Question	Marking Guidance	Mark	Comments
7(a)	Variable oxidation state	1	
	eg Fe(II) and Fe (III)	1	Any correctly identified pair Allow two formulae showing complexes with different oxidation states even if oxidation state not given
	(Characteristic) colour (of complexes)	1	
	eg Cu^{2+}(aq) / $[Cu(H_2O)_6]^{2+}$ is blue	1	Any correct ion with colour scores M3 and M4 Must show (aq) or ligands OR identified coloured compound (e.g. $CoCO_3$)
7(b)	Tetrahedral	1	
	$[CuCl_4]^{2-}$ / $[CoCl_4]^{2-}$	1	Any correct complex (Note charges must be correct)
	Square planar	1	
	$(NH_3)_2PtCl_2$	1	Any correct complex
	Linear	1	Do not allow linear planar
	$[Ag(NH_3)_2]^+$	1	$[AgCl_2]^-$ etc
7(c)(i)	$[Ca(H_2O)_6]^{2+} + EDTA^{4-} \rightarrow [CaEDTA]^{2-} + 6H_2O$	1	If equation does not show increase in number of moles of particles CE = 0/3 for 7(c)(ii) If no equation, mark on

7(c)(ii)	2 mol of reactants form 7 mol of products	1	Allow more moles/species of products Allow consequential to 7(c)(i)
	Therefore disorder increases	1	
	Entropy increases / +ve entropy change / free-energy change is negative	1	

7(c)(iii)	Moles EDTA = 6.25 x 0.0532 / 1000 = (3.325×10^{-4})	1	
	Moles of Ca^{2+} in 1 dm^3 = 3.325×10^{-4} x 1000 / 150 = (2.217×10^{-3})	1	Mark is for M1 x 1000 / 150 **OR** M1 x 74.1 If ratio of Ca^{2+} : EDTA is wrong or 1000 / 150 is wrong, CE and can score M1 only This applies to the alternative
	Mass of $Ca(OH)_2$ = 2.217×10^{-3} x 74.1 = 0.164 g	1	M1 x 74.1 x 1000 / 150 Answer expressed to 3 sig figs or better Must give unit to score mark Allow 0.164 to 0.165