INORGANIC CHEMISTRY–I

(Common for B.Sc. Bio. Tech. Semester-IV)

Time Allowed : Three Hours **Maximum Marks : 26**

Note : Attempt five questions in all. Select two question each from Section A and B while Q. No. IX (Section-C) is compulsory.

SECTION-A

I. (a) Write down the names of the following complexes :

(i) $K_3[Cr(C_2O_4)_3]$ (ii) $[Co(NH_3)_2(H_2O)_2Cl_2]^+$

(iii) $[Pt(en)_3]^{2+}$ (iv) $[NiCl_4]^{2-}$.

(b) Write down the formulae of the following complexes :

(i) Tris(ethylenediamine) platinum (IV).

(ii) Tetraaquadibromocobalt(III) ion.

(iii) Sodium tetraiodozincate(II)

(iv) Tetracyanonickelate(II) ion. (1/2×8=4)

II. Determine the Effective Atomic Number (EAN) of the metal in each of the following coordination compounds or complexions :

(a) $[Cu(NH_3)_4]^{2+}$ (b) $[Ag(NH_3)_2]^{1+}$

(c) $[Fe(CN)_6]^{4-}$ (d) $Mo(CO)_6$ (e) $[Fe(C_2O_4)_3]^{3-}$

Which of these species follow the EAN Rule ? (4)

III. Discuss the Valence bond theory of transition metal complexes. Give its limitations. (4)

IV. What are Lattimer diagrams ? To what use are they put ? Explain giving examples. (4)

SECTION–B

V. Discuss the Arhenius concept of acids and bases with suitable examples. (4)

VI. Discuss the Lux-Flood solvent system for acids and bases. (4)

VII. Discuss the following reactions in liq. NH_3 as a solvent giving suitable examples :

(a) Acid-base reactions. (b) Complex formation reactions.

(c) Precipitation reactions. (d) Ammonolysis. (4)

VIII. Discuss the advantages and disadvantages of liq. SO_2 as a solvent. (4)

SECTION–C

IX. Attempt all the following :

(a) Sketch the two structures that describe most six coordinate complexes. Which is more common ?

(b) What do you understand by Ionising and Non-ionising solvents ? Give examples.

(c) What is Lewis concept of acids and bases ?

(d) Identify base and acid in the following reaction using Lux-Flood concept :

$CaO + SiO_2 \rightarrow CaSiO_3$

(e) Why strong oxidising agents do not exist in liquid ammonia ? (2×5=10)