; $SOCl_2$, H_2S , NH_3 , C_6H_6 , C_2H_4 , and H_2O .
4. Explain the factors that favour cluster formation.
5. Differentiate the active site structure of Hemerythrin and hemoglobin.
6. CO is both an σ -donor and π -acceptor- Explain.
7. Explain the following:
 - (a) Chelate effect
 - (b) Jahn- Teller Effect
8. How are metal d-orbitals split in trigonal planar and linear geometries.

Section 'B'

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

1. (a) What is crystal field splitting? How it is determined.
(b) Draw the molecular orbital diagram of CO and explain its feature.
(c) Discuss the factors that influence the stability of metal complexes.
2. (a) What are bonding and antibonding molecular orbitals? Draw the molecular orbital diagram for $[PtCl_4]^-$ complex and explain.
(b) State HSAB rule and explain the applications of this rule.
3. State the following:

- (a) L-S coupling.
- (c) Symmetry selection and Spin selection rule.
- (d) Reductive Elimination reactions.
4. What is Orgel diagram? Explain electronic spectra of $d1$, $d9$ and $d2n$ octahedral complexes with the help of Orgel diagram.

