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

USCCHT07 - Chemistry Paper-I (Inorganic Chemistry)

P. Pages : 2 **GUG/W/23/12000 (S)**

Time : Three Hours * 8 3 1 8 * Max. Marks : 50

Note : 1. All five question are compulsory and carry equal marks.
2. Write chemical equations and draw diagrams wherever necessary.

1. a) What is geometrical isomerism? Explain geometrical isomerism shown by six coordinated complexes. **5**

b) Write the postulates of Werner's theory? Explain the bonding in $CoCl_3 \cdot 3NH_3$ and $CoCl_3 \cdot 5NH_3$? **5**

OR

c) Define EAN. Calculate effective atomic numbers of the following complexes. **2½**

i) $[Ni(CO)_4]$ $Z = 28$ ii) $[Fe(CN)_6]^{4-}$ $Z = 26$

d) What are chelates? Describe the different types of chelates. **2½**

e) On the basis of VBT explain why $[NiCl_4]^{2-}$ is tetrahedral whereas $[Ni(CN)_4]^{2-}$ is square planar? **2½**

f) Explain optical isomerism in six coordinated complexes. **2½**

2. a) What is frost diagram? Discuss the frost diagram for manganese in acidic and basic medium . **5**

b) What is the SHAB principle? Describe any four application? **5**

OR

c) Discuss the Pourbaix diagram of iron species. **2½**

d) Write short note on redox stability in water. **2½**

e) Write a note on Latimer diagram. **2½**

f) How hardness of an acids or bases depends on electronegativity? **2½**

3. a) Discuss the various factor's affecting the magnitude of 10 Dq. **5**

b) Discuss in details the electronic spectrum of $[Cu(H_2O)_6]^{2+}$ complex ion. **5**

OR

c) Discuss the limitations of valence Bond theory. **2½**

d) The value of Δ_o for $\left[Cr(H_2O)_6\right]^{3+}$ complex is $17400\,cm^{-1}$. Calculate the crystal field stabilization energy for this complex in $kJ\,mol^{-1}$. **2½**

e) Explain the splitting of d-orbital in octahedral complex. **2½**

f) Explain John-Teller effect using suitable example. **2½**

4. a) Draw a well labelled diagram of double beam spectrophotomer. Discuss its applications. **5**

b) Explain the term thermodynamic stability and kinetic stability. What is the correlation between them. **5**

OR

c) Describe the Job's method for determination of Fe (III) – SSA complex. **2½**

d) How nature of the coordinating group factor's affects stability of complex. **2½**

e) State Beer-Lambert low. Explain its deviations. **2½**

f) Explain single beam photoelectric calorimeter with suitable diagram. **2½**

5. Attempt **any ten** of the following. **10**

a) What is co-ordination number?

b) Define EAN rule.

c) What is double salt?

d) Define symbiosis.

e) Write Nearst equation of single electrode potential.

f) What is disproportionation.

g) Define low spin complex.

h) Define spin selection rule.

i) Give relationship between Δo and Δt.

j) What are labile and inert complexes.

k) What is mean by domain?

l) What is effect of steric hindrance on stability of complex.

****