Exam. Code: 0005
Sub. Code: 0451

2121

B.A./B.Sc. (General) Fifth Semester

Chemistry

Paper – XVII: Inorganic Chemistry – A

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

Time allowed: 3 Hours Max. Marks: 22

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting one question from each Unit.*

x-x-x

1. (a) Discuss the order of ligands in terms of their increasing ligand strength as per spectrochemical series. [1]
   (b) Comment on Huggins suggestion for coordination compounds. [1]
   (c) Describe the thermodynamic stability of metal complexes. [1]
   (d) What do you understand by ferrocene? [1]
   (e) Explain the use of metal compounds in medicines. [1]
   (f) Elucidate the formula and structure of Zeise's salt. [1]

UNIT-I

2. (a) Explicate the crystal field theory and d-orbitals splitting in tetrahedral and square planer complexes. [2]
   (b) Define hybridization. Narrate the experimental evidence for metal-ligand covalent bonding in complexes. [2]
3. (a) Explain the following: (i) Crystal field theory (ii) Crystal field stabilization energy (iii) Low spin complexes (iv) $Ni(CO)_4$ is diamagnetic. [2]
   (b) Compare the VBT and CFT. Explain the failures of CFT. [2]

UNIT-II

4. (a) What is kinetic stability? How does polarization theory and π-bonding theory explain the stability of square planner complexes? [2]
   (b) Clarify the following with proper examples: (i) Labile ligand and inert ligand (ii) Associative pathway and dissociative pathway in substitution reactions. [2]
5. (a) Enlighten trans effect. Write the factors which influence the formation of complexes. [2]
   (b) What do you mean by substitution reaction? Discuss the different pathways by which one may replace with another in square planner complexes. [2]

UNIT-III

6. (a) Define organometallic compounds? Write the rules for IUPAC nomenclature for organometallic compounds. [2]
   (b) Outline metal carbonyls. Discuss the nature of bonding and structures of any two mononuclear carbonyls. [2]
7. (a) Write the classification of carbonyls. Discuss the role of vibrational spectroscopy in the study of metal carbonyls. [2]
   (b) Explain the following with proper examples: (i) Simple and mixed organometallic compounds (ii) Ionic and σ bonded covalent organometallic compounds. [2]

UNIT-IV

8. (a) What do you understand by haemoglobin? Discuss the role of haemoglobin in living systems. [2]
   (b) State nitrogen fixation? Explain the Vivo and Vitro nitrogen fixation with a suitable example. [2]
9. (a) Describe the essential and trace elements in biological systems. [2]
   (b) Define the Bohr effect. Detailing the causes and consequences of the Bohr effect. [2]

x-x-x