Chapter Summary Worksheet

Chapter 11 Transition metals and the *d*-block elements

Print out and complete this worksheet to generate a summary for Chapter 11.

1 Which could **not** act as a ligand?

- ☐ **A** F^-
- ☐ **B** $CH_2{=}CH_2$
- ☐ **C** $C_6H_5NH_2$
- ☐ **D** CH_3COO^-

2 In which equation is there a *decrease* in entropy?

- ☐ **A** $[Cr(H_2O)_6]^{3+}(aq) + 3C_2O_4^{2-}(aq) \rightarrow [Fe(C_2O_4)_3]^{3-}(aq) + 6H_2O(l)$
- ☐ **B** $Zn(s) + 2H^+(aq) \rightarrow Zn^{2+}(aq) + H_2(g)$
- ☐ **C** $[CuCl_4]^{2-}(aq) + EDTA^{4-}(aq) \rightarrow [Cu(EDTA)]^{2-}(aq) + 4Cl^-(aq)$
- ☐ **D** $[CuCl_4]^{2-}(aq) + 6H_2O(l) \rightarrow [Cu(H_2O)_6]^{2+}(aq) + 4Cl^-(aq)$

3 When aqueous sodium hydroxide is added to a solution of a compound of a transition metal, an off-white precipitate is obtained which darkens on standing. When aqueous barium chloride solution was added to a solution of the transition metal compound, a white precipitate is obtained, which remains on the addition of hydrochloric acid. The compound is:

- ☐ **A** $FeSO_4$
- ☐ **B** $MnSO_4$
- ☐ **C** $CrSO_3$
- ☐ **D** $NiSO_4$

4 In the table, which complex has the correct shape and oxidation state?

	Complex	Shape	Oxidation state
☐	**A** $[CrCl_4]^-$	Planar	+3
☐	**B** $[CuCl_4]^{2-}$	Tetrahedral	+1
☐	**C** $[CuCl_2]^-$	Linear	+2
☐	**D** $[Cu(NH_3)_4(H_2O)_2]^{2+}$	Octahedral	+2

5 Which is the electronic configuration of a transition metal?

- ☐ **A** [Ar] $3d^5\ 4s^1$
- ☐ **B** [Ar] $3d^{10}\ 4s^2$
- ☐ **C** [Ar] $3d^1\ 4s^2$
- ☐ **D** [Ar] $4d^7\ 5s^2$

6 Which of the following does **not** give rise to a solution when excess ammonia solution is added?

- ☐ **A** silver(I) nitrate, $AgNO_3$
- ☐ **B** copper(I) chloride, CuCl
- ☐ **C** iron(II) sulfate, $FeSO_4$
- ☐ **D** nickel(II) sulfate, $NiSO_4$

7 A solution of which of the following gives a precipitate with aqueous sodium hydroxide that then dissolves in excess alkali?

- ☐ **A** $CrCl_3$
- ☐ **B** $FeCl_3$
- ☐ **C** $CuCl_2$
- ☐ **D** CuCl

8 Which statement is true of transition metals?

- ☐ **A** All their ions are coloured.
- ☐ **B** Their compounds exist in more than one oxidation state.
- ☐ **C** They have at least one unpaired electron in their *d*-shells.
- ☐ **D** in the +2 oxidation state, their compounds can be oxidised.

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