

Question	Answers	Additional Comments/Guidance	Mark
03.1	$(\Delta S = \Sigma(S_{\text{products}}) - \Sigma(S_{\text{reactants}}))$ $= [(4 \times 211) + (6 \times 189)] - [(4 \times 193) + (5 \times 205)] = (1978 - 1797)$ $181 \text{ (J K}^{-1} \text{ mol}^{-1}\text{)}$		<p>1</p> <p>1</p>
03.2	$(\Delta G = \Delta H - T\Delta S) = -905 - (600 + 273) \times 181 \times 10^{-3}$ $\Delta G = -1063 / -1060 \text{ (kJ mol}^{-1}\text{)}$ <p>If alternative value of $\Delta S = 211$ used, answer = $-1089 \text{ (kJ mol}^{-1}\text{)}$</p>	<p>If answer to 03.1 is incorrect, mark consequentially:</p> <ul style="list-style-type: none"> $-905 - (873 \times 03.1 \times 10^{-3})$ 	<p>1</p> <p>1</p>
03.3	<p>ΔG becomes more negative/less positive</p> <p>The entropy change / ΔS is positive / $T\Delta S$ gets bigger / $-T\Delta S$ gets more negative.</p>	<p>Ignore increase/decrease/larger/smaller ΔG</p> <p>Consequential on wrong 03.1</p> <p>If candidate does a calculation in 03.1 to produce ΔS negative then allow ΔG becomes less negative or more positive</p>	<p>1</p> <p>1</p>

03.4	Reactant(s) adsorbed onto the (platinum surface) / (platinum) provides a surface / active sites		1
	Reaction (on the surface) or bond breaking(weakening) / bond making occurs (on the surface)		1
	Desorption (of the product) or wtte		1
03.5	(Oxidation state changes from) -3 to +2 OR (+) 5		1
03.6	$2\text{NH}_3 + 2\text{O}_2 \rightarrow \text{N}_2\text{O} + 3\text{H}_2\text{O}$	Allow multiples Ignore state symbols	1
Total			11