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**Question Bank of Bond Theory**

**Third stage Chemistry 2023-2024**

**Assistant Lecturer**

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# Q1&Q2/

Q3/ Answer the following:

(a) What is the systematic name of Na3[AlF6]?

(b) What is the systematic name of [CoCl2(en)2]NO3?

(c) What is the formula of tetraammine bromo chloroplatinum(IV) chloride?

(d) What is the formula of hexaamminecobalt(III) hexachloroferrate(III)?

(e) What is the systematic name of Li[AlH4]?

(f) What is the systematic name of Na3[Co(NO2)6]

Q4/ Give the chemical formula for Hexaaquanickel(ll) aquapentabromochromate(lll).

Q5/ Give the name for [Co(NH3)6][CoCl6].

Q6/ Practice naming some complex compounds:

a- [PtCl2(NH3)2] b- K2[PtCl4] c- [Pt(NH3)4]2+

d- [Pt(NH3)3Cl]Cl e- [Ni(CN)4]2- f- [CoCl4(NH3)2]-.

Q7/ Practice writing the complex compound formulas:

1-Hexaaquochromium (III) chloride.

2-Ammonium diaquatetrachloroaurate (III).

3-Potassium hexacyanoferrate (II).

4-Potassium hexacyanoferrate (III).

5-Lithium tetrahydrido aluminate(III).

6-Sodium hexanitrito Cobaltate (III).

. 7-Potassium tetracyano urate (II) ion

Q8/ The correct name for the complex Na2[Ni(CN)4]

1. Disodium tetranickelcyanide.
2. Sodium tetracyanidenickel(l).
3. Disodium tetracyanonickelo(lV).
4. Natrium tetranickel (Vl)cyanide.
5. Sodium tetracyanonickelate(ll).

Q9/ [Ag(NH3)2]Cl or [Ag(NH3)2]NO3.

In the above compounds,

1-silver is \_\_\_\_\_\_\_\_\_\_\_\_.

2-NH3 is \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

and Cl− or NO3− is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

3-C.N. is \_\_\_\_\_\_\_\_\_\_\_\_.

4-Ligands are attached by \_\_\_\_\_\_\_\_\_\_\_bonds.

5-Counterions are attached by \_\_\_\_\_\_\_ bonds.

Q10/ Name the following coordination compounds according IUPAC system:

1-[Co2(CO)8] 2-[Fe2(CO)9] 3-[Cr(C6H6)2]

4-[Fe(CO)2(NO)2] 5-[PdCl2(NH3)2] 6-[Fe(CN)6]4-

7-[Cd(CN)4]2- 8-[Cu(CN)4]3- 9-K4[Fe(CN)6]

10-K3[Fe(CN)6] 11-[Co(NH3)6]3+ 12-Na[Fe(CN)6]

13-[CoCl(NH3)4(H2O)]Cl2 14-Li[AlH4] 15-Na3[Co(NO2)6]

16-[Ag(NH3)2]NO3 17-K[Au(CN)4]- 18-[Ni(CN)4]2-

Q11/ Write Limitations of Sedgwick theory.

Q12/ Write the geometrical structure of the following metal complexes based on VBT:

1. Structure of nickel tetracarbonyl [Ni(CO)4] .
2. Formation of [NiCl4] 2-
3. Structure of [Ni(CN)4]2- .
4. Structure of [CoF6]3- .
5. Structure of [Co(NH3)6]3+ .

Q13/ Draw the electron box diagram, geometrical structure, hybridization and calculate magnetic moment for the following coordination compounds according VBT:

1- [FeF6]3- 2-[CuCl5]3- 3-[Co(NH3)4(H2O)Cl]Cl2  
4-Li[AlH4] 5-Na3[Co(NO2)6] 6-[Ag(NH3)2]NO3   
7-K[Au(CN)4]- 8-[Fe(CN)6] 4-  9-[Cd(CN)4]2-

10-[Cu(CN)4]3- 11-K4[Fe(CN)6] 12-K3[Fe(CN)6]

Q14/ Define the following:

1- Ligand 2- Coordination compound 3- Coordination number

4- ambidentate ligand.

Q15/ Write types of ligand and give an example for each one.

Q16/ Write types of metal complex and give an example for each one.

Q17/ Write ligands classification scheme in detail.

Q18/ Explain Werner’s theory.

Q19/ Explain chain theory.

Q20/ Explain ligands on the basis of bonding with examples.

Q21/ Write metal complex applications in the life.

Q22/ How can estimate gold in an ore by using metal complex.

Q23/ Discuss Werner’s theory on the following compounds:

1-CoCl3.6NH3 2-CoCl3.4NH3 3-IrCl3.6NH3.

Q24/ Write the present formulae, C.N and oxidation state for the following metal complexes:

1- Zeises’ salt 2- Erdman’s salt.

Q25/ Order the following compounds according increase electrical conductivity and moles of AgCl ppt with write number ions for each one:

CoCl3.6NH3, CoCl3.4NH3 , CoCl3.5NH3 , CoCl3.6NH3 .

Q26/ What is central atom, C.N and type of donor atom for chlorophyll.

Q27/ Write Limitations of Werner theory.