

(2 ½ Hours)

Total Marks: 60

N.B: 1) All questions are Compulsory.**2) Figures to the right indicate full marks.****Q.1 A) Attempt ANY TWO of the following:**

- i) Describe the mechanism of "inner sphere" electron transfer reaction in octahedral complexes 4
- ii) Explain the π -bond theory of trans effect. 4
- iii) Explain the following factors affecting the rate of reaction. 4
1. Temperature. 2. Catalyst.
- iv) Discuss the mechanism of isomerization reactions. 4

Q.1 B) Attempt ANY ONE of the following

- i) Explain the spectrophotometric method used for the determination of the rate of reaction. 4
- ii) Explain the effect of Trans effect and nature of leaving group on the rate of substitution reaction of square planar complexes. 4

Q. 2 A) Attempt ANY TWO of the following

- i) Write any one method of preparation of Zieser's salt. Draw its structure and discuss the bonding. 4
- ii) Give any one method of preparation of ferrocene. Write the following chemical reactions of the ferrocene. 4
1) Alkylation reaction 2) Mannich reaction
- iii) Explain the structure of bis (triphenyl phosphine) diphenylacetylene Platinum (0) complex. 4
- iv) State 16 electron rule. With the help of electron count, show which of the following complexes obey the rule? 4
1) $[\text{Rh Cl} (\text{PPh}_3)_3]$ 2) $[(\eta^5\text{-C}_5\text{H}_5)\text{Mn } \eta^6\text{-C}_6\text{H}_6]$ 3) $[\text{Ir} (\text{CO}) (\text{Br}) (\text{PPh}_3)_2]$

Q. 2 B) Attempt ANY ONE of the following.

- i) Write any one method of preparation for alkyne complexes of platinum. Give its two chemical properties. 4
- ii) Discuss the structure and bonding in diallyl nickel (0) 4

Q. 3 A. Attempt ANY TWO of the following

- i) Explain toxic effects of radioisotopes on human body. 4
- ii) Write a note on sources, toxicology & toxicity of mercury as heavy metal pollutant. 4
- iii) Which metal is associated with Itai-itai disease? Give symptoms & characteristics of this disease. 4
- iv) Give toxic effects of copper metal & discuss remedial measures. 4

- Q. 3 B.** Attempt **ANY ONE** of the following
- Describe case study of arsenic poisoning in the Indo-Bangladesh region. **4**
 - Explain biochemical effects of lead poisoning. **4**
- Q. 4 A.** Attempt **ANY TWO** of the following
- On the basis of oxygen dissociation curve, Explain cooperative binding mechanism of oxygen with haemoglobin. **4**
 - Explain the structural features of hemerythrin. **4**
 - Comment on T form and R form of haemoglobin. **4**
 - Discuss the role of enzyme mono oxygenase in oxygen activation. **4**
- Q. 4 B.** Attempt **ANY ONE** of the following
- Give any four differences between haemoglobin and myoglobin. **4**
 - Write a note on 'Transferrin as carrier of iron.
- Q. 5** Attempt **ANY FOUR** of the following: **12**
- Discuss the following reactions as complementary and non-complementary.
 - $\text{Pt (IV)} + 2\text{Cr (II)} \longrightarrow \text{Pt (II)} + 2\text{Cr (III)}$
 - $\text{Sn (II)} + \text{Tl (III)} \longrightarrow \text{Sn (IV)} + \text{Tl (I)}$
 - Based on Taube's classification, Identify Labile and Inert complexes from the following complexes.
 - $[\text{Ti (H}_2\text{O)}_6]^{3+}$
 - $[\text{V (H}_2\text{O)}_6]^{2+}$
 - $[\text{Co (NH}_3)_6]^{2+}$
 - Give one method of preparation of Tricarbonyl butadiene Iron(O) complex. Explain its structure on the basis of valence bond theory.
 - On the basis of valence bond theory explain structure and bonding of dibenzene chromium (0).
 - Give sources of cadmium in the environment.
 - Explain why hexavalent chromium is more toxic than trivalent chromium.
 - Explain with suitable chemical reactions, conversion of N_2 to NH_3 in nitrogen fixation process.
 - Explain the importance of cis - platin in medicine.
