

**GIET UNIVERSITY, GUNUPUR - 765022**

M. Sc (Second Semester) Examinations, July - 2023

**22CHPC202 - Inorganic Chemistry-II
(Chemistry)**

Time: 3 hrs

Maximum: 70 Marks

(The figures in the right hand margin indicate marks.)

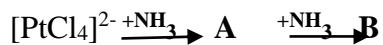
PART – A**(2 x 10 = 20 Marks)**Q.1. Answer ***ALL*** questions

- | | CO # | Blooms Level |
|--|------|--------------|
| a. Write note on Brown ring compounds. | CO1 | K1 |
| b. Identify the 18 electron species.
$\eta^5\text{-C}_6\text{H}_5\text{Fe}(\text{CO})_2\text{Cl}$, $\eta^3\text{-C}_5\text{H}_5$, $\eta^5\text{-C}_5\text{H}_5\text{Fe CO}$ | CO1 | K2 |
| c. Explain inner orbital octahedral complexes. | CO3 | K1 |
| d. Determine the structure of heteroboranes $\text{C}_2\text{B}_8\text{H}_{10}$ | CO2 | K2 |
| e. What is trans effect? | CO4 | K1 |
| f. Write short note on chelate effect | CO3 | K1 |
| g. Write note on Inorganic Catenation. | CO2 | K1 |
| h. What is acid hydrolysis? | CO4 | K1 |
| i. Write a note on remote attack. | CO4 | K1 |
| j. Calculate number of skeletal electron present in $\text{C}_2\text{B}_4\text{H}_6$ | CO2 | K2 |

PART – B**(10 x 5=50 Marks)**Answer ANY FIVE questions

- | | Marks | CO # | Blooms Level |
|--|-------|------|--------------|
| 2. a. Calculation of Metal- Metal bond and structure of the following complexes
(a) $\text{H}_2\text{Os}_3(\text{CO})_{10}$ (b) $\text{Co}_4(\text{CO})_{12}$ (c) $\text{Fe}_3(\text{CO})_{12}$ (d) $\text{Ir}_4(\text{CO})_{12}$ | 6 | CO1 | K2 |
| b. Calculate the effective atomic number of single metal atom
$[\text{Fe}^{2-}(\text{NO}^+)_2(\text{PR}_3)_2]$, $\text{Co}_4(\text{CO})_{12}$ | 4 | CO1 | K2 |
| 3.a. Write the preparation, properties and structure of $\text{Fe}_2(\text{CO})_9$ | 10 | CO1 | K1 |
| 4. a. Determine the structure of boron cluster
B_5H_{11} , B_8H_{16} , B_5H_8^- , B_5H_9 | 6 | CO2 | K2 |
| b. Write down the preparation of carboranes. | 4 | CO2 | K1 |
| 5.a. Classify the following complex ions as inert or labile and how?
$[\text{Ti}(\text{H}_2\text{O})_6]^{2+}$, $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$, $[\text{PtCl}_6]^{2-}$, $[\text{Ni}(\text{CN})_4]^2-$ | 6 | CO3 | K2 |
| b. Explain the difference between kinetic inertness vs lability, thermodynamic stability vs instability? | 4 | CO3 | K1 |

6. a. Citing an example discuss the outer sphere mechanism of electron transfer reaction. 6 C04 K2
- b. Write down the preparation properties of Carbides. 4 CO2 K1
- 7.a. Write notes on the following: 6 CO3 K1
- (a) Trans effect (b) Labile and inert complexes
- b. Explain Marcus equation. 4 CO4 K2
8. a. Explain Outer orbital complexes involving SP³d² hybridization. 6 CO3 K1
- b. Find out the product A and B and draw the structure 4 CO4 K2



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