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REVISION PAPER CHEMISTRY
UNIT- IX (COORDINATION COMPOUNDS)
Subject: Chemistry
Class: XII

Time: 1 Hour
Max. Marks: 20

Note: There are **09** questions in this question paper with internal choice. Q. No. 1-2 consist of multiple-choice questions carrying 1 mark each. Q. No. 3-4 consist of Assertion and Reason questions carrying 1 mark each. Q. No. 5-6 consist of very short answer questions carrying 2 marks each. Q. No. 7 consists of short answer questions carrying 3 marks each. Q. No. 8 consists of case- based questions carrying 4 (1+1+2) marks. Q. No. 9 consists of long answer questions carrying 5 marks each.

S. No.	Questions	Marks
1.	Which of the following complexes does not show geometrical isomerism? (a) $[Pt(NH_3)_2Cl_2]$ (b) $[Co(NH_3)_4Cl_2]$ (c) $[Co\,Cl_2(en)_2]$ (d) $[Ni(CO)_4]$	1
2.	Wilkinson's catalyst is used for (a) Epoxidation (b) hydrogenation (c) polymerization (d) substitution	1
	In the following questions one mark each (Q. No. 3-4) a statement of **Assertion (A)** followed by a statement of **Reason (R)** is given. Choose the correct answer out of the following choices. (i) A and R both are correct statements and R is the correct explanation for A. (ii) A and R both are correct statements and R is not correct explanation for A. (iii) A is correct statement but R is wrong statement. (iv) A is wrong statement but R is correct statement.	
3.	**Assertion (A):** Different metal ions have different colours with the same ligand. **Reason (R):** Different metal ions have different crystal field splitting energy.	1
4.	**Assertion (A):** $[Ni(CN)_4]^{2-}$ has square planar and $[NiCl_4]^{2-}$ has tetrahedral shape. **Reason (R):** $[Ni(CN)_4]^{2-}$is diamagneticwhile $[NiCl_4]^{2-}$is paramagnetic.	1
5.	Write the state of hybridisation, the shape and the magnetic behaviour of the following complex entities: (a) $[Cr(NH_3)_4Cl_2]Cl$ (b) $[Co(en)_3]Cl_3$	2
6.	Using Crystal field theory, write the electronic configuration of iron ion in the following complex ion. Also, predict its magnetic behavior: $[Fe(H_2O)_6]^{2+}$ OR (a) On the basis of Crystal field theory, write the electronic configuration of d^4 ion if $\Delta_0 < P$. (b) Write the hybridisationand magnetic behaviour of the complex $[Ni(CO)_4]$. (Atomic No. of Ni= 28)	2
7.	(a) Calculate the spin only magnetic moment of complex$[FeF_6]^{3-}$. (b) Write the IUPAC name of the given complex: $[Co(NH_3)_5Cl]Cl_2$. (c) Why is the complex $[Co(en)_3]^{3+}$ more stable than $[Co\,F_6]^{3-}$? OR Give reasons of the following observations: (a) $[Mn(CN)_6]^{3-}$ has two unpaired electrons whereas $[MnCl_6]^{3-}$has four unpaired electrons. (b) $[Fe(CN)_6]^{3-}$ion is d^2sp^3 hybridised. (c) $[Co(NH_3)_6]^{3+}$ is a diamagnetic complex ion.	3

8.	**The following questions are case-based questions. Each question has an internal choice and carries 4(1+1+2) marks each. Read the passage carefully and answer the following questions that follow.** To explain bonding in coordination compounds various theories were proposed. One of the important theory was valence bond theory. Acccording to that, the central metal ion in the complex makes available a number of empty orbitals for the formation of coordination bonds with suitable ligands. The appropriate atomic orbitals of the metal hybridise to give a set of equivalent orbitals of definite geometry. The d-orbitals involved in the hybridisation may be either inner d-orbitals i.e., (n-1)d or outer d-orbitals i.e., nd. For example, Co^{3+} forms both inner orbital and outer orbital complexes, with ammonia it forms $[Co(NH_3)_6]^{3+}$ and with fluorine it forms $[CoF_6]^{3-}$ complex ion. Answer the following questions: (a) Discuss the hybridisation and magnetic character of $[CoF_6]^{3-}$ ion. (b) Write the hybridisation and magnetic character of $[Co(C_2O_4)]^{3-}$. (Atomic No. of Co = 27) (c) The magnetic moment of $[Cr(H_2O)_6]Cl_3$is 3.83 BM. Why? OR Write IUPAC name of the complex $[Cr(H_2O)_4Cl_2]^{+}$. Draw structures of geometrical isomers for this complex.	4
9.	For the complex $[Fe(en)_2Cl_2]Cl$, identify the following: (a) Oxidation number of iron. (b) Hybrid orbitals and shape of the complex. (c) Magnetic behaviour of the complex. (d) Number of its geometrical isomers. (e) Whether there may be optical isomer also. (f) Name of the complex. OR (a) Why are differnet colours observed in octahedral and tetrahedral complexes for the same metal and same ligand? (b) Violet coloured $[Cr(H_2O)_6]^{3+}$ becomes bright blue when reduced to $[Cr(H_2O)_6]^{2+}$. (c) Arrange the following ligands in the order of increasing field strength in spectro chemical series: NH_3, CN^-, CO, H_2O.	5