(C) Write a note on Silicone elastomers. 2½

(D) Write uses of silicone oils. 2½

(E) What happens when $(NPCl_2)_3$ is treated with :

(i) Moist air and

(ii) Excess NH_3 ? 2½

(F) Write one method of preparation of each :

$(NPCl_3)_3$ and $(NPCl_3)_4$. 2½

5. Attempt any **TEN** of the following :

(i) Explain effect of geometry on 10 Dq.

(ii) State Laporte selection rule.

(iii) Calculate CFSE value for d^6 tetrahedral.

(iv) Write CFT configuration and predict number of impaired electrons in $[CoCl_4]^{2-}$ ion.

(v) Calculate magnetic moment of weak field d^5 octahedral complex using CFT.

(vi) Why Fe (III) complexes are more stable than Fe(II) complexes ?

(vii) Write two advantages of spectrophotometer over colorimeter.

(viii) What is R_f value ?

(ix) Explain cation exchange.

(x) Give two uses of Silicone resins.

(xi) What is the action of heat on $(NPCl_2)_3$?

(xii) Write any two uses of polyphosphazenes.

1×10=10

TKN/KS/16/5917

Bachelor of Science (B.Sc.) Semester–VI (C.B.S.) Examination

CH-601 : INORGANIC CHEMISTRY

Paper—1

Time—Three Hours] [Maximum Marks—50

N.B. :— (1) All **FIVE** questions are compulsory and carry equal marks.

(2) Write equations and draw diagrams wherever necessary.

1. (A) Draw d-orbital splitting diagram and write CFT configuration of the following : 5

(i) $[Co(NH_3)_6]^{3+}$ and (ii) $[CoF_6]^{3-}$

(B) Explain the following :

(i) Position and intensity of the absorption band in an electronic spectrum of $[Ti\ (H_2O)_6]^{3+}$.

(ii) Spin selection rule. 5

OR

(C) Explain how the nature of the ligands and oxidation states of the metal ion affects the value of 10 Dq. 2½

(D) Explain the John-Teller effect with suitable example. 2½

(E) Calculate CFSE for $[Co(NH_3)_6]^{3+}$ ion for which Δ_o value is 23,000 cm^{-1} and mean pairing energy is 21,000 cm^{-1}. 2½

(F) Write limitations of valence bond theory of metal complexes. 2½

2. (A) Draw d-orbital splitting diagram and explain magnetic properties of the following :

(i) $[Fe(CN)_6]^{4-}$ and (ii) $[FeF_6]^{3-}$ 5

(B) (i) Explain thermodynamic and kinetic stability of the complexes with suitable example.

(ii) What is Chelate effect ? How does it affect the stability of the metal complexes ? 5

OR

(C) Identify the following having quenching towards orbital moment :

(i) t_{2g}^2

(ii) t_{2g}^6

(iii) $t_{2g}^6 eg^1$

(iv) t_{2g}^1

(v) $t_{2g}^4 eg^2$ 2½

(D) Write CFT configuration and calculate magnetic moment for $[Ni(NH_3)_6]^{2+}$ ion. 2½

(E) Discuss correlation between stepwise and overall stability constant. 2½

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

3. (A) State and derive mathematical expression of Beer-Lambert's Law. Explain the terms :

(i) Absorbance

(ii) Molar absorptivity and

(iii) λ_{max}. 5

(B) What is Chromatography ? Discuss the principle and technique involved in paper chromatography. 5

OR

(C) Draw Well-labelled diagram of single beam spectrophotometer. 2½

(D) A standard solution of 2.5×10^{-4} M in a cell with 1.5 cm path length showed a percentage transmittance of 65% at a wavelength of 500 nm. 2½

(E) Explain the terms eluent, eluate and elution. 2½

(F) Discuss the technique involved in the separation of cations by ion-exchange method. 2½

4. (A) What are Silicones ? Give one method of preparation of each, Linear and Two dimentional cross-linked silicon. 5

(B) What is meant by phosphonitrilic halides ? Discuss the bonding and structure of $(NPCl_2)_3$. 5

OR