B.Sc. - II (CBCS Pattern) Semester-IV

USCCHT07 - Chemistry Paper-I - Inorganic Chemistry

P. Pages : 2 **GUG/S/25/12000(S)**

Time : Three Hours * 4 7 0 7 * Max. Marks : 50

Notes : 1. All questions are compulsory.
2. All questions carry equal marks.

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 structural isomers. **5**

OR

c) Define EAN concept? Calculate EAN in the following complexes ion $[Fe(CN)_6]^{-4}$ **2½**

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

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

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

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

b) What is the SHAB principle? Describe any three applications of SHAB principle. **5**

OR

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

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

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

f) What is Pourbaix diagram? Draw it for iron species. **2½**

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

b) Define electronic spectra and discuss the electronic spectra of $[Ti(H_2O)_6]^{+3}$ complex in detail. **5**

OR

c) The crystal field splitting energy for $[Cr(H_2O)_6^{3+}$ is $20100\,cm^{-1}$ calculate the CFSE for this complex in kJ/mole. **2½**

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

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

f) Define selection rule and write a note on laporate selection rule. **2½**

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) Define Calorimeter and discuss its type. **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. **10**

a) What is double salt? Give one example.

b) Define co-ordination number.

c) Define CFSE

d) Give any two examples of hard acid and hard base.

e) Write Nernst equation of single electrode potential.

f) What is disproportion?

g) Define λ max.

h) Define ligand.

i) Define geometrical isomerism.

j) What stable & unstable complex.

k) What is the statement of beers lamberts law.

l) Write role of monochromator.

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