FAN valence

$[Cu(NH_3)_4]SO_4$ 35 17

$[Ni(en)_3]Cl_2$ 38 20

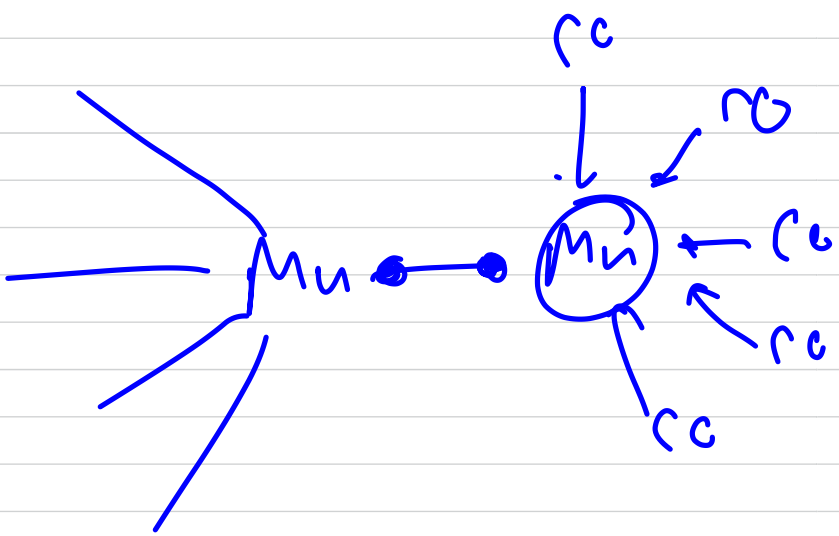
$K_2[Pt^{II}Cl_4]$ 84 16

$(CO)_5Mn-Mn(CO)_5$ 36 (36) (36) 18 18

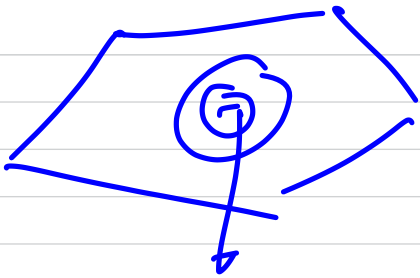
$[V(CO)_6]^-$ (36) 18

$[Fe(\pi - C_5H_5)_2]$ 36

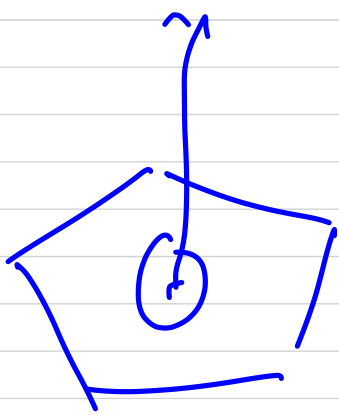
18



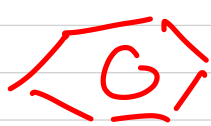
25
10
35
+1
36



Fe^{+2}



$$
\begin{array}{r}
26 \\
-\ 2 \\
\hline
24 \\
+\ 6 \\
+\ 6 \\
\hline
36
\end{array}
$$



Cr

$$
\begin{array}{r}
6 \\
6 \\
6 \\
\hline
18
\end{array}
$$

H.W.

value c - ✓

Q written Q. ✓

Q JEE(M) chemical bonding ✓ 36.76

Q which is most stable carbo-

(A) $[V(CO)_6]$ (B) $[Mn(CO)_6]$

(C) $[Cr(CO)_6]$ (D) $[Fe(CO)_4]$

Q which is not as a good reducing agent.

(A) $[Cr(CO)_6]$

(B) $[V(CO)_6]$ (O.A.)

(C) $[Mn(CO)_6]$ (R.A.)

(D) $[Fe(CO)_5]$

Q which of the following have follow 18e- Rule.

(A) $(OC)_4Co-Co(CO)_4$ (B) $[Fe(CO)_5]$

(C) $[Cr(\pi-C_6H_6)_2]$ (D) $[V(CO)_6]^-$

Q calculate EAN of Fe in

$[Fe(CO)_2(NO)_2]^0$

V.T.

$[Fe^0(CO)_2(NO)_2]$

EAN: 26
- 0
(2 × 2 CO) + 4
(2 × 2 NO) + 6

EAN = 36

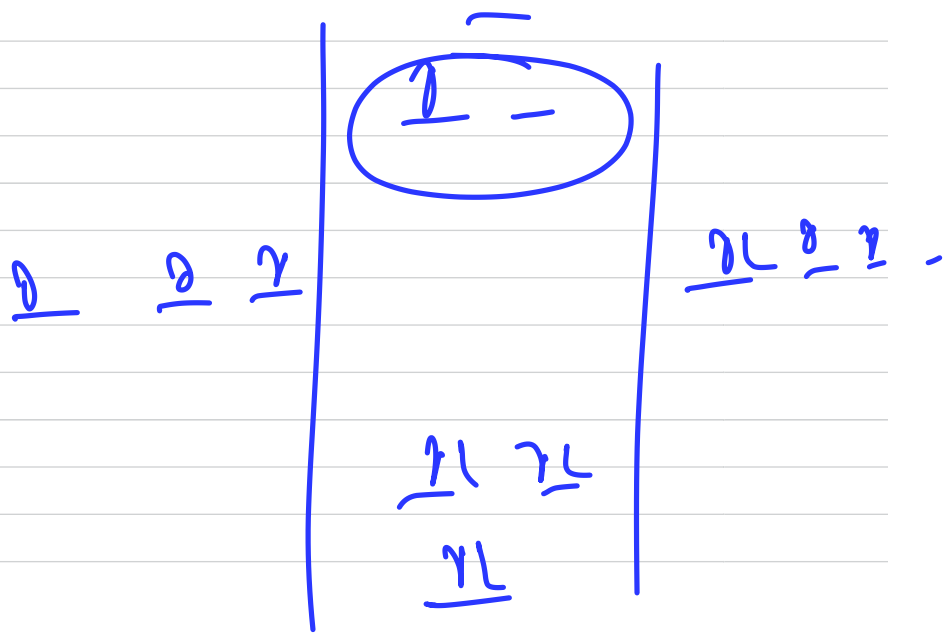
U.S.

$[Fe^{-2}(CO)_2(NO)_2^{\oplus}]$

EAN: 26
+ 2
(2 × 2 CO) + 4
(2 × 2 NO) + 4

EAN = 36

Neutral NO is considered as 3e- donor



(Isomerism)

*

Structural

1. Ionization
2. Hydrated / Solvated
3. Linkage
4. Co-ordination
5. Co-ordination position
6. Ligand isomerism
7. Polymerization isomerism

Stereo

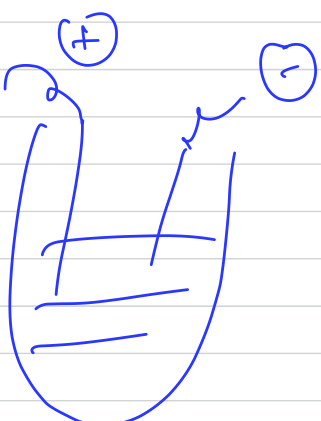
1. G.I.
2. O.I.

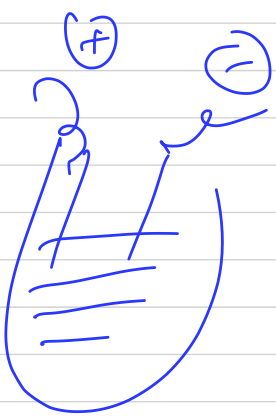
Structural Isomerism:-

(1) Ionization Iso:-

(1) $[Co(NH_3)_5(SO_4)]Cl \rightarrow [Co(NH_3)_5SO_4]Cl$

(2) $[Co(NH_3)_5Cl]SO_4 \rightarrow [Co(NH_3)_5Cl]SO_4$





$[Pt(NH_3)_4Cl_2]Br_2$ $[Pt(NH_3)_4Br_2]Cl_2$

$[Pt(NH_3)_4Cl_2]^{+2}, 2Br^-$ $[Pt(NH_3)_4Br_2]^{+2}\ 2Cl^-$

$AgNO_3$

2 AgBr ↓ Pale

1 AgCl ↓ white

(2) Hydrated/ Solvated Iso:-

$CoCl_3 \cdot 6H_2O$

1. $[Co(H_2O)_6]Cl_3$ (S)

2. $[Co(H_2O)_5Cl]Cl_2 \cdot H_2O$ (S)

3. $[Co(H_2O)_4Cl_2]Cl \cdot 2H_2O$ (S) → cis, trans.

4. $[Co(H_2O)_3Cl_3] \cdot 3H_2O$ (Exist in solvent)

Difficult by 1. quantitative IT
2. Conductivity 3. Colligative prop
a. suitable Solubility Agent

(3) Linkage Isomers

1. $[Co(NH_3)_5NO_2]SO_4$ (yellow)

Pentaamminenitrito-N-cobalt(III) sulphate

2. $[Co(NH_3)_5(ONO)]SO_4$ (Red)

pentaamminenitrito-O cobalt(III) sulphate

(4) Co-ordination Ion :--

(1) $[Co^{III}(NH_3)_6]^{+3}[Cr^{III}(NO_2)_6]^{-3}$

(2) $[Co^{III}(NH_3)_5(NO_2)]^{+2}[Cr^{III}(NH_3)(NO_2)_5]^{-2}$

(3) $[Co^{III}(NH_3)_4(NO_2)_2]^{+}[Cr^{III}(NH_3)_2(NO_2)_4]^{-}$

$[Co^{III}(NH_3)_3(NO_2)_3]^{0}[Cr^{III}(NH_3)_3(NO_2)_3]^{0}$

(4) $[Cr(NH_3)_6]^{+3}[Co(NO_2)_6]^{-3}$

(5) $[Cr^{III}(NH_3)_5(NO_2)]^{+2}[Co^{III}(NH_3)(NO_2)_5]^{2-}$

(6) $[Cr^{III}(NH_3)_4(NO_2)_2]^{+}[Co^{III}(NH_3)_2(NO_2)_4]^{-}$

Total = 6 Coordination Ion

(1) $[Pt(NH_3)_4][PtCl_4]$?

Total coordination no. = ?

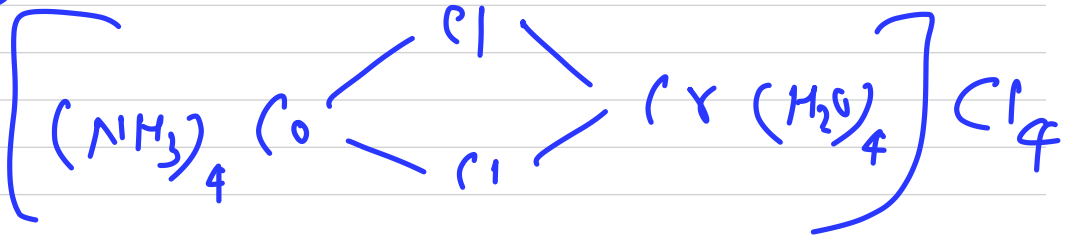
(2) $[Pt(NH_3)_6][PtCl_4]$?

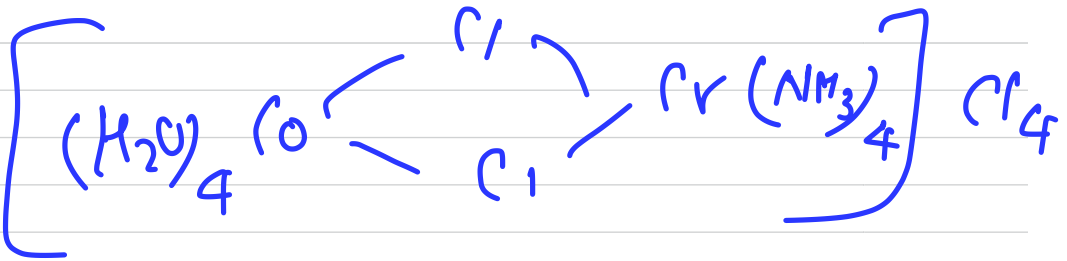
(3) $[Fe(NH_3)_6][Fe(NH_3)_6]$?

(4) $[Cr(en)_3][Co(NO_2)_6]$?

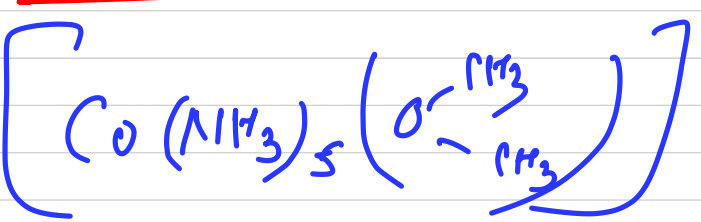
(5) coordination isomerism

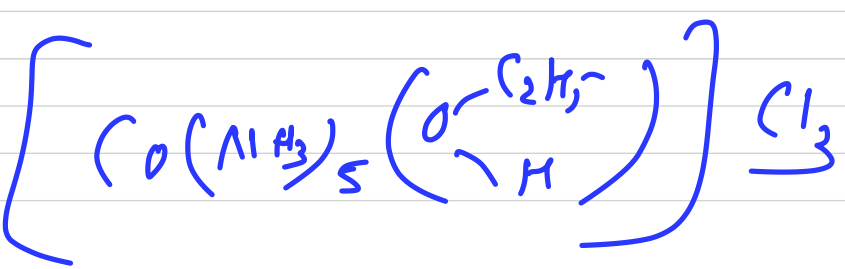
(1)



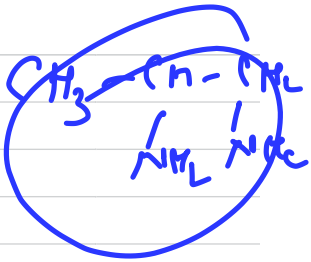


(6) ligand isomerism

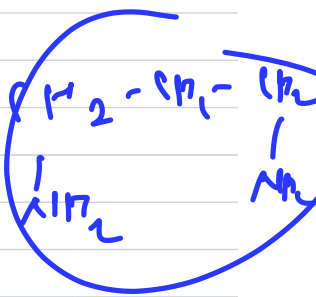




$[Pt(pn)_3]Cl_4$



$[Pt(tn)_3]Cl_4$



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⑦ Polymerization :-

	Pt : NH_3 : Cl
(1) $[Pt(NH_3)_2Cl_2]$	1 : 2 : 2
(2) $[Pt(NH_3)_4][PtCl_4]$	2 : 4 : 4

21 - 40

IUPAC

+

Pack - 18

RACE # 18 | INORGANIC CHEMISTRY

M.M. : 36 | TIME : 40 Min.

Choose the correct option, only one is correct

1. In the compound $CoCl_3 \cdot 5NH_3$ **[3]**

(A) all the Cl show primary valency (PV) only

(B) two Cl show (PV) and one Cl secondary valency (SV)

(C) two Cl show (PV) and one Cl (PV) as well as (SV)

(D) all the Cl show (SV)

2. Which of the following statements is incorrect? **[3]**

(A) Co-ordination compounds and complexes are synonymous terms.

(B) Complexes must give ions in the solution.

(C) Complexes may give ions in the solution or may not give ions in the solution.

(D) Generally complex ion does not dissociate into its component parts even in the solution.

3. Consider the following complexes: **[3]**

(I) Na_2PtCl_6 (II) $PtCl_4 \cdot 2NH_3$ (III) $PtCl_4 \cdot 3NH_3$ (IV) $PtCl_4 \cdot 5NH_3$

Their electrical conductances in an aqueous solutions are:

(A) 256, 0, 97, 404 (B) 404, 0, 97, 256

(C) 256, 97, 0, 404 (D) 404, 97, 256, 0

4. Which will not give test of all the ions present in it **[3]**

(A) $K_2Fe_2(SO_4)_4 \cdot 24H_2O$ (B) $(NH_4)_2Fe(SO_4)_2 \cdot 6H_2O$

(C) $K_3[Fe(CN)_6]$ (D) $Fe_2(SO_4)_3$

5. In the given Binary compounds such as $CrCl_3$, $CoCl_2$ and $PdCl_2$ have primary valence of _____ :

(A) 2, 2 and 3 respectively (B) 3, 2 and 2 respectively **[3]**

(C) 3, 3 and 2 respectively (D) 2, 3 and 2 respectively

More than one may be correct

6. Select the correct the correct statement according to werner theory : **[3]**

(A) In coordination compounds metals show two types of linkages (valences)-primary and secondary.

(B) The primary valences are normally ionisable and are satisfied by negative ions.

(C) The secondary valences are non ionisable. These are satisfied by neutral molecules or negative ions. The secondary valence is equal to the coordination number and is fixed for a metal.

(D) The ions/groups bound by the secondary linkages to the metal have characteristic spatial arrangements corresponding to different coordination numbers.

Match the List :

7. Select the correct code in the given following matching list **[5]**

List I (Formula and Colour)	List II (Solution conductivity corresponds to)
(P) $[Co(NH_3)_6]Cl_3$ (Yellow)	(1) 1 : 1 electrolyte
(Q) $[CoCl(NH_3)_5]Cl_2$ (Purple)	(2) 1 : 2 electrolyte
(R) $[CoCl_2(NH_3)_4]Cl$ (Green)	(3) 1 : 3 electrolyte
(S) $[PtCl_2(NH_3)_2]$ (Deep Yellow)	(4) 0 : 0 electrolyte

Select correct code for your answer :

	(P)	(Q)	(R)	(S)		(P)	(Q)	(R)	(S)
(A)	2	3	1	4	(B)	3	2	1	4
(C)	2	3	4	1	(D)	2	1	3	4

8. Select the correct code in the given following matching list **[5]**

List I (Formula)	**List II** (Moles of AgCl precipitated per mole of the compounds with excess $AgNO_3$)
(P) $PdCl_2.4NH_3$	(1) 0
(Q) $NiCl_2.6H_2O$	(2) 2
(R) $PtCl_4.2HCl$	(3) 2
(S) $CoCl_3.4NH_3$	(4) 1

Select correct code for your answer :

	(P)	**(Q)**	**(R)**	**(S)**		**(P)**	**(Q)**	**(R)**	**(S)**
(A)	2	4	1	3	(B)	4	2	1	3
(C)	2	3	1	4	(D)	2	1	3	4

Integer

9. Find the number of correct statement(s) is/are :- **[4]**

(I) Both double salts as well as complexes are formed by the combination of two or more stable compounds in stoichiometric ratio

(II) double salts such as carnallite, $KCl.MgCl_2.6H_2O$, potash alum, $KAl(SO_4)_2.12H_2O$, etc. dissociate into simple ions completely when dissolved in water

(III) complex ions such as $[Fe(CN)_6]^{4-}$ of $K_4Fe(CN)_6$, do not dissociate into Fe^{2+} and CN^- ions

(IV) Mohr's salt, $FeSO_4.(NH_4)_2SO_4.6H_2O$ does not, dissociate into simple ions completely when dissolved in water

(V) $[CoCl_2(NH_3)_4]Cl$ complex dissociate into Co^{3+} and Cl^- ions

10. In the given following compounds, the total number of compounds which contains secondary valences of metals is six : **[4]**

$PdCl_2.4NH_3$, $NiCl_2.6H_2O$, $PtCl_4.2HCl$, $CoCl_3.4NH_3$, $PtCl_2.2NH_3$

NOTE:-

I will arrange Extra class on this sunday (23.1.22) for study of Stereo isomerism.

(No discussion in Extra class)