PHYSICAL / INORGANIC CHEMISTRY

DPP
DAILY PRACTICE PROBLEMS

DPP No. 6

Total Marks : 18

Max. Time : 21 min.

Topic : Coordination Compounds

Type of Questions		M.M., Min.
Single choice Objective ('–1' negative marking) Q.1 to Q.2	(3 marks, 3 min.)	[6, 6]
Subjective Questions ('–1' negative marking) Q.3 to Q.5	(4 marks, 5 min.)	[12, 15]

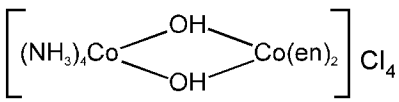
1. The coordination number of a central metal atom of a complex is :
(A) The number of only anionic ligands bonded to the metal ion.
(B) The number of ligands around a metal ion bonded by π bonds.
(C) The number of ligands around a metal ion bonded by σ and π bonds both.
(D) The number of σ bonds between ligands & central metal atom.

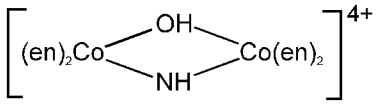
2. Which of the following statement(s) is/are true
(A) Chelation effect is maximum for five and six membered rings.
(B) Chelating ligands are at least bidentate ligand.
(C) As the number of rings in a complex increase stability of complex (Chelate) also increases.
(D) Azide ion (N_3^-) has two N as donor atoms and behaves as a chelating ligand.

3. Write IUPAC names of the following

(a) $[Co(NH_3)_6][CuCl_5]$ (b) $[V(H_2O)_6]Cl_3$

(c) $(NH_4)_3[Co(C_2O_4)_3]$

(d) 

(e) 

(f) $Na_2[SiF_6]$ (g) $K_2[CrO_4]$

(h) $[(NH_3)_5Cr - OH - Cr(NH_3)_5]Cl_5$ (i) $[Fe(en)_3][Fe(CO)_4]$

(j) $[TiCl_4(Et_2O)_2]$ (k) $Mn_2(CO)_{10}$

(l) $[VO(acac)_2]$ (m) $Fe_4[Fe(CN)_6]_3$

4. Write the structural formula corresponding to each of the following IUPAC names :
(a) hexaamminechromium (III) tetrachloridocuprate (II)
(b) diamminedichloridoplatinum (II)
(c) tetracarbonyl nickel(0)
(d) tetraammineplatinum(II) amminetrichloridoplatinate (II)
(e) sodium dithiosulphatoargentate(I)
(f) potassium tetracyanido-C-nickelate(0)
(g) bis(η^5 – cyclopentadienyl)iron (II)
(h) tetrathiocyanato-N-zincate (II) ion
(i) potassium tetraoxidomanganate(VII)
(j) potassium trioxalatoaluminate (III)
(k) tetrapyridineplatinum (II) tetrachloridoplatinate (II)

5. A coordination compound has the formula $CoCl_3.4NH_3$. It does not liberate NH_3 but precipitates Cl^- ions as AgCl. Give the IUPAC name of the compound and write its structural formula.

Answer Key

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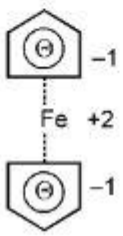
1. D **2.** ABC

3. (a) Hexaamminecobalt(III) pentachloridocuprate(II)
(b) Hexaaquavanadium(III) chloride
(c) Ammonium tri(oxalato)cobaltate(III)
(d) Tetraamminecobalt(III)-di- μ-hydroxidobis(ethylenediamine)cobalt(III) chloride
(e) Bis (ethylenediamine) cobalt (III)-μ-imido-μ-hydroxidobis(ethylenediamine) cobalt (IV) ion
(f) Sodium hexafluoridosilicate(IV)
(g) Potassium tetraoxidochromate(VI)
(h) μ-hydroxidobis-(pentaamminechromium(III)) chloride
(i) Tris(ethylene diamine) iron (III) tetracarbonyl iron (–III) (metal in this complex can also be iron (II))
(j) Tetrachloridobis(diethylether)titanium(IV)
(k) Decacarbonyldimanganese(0)
(l) Bis(acetylacetonato)oxidovanadium(IV)
(m) Iron (III) hexacyanido-C-ferrate(II) (also called Prussian blue)

4. (a) $[Cr^{III}(NH_3)_6]_2[Cu^{II}Cl_4]_3$ (b) $[Pt^{II}Cl_2(NH_3)_2]$
(c) $[Ni^0(CO)_4]$ (d) $[Pt^{II}(NH_3)_4][Pt^{II}Cl_3NH_3]_2$
(e) $Na_3[Ag^I(S_2O_3)_2]$ (f) $K_4[Ni^0(CN)_4]$
(g) $Fe[\eta^5 - C_5H_5]_2$
η^5 means that all the five carbon atoms of cyclopentadienyl anion are coordinated to the metal ion



(h) $[Zn^{II}(NCS)_4]^{2-}$ (i) $K[Mn^{VII}O_4]$ (j) $K_3[Al^{III}(C_2O_4)_3]$ (k) $[Pt^{II}(Py)_4][Pt^{II}Cl_4]$.

5. $[Co(NH_3)_4Cl_2]Cl$ Tetramminedichloridocobalt(III) chloride.

Hints & Solutions

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1. By defination.

2. Azide ion (N_3^-) does not act as bidenate ligand because it is linear and it is not possible to donate both the electrons simultaneously to same metal ion/atom.