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

USCChT07 - Chemistry : Paper-I (Inorganic Chemistry)

P. Pages : 2 **GUG/S/19/12000**

Time : Three Hours * 3 7 8 6 * Max. Marks : 50

---

1. a) What do you understand by primary and secondary Valencies? Discuss Werner's theory with suitable example. **5**

b) What is isomerism? Discuss the type of structural isomerism with one example of each. **5**

OR

c) Write a note on EAN concept? Calculate EAN in the following complexes ion. **2½**

i) $\left[Fe(CN)_6\right]^{4-}$ ii) $\left[Cu(CN)_4\right]^{2-}$

d) What are chelates? Describe the various type of chelates. **2½**

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

f) On the basis of V. B. T., explain that $\left[Ni(CN)_4\right]^{2-}$ is square planner while $\left[NiCl_4\right]^{2-}$ is tetrahedral complexes. **2½**

2. a) What is the SHAB principle? Describe any three application of this principle. **5**

b) What are Latimer diagram? How are they represented? Explain with suitable example. **5**

OR

c) How hardness of an acids or bases depends on electronegativity. **2½**

d) What is pourbaix diagram? Draw it for iron species. **2½**

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

f) Draw the frost diagram of Nitrogen in acidic and basic solution. **2½**

3. a) What are the postulates of crystal field theory. Discuss crystal field sphting of d-orbitals in octahedral complexes. **5**

b) i) discuss the electronic spectra of $\left[Ti(H_2O)_6\right]^{3+}$ in detail. **5**

OR

c) Calculate CFSE of CO^{2+} ion in strong and weak field of octahedral complexes. **2½**

d) Write limitation of V. B. T. of coordination compounds. **2½**

e) Explain John – Teller effect with suitable example. **2½**

f) Write a note on **2½**
i) Spectrochemical series. ii) Spin selection rule

4. a) What is the stepwise and overall stability constant? How are they related with each other? Explain with suitable example. **5**

b) State Beer-Lambert law. Give it's deviation. Draw well labelled diagram of single beam spectrophotometer. **5**

OR

c) Explain double beam photoelectric colorimeter with suitable diagram. **2½**

d) Describe the mole ratio method of determination of composition of Fe^{III} - SSA complex. **2½**

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

f) Give the application of calorimeter and spectrophotometer in quantitative analysis. **2½**

5. Attempt **any ten** of the following. **1x10 =10**

a) What is double salt? Give one example.

b) Define co-ordination number.

c) Write IUPAC Name of the complexes.
i) $K_4\left[Fe(CN)_6\right]$ ii) $\left[Cu(NH_3)_4\right]So_4$

d) Classify the following into hard and soft acids
H^+, Li^+, Ag^+, Au^+

e) Write Nernst equation of single electrode potensial.

f) What is disproportion?

g) Define λ max

h) Give the relationship between Δo and Δt

i) State Laporte selection rule.

j) What are Labile and inert complexes?

k) What is principle of photometry.

l) Define kinetic stability of metal complexes.

****