INDIAN SCHOOL MUSCAT
CLASS 12
CHEMISTRY
COORDINATION COMPOUNDS

1 A chelating agent has two or more than two donor atoms to bind to a single metal ion. Which of the following is not a chelating agent?

a) Thiosulphato
b) Oxalato
c) Glycinato
d) Ethane-1,2-diamine

2 IUPAC name of $[Pt(NH_3)_2Cl(NO_2)]$ is

a) Platinum diamminechloronitrite
b) Chloronitrito-N-ammineplatinum (II)
c) Diamminechloridonitrito-N-platinum (II)
d) Diamminechloronitrito-N-plantinate (II)

3 In the complex $[M(en)_2(C_2O_4)]^-$, the coordination number and the oxidation state of the element 'M' respectively are

a) 6 and 2
b) 2 and 2
c) 4 and 3
d) 6 and 3

4 Some salts containing two different metallic elements give test for only one of them in solution, such salts are

a) double salts
b) normal salts
c) complex salts
d) None of these

5 On the basis of Crystal Field Theory, how many unpaired electrons are there in a strong field iron(II) octahedral complex?

a) 0
b) 1
c) 2
d) 4
e) 6

6 Strong field ligands such as CN^- usually produce

a) high spin complexes and small crystal field splitting.
b) low spin complexes and small crystal field splitting.
c) low spin complexes and high crystal field splitting.
d) high spin complexes and high crystal field splitting.

7 Among the ligands NH_3, en, CN^- and CO, the correct order of field strength is
(a) $NH_3 < en < CN^- < CO$
(b) $CN^- < NH_3 < CO < en$
(c) $en < CN^- < NH_3 < CO$
(d) $CO < NH_3 < en < CN^-$

8 The solution of the complex $[Cu(NH_3)_4]\ SO_4$ in water will
(a) give the tests of Cu^{2+} ion
(b) give the tests of NH_3
(c) give the tests of SO_4^{2-} ions
(d) not give the tests of any of the above

9 A complex compound in which the oxidation number of a metal is zero is
a) $K_4\ [Fe\ (CN)_6]$
b) $K_3\ [Fe\ (CN)_6]$
c) $[Ni\ (CO)_4]$
d) $[Pl\ (NH_3\ )_4]Cl_2$

10 Which has maximum paramagnetic character?
a) $[Fe(CN)_6]^{4-}$
b) $[Cu(H_2O)_4]^{2+}$
c) $[Cu(NH_3)_4]^{2+}$
d) $[Mn\ (H_2O)_6]^{2+}$

11 Lanthanoid contraction is caused due to
(a) the same effective nuclear charge from Ce to Lu
(b) the imperfect shielding on outer electrons by 4f electrons from the nuclear charge
(c) the appreciable shielding on outer electrons by 4 f electrons from the nuclear charge
(d) the appreciable shielding on outer electrons by 5 d electrons from the nuclear charge

12 When 1 mol $CrCl_3 \cdot 6H_2O$ is treated with excess of $AgNO_3$, 3 mol of AgCl are obtained. The formula of the complex is :
a) $[CrCl_3(H_2O)_3] \cdot 3H_2O$
b) $[CrCl_2(H_2O)_4]Cl \cdot 2H_2O$
c) $[CrCl(H_2O)_5]Cl_2 \cdot H_2O$
d) $[Cr(H_2O)_6]Cl_3$

13 Taking H_2O as a weak field ligand, the number of unpaired electrons in $[Mn(H_2O)_6]^{2+}$ will be ____. (Atomic No. of Mn = 25)
a) 3
b) 4
c) 2
d) 5

14 The formula for tris(ethane-1,2-diamine)cobalt (III) ion is
a) $[Co(en)_2]^{3+}$

b) $[Co(en)_3]^{3+}$
c) $[Co_3(en)]^{3+}$
d) $[Co_3(en)_3]^{3+}$

15 If the ligand happens to be multidentate and cyclic without steric effects, then the stability of the complex is ____.
a) is increased
b) is decreased
c) remains the same
d) doesn't have any effect

FILL IN THE BLANKS

1) The _____ is enclosed in brackets in formulas for complex species, and it includes the central metal ion plus the coordinated groups.
2) The oxidation number of the central metal atom in the coordination compound $[Pt(NH_3)_3Cl]Cl$ is _____

3) If $\Delta_o > P$ for d^4, electronic configuration in terms of CFT is _____ .
4) _____example of bidentate ligand
5) Hybridisation of Ni in $[Ni(CN)_4]^{2-}$ is _____

MATCH THE FOLLOWING:

I

Column I (Complex ion)	Column II (Hybridisation, number of unpaired electrons)
(A) $[Cr(H_2O)_6]^{3+}$	(1) dsp^2, 1
(B) $[Co(CN_4)]^{2-}$	(2) sp^3d^2, 5
(C) $[Ni(NH_3)_6]^{2+}$	(3) d^2sp^3, 5
(D) $[MnF_6]^{4-}$	(4) sp^3, 4
	(5) sp^3d^2, 2

II

Column I FORMULA	Column II NAME
A. $[Ni(CO)_4]$	1. tetraammineaquaiodocobalt(III) sulfate
B. $[Mn(CN)_5]^{2-}$	2. potassium diamminetetrachlorochromate(III)
C. $K[Cr(NH_3)_2Cl_4]$	3. pentacyanomanganate(II) ion
D. $[Co(NH_3)_4(OH)_2I]SO_4$	4. tetracarbonylnickel(0)

III

Column I	Column II
(a) $[Ni(CO)_4]$	1. Ambidendate ligand
(b) CN^-	2. Double salt
(c) $K[Cr(NH_3)_2Cl_4]$	3. Homoleptic complexes
(d)$FeSO_4.(NH_4)_2SO_4.6H_2O$	4. Heteroleptic complexes

ASSERTION REASONING TYPE QUESTIONS-

1 Assertion. The complex $(Co(NH_3)_3C1_3]$ does not give precipitate with $AgNO_3$.
Reason. The given complex does not contain any ionisable valency.

2 Assertion. Both $[Ni(CN)_4]^{2-}$ and $[NiC1_4]^{2-}$ have same shape and same magnetic behaviour.
Reason. Both are square planar and diamagnetic.

3 Assertion. The number of unpaired electrons present in $[Cu(NH_3)_4]^{+2}$ complex is zero.
Reason. The complex is square planar with dsp^2-hybridization.