(i) Printed Pages : 4] Roll No. .....

(ii) Questions : 9] **Sub. Code : 0 4 5 1**

Exam. Code : 0 0 0 5

B.A./B.Sc. (General) 5th Semester Examination

1127

CHEMISTRY

(Inorganic Chemistry–A)

(Same for B.Sc. Microbiology and Food Technology)

Paper : XVII

Time : 3 Hours] **[Max. Marks : 22**

Note :– (i) Attempt *five* questions in all, selecting *one* question from each Unit and Unit V is compulsory.

(ii) All questions carry equal marks.

Unit–I

1. (a) Discuss the crystal field splitting of *d*-orbitals in octahedral complexes. 2

(b) Define crystal field stabilization energy. Draw energy level diagram to show the occupancy of orbitals in the following systems :

(i) d^6–Low spin, octahedral

(ii) d^8–Tetrahedral 2

2. (a) How will you predict a given complex to be high spin or low spin on the basis of crystal field splitting (Δ_0) and pairing energy in octahedral complexes ? 2

(b) Which of the following has higher crystal field splitting energy and why ?

(i) $[Co(H_2O)_6]^{3+}$ or $[Co(H_2O)_6]^{2+}$

(ii) $[Co(CN)_6]^{3-}$ or $[Co(NH_3)_6]^{3+}$ 2

Unit–II

3. (a) Differentiate between thermodynamic stability and kinetic stability of the complexes with examples. 2

(b) What is meant by stability of a complex ? Derive relationship between stepwise and overall stability constants of the complexes. 2

4. (a) What is Trans-Effect ? Which theory of it, explain larger trans-effect of CO compared to NH_3. 2

(b) What is meant by the terms : Inert and labile complexes ? Show that inertness of a complex has no relation with its thermodynamic stability ? 2

Unit–III

5. (a) What are metal carbonyls ? Discuss the bonding in these complexes and give evidences in support of such bonding. 2

(b) Why do Organolithium compounds prefer to oligomerize than exists as single molecule ? Draw the structure of $(LiCH_3)_4$. 2

6. (a) What do you mean by Homogeneous hydrogenation ? Name three homogeneous hydrogenation catalysts used for homogeneous hydrogenation of alkenes. 2

(b) What is hapticity ? Give examples of ligands of various hapticity. 2

Unit–IV

7. (a) Draw and discuss Hb-O_2 bonding curve at different partial pressures of O_2. How is it different from that of Mb-O_2 curve ? 2

   (b) What is meant by essential Trace elements ? Give examples. Discuss the role of any *two* of these. 2

8. (a) What is meant by Nitrogen Fixation ? Write the difference between Nitrogen fixation and Nitrogen assimilation. 2

   (b) What is Porphyrins ? Draw and discuss the structure of Heme. 2

Unit–V

9. Compulsory questions :

   (a) Give one example each of two electrons and four electrons donor ligands.

   (b) What is Zeise salt ?

   (c) Name two powerful trans ligands.

   (d) Define EAN rule with example.

   (e) What is importance of spectro-chemical series ?

   (f) What are Oxyhaemoglobin and Oxymyoglobin ?

   1×6=6