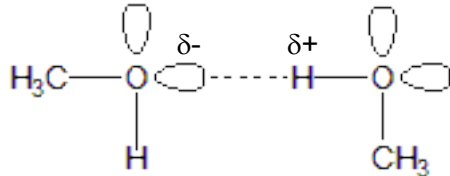


Question	Marking guidance	Mark	AO	Comments
05.1	$\Delta S = 238 + 189 - 214 - 3 \times 131 = -180 \text{ J K}^{-1} \text{ mol}^{-1}$ $\Delta G = \Delta H - T\Delta S$ $= -49 - \frac{523 \times (-180)}{1000}$ $= +45.1 \text{ kJ mol}^{-1}$	1	AO1b	Units essential
		1	AO1a	
		1	AO1b	
		1	AO1b	
05.2	When $\Delta G = 0$, $\Delta H = T\Delta S$ therefore $T = \Delta H/\Delta S$ $= -49 \times 1000/-180 = 272 \text{ (K)}$	1	AO1b	Mark consequentially to ΔS in 5.1
		1	AO1b	

05.3	<p>Diagram marks</p>  <p>Diagram of a molecule showing O–H bond and two lone pairs on each oxygen</p> <p>Labels on diagram showing $\delta+$ and $\delta-$ charges</p> <p>Diagram showing $\delta+$ hydrogen on one molecule attracted to lone pair on a second molecule</p> <p>Explanation mark</p> <p>Hydrogen bonding (the name mentioned) is a strong enough force (to hold methanol molecules together in a liquid)</p>	1	AO2a	Allow explanation of position of $\delta+$ and $\delta-$ charges on H and O
		1	AO2a	
		1	AO2a	
		1	AO2a	