Bachelor of Science (B.Sc.) Semester—IV Examination

CH–401 : CHEMISTRY

(Inorganic Chemistry)

Paper—I

Time—Three Hours] [Maximum Marks—50

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

(2) Write equation and draw diagram wherever necessary.

1. (A) Using valance bond theory explain structure and magnetic properties of :

(i) $[Fe(CN)_6]^{4-}$ and (ii) $[CoF_6]^{3-}$. 5

(B) What are chelates ? Give one example of chelate formed by bidentated and hexa-dentated ligand. Explain the Industrial applications of chelates. 5

OR

(C) Differentiate between double salt and Co-ordination compund. 2½

(D) Write IUPAC Name of following :—

(i) $[Fe(H_2O)_6]^{2+}$ and (ii) $Ag[Ag(CN)_2]$. 2½

(E) What is EAN ? Calculate EAN in $[Cu(H_2O)_4]^{+1}$ z = 29. 2½

(F) Give the postulates of Werner's theory. 2½

2. (A) Explain geometrical isomerism in 6-Co-ordinated complexes. 5

(B) What are Latimer diagrams ? Discuss Latimer diagram for chlorite in acidic solution. 5

OR

(C) Explain :

Ligand and Linkage isomerism with one example each. 2½

(D) Discuss the stability field of water. 2½

(E) Explain optical isomerism in 4-coordinated complexes. 2½

(F) Discuss Frost diagram for oxygen. 2½

3. (A) What are organometallic compounds ? How are they classified on the basis of metal-carbon bond ? 5

(B) Give one method of preparation of $Ni(CO)_4$, $Fe(Co)_5$ and $Cr(Co)_6$.

Discuss the structure and bonding in $Fe(Co)_5$. 5

OR

(C) Give one method of Preparation of Alkyl and Aryl lithium. 2½

(D) Discuss the structure and bonding in $Ni(Co)_4$. 2½

(E) Explain structure and bonding in metal ethylenic complex. 2½

(F) Give the name of following organometallic compounds :

(i) $(C_6H_5)_2$ Hg and (ii) $(CH_3)_3$ SnBr. 2½

4. (A) What are the functions of Haemoglobin ? Discuss the structure of hemoglobin. 5

(B) What is Hard acid ? Explain :

(i) AgI_2^- is stable complex while AgF_2^- does not exist

(ii) Calcium occurs as a Calcium Carbonate not as Carbonate Sulphide. 5

OR

(C) Explain symbiosis with example. 2½

(D) What is the role of Na^+ and K^+ ions in biological system. 2½

(E) Explain the bio-chemical role of calcium. 2½

(F) Discuss the structure of myoglobin. 2½

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

(i) What is ligand ?

(ii) Define the term complex ion

(iii) Using Werner's theory predict the number of Cl^- ions precipitated by $AgNO_3$ in $CoCl_3 \cdot 5NH_3$.

(iv) Define ionisation isomerism.

(v) What is Frost diagram ?

(vi) What is disproportionation ?

(vii) What are metal carbonyls ?

(viii) What is the action of heat on Triethyl aluminium ?

(ix) What is meant by homogeneous hydrogenation of alkenes ?

(x) Give the name of two essestinal non metals in biological systems.

(xi) Define soft acids.

(xii) Classify the following as hard and soft bases :

(i) PO_4^{3-} and (ii) SCN^-. 1×10