

**M. SC. IN CHEMISTRY/M. SC. IN
ANALYTICAL CHEMISTRY
(MSCCHEM/MSCANCHEM)**

Term-End Examination

December, 2024

MCH-016 : INORGANIC CHEMISTRY-II

Time : 2 Hours

Maximum Marks : 50

Note : Answer any *five* questions. All questions
carry equal marks.

1. (a) What are inert and labile complexes ?

Write any *four d* electron configurations of
each of these metal complexes. 5

- (b) List the different types of octahedral substitution reactions and give a suitable example for each of them. 5
2. (a) Giving the stereochemical changes, write the possible products formed by the dissociation of $\text{trans-[M(LL)}_2\text{BX}]$. Also, give suitable structures for these. 6
- (b) With suitable diagrams, explain the bonding in linear metal nitrosyl complexes with σ -donor, σ -donor- π acceptor and σ -donor- π donor type of **trans** ligands. 4
3. (a) Using the mechanism of bond rupture, explain the rearrangement of the **cis** Λ enantiomer of **cis**- M(AB)_3 complex. Compare the intermediate formed in this case with that of similar mechanism

involving the **cis** Δ enantiomer of **cis** $M(AB)_3$ complex. 7

(b) How does the nature of bridged ligands influence the inner-sphere electron transfer of metal complexes ? Give *one* example of each factor. 3

4. (a) With the help of suitable examples (any *three*), discuss how outer sphere electron transfer reactions can help in the synthesis of coordination compounds. 5

(b) Give the elementary steps and rate expression for the inner-sphere mechanism. 5

5. (a) What are the *two* main functions of ferritin ? Explain how ferritin stores and releases iron. 5

- (b) (i) Give a brief account of role of cytochrome-C oxidase. 3
- (ii) Explain the role of cytochrome P₄₅₀ in drug metabolism. 2
6. (a) Using the Z-scheme, explain the main steps in the photosynthesis along with suitable reactions. 5
- (b) (i) Explain how xanthine is transformed to uric acid. 2
- (ii) Which metal ion is present in carboxypeptidase ? With which other metal ion can it be replaced ? Explain the effect of this metal change. 3
7. (a) Giving suitable examples, briefly explain the role of metal ions in protein-RNA interactions. 5

- (b) Name any *two* main group metals and any *four* transition metals which are required for normal biological functioning in humans. 3
- (c) Where is copper mainly located in the human body ? Give reasons for this. 2

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