

B.Sc. Semester-VI Examination, 2022-23**CHEMISTRY [Honours]**

Course ID : 61411 Course Code : SH/CHEM/601/C-13

Course Title : Inorganic Chemistry V

Time : 1 Hour 15 Minutes Full Marks : 25

*The figures in the right-hand margin indicate marks.**Candidates are required to give their answers in their own words as far as practicable.*

1. Answer any **five** questions: $1 \times 5 = 5$
- Mention the name of the metal ion with oxidation state present in hemocyanin.
 - Write down one reductive elimination reaction.
 - Differentiate kinetic and thermodynamic stability of products.
 - Draw the structure of the complex formed between Lewisite and British Anti Lewisite (BAL).
 - Using EAN rule find the simplest formula of a mononuclear carbonyl of chromium.
 - Write down the structure of the product formed between binuclear carbonyl of cobalt and nitrosyl.

[Turn Over]

- What is Bohr effect?
 - What is the cause of Wilson's disease?
2. Answer any **two** questions: $5 \times 2 = 10$
- What is hapticity of a ligand? Explain the hapticity of a Cp (cyclopentadienyl ion) in $[\text{W}(\text{Cp})_2(\text{CO})_2]$. Find the value of 'x' in $[\text{Fe}_2(\text{CO})_x\text{H}]^-$. $1+2+2=5$
 - Discuss the core structure and oxidation states of the metal ions of hemerythrin and oxyhemerythrin. State the mechanism of the biological function of carbonic anhydrase. $3+2=5$
- What is trans effect? Compare with justification the trans effect of Cl^- , Br^- and NH_3 .
 - Explain with example, hydroformylation reaction. $(1+2)+2=5$
 - Show that each iron in $\text{Fe}_2(\text{CO})_9$ conforms to the 18-e rule.
 - Cite one nonheme electron transfer protein and indicate the change of oxidation state during electron transfer process. $3+2=5$

3. Answer any **one** question: $10 \times 1 = 10$

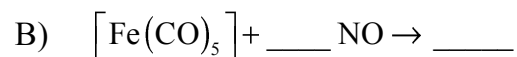
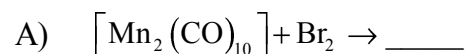
- a) i) Discuss the important role of Mg^{2+} in photosynthesis.
- ii) Write down the reaction involve during nitrogen fixation process and show schematically the mechanism of the process.
- iii) What is Ziegler-Natta Catalyst? What are the products form when ethylene and propylene are separately subjected to Ziegler-Natta Catalyst?
- iv) How *cis*-platin is synthesized?

$$2 + (1+2) + (1+2) + 2 = 10$$

- b) i) Rationalize the IR frequencies (cm^{-1}) of the following:

Compound	Frequencies (cm^{-1})
CO	2143
$Cr(CO)_6$	2100
$V(CO)_6$	1860

- ii) Complete the following reactions:



- iii) Explain with example with the help of M.O. Theory, why 18-electron metal carbonyls are stable.

- iv) Explain why, square planar complex undergoes ligand substitution reactions via associative mechanism. $3+2+3+2=10$
