**US02CCHE21 GENERAL CHEMISTRY**

**UNIT-3 Coordination Chemistry**

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| --- | --- |
| **Q.1**  | **Write correct answer for the following multiple choice question**. |
| **1** | Which one of following is an example of bidentate ligand ? |
|  | (a) | Edta | *(b)* | *Ethylene diamine* | (c) acetate  | (d) pyridine  |
| 2 | Identify the monodentate ligand from the following |
|  | (a) | CO3-2 | (b) | en | (c) | edta | *(d)* | *H2O* |
| **3** | The dentate character of ligand “trien” is…………. |
|  | (a) | Bidentate | (b) | Tridentate  | *(c)* | *tetradentate* | (d) | None  |
| **4** | The oxidation state of “Co” in [Co(NH**3**)**6**]Cl**3** is…….. |
|  | (a) | +2 | *(b)* | *+ 3* | (c) | + 4 | (d) | + 5 |
| 5 | Coordination number of Cr in NH4[Cr(H2O)2Cl4] complex is: |
|  | (a) | 1 | (b) | 3 | (c) | 4 | *(d)* | *6* |
| **6** | Which is the simple salt ? |
|  | *(a)* | *NaCl* | (b) | Potash alum  | (c) | EDTA | (d) Mohr’s salt |
| 7 | [ EDTA ] -4 is a  |
|  | (a) | Monodentate ligand | (b) | Bidentate ligand | (c) | Quadrident-ate ligand | *(d)* | *Hexadentate ligand* |
| 8 | From the given compounds, which one is the lattice compound? |
|  | (a) | NaCl | (b) | Na2SO4   | (c) | K4 [Fe(CN)6 ] | *(d)* | *FeSO4(NH4)2 SO4 6H2O* |
| 9 | Which one of the following geometries are possible with coordination number 4 : |
|  | (a) | Tetrahedral | (b) | Square planar | (c) | Octahedral | *(d)* | *Both (a) and (b)* |
| 10 | Ethylene diamine is a ------- ligand. |
|  | (a) | Monodentate  | (b) | Polydentate | (c) | Tridentate | *(d)* | *Bidentate* |
| **11** | Valency of “NO” ligands is …………. |
|  | (a) | 1 | (b) | + 1 | (c) | - 1 | *(d)* | *0* |
| **12** | In a co-ordination compound primary valency of a central metal ion is satisfied by : |
|  | (a) | Ligand | (b) | Anion | (c) | Radical | (d) | Cation |
| 13 | In a co-ordination compound secondry valencies of a central metal ion is satisfied by : |
|  | (a) *Cation* | (b) | Anion | (c) | Radical | *(d)* | *Ligand* |
| **14** | Which of the following represents chelating ligand? |
|  | (a) | Cl**--** | (b) | OH-- | (c) | H2O | *(d)* | *DMG* |
| **15** | During complex formation, metal ion acts as \_\_\_\_\_\_ and ligand acts as\_\_\_\_\_.(a)Lewis acid and Lewis Base (b) Arrhenius acid and base (c)small and big molecule(d) none of these |
| **16** | Complex containing two or more central metal ions are called \_\_\_\_\_\_\_\_\_\_\_\_.(a)polynuclear complex (b)chelate (c)positive complex (d)negative complex |
| **17** | Coordination number (secondary valency) of Cr in the complex K3[Cr(C2O4)3] is \_\_\_\_.(a)6 (b)3 (c)4 (d)2 |
| **18** | What is the charge on [CrIII(CO)2(CN)4] complex?(a)-1 (b)2 (c)1 (d)-2 |
|  | *There is no short cut, except hard work with understanding to excel in examination.*Dr. H. R. MARADIYA B.Sc. Chem. Sem. II – Chem. Dept./V. P. Sci. College |
| **2**  | **Answer the following in short. (2 marks)**  |
| 1 | **Write IUPAC name for the following.**[ Pt**II**(en)2 ][ PtCl6] [Cr**III**(H2O)4 Cl**2**]**+** [CoCl (H2O)2 (NH3)3] + 2 [Ni(CN)4 ] **--** 4  (NH3)5 Cr OH Cr (NH3)5]Cl5  [CoBr6(H2O)(en)2]+ 2 [BrF4]-NH4[Cr(NH3)2(NCS)4][(NH3)4Co-NH2-OH-Co(NH3)4] |
|  **2 2** | **Give the systematic formula for the following.** |
| 1 | Tetra cyano nicklate (II) ion. |
| 2 | Tris(ethylene diamine)manganese(III)chloride |
| 3 | Tetra iodo mercurate(II) ion |
| 4 | Dichloro argentate(I) ion |
|  3  | Name the following polydentate ligand , draw the structure and write its dentate character.(ox) **–** 2  , (gly) **--- ,**(oxin) **---,**(dmg)**--,**(NTA)**—3,**(acac)**-- ,** EDTA**—4, terpy, o-phen.** |
| 4 | Show that sulphate is a flexidentate ligand. |
| 5 | Give definitions of:Coordination compound, coordination number, coordinating atom. |
| 6 | Differentiate between: Coordination compound and double salt (Lattice compound). |
| 7 | Show how following compound dissociates in water with the equation.Mohr’s salt, Potash alum, potassium hexachloroplatinate(IV), sodium tetra cyano nickelate(0). |
| Q-3 | Long question. (4-5 marks) |
|  |  **In the co-ordination compound [Cr(en)3][Ni(CN)6]** |
| 1 | The oxidation state of chromium ion and nickel ion are ------------- |
| 2 | The co-ordination number of chromium ion and nickel ion are ---------------- |
| 3 | The dentate character of different ligands are ----------- |
| 4 | Ionic charge on complex cation and complex anion are------------- |
| 5 | IUPAC name of the compound is\_\_\_\_\_. |
|  | **Similarly for [Co(H2O)6][Co(CN)6] and Na[SbCl5(C6H5)]co-ordination compounds.** |
| Q-4 | **Very long question. (10 marks)** |
|  |  |
|  1 | Explain ligand, ambidentate ligand and flexidentate ligand. Give complete classification of ligands.  |
|  2 | Define chelate. Give the classification and uses of chelates. |
|  3 | Discuss Werner’s theory. Describe the geometry of the complexes with coordination numbers 2 to 6 with suitable structure.  |

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