TKN/KS/16/5857

Bachelor of Science (B.Sc.) Semester–IV

(C.B.S.) Examination

CHEMISTRY —(CH–401)

(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 diagram wherever necessary.

1. (A) What are inner and outer orbital complexes ? Explain the structure and magnetic properties of $[FeF_6]^{3-}$ ion using VBT. 5

(B) What are Chelates ? Give classification of chelates formed by bidentate ligands. Write one industrial and biological application of Chelates. 5

OR

(C) Distinguish between double salts and co-ordination compounds. 2½

(D) What are the postulates of Werner's Coordination theory ? 2½

(E) Explain with example the terms :

(i) Ligand

(ii) Co-ordination sphere. 2½

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

(i) What is EAN ?

(ii) What is ambidentate ligand ?

(iii) Draw the structure of EDTA ligand.

(iv) What is optical isomerism ?

(v) Give on example of ionization isomerism.

(vi) What is Pourbaix diagram ?

(vii) What are Ylides ?

(viii) Draw the structure of trimethyl aluminium.

(ix) Draw the structure of $[Fe(CO)_5]$.

(x) Define calcium pump.

(xi) What is antagonism ?

(xii) Identify soft and hard acid and base from :

(a) Ca^{2+}

(b) CN^- 1×10

(F) Write IUPAC name of following :

(i) $K_4[Fe(CN)_6]$

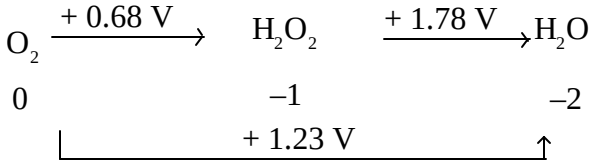
(ii) $[Co(NH_3)_6]Cl_3$. 2½

2. (A) What is structural isomerism ? Explain the following with suitable example :

(i) Ligand isomerism

(ii) Linkage isomerism. 5

(B) What is Frost diagram ? Discuss its importance. Construct Frost diagram of oxygen from the following Latimer diagram.



5

OR

(C) Discuss geometrical isomerism in four co-ordinated complexes. 2½

(D) Explain disproportionation and compro-portionation with suitable example. 2½

(E) What is Latimer diagram ? Draw Latimer diagram of Chlorine in acidic medium. 2½

(F) Draw the Pourbaix diagram of Iron. 2½

3. (A) What are Organometallic Compounds ? What is the action of (i) CO and (ii) CO_2 on alkyl lithium ? Explain structure and bonding in methyl lithium. 5

(B) Give any two methods of preparation of $Ni(CO)_4$. Explain the bonding in metal carbonyls. 5

OR

(C) What are metal carbonyls ? Give their classification. 2½

(D) Give the applications of organo-metallic compounds. 2½

(E) Discuss the structure of $Cr(CO)_6$. 2½

(F) Write IUPAC name of the following :

(i) $C_6H_5A_sH_2$

(ii) $(C_5H_5)_2Fe$. 2½

4. (A) What are porphyrins ? Explain the structure and function of haemoglobin. 5

(B) What is Pearson's HSAB Principle ? Discuss any two applications of it. 5

OR

(C) Give classification of essential elements in biological processes. 2½

(D) Explain biological role of Na^+ and K^+ ions. 2½

(E) Discuss symbiosis with example. 2½

(F) Explain why Calcium and Magnesium exist in nature as carbonates and not as sulphides ? 2½