

CHE-501**Inorganic Chemistry-1****M.sc. Chemistry (MSCCH – 12/13/16/17****First Year, Examination-2019****Time: 3 Hours****Max. Marks: 80**

Note : This paper is of Eighty (40) marks containing three (03) Sections A,B and C. Learners are required to attempt the questions contained in these sections according to the detailed instructions given there in.

Section-A**(Long Answer Type questions)**

Note : Section 'A' contains four (04) long-answer-type questions of Nineteen (19) marks each. Learners are required to answer any two (02) questions only.

1. Discuss the reaction mechanism ($S_N + S_{N2}$) Of base hydrolysis in octahedral complexes
2. Explain how the group theory has been helpful in determining the atomic orbiters of central metal atom for hybridization in different inorganic molecules.
3. Discuss the sigma and pi-bending in octafudral complexes on the basis of molecular orbital theory.
4. Write short notes on:
 - (i) Stability constant and its determination
 - (ii) Wade's Rule and the cluster structures.

Section-B
(Short Answer Type Questions)

Note: Section 'B' contains eight (08) short answer type questions of four (08) marks each. Learners are required to answer four (04) questions only.

1. Explain improper rotation and improper axis of Rotation with example.
2. What do you understand by the terms labile and Inert complexes, explain giving examples.
3. Relate the symmetry of molecule with optical activity.
4. How does the CFT explain colour of coordination compounds ?
5. Discuss the structure of $[\text{Fe}_2(\text{CO})_9]$
6. Give a brief note on spin- selection rule.
7. Draw and explain Orgel diagram of d^7 configuration in octahedral field.
8. Discuss outer sphere mechanism of electron transfer reaction in an octahedral complexes.

Section-C

Note: Section 'C' contains ten (10) objective type questions of one (1) mark each. All the questions of this section are compulsory.

Choose the correct answer.

- The Skeletal electron pairs present in $[\text{Rh}_6\text{Cco}]_{16}$ are
 - 5
 - 6
 - 7
 - 8
- The symmetry point group for POCl_3 molecule is
 - D_{6h}
 - C_{3v}
 - C_{2h}
 - D_{2h}
- The central metal ion of a high spin complex has five electrons in its d- level. The calculated value of u spin only would be
 - 2.83 BM
 - 5.82 B M
 - 2.73 BM
 - 5.92 BM
- Which of the following should be coloured complex?
 - Cu^+ complex
 - Ti^{4+} complex
 - Sc^{3+} complex
 - None of the above
- Which of the following metals is an important Constitent of chlorophyll?
 - Mg^{2+}
 - Mn^{2+}
 - Mo^+
 - Zn^{2+}

6. For the greater impact on crystal field splitting which of the following statements is correct?
- Ligand with higher negative charge.
 - Ligand of smaller size
 - Ligand with good sigma donor or acceptance property.
 - all the statements are correct
7. The cytochrome metallo-enzyme contains
- Fe (II)
 - Mg (II)
 - Ca (II)
 - Zn (II)
8. The S_N2 reaction in inorganic octahedral complex, would preferably proceed through the reaction intermediate
- Pentagonal bipyramidal
 - Octahedral wedge
 - Trigonal bipyramidal
 - Square pyramidal
9. The electronic spectra of transition metal in complexes are observed in which of the following range?
- Visible
 - UV
 - UV / Visible
 - IR
10. Which one of the following complex ions will have highest frequency of maximum absorption?
- $[TiF_6]^{3-}$
 - $[TiCl_6]^{3-}$
 - $[Ti(H_2O)_6]^{3+}$
 - $[Ti(CN)_6]^{3-}$
