Progressive Education Society's

Modern College of Arts, Science & Commerce, Ganeshkhind, Pune – 16, NEP 2020 (Autonomous)

End Semester Examination: MAR / APR 2025

***Total No. of Questions**: 4/18* ***Total No. of Pages**:02*

SECOND YEAR (NEP Version 1)
COURSE CODE: CHE-24102
COURSE NAME: COORDINATION CHEMISTRY
(Semester IV)

Program: B.Sc. General **Credits: 2**
Program Specific: S.Y.B.Sc. **Time: 2 Hours**
Course Type: Major **Max. Marks: 30**
Paper: II **SET: A**

Instructions to the candidate:

1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*
3) *Draw a well labelled diagram wherever necessary.*

Q1) Answer the following: **[5 x 1= 5 Marks]**

1. Define primary valency.
2. What is structural isomerism?
3. What is a ligand?
4. Name two types of geometrical isomerism.
5. Write the name of ***pn*** ligand.

Q2) Answer any FIVE of the following: **[5 x 2 =10 Marks]**

1. Give the IUPAC names of $K_2[Cu(ox)_2]$ and $[Cu(NH_3)_4]SO_4$ complexes.
2. Write the formula of (i) Chloroaquobis(ethylenediamine)rhodium(III) chloride.

   (ii) Potassium tris(oxalate)aluminate(III)
3. Write the coordination number of $K_2[Cu(ox)_2]$ and $[Cu(NH_3)_4]SO_4$ complexes.
4. Calculate oxidation states of central metal ion in $K_3[Fe(CN)_6]$ and $[Co(NH_3)_4Cl_2]NO_3$ complexes.
5. Explain ionization isomerism with an example.
6. State with reason the isomerism seen in $[Co(H_2O)_5NO_2]Cl_2$ and $[Co(H_2O)_5ONO]Cl_2$.
7. Give two examples of octahedral complexes with symmetrical bidentate ligands.

Q3) Answer any TWO of the following: **[2 x 5 = 10 Marks]**

1. Differentiate between Double salt and Complex compound. (five differences)
2. State with reason whether $K_2[Cu(ox)_2]$ and $[Cu(NH_3)_4]SO_4$ complexes obey EAN rule and comment on stability of the complexes.[Given: Cu: Z=29]
3. Explain ligand isomerism and coordination isomerism with examples.
4. Discuss the geometrical and optical isomerism for $[M(AA)_2B_2]$ type complex with an example.

Q4) Answer any ONE of the following: **[5 x 1 = 5 Marks]**

1. Draw the structures of Werner complexes of $[Co(NH_3)_6]Cl_3$ and $[Co(NH_3)_5Cl]Cl_2$. Give the primary and secondary valency along with IUPAC names of both the complexes.
2. Draw optical isomers and '*fac'* & '*mer'* isomers of $[Co(NH_3)_3Cl_3]$ complex. State the type of the complex. Also draw the optical isomers of above complex.

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