CHEMISTRY

Ph.D. Entrance Examination
Model paper

Marks : 100

Time : 90 min.

1) The reaction :-

$[RhCl L_2] + H_2 \rightleftharpoons RhCl L_2H_2$ is called

(a) Reductive Elimination (b) Insertion

(c) oxidative addition (d) Complementary reaction.

2) The function of Cu(II) salt in wacker's process is

(a) catalyst (b) co-catalyst (c) Reducing agent

(d) Oxidising agent.

3) Which of the following complexes is Expected to be labile to ligand substitution.

(a) $[Ir(NH_3)_6]^{+3}$ (b) $[Mo(NH_3)_6]^{3+}$ (c) $[Ni(CN)_3]^{+2}$

(d) $[Co(NO_2)_6]^{+3}$

4) The Compound which Exhibits Jahn-Teller distortion.

(a) $[Mn(H_2O)_6]^{+2}$ (b) $[Mn(H_2O)_6]^{+3}$ (c) $[Cr(H_2O)_6]^{+3}$

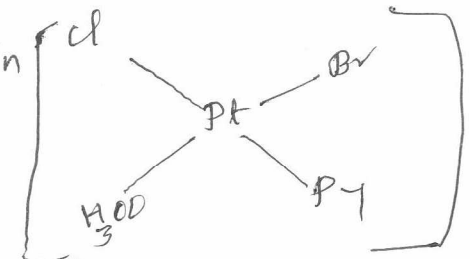
(d) $[Fe(CN)_6]^{-4}$

5) Complexes of which ion are not kinetically labile

(a) Cr^{+3}, Co^{3+} (b) V^{3+} Ti^{4+}

(c) Cu^{2+} Ni^{2+} (d) none of these

6) The correct order of addition of NH_3, Phridine (Py) & Br^- to $[PtCl_4]^{-2}$ to obtain



(a) Py, Br, & NH_3 (b) NH_3, Py & Br^-

(c) Br^-, Py & NH_3 (d) NH_3, Br^- & Py.

7) Which of the following combinations can be regarded as Soft acids.

(a) BF_3 & Sn^{4+} (b) Cu^+ & Cd^{2+}

(c) SCN^- & H^- (d) Na^+ & NH_3

8) Among the following ions which one has the highest Paramagnetism?

(a) $[Cr(H_2O)_6]^{3+}$ (b) $[Fe(H_2O)_6]^{2+}$

(c) $[Cu(H_2O)_6]^{2+}$ (d) $[Zn(H_2O)_6]^{2+}$

9) The correct order of Spin Only Magnetic Moments values is -

(a) $[MnCl_4]^{2-} > [CoCl_4]^{2-} > [Fe(CN)_6]^{4-}$

(b) $[Fe(CN)_6]^{4-} > [CoCl_4]^{2-} > [MnCl_4]^{2-}$

(c) $[Fe(CN)_6]^{4-} > [MnCl_4]^{2-} > [CoCl_4]^{2-}$

(d) $[MnCl_4]^{2-} > [Fe(CN)_6]^{4-} > [CoCl_4]^{2-}$

Select incorrect Statements

(a) for a given ion and ligend, greater the charge on the Metal ion, greater the Stability

(b) A Complex ion that Exchange ligends slowly is said to be non-labile or inert.

(c) Increases the stability of the Complexes due to presence of multidentate cyclic ligend is called Macrocyclic effect.

(d) $[Ni(CN)_2]^{2+}$ is less stable than $[Ni(NH_3)_6]^{2+}$

11) Which of the Following Combinations can be regarded as Solt acids.

(a) BF_3 & Sn^{4+} (b) Cu^+ & Cd^{2+}

(c) SCN^- & H^- (d) Na^+ & NH_3