Exam. Code : 107402

Subject Code : 2113

B.Sc. (Bio-Technology) Semester—II

INORGANIC CHEMISTRY—B

Paper—BT-3

Time Allowed—3 Hours] [Maximum Marks—40

SECTION—A

Note :— All questions are compulsory. Each question carries 1 marks.

1. Give two examples of complexes containing N_2 as ligand.
2. Metal-metal bond distance in $Mn_2(CO)_{10}$ is longer than $Fe_2(CO)_9$. Why ?
3. What do you understand by macrocyclic ligand ? Give one example.
4. Which of the two will form the strongest complex with 18-crown-6 : Li^+ or K^+ ? Give suitable reason in support of your answer.
5. What is chelate effect ?
6. How does the nature of central metal ion affect the stability of complex ?
7. What do you understand by Bohr's effect ?

8. What abnormality is caused in biological systems due to magnesium deficiency ?

SECTION—B

Note : Attempt any **five** questions. Each question carries **4** marks.

1. Discuss a method of preparation and structure of one :
   (i) Mononuclear,
   (ii) Dinuclear,
   (iii) Trinuclear and
   (iv) Tetranuclear metal carbonyl.
2. Write brief notes on :
   (a) Metal carbonyl halides and
   (b) Metal carbonyl hydrides.
3. Give two methods to prepare crown ethers. Also discuss the importance of crown ethers in phase transfer catalysis.
4. Give two methods to prepare cryptands. Also discuss the factors affecting the selectivity of cryptands.
5. What do you understand by the kinetic and thermodynamic stability of co-ordination metal complexes ?

6. Write a brief note on complexes containing amino acid as ligand.

7. Draw and discuss Hb-O_2 binding curves at :

   (i) Different partial pressure of oxygen and

   (ii) Different pH.

   How is it different from Mb-O_2 curve ?

8. Draw the structure of chlorophyll. Also briefly discuss its role in photosynthesis.

SECTION—C

Note :— Attempt any two questions. Each question carries **6** marks.

1. (a) What are metal carbonyls ? Also discuss bonding in linear MCO group in metal carbonyls. 4

   (b) How does infrared spectroscopy help in characterization of metal carbonyls ? 2

2. Discuss various types of cation-binding hosts. Give one example of each type along with their structures. Also discuss various interactions for the host-guest relationships of these molecules.

3. What do you understand by stability of complex ? How do the following factors affect the stability of complexes :

   (a) Nature of central metal ions.

   (b) Nature of ligands.

4. (a) Draw the structure of heme unit of myoglobin and hemoglobin. Discuss in detail the roles played by these bioinorganic compounds in biological systems. 4

(b) What happens when Fe-porphyrin complex without polypeptide chain comes in contact with oxygen ? 2