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**Max Time : 1 hr** **Class = 12th Chemistry Test**  **Max Marks : 30**

**Co-ordination compounds**

1. Multiple choice questions : [ 1 X 10 = 10]
2. NO2 is a :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Monodentate ligand | b) Tetradentate ligand | c) Hexadentate ligand | d) Ambidentate ligand |

1. 2,4-dinitro phenyl hydrazine is an example of :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Tridentate ligand | b) Monodentate ligand | c) Polydentate ligand | d) Didentate ligand |

1. Valence bond theory of co-ordination compounds was given by :

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| --- | --- | --- | --- |
| a) Werner | b) Pauling | c) John Rowling | d) Van leck and Bethe |

1. Predict the number of ions produced per formula unit in an aqueous solution of [Co(en)3]Cl3.

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| --- | --- | --- | --- |
| a) 4 | b) 3 | c) 6 | d) 2 |

1. The most stable complex is :

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| --- | --- | --- | --- |
| a) [Fe(H2O)6]3 + | b) [Fe(NH3)6]3 + | c) [Fe(C2O4)3]3 + | d) [FeCl6]3 – |

1. Amongst the following ions, which has the highest paramagnetism?

|  |  |  |  |
| --- | --- | --- | --- |
| a) [Cr(H2O)6]3 + | b) [Fe(H2O)6]2 + | c) [Cu(H2O)6]2 + | d) [Zn(H2O)6]2 + |

1. The magnetic moment (spin only) of [NiCl4]2 – is :

|  |  |  |  |
| --- | --- | --- | --- |
| a) 1.82 B. M. | b) 5.46 B. M. | c) 2.82 B. M. | d) 1.41 B. M. |

1. Which of the following complex compound will exhibit highest magnetic behaviour?

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| --- | --- | --- | --- |
| a) [Zn(NH3)6]2 + | b) [Ti(NH3)6]3 + | c) [Cr(NH3)6]3 + | d) [Co(NH3)6]3 + |

1. When one mole of CoCl3.5 NH3 was treated with excess of silver nitrate solution, 2 mole of AgCl was precipitated. The formula of the compound is :

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| --- | --- |
| a) [Co(NH3)5 Cl2] Cl | b) [Co(NH3)5 Cl] Cl2 |
| c) [Co(NH3)4 Cl2] (NH3) Cl | d) [Co(NH3)3 Cl3] (NH3)2 |

1. Which of the following is an outer orbital complex and exhibit paramagnetic behaviour?

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| --- | --- | --- | --- |
| a) [Ni(NH3)6]2 + | b) [Zn(NH3)6]2 + | c) [Cr(NH3)6]3 + | d) [Co(NH3)6]3 + |

1. Write the electronic configuration of Fe (III) on the basis of crystal field theory when it forms an octahedral complex in the presence of (i) Strong field ligand (ii) Weak field ligands. [ 1 ]
2. Write IUPAC name of the co-ordination isomer of [Co(NH3)6 ] [Cr(CN)6]. [ 1 ]
3. Which type of isomerism is exhibited by the following complex : [Co(NH3)5 SO4] Cl. [ 1 ]
4. Using crystal field theory, draw energy level diagram, write electronic configuration of the central metal atom/ion and determine the magnetic moment value in the [Fe(H2O)6]2 + . [ 2 ]
5. Draw the structure of optical isomers of : [ 2 ]

(a) [Cr (C2O4)3] 3 –  (b) [Co (NH3)2 Cl2 (en)]+

1. What is meant by crystal field splitting energy? On the basis of crystal field theory, write the electronic configuration d4 in terms of t2g and eg in an octahedral fiels when:
2. o > P (b) o > P [ 2 ]
3. Draw the geometrical isomer of [CoCl2 (en)2]2+. Which geometrical isomer of [CoCl2 (en)2]2+ is not optically active and why? [ 2 ]
4. A metal ion Mn+ having d4 valence electronic configuration combines with three bidentate ligands to form a complex compound. Assuming o > P : [ 3 ]
5. Explain orbital splitting during this complex formation.
6. Write the electronic configuration of the valence electrons of the metal Mn+ ion in terms of t2g and eg.
7. What type of hybridization will Mn+ ion have?
8. Name the type of isomerism exhibited by this complex.
9. Write IUPAC name of the following co-ordination compounds: [ 3 ]

|  |  |  |
| --- | --- | --- |
| 1. [Co(NH3)5 Cl] Cl2 | 1. K2 [PdCl4] | 1. [Pt (NH3)2 Cl (NH2 CH3)] Cl |

1. Explain on the basis of valence bond theory that [Ni (CN)4]2 – ion with square planer structure is diamagnetic and the [NiCl4]2 – ion with tetrahedral geometry is paramagnetic. [ 3 ]