



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 6th Semester Examination, 2022

CEMACOR13T-CHEMISTRY (CC13)

INORGANIC CHEMISTRY-V



Time Allotted: 2 Hours

Full Marks: 40

*The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.*

Answer any three questions taking one from each unit

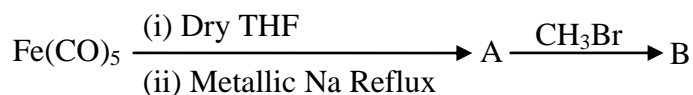
Unit-I

1. (a) Name one zinc containing metallo-enzyme and explain its biological function. 1+3
 - (b) What is biological nitrogen fixation? Explain. 3
 - (c) What are the biological functions of the following? 3
 - (i) Myoglobin and
 - (ii) Ferridoxin.
 - (d) Indicate the oxidation state of copper ions in deoxy- and oxy-hemocyanin. What is the oxidation state of O₂ ligand in oxyhemocyanin? 1+1+1
 - (e) How can you differentiate oxygen carrier and oxygen transport proteins? Explain with examples. 3
2. (a) What difference is noted in the binding of oxygen to hemoglobin and hemerythrin? 4
 - (b) Discuss the role of PS-I and PS-II in photosynthesis. Name an electron transport protein involved in the process. 4+1
 - (c) Name two toxic elements and describe their toxic effects. 4
 - (d) What is *cis*-Platin? State its medicinal use. Why is *trans*-isomer not active as a medicine? 3

Unit-II

3. (a) What do you mean by hapticity? Cite examples of mono-, tri- and penta haptic cyclopentadienyl complexes. 1+3
- (b) Giving examples explain the different coordination modes of NO. 3
- (c) Discuss the mechanistic steps in Wacker process of oxidation of olefins. 3

- (d) Identify A and B with explanation: 3



- (e) Define with example, oxidative addition reaction. What type of compounds generally undergo this type of reaction? 1+2

4. (a) Illustrate with example that isocyanide stabilize higher oxidation state. 2

- (b) Using 18-electron rule, establish the structure of $\text{Os}_3(\text{CO})_{12}$ and $\text{Co}_4(\text{CO})_{12}$. 4

- (c) Write a method of preparation of ferrocene and give the product of the reaction: 4



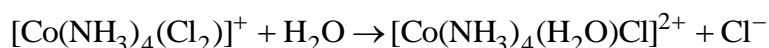
- (d) What is meant by 'hydroformylation' reaction? 2

- (e) Name and describe the catalyst in homogeneous hydrogenation of alkene. How is it different from Ziegler-Natta catalyst? 4

Unit-III

5. (a) State two factors affecting rate of substitution reaction. 2

- (b) Elucidate the mechanism of the following substitution reaction: 2+2



Explain the effect of charge on the complex.

- (c) Differentiate between labile and inert complex. 2

6. (a) Write down the products (with reaction steps) when the *cis*- and *trans*-isomers of $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$ react with excess thiourea (tu). Explain the reaction with the help of *trans*-effect. 4

- (b) Explain the *trans*-effect phenomenon by polarization theory with example. 2

- (c) Explain the term CFAE and its importance. 2

N.B. : Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.

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