B.Sc. (with Credits)-Regular-Semester 2012 Sem VI

B.Sc.4510 - Chemistry Paper-I : Inorganic Chemistry

P. Pages : 2 **GUG/S/18/5627**

Time : Three Hours * 1 6 5 8 * Max. Marks : 50

Notes : 1. All **five** questions are compulsory and carry equal marks.
2. Write chemical reactions and draw diagram wherever necessary.

1. a) Explain crystal field splitting in case of tetrahedral complexes with suitable example. **5**

b) Discuss in detail the electronic spectrum of $[Ti(H_2O)_6]^{3+}$ complex ion. **5**

OR

c) Discuss the limitations of valence Bond Theory. **2.5**

d) The value of Δ_0 for $[Cr(H_2O)_6]^{3+}$ complex is $17,400\,cm^{-1}$. Calculate the crystal field stabilization energy far this complex in $kJ\,mol^{-1}$. **2.5**

e) State and explain spectrochemical series. **2.5**

f) Explain John-Teller Effect using suitable example. **2.5**

2. a) Discuss spin only formula and orbital contribution to the magnetic moment. **5**

b) Explain the terms thermodynamic stability and kinetic stability. What is the correlation between them? Explain with suitable example. **5**

OR

c) Describe the Job's method of continuous variation method for the determination of Fe (III) – SSA complex. **2.5**

d) How nature of the co-ordinating group factor's affects stability of complex? **2.5**

e) Why, tetrahedral complexes are always high spin in nature? **2.5**

f) $[Fe(CN)_6]^{3-}$ ion is paramagnetic while $[Fe(CN)_6]^{4-}$ ion is diamagnetic in nature. Explain on the basis of CFT. **2.5**

3. a) Draw a well labelled diagram of double beam spectrophotometer. Discuss its applications. **5**

b) Describe principle and technique used in solvent extraction. **5**

OR

c) Discuss the types of paper chromatographic techniques. **2.5**

d) Discuss double beam photoelectric colorimeter with well labelled diagram. **2.5**

e) Write a note on ion – exchange capacity. **2.5**

f) Describe various reasons for the deviation from Beer-lamberts law. **2.5**

4. a) Give any one method for preparation of alkyl and aryls of mercury and discuss their structure and bonding. **5**

b) What are metalloporphyrins? Explain in details the biological role of hemoglobin and and myoglobin in transport of oxygen. **5**

OR

c) Give any two methods of preparation of alkyl aluminium. **2.5**

d) Discuss the functions of calcium in biological system. **2.5**

e) Write a short note on Entisols. **2.5**

f) Discuss the procedure for taking soil sample. **2.5**

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

i) Write any two postulates of CFT.

ii) State laporte selection rule.

iii) Define d – d transition.

iv) Calculate magnetic moment of Mn^{2+} ion.

v) What is role of pH in complex formation.

vi) Draw a well labelled diagram of Gauy's balance.

vii) Define λ_{max}.

viii) Define the term Elution.

ix) Calculate R_f value far Ni^{2+}, if distance travelled by solvent and Ni^{2+} are 8.5cm and 1.5cm resp.

x) Write any two soil group found in India.

xi) What is Hypocalcemia.

xii) Write any two macrominerals.

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