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63(FY) SEM-4/MAJ/CHMMAJ2034

2025

CHEMISTRY

(Major)

Paper : CHMMAJ2034

(Inorganic Chemistry-II)

Full Marks : 50

Pass Marks : 20

Time : Two hours

The figures in the margin indicate full marks for the questions.

1. Choose the correct answer from the following: 1×5=5

(a) Pyridine is an example of

(i) Unidentate ligand

(ii) Bidentate ligand

(iii) Tridentate ligand

(iv) Tetridentate ligand

- (b) The highest oxidation state of *Mn* is
- (i) +3
 - (ii) +5
 - (iii) +6
 - (iv) +7
- (c) Which of the following metal is present in Chlorophyll
- (i) Ca
 - (ii) Mg
 - (iii) Fe
 - (iv) Zn
- (d) SCN is an example of
- (i) Unidentate Ligand
 - (ii) Polydentate Ligand
 - (iii) Chelate Ligand
 - (iv) Ambidentate Ligand
- (e) Which metal ion is found in Vitamin B12
- (i) Fe (III)
 - (ii) Co (III)
 - (iii) Ni (II)
 - (iv) Zn (II)

2. Answer the following questions : **(any five)**
2×5=10

- (a) Write the IUPA name of the following complexes : 1+1=2
- (i) $[\text{PtCl}(\text{NH}_3)_4(\text{NO}_2)]\text{SO}_4$
 - (ii) $\text{K}_4[\text{Fe}(\text{CN})_6]$
- (b) What is the difference between double salt and co-ordination compounds ?
- (c) Explain why $\text{Ni}(\text{CO})_4$ is diamagnetic but tetrahedral.
- (d) What is calcination ?
- (e) What is the difference between mineral and ore ?
- (f) Why do transition metal ions and their complexes show magnetic properties ?
- (g) Why does NH_3 readily form complex but NH_4^+ does not ?

3. Answer the following questions : **(any five)**
5×5=25

- (a) Describe Jahn-Teller effect in Cu^{2+} complexes.
- (b) Discuss the catalytical properties of transition elements.
- (c) Give the point of difference between elements of 3d series and those of 4d & 5d series.

- (d) Explain the factors that affect the crystal field splitting energy (Δ)
- (e) How is the colour of the complex compound explained by the C.F.T. ?
- (f) Describe Mond process of extracting Ni.
- (g) Discuss complex formation in the case of transition metals.
- (h) What is meant by Latimer diagram ? Explain with an example.

4. Answer the following questions (**any one**):
 $1 \times 10 = 10$

- (a) (i) Explain the following terms with an example of each. $2 \times 3 = 6$
 - (1) Co-ordination number
 - (2) Oxidation number
 - (3) Ionisation isomerism
- (ii) Write the important postulates of Werner's theory of co-ordination complexes. 4
- (b) (i) Discuss magnetic properties of transition elements. 6
- (ii) Write the main postulates of valence bond theory. 4