[Time: 2½ HOURS] **[Marks: 60]**

Please check whether you have got the right question paper.

N.B. : 1. All question are compulsory.

2. Figures to the right indicate full marks.

Q.1. a) Attempt any two of the following:-

i) Define rate of reaction. Explain the following methods for determination of rate of reaction. **04**

1) Direct Chemical Analysis 2)Potentiometric method.

ii) With reference to Octahedral complexes explain the ligand substitution reaction without breaking of metal- Ligand bond. **04**

iii) Explain Inner sphere mechanism of electron transfer reaction in complexes. **04**

iv) Explain any two factors affecting rate of reactions. **04**

b) Attempt any one of the following:-

i) What is trans effect? Explain its electrostatic polarization theory. **04**

ii) Complete the following reactions **04**

$[PtCl_4]^{2-} + NH_3 \rightarrow [A]^- + NO_2^- \rightarrow [B]^-$

$[PtCl_4]^{2-} + Py \rightarrow [C] + Br^- \rightarrow [D]$

Q.2. a) Attempt any two of the following:-

i) Give one method of preparation and two chemical properties of alkyl derivatives of Platinum compounds. **04**

ii) Assuming that the following complexes obey 16 electronrule, with the help of electron count, identify metal M belonging to 1st transition series . **04**

1) $M(\eta^5\text{-}C_5H_5)(CO)Cl_2$ 2)) $M(CH_3Br)(PPh_3)_3$

3) $M(\eta^2\text{-}C_2H_2)(CO)_4$ 4)) $M(\eta^6\text{-}C_6H_6)(CO)_3$

iii) Write a note on half sandwich complexes of Molybdenum and Chromium. **04**

iv) On the basis of valence bond theory explain structure and bonding of dibenzene chromium(0) **04**

b) Attempt any one of the following:-

i) Give any one method of preparation of ferrocene. **04**

Write the following chemical reactions of the ferrocene .

1)alkylation reaction 2) Mannich reaction

ii) Give one method of preparation of bis(triphenyl phosphine) diphenylacetylene Platinum(0) complex, Explain its structure . **04**

Q.3. a) Attempt any two of the following:-

i) Discuss the sources,toxicity and prevention of mercury poisoning. **04**

ii) Describe case study of arsenic poisoning in Indo-Bangladesh region. **04**

iii) Discuss the sources and the toxic effects of radiation on human cells. **04**

iv) Explain the sources ,biochemical effects and control of copper poisoning. **04**

b) Attempt any one of the following:-

i) Explain the sources ,speciation ,toxic effects and treatments caused by cadmium poisoning. **04**

ii) Describe use of ^{99m} Tc,^{198}Au and ^{59}Fe as radio diagnostic aid. **04**

Q.4. a) Attempt any two of the following:-

i) Explain role of hemerythrene and hemocyanine in living systems. **04**

ii) Discuss the steps involved in the reaction catalysed by monoxygenase. **04**

iii) What are ionophores? Draw the structure of valinomycin and nonactin. **04**

iv) Explain the mechanism of the action of cis platin as an anticancer drug. **04**

b) Attempt any one of the following:-

i) What do you mean by cooperative interaction in oxygen affinity of haemglobin? Explain the phenomenon by Hill equation and plot. **04**

ii) Discuss the reaction catalysed by the enzyme nitrogenese. **04**

Q.5 Attempt any four of the following;- **12**

a) What are complementary and non-complementary reactions? Identify the following reactions as complementary or non-complementary.

i) $Tl(III) + 2Fe(II) \rightarrow Tl(I) + 2Fe(III)$

ii) $Pt(IV)\ 2Cr(II) \rightarrow Pt(II) + 2Cr(III)$

iii) $Sn(II) + Hg(II) \rightarrow Sn(IV) + Hg(0)$

b) Explain in brief the mechanism of racemization reaction with suitable example.

c) Explain the structure of bis (triphenyl phosphine) diphenylacetylene Platinum(0) complex

d) Give one method of preparation of Zeise's salt .Draw its structure and discuss the salient features.

e) Explain the effect of toxic heavy metals on enzymes.

f) Explain the treatment on lead poisoning.

g) Write a note on tyrosinase.

h) Role of ferritin in biological system.
