



CHEMISTRY

BOOKS - OSWAAL PUBLICATION

CHEMISTRY (KANNADA ENGLISH)

CO-ORDINATION COMPOUNDS

Topic 1 Co Ordination Compounds And Their Properties Iupac Nomenclature Of Mononuclear Co Ordination Compounds Very Short Answer Type Questions

1. How many moles of $AgCl$ will be precipitated when an excess of $AgNO_3$ solution is added to one molar solution of $[CrCl(H_2O)_5]Cl_2$?



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2. State whether ethylene diamine is a monodentate or bidentate ligand.



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3. How many ions are formed per molecule of potassium hexacyano ferrate (II) when dissolved in water?



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4. Give the IUPAC name of $[Zn_2Fe(CN)_6]$



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5. What is effective atomic number?





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6. How are anti-bonding molecular orbitals formed ?



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7. What is co-ordination entity ?



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8. What is a simple salt?



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9. What are double salts? Give one example.



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10. What is a complex salt?



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11. What are co-ordination compounds ?



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12. How are inorganic salts classified ?



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13. Give an example for a cationic complex.



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14. Give an example for an ionic complex.



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15. Give an example for a neutral complex.



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16. What is a complex ion ?



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17. Give an example for a cationic complex.



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18. Give an example for an ionic complex.



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19. What is a ligand ?



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20. Which of the following is more stable complex and why?



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21. Give two examples of ligands which form coordination compounds useful in analytical chemistry.



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22. Which complex ion is formed when undecomposed AgBr is washed with hypo solution in photography?



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23. Give IUPAC name of ionization isomer of $[Ni(NH_3)_3NO_3]Cl$.



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24. Why is CO a stronger ligand than Cl^- ?



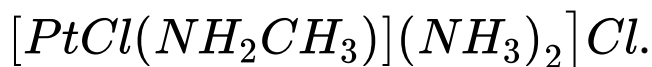
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25. Write the IUPAC name of



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26. Write the IUPAC name of





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27. Write the IUPAC name of



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28. What is the denticity of co-ordination compound used for the treatment of lead poisoning?



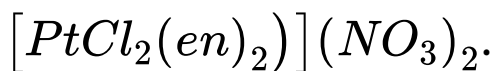
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29. What is ambidentate ligand ? Give an example ?



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30. Write the IUPAC name of



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31. Illustrate the following with an example :

'Coordination isomerism.'



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32. Give an example of linkage isomerism.



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33. Given an example of ionization isomerism.



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34. Illustrate the following with an example :

'Coordination isomerism.'



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Topic 1 Co Ordination Compounds And Their Properties Iupac Nomenclature Of Mononuclear Co Ordination Compounds Short Answer Type Questions

1. Define radius ratio. Give the limiting radius ratio value for a co-ordination number of 6.



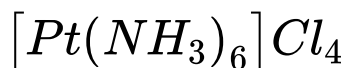
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2. Write the IUPAC Name of the $K_4[Ni(CN)_4]$



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3. Write the IUPAC Name of the





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4. Calculate EAN of iron in potassium ferricyanide.



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5. Explain linkage isomerism with example.



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6. Write the IUPAC name of $[Co(ONO)(NH_3)_5]Cl_2$. Write the formula of a linkage isomer of this compound.



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7. $FeSO_4$ solution mixed with $(NH_4)_2SO_4$ solution in 1:1 molar ratio gives the test of Fe^{2+} but $CuSO_4$ solution mixed with aqueous ammonia in 1:4 molar ratio does not give the test Cu^{2+} ion. Explain why.





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8. Write all the geometrical isomers of $[Pt(NH_3)(Br)(Cl)(py)]$ and how many of these will exhibit optical isomerism ?



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9. What is the co-ordination entity formed when excess of aqueous KCN is added to an aqueous solution of copper sulphate ? Why is that no precipitate of copper sulphide is

obtained when $H_2S(g)$ is passed through this solution ?



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10. What is spectrochemical series ? Explain the difference between a weak field ligand and a strong field ligand.



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11. A solution of $[Ni(H_2O)_6]^{2+}$ is green but a solution of $[Ni(CN)_4]^{2-}$ is colourless .

Explain.



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12. How many ions are produced from the complex, $[Co(NH_3)_6]Cl_2$ in solution ?

(i) 6 (ii) 4 (iii) 3 (iv) 2



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13. Write the IUPAC name of the complex $[Cr(NH_3)_4Cl_2]^+$. What type of isomerism does it exhibit?



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14. State reason for the following

CO is stronger complexing reagent than NH_3 .



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15. State reason for the following

The molecular shape of $Ni(CO)_4$ is not the same as that of $[Ni(CN)_4]^{2-}$.



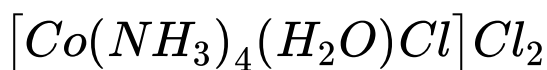
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16. Indicate the type of isomerisms exhibited by the complex $[Co(NH_3)_5(NO_2)](NO_3)_2$ (At. No. Co = 27).



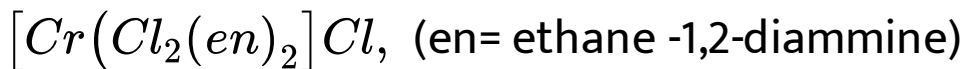
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17. Name the following co-ordination compounds according to IUPAC system of nomenclature :



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18. Name the following co-ordination compounds according to IUPAC system of nomenclature :



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Topic 1 Co Ordination Compounds And Their Properties Iupac Nomenclature Of Mononuclear Co Ordination Compounds Long Answer Type Question I

1. Define linkage isomerism of co-ordination compounds. Give an example.



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2. What is an ambidentate ligand ? Name the type of structural isomerism arises when such ligand present in the complex.



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3. Give the IUPAC name of $K_2[Zn(OH)_4]$.



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4. Mention the geometry, magnetic property and type of hybridization in $[Ni(CN)_4]^{2-}$ complex.



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5. Give differences between $[NiCl_4]^{2-}$ and $[Ni(CN)_4]^{2-}$ with respect to type hybridization, magnetic behaviour and geometry.



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6. What is a heteroleptic complex ?



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7. Give the IUPAC name of $K_3[Cr(C_2O_4)_3]$



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8. When a linkage isomerism is possible for coordination compounds ?





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9. Give the IUPAC name of $[CoCl_2(NH_3)_4]Cl$.

Draw cis and trans isomers of

$[CoCl_2(NH_3)_4]^+$ ion.



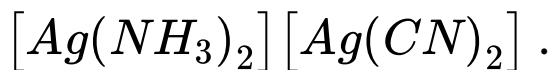
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10. (a) What is coordination isomerism? Give an example.



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11. Write the IUPAC name of the complex:



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12. For $[Co(en)_3]Cl_3$: Give the IUPAC name.



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13. For $(Co(en)_3)Cl_3$.

Give the coordination number of the central

metal ion.



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14. For $[Co(en)_3]Cl_3$: What type of stereoisomerism does it exhibit ?



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15. For the given complex $[Co(NH_3)_5Br]SO_4$, write the IUPAC name and its ionisation isomer.



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16. Which set of d-orbitals of a metal atom/ion experience more repulsion in octahedral field created by the ligands?



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17. Give the IUPAC name of $[Ti(H_2O)_6]^{3+}$.

Draw cis and trans isomers of $[Pt(NH_3)_2Cl_2]$

.



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18. Mention the geometry and magnetic property of tetracarbonylnickel complex with structure.



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19. $[Fe(CN)_6]^{4-}$ and $Fe(H_2O)_6^{2+}$ are different colours in dilute solutions . Why ?



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20. The oxidation number of cobalt in $K[Co(CO)_4]$ is : (i) + 1 (ii) + 3 (iii) -1 (vi) - 3



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21. Write the IUPAC name of the complex $[Cr(NH_3)_4Cl_2]Cl$.



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22. What type of isomerism is exhibited by the complex $[Co(en)_3]^{3+}$? (en= ethane -1, 2-diammine)



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23. Why is $[NiCl_4]^{2-}$ paramagnetic but $[Ni(CO)_4]$ is diamagnetic ?

(At. Nos. : Cr= 24 , Co= 27 , Ni= 28)



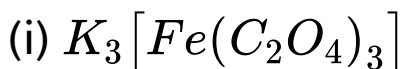
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24. How is double salt different from a complex ?



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25. Write IUPAC names of the following :



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26. Draw the structure of cis-isomer of $[Co(NH_3)_4Cl_2]^+$.



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27. Write the optical isomers cis $[PtCl_2(en)_2]^{2+}$.



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Topic 2 Werner S Theory Bonding In Co Ordination Compound Vbt Cft And Importance

Of Co Ordination Compounds Very Short Answer Type Questions

1. How many cyanide ions in $K_4[Fe(CN)_6]$ are involved in satisfying the primary valency of the central metal ion ?



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2. Write the electronic configuration of Lithium molecule.



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3. Who is the father of Co-ordination Chemistry ?



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4. Which type of particles satisfy primary valency?



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5. Which type of particles satisfy secondary valency?



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6. Name the central atom present in haemoglobin and chlorophyll.



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7. Name the two broad categories of organometallic compounds ?



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8. What is crystal field splitting energy (CFSE)?



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Topic 2 Werner S Theory Bonding In Co Ordination Compound Vbt Cft And Importance

Of Co Ordination Compounds Short Answer Type Questions

1. Mention any two characteristics of bonding molecular orbitals.



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2. State EAN rule for co-ordination compounds.



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3. What are the limitation of VBT ?



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4. What are t_{2g} and e_g orbitals ?



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5. What are the demerits of Werner's theory?



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6. Give the significance of d^4 ions in octahedral field.



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7. Using valence bond theory explain geometry, hybridisation and magnetic property of $[CoF_6]_3^-$ (Atomic number of Co = 27).



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8. Explain the Crystal field splitting in an octahedral field.



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9. What is spectrochemical series ? Explain the difference between a weak field ligand and a strong field ligand.



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Topic 2 Werner S Theory Bonding In Co Ordination Compound Vbt Cft And Importance Of Co Ordination Compounds Very Answer Type Questions

1. Using valence bond theory (VBT), account for the geometry, type of hybridization and magnetic property of $[NiCl_4]^{2-}$.



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2. With the help of valence bond theory account for the geometry and magnetic

property of $(Co(NH_3)_6)^{3+}$.



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3. Write any three postulates of Werner's theory of complexes.



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4. Using VBT, explain the geometry and magnetic property of $[Ni(CN)_4]^{-2}$. (Atomic Number of Ni=28).



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5. Using valence bond theory explain geometry, hybridisation and magnetic property of $[CoF_6]_3^-$ (Atomic number of Co = 27).



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6. Mention any two applications of coordination compounds.



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7. What is crystal field splitting?



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8. Salient features of Molecules Orbital Theory

(MOT)



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9. With the help of VBT explain the hybridisation in tetracarbonyl nickel and sketch the shape of the complex.



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10. Discuss briefly giving an example in each case the role of co-ordination compounds in.

(i) Biological systems

(ii) Medicinal chemistry

(iii) Analytical Chemistry





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11. Aqueous copper sulphate solution (blue in colour) gives (i) a green precipitate with aqueous potassium fluoride, and (ii) a bright green solution with aqueous potassium chloride. Explain these experimental results.



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12. Explain the hybridisation, geometry and magnetic property of $[Ni(Cl)_4]^{2-}$.



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13. Which of the following overlapping of atomic orbital will not be allowed ?

(i) $2P_x + 2P_z$

(ii) $2P_x - 2P_x$

(iii) $2s + 2s$



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14. On the basis of Valence bond theory account for the hybridization, shape and magnetic property of cuprammonium ion.



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15. With the help of VBT explain the geometry of $K_4[Fe(CN)_6]$ and predict its magnetic property.



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16. What is meant by stability of a co-ordination compound in solution ? State the factors which govern the stability of complexes.



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17. What is crystal field splitting energy ? How does the magnitude of Δ_0 decide the actual configuration of d - orbitals in a co-ordination entity ?



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18. Just like human beings, plants also need various nutrients for their healthy growth. Iron is one of these. The deficiency of iron results in disorder known as iron chlorosis. It appears in the form of yellow leaves. It adversely affect the yield of fruits from citrus trees.

(i) In which oxidation state is iron generally present in the soil ?

(ii) Why is iron hydroxide not assimilated in the soil ?

(iii) Which complex of iron is readily absorbed by soil ?

(iv) What is the value associated with the use of this complex ?



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19. Who is the father of co-ordination chemistry?



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