

Question	Answer	Marks	Guidance
18	<p>ΔH calculation from experiment</p> <p>$q = 100 \times 4.18 \times 20.5$ OR 8569 J OR 8.569 kJ ✓</p> <p>Amount of butan-1-ol = $\frac{0.259}{74} = 3.5 \times 10^{-3}$ mol ✓</p> <p>$\Delta H = -2448$ kJ mol⁻¹ ✓</p> <p>ΔS calculation</p> <p>$\Delta S = S_{\text{products}} - S_{\text{reactants}}$</p> <p>$\Delta S = (4 \times 214) + (5 \times 70) - [(228) + (6 \times 205)]$ OR $\Delta S = 1206 - 1458$ ✓</p> <p>$\Delta S = -252$ J K⁻¹ mol⁻¹ OR -0.252 kJ K⁻¹ mol⁻¹ ✓</p> <p>ΔG calculation</p> <p>$\Delta G = \Delta H - T\Delta S$</p> <p>$\Delta G = -2448 - (298 \times -0.252)$ ✓</p> <p>$\Delta G = -2373$ (kJ mol⁻¹) ✓</p>	7	<p>ALLOW Calculator value for $\Delta H = -2448.285714$ correctly rounded to three or more significant figures</p> <p>Mark for use of correct expression with ΔS in kJ K⁻¹ mol⁻¹</p> <p>ALLOW three or more sig figs for ΔG</p>
	Total	7	