CH1012 Tutorial 4

Name:

- 1. Draw 3D structures of the following complexes and identify those that may exist as **geometric** isomers:
 - $[Pt(NH_3)_2(NO_2)_2]$

• [Co(NH₃)₃Cl₃]

• [Zn(NH₃)₂(OH)Cl]

2. Ti(III) compounds are coloured, while Ti(IV) compounds are colourless. Why?

3. What is the **crystal field splitting energy**?

4. Assign the **oxidation state** of nitrogen in the following molecules: NO_2^- HNO₃ N₂O

5. Determine if the following reactions are **redox** or **metathesis reactions**, explain your decision. For <u>redox</u> reaction(s) identify the oxidised and reduced species.

(i)	2HCl(aq) +	$Ca(OH)_2(aq) \rightarrow$	$CaCl_2(aq) +$	$2H_2O(1)$
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- $\begin{array}{cccc} (ii) & CaCl_2(l) & \rightarrow & Ca(s) \ + & Cl_2(g) \end{array}$
- 6. Balance the equation for the following redox reaction in **acidic solution**. Your method for balancing the equation should be clearly presented.

 $MnO_4(aq) + ClO_3(aq) \rightarrow Mn^{2+}(aq) + ClO_4(g)$