

B.Sc.(Part-II) (CBCS Pattern) Semester - IV
USCCHT07 - Chemistry Paper-I (Inorganic Chemistry)

P. Pages : 2

Time : Three Hours



GUG/S/23/12000

Max. Marks : 50

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- Notes : 1. All **five** questions are compulsory and carry equal marks.
2. Write chemical equation and draw diagram whenever necessary.

1. a) What are the postulates of Werner's Theory? Discuss Werner's Theory with suitable example. 5
- b) What is geometrical isomerism? Explain geometrical isomerism shown by four coordinated complexes. 5

OR

- c) Write a note on EAN concept? Calculate EAN of $[\text{Fe}(\text{CN})_6]^{4-}$ complex ion ($Z=26$). 2½
- d) Give the postulates of Valence Bond Theory of transition metal complexes. 2½
- e) What are chelates? Describe the various types of chelates. 2½
- f) Explain the following with suitable examples. 2½
- i) Ionization isomerism.
- ii) Linkage isomerism.
2. a) What is the SHAB principle? Describe any three applications of SHAB principle. 5
- b) What are Latimer diagram? How are they represented? Explain with suitable example. 5

OR

- c) Discuss Frost diagram for oxygen. 2½
- d) Explain the term symbiosis with suitable example. 2½
- e) Write a short note on redox stability in water. 2½
- f) Discuss pourbaix diagram. 2½
3. a) What are the postulates of crystal field theory? Explain the splitting of d-orbitals in octahedral complexes. 5
- b) Discuss the electronic spectrum of $[\text{Cu}(\text{H}_2\text{O})_6]^{2+}$ in details. 5

OR

- c) Explain, how nature of central metal ion affected to the crystal field splitting energy. 2½

- d) Explain John-Teller effect with suitable example. 2½
- e) Write the limitations of Valence Bond Theory of coordination compounds. 2½
- f) The crystal field splitting energy for $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$ is $20,100\text{cm}^{-1}$. Calculate the crystal field stabilization energy (CFSE) for this complex. 2½
4. a) Explain the stepwise and overall formation constant. How they are related with each other? Explain with suitable example. 5
- b) Draw a well labelled diagram of double beam photoelectric colorimeter. Discuss its quantitative application. 5

OR

- c) State Beer-Lambert law. Explain its deviation. 2½
- d) Discuss the single beam spectrophotometer with well labelled diagram. 2½
- e) How does the nature of ligand affect the stability of the complexes. 2½
- f) Explain the Job's method for determination of composition of Fe(III)-SSA complex. 2½
5. Attempt **any ten** of the following. **1x10**
=10
- i) Write the IUPAC name of following complexes.
- a) $\text{K}_4[\text{Fe}(\text{CN})_6]$ b) $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$
- ii) What is Ligand?
- iii) Why tetrahedral complexes not shown the cis-trans isomerism?
- iv) Define disproportionation.
- v) Classify the following into hard and soft acids.
 $\text{H}^+, \text{Li}^+, \text{Ag}^+, \text{Au}^+$
- vi) Draw the splitting diagram of tetrahedral complex.
- vii) What is hole formalism?
- viii) State Laporte selection rule.
- ix) What is the relation between Δ_o, Δ_t and Δ_{sp} ?
- x) What is λ_{max} ?
- xi) Define labile and inert complex.
- xii) Define kinetic stability of metal complexes.
