Class 12 Chemistry · Chapter 5: Coordination Compounds

Worksheet · 20 marks · about 40 minutes · based on NCERT

Name _____ Class and section _____ Date _____

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1. Which of the following ligands can bind a metal ion through either of two different donor atoms? [1]

(a) $C_2O_4^{2-}$ (b) $H_2NCH_2CH_2NH_2$

(c) SCN^- (d) NH_3

2. The formula of diamminebis(ethane-1,2-diamine)cobalt(III) chloride is [1]

(a) $[Co(NH_3)_2(en)_2Cl]Cl_2$ (b) $[Co(NH_3)_2(en)_2]Cl_2$

(c) $[Co(NH_3)_2(en)_2]Cl_3$ (d) $[Co(NH_3)(en)_2]Cl_3$

3. Platinum(IV) has a secondary valence of 6 in $PtCl_4{\cdot}4NH_3$, and all four NH_3 molecules are bound to the metal. One formula unit of the compound gives, in water, [1]

(a) 2 ions (b) 3 ions

(c) 4 ions (d) 5 ions

4. The hexadentate ligand $EDTA^{4-}$ binds a metal ion through [1]

(a) six O atoms (b) four N atoms and two O atoms

(c) two N atoms and four O atoms (d) two N atoms and two O atoms

5. Which of the following is a heteroleptic complex? [1]

(a) $[Cr(CO)_6]$ (b) $[Ni(en)_3]^{2+}$

(c) $[Co(NH_3)_4(H_2O)Cl]^{2+}$ (d) $[Cu(NH_3)_4]^{2+}$

6. Using valence bond theory, give the hybridisation and the magnetic behaviour of the tetrahedral ion $[Zn(NH_3)_4]^{2+}$. [2]

7. Name the metal present in (i) chlorophyll and (ii) vitamin B12. Name one platinum complex used to inhibit the growth of tumours. [2]

8. Write the IUPAC names of (i) $Li[AlH_4]$ and (ii) $[CuCl_2(H_2O)_2]$. [2]

9. Write the formulas of (i) sodium hexanitrito-N-cobaltate(III), (ii) tetraamminecopper(II) sulphate and (iii) pentacarbonyliron(0). [3]

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10. One mole of $IrCl_3 \cdot 4NH_3$ gives one mole of AgCl at once with excess $AgNO_3$(aq). Iridium has coordination number 6 in it. (a) Write its formula. (b) State the primary and the secondary valence of iridium and what each corresponds to today. (c) How many geometrical isomers can the complex ion have? [3]

11. Co^{2+} (Z of Co = 27) forms octahedral complexes with ligands at both ends of the spectrochemical series. Write the t_2g/eg configuration of Co^{2+} when $\Delta o < P$ and when $\Delta o > P$, and calculate the spin-only magnetic moment in each case. [3]

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