

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

P. Pages : 2

Time : Three Hours



**GUG/W/24/12000**

Max. Marks : 50

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1. a) What do you mean primary and secondary valences? Explain the formation of Cobalt amine complexes on the basis of Werner's theory. 5
- b) What is Isomerism? 5  
Explain  
i) Ionization and  
ii) Linkage isomerism with suitable examples.

**OR**

- c) What is EAN Rule? Explain with example. 2½
- d) What are chelates? Give its application. 2½
- e) Explain Hydrate isomerism with suitable examples. 2½
- f) Give the postulates of valence bond theory. 2½
2. a) What is Pearson's HSAB Principle? Discuss any two applications of HSAB Principle. 5
- b) What is Frost diagram? Discuss the Frost diagram for manganese in acidic & basic medium. 5

**OR**

- c) Write a short note on Redox stability in water. 2½
- d) Explain Latimer diagram with example. 2½
- e) What are comproportionation and disproportionation reactions. Give one example of each. 2½
- f) How hardness of acids or bases depend on electronegativity. 2½
3. a) What are the postulates of crystal field theory. Discuss the splitting of d-orbital in octahedral complex. 5
- b) Discuss the electronic spectra of  $[\text{Cu}(\text{H}_2\text{O})_6]^{2+}$  complex in details. 5

**OR**

- c) Explain John-Teller effect. 2½
- d) Explain the effect of nature of ligand on crystal field splitting. 2½
- e) Write limitation of Valence Bond Theory of coordination compounds. 2½
- f) Calculate CFSE of  $\text{CO}^{3+}$  ion in strong and weak field of octahedral complexes. 2½
4. a) What is the stepwise and overall stability constant? How are they related to each other? Explain with suitable example. 5
- b) State Beer-Lambert Law? Give its deviation. Draw the well labelled diagram of double beam photoelectric colorimeter. 5

**OR**

- c) Explain Job's method of determination of composition of Fe(III)-SSA complex. 2½
- d) Give the application of colorimeter & spectrophotometer in quantitative analysis. 2½
- e) How does the nature of ligand affects the stability of metal complexes. 2½
- f) Explain the principle of single beam spectrophotometer with suitable diagram. 2½
5. Attempt **any ten**. 10
- i) Define co-ordination isomerism.
- ii) What is double salt?
- iii) Write IUPAC name of:
- a)  $[\text{Cr}(\text{H}_2\text{O})_4\text{Cl}_2]\text{NO}_3$       b)  $\text{Fe}(\text{CO})_5$
- iv) What are Pourbaix diagrams?
- v) What is symbiosis?
- vi) Write Nernst's equation of single electrode potential.
- vii) What is Spectrochemical series?
- viii) List the steps involved in quantitative chemical analysis using colorimetry.
- ix) What is Laporte selection rule?
- x) What are inert and labile complex?
- xi) What is principle of photometry?
- xii) Define thermodynamics stability of metal complex.

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