B.Sc. (Part-II) (CBCS Pattern) Sem-IV

# USCCHT07 - Chemistry Paper-I : Inorganic Chemistry

P. Pages : 2 **GUG/W/22/12000**

Time : Three Hours * 0 6 8 3 * Max. Marks : 50

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Notes :
1. All questions carry equal marks.
2. Diagrams and Chemical equation should be given wherever necessary.
3. Illustrate your answers wherever necessary with the help of neat sketches.
4. Use of slide rule, Logarithmic tables, Steam tables, Mollier's chart, Drawing instruments, Thermodynamic tables for moist air, Psychrometric charts and Refrigeration charts is permitted. Non programmable electronic calculator is allowed.
5. Discuss the reaction, mechanism wherever necessary.

**1.** a) What do you means primary and secondary valances? Discuss Werner theory with cobalt amine complex. **5**

b) What is Stereoisomerism? Discuss the Geometrical isomerism in four coordinated complex. **5**

**OR**

c) What is EAN Rule? Explain with example. **2½**

d) What are chelate? Give it's application. **2½**

e) Explain Ionization and Hydrate isomerism with one example of each. **2½**

f) Explain $\left[Ni(CN)_4\right]^{2-}$ is square planar while $\left[NiCl_4\right]^{2-}$ is tetrahedral complex, by using V.B.T. concept. **2½**

**2.** a) What do you means Pearson's SHAB concept? Describe any two application of it. **5**

b) What is Frost diagram? Discuss the Frost diagram for magnese in acidic & basic medium. **5**

**OR**

c) Write a short note on Redox stability in water. **2½**

d) Explain Lattimer diagram with example. **2½**

e) What are comproportionation and disproportionation reaction. Give one example of each. **2½**

f) How hardness of an acid or bases depend on electronegativity. **2½**

**3.** a) What are the postulates of crystal field theory. Discuss crystal field splitting of d-orbitals in square planar complex. **5**

b) Discuss the electronic spectra of $\left[Cu(H_2O)_6\right]^{2+}$ 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 V.B.T. of coordination compounds. **2½**

f) Calculate CFSE of $CO^{2+}$ 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 it's 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 calorimeter & spectrophotometer in quantitative analysis. **2½**

e) How does the metal ion affects the stability of metal complexes. **2½**

f) Explain the principle of single beam spectrophotometer with suitable diagram. **2½**

**5.** Attempt **any ten.** **1x10**

i) Define linkage isomerism.

ii) What is double salt?

iii) Write IUPAC name of:

a) $[Cu(NH_3)_4]SO_4$

b) $[Ti(H_2O)_6]^{3+}$

iv) What are Pourbaix diagrams?

v) What is symbiosis?

vi) Write Nernst's equation of single electrode potential.

vii) Which one show strong distraction? Why?

$d^5, d^8, d^9, d^{10}$

viii) Give the relationship bet$^n$ $\Delta_0$ & $\Delta t$ .

ix) What are 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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