

Question Number	Answer	Mark
6(a)	<p>The only correct answer is D</p> <p><i>A is not correct because it is the 2nd most soluble</i></p> <p><i>B is not correct because it is the 3rd most soluble</i></p> <p><i>C is not correct because it is the least soluble</i></p>	(1)

Question Number	Acceptable Answer	Additional Guidance	Mark
6(b)(i)	<p>An answer that makes reference to the following point:</p> <ul style="list-style-type: none">the concentration of a solid / $\text{Mg}(\text{OH})_2$ is constant / unchanged / changes very little	<p>Allow magnesium hydroxide is in a different phase / state (from the aqueous ions)</p> <p>Ignore solids do not appear in K_c expressions / just 'it is solid'</p> <p>Ignore solid does not affect the concentration of the solution</p> <p>Ignore it is a heterogeneous equilibrium</p> <p>Ignore it is difficult to measure the concentration of a solid</p> <p>Do not award the solid does not have a concentration</p>	(1)

Question Number	Acceptable Answer	Additional Guidance	Mark
6(b)(ii)	<ul style="list-style-type: none"> mol³ dm⁻⁹ 	Allow dm ⁻⁹ mol ³ mol ³ /dm ⁹ Ignore any working before the answer	(1)

Question Number	Acceptable Answer	Additional Guidance	Mark
6(b)(iii)	<ul style="list-style-type: none"> use of $\Delta_{\text{sol}}H = \Delta_{\text{hyd}}H[\text{Mg}^{2+}(\text{aq})] + 2\Delta_{\text{hyd}}H[\text{OH}^{-}(\text{aq})] - \Delta_{\text{latt}}H[\text{Mg}(\text{OH})_2(\text{s})]$ (1) calculation of $\Delta_{\text{sol}}H$ (1) 	<u>Example of calculation</u> $\Delta_{\text{sol}}H = -1920 + 2(-460) - (-2842)$ Allow this shown on a Hess cycle $\Delta_{\text{sol}}H = (+)2 \text{ (kJ mol}^{-1}\text{)}$ Allow 2000 J mol ⁻¹ Correct answer with no working scores 2	(2)

Question Number	Answer	Mark
6(b)(iv)	<p>The only correct answer is D</p> <p><i>A is not correct because it should not be linear and should level off</i></p> <p><i>B is not correct because it should not increase in that way and should level off</i></p> <p><i>C is not correct because it should not be horizontal</i></p>	(1)

Question Number	Acceptable Answer	Additional Guidance	Mark
6(b)(v)	<p>An answer that makes reference to the following points:</p> <p>Addition of magnesium sulfate solution:</p> <ul style="list-style-type: none"> • equilibrium position shifts to the left / in the backwards direction (1) • because increased concentration / amount of magnesium ions / $Mg^{2+}((aq))$ (1) <p>Addition of dilute hydrochloric acid:</p> <ul style="list-style-type: none"> • equilibrium shifts to the right / in the forwards direction (1) • because the hydrogen ions / $H^+((aq))$ react with / neutralise / removes the hydroxide ions / $OH^-((aq))$ (1) 	<p>Mark independently</p> <p>Allow more magnesium hydroxide precipitates / forms</p> <p>Allow more Mg^{2+} ions present</p> <p>Allow more magnesium hydroxide dissolves / dissociates</p> <p>Allow $H^+((aq)) + OH^-((aq)) \rightarrow H_2O((l))$</p> <p>Allow magnesium hydroxide reacts with / is neutralised by acid / equation to show this</p> <p>Allow acid / HCl reacts with / neutralises / removes hydroxide ions</p> <p>Penalise reference to K_c changing once only</p>	(4)

(Total for Question 6 = 10 marks)