

1	(iii) Outer orbital complexes involve _____ hybridization and are _____ spin complexes.
2	<p>(a) (i) Write the IUPAC names of the following complexes:</p> <p>(1) $[\text{Cu}(\text{NH}_3)_4]\text{SO}_4$</p> <p>(2) $[\text{Co}(\text{en})_2\text{Cl}_2]$</p> <p>(3) $\text{K}_3[\text{Al}(\text{C}_2\text{O}_4)_3]$</p> <p>(ii) With reference to the coordination complex ion $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$ answer the following: (at. no. of Fe = 26)</p> <p>(1) Give the IUPAC name of the complex ion.</p> <p>(2) What is the oxidation number of the central metal atom?</p> <p>(3) How many unpaired electrons are there in the complex ion?</p> <p>(4) State the type of hybridisation of the complex ion.</p> <p style="text-align: center;">OR</p> <p>(b) (i) Name of the type of isomerism exhibited by the following pairs of compounds:</p> <p>(1) $[\text{Co}(\text{ONO})(\text{NH}_3)_5]^{2+}$ and $[\text{Co}(\text{NO}_2)(\text{NH}_3)_5]^{2+}$</p> <p>(2) $[\text{Cr}(\text{H}_2\text{O})_4\text{Cl}_2] \cdot 2\text{H}_2\text{O}$ and $[\text{Cr}(\text{H}_2\text{O})_5\text{Cl}]\text{Cl}_2 \cdot \text{H}_2\text{O}$</p> <p>(3) $[\text{Co}(\text{NH}_3)_6]$ $[\text{Cr}(\text{CN})_6]$ and $[\text{Cr}(\text{NH}_3)_6]$ $[\text{Co}(\text{CN})_6]$</p> <p>(ii) Using the valence bond approach, predict the shape, hybridisation and magnetic behaviour of $[\text{Ni}(\text{CO})_4]$. (at. no. of Ni = 28)</p>
3	(ii) When a coordination compound $\text{CoCl}_3 \cdot 6\text{NH}_3$ is mixed with AgNO_3 , three moles of AgCl are precipitated per mole of the compound. Write the structural formula and IUPAC name of the coordination compound.

4	<p>(i) Write the IUPAC names of the following:</p> <p>(1) $\text{K}_3[\text{Fe}(\text{C}_2\text{O}_4)_3]$</p> <p>(2) $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{SO}_4$</p> <p>(ii) $[\text{Fe}(\text{CN})_6]^{4-}$ is a coordination complex ion.</p> <p>(1) Calculate the oxidation number of iron in the complex.</p> <p>(2) Is the complex ion diamagnetic or paramagnetic?</p> <p>(3) What is the hybridisation state of the central metal atom?</p> <p>(4) Write the IUPAC name of the complex ion.</p>
5	<p>(iv) What type of isomerism is shown by the following coordination compounds: $[\text{Pt Cl}_2 (\text{NH}_3)_4] \text{Br}_2$ and $[\text{Pt Br}_2 (\text{NH}_3)_4] \text{Cl}_2$. Write their IUPAC names.</p>
6	<p>(a) For the complex ion $[\text{Fe}(\text{CN})_6]^{3-}$, state:</p> <p>(i) the type of hybridisation.</p> <p>(ii) the magnetic behaviour.</p> <p>(iii) the oxidation number of the central metal atom.</p> <p>(b) Write the IUPAC name of $[\text{Co}(\text{en})_2\text{Cl}_2]^+$ ion and draw the structures of its geometrical isomers.</p>

7	<p>(a) Write the formula of the following compounds: [2]</p> <p>(i) Potassium trioxalatoaluminate(III)</p> <p>(ii) Hexaaquairon(II) sulphate.</p> <p>(b) Name the types of isomerism shown by the following pairs of compounds: [1]</p> <p>(i) $[\text{Cu}(\text{NH}_3)_4][\text{PtCl}_4]$ and $[\text{Pt}(\text{NH}_3)_4][\text{CuCl}_4]$</p> <p>(ii) $[\text{Co}(\text{Pn})_2\text{Cl}_2]^+$ and $[\text{Co}(\text{tn})_2\text{Cl}_2]^+$</p> <p>(c) For the coordination complex ion $[\text{Co}(\text{NH}_3)_6]^{3+}$</p> <p>(i) Give the IUPAC name of the complex ion.</p> <p>(ii) What is the oxidation number of cobalt in the complex ion?</p> <p>(iii) State the type of hybridisation of the complex ion.</p> <p>(iv) State the magnetic behaviour of the complex ion.</p>
8	<p>(ii) The complex ion $[\text{Ni}(\text{CN})_4]^{2-}$ is:</p> <p>(1) Square planar and diamagnetic</p> <p>(2) Tetrahedral and paramagnetic</p> <p>(3) Square planar and paramagnetic</p> <p>(4) Tetrahedral and diamagnetic</p>

9	<p>(a) Write the IUPAC names of the following: [2]</p> <p>(i) $[\text{Co}(\text{NH}_3)_4\text{SO}_4]\text{NO}_3$</p> <p>(ii) $\text{K}[\text{Pt}(\text{NH}_3)\text{Cl}_3]$</p> <p>(b) What type of isomerism is exhibited by the following pairs of compounds: [1]</p> <p>(i) $[\text{PtCl}_2(\text{NH}_3)_4]\text{Br}_2$ and $[\text{PtBr}_2(\text{NH}_3)_4]\text{Cl}_2$</p> <p>(ii) $[\text{Cr}(\text{SCN})(\text{H}_2\text{O})_5]^{2+}$ and $[\text{Cr}(\text{NCS})(\text{H}_2\text{O})_5]^{2+}$</p> <p style="text-align: center;">54</p> <p>(c) How does $\text{K}_2[\text{PtCl}_4]$ get ionised when dissolved in water? Will it form precipitate when AgNO_3 solution is added to it? Give a reason for your answer. [2]</p>
10	<p>(v) In the complexes $[\text{Fe}(\text{CN})_6]^{3-}$ and $[\text{Pt}(\text{en})(\text{H}_2\text{O})_2(\text{NO}_2)(\text{Cl})]^{2+}$ the respective oxidation numbers of central metal atoms are :</p> <p>(1) + 3 and +4</p> <p>(2) +6 and +4</p> <p>(3) +6 and +3</p> <p>(4) +3 and +3</p>
11	<p>(a) Write the IUPAC names of the following coordination compounds: [1]</p> <p>(i) $[\text{Cr}(\text{NH}_3)_4(\text{H}_2\text{O})_2]\text{Cl}_3$</p> <p>(ii) $[\text{PtCl}_2(\text{NH}_3)_4][\text{PtCl}_4]$</p> <p>(b) State the hybridization and magnetic property of $[\text{Fe}(\text{CN})_6]^{3-}$ ion according to the valence bond theory. [1]</p> <p>(c) (i) What type of isomers are $[\text{Co}(\text{NH}_3)_5\text{Br}]\text{SO}_4$ and $[\text{Co}(\text{NH}_3)_5\text{SO}_4]\text{Br}$? Give a chemical test to distinguish between them. [2]</p> <p>(ii) Write the structures of optical isomers of the complex ion $[\text{Co}(\text{en})_2\text{Cl}_2]^+$ [1]</p>