his question paper contains 4 printed pages.]

603 *Your Roll No.*.....

B.Sc. Prog./III **AS**

CH–301 : INORGANIC CHEMISTRY

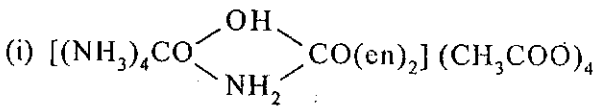
(Admissions of 2008 & onwards)

ime : *2 Hours* *Maximum Marks : 50*

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt **four** *questions in all, including Q. No.* **1**, *which is compulsory.*

(a) Name the following compounds as per IUPAC system

(i) 

(ii) $K_3[Fe(CN)_5NO^+]$

(iii) $(NH_4)_2[Ni(en)Br_2(H_2O)(NH_3)]$ (3×2)

(b) Give the formulae for following names of complexes :

(i) Bis(dimethylglyoximate) nickel(II) (2)

(ii) Ammonium tetrathiocyanato-N diiodochromate(III) (2)

P.T.O.

(iii) μ-amido-μ-superoxotetrakis(ethylenediamne) dicobalt(III) nitrate (2.5)

2. (a) Ionization Energies of 3d elements are lower than 4d or 5d elements, why ? (3)

(b) Discuss the structure and bonding of Zeiss salt (4)

(c) Give two examples of compounds having d^0 system but even then these are coloured explain the reason for the same. (3)

(d) Transition elements have a tendency to form complexes. Explain. (2.5)

3. Write short notes on any **three** of the following :

(i) Separation of Lanthanons by Ion Exchange Chromatography. (2½)

(ii) Discuss Latimer diagrams, their significance and applications for oxidation states of metals for Mn, Cu, & Fe. (3)

(iii) What are inner orbital & outer orbital complexes ? Illustrate your answer with examples for Cr & Fe complexes. (4)

(iv) What is John-Teller distortion, explain with the help of a suitable example. (3)

4. (a) What happens when : (Write equation)

(i) H_2S is bubbled through acidic solution of $K_2Cr_2O_7$

(ii) Cl_2 is passed through a solution of $K_4Fe(CN)_6$

(iii) CH_3COOH is added to a mixture of $CO(NO_3)_2$ and KNO_2

(iv) $KMnO_4$ is added to $MnSO_4$ in neutral medium

(b) Complete the reaction

$$K_2Cr_2O_7 + NaCl + H_2SO_4(conc) = \overset{?}{\text{----}} + \overset{?}{\text{----}} + \overset{?}{\text{----}} + .$$

(2.5)

5. (a) Calculate CFSE for d^1, d^4, d^6 systems for octahedral geometry in weak and strong fields. (4.5)

(b) Why magnitude of crystal field splitting in tetrahedral complexes is less than in octahedral fields ? (4)

(c) Calculate Effective Atomic Number of

$Fe(CO)_5$, $Ni(CO)_4$ & $[Fe(CN)_6]^{4-}$ and $V(CO)_6$

(4)

6. (a) Discuss geometrical isomerism in square-planar complexes taking suitable examples. (4)

P.T.O.

(b) Which of the following ions has maximum value of magnetic moment ?

Cu^{+}, Cr^{3+}, Mn^{2+} (3)

(c) Use Valence Bond theory to explain the bonding in the following compounds :

$[Ni(CN)_4]^{2-}$, $[Ni(H_2O)_6]^{2+}$ (3)

(d) Explain the structure of $[Li_4(CH_3)_4]$. (2.5)