

Solutions

Each answer shows the steps, then the **result**.

2.1

- $\Delta G^\ominus = \Delta H^\ominus - T\Delta S^\ominus$

2.2

- $\Delta G \leq 0$ (negative or zero)

3.1 A

- With $-\Delta H$ and $+\Delta S$, ΔG is negative at all temperatures

3.2 B

- Temperature must be in kelvin

3.3

(a)

- $\Delta G = 120 - 298(0.200) = 120 - 59.6 = +60.4 \text{ kJ mol}^{-1}$; not feasible (positive ΔG)

(b)

- feasible when $\Delta G = 0$: $T = \Delta H / \Delta S = 120 / 0.200 = 600 \text{ K}$

3.4

- at low T the $T\Delta S$ term is small, so $\Delta G = \Delta H - T\Delta S$ stays positive; raising T increases $T\Delta S$ until it exceeds ΔH , making ΔG negative and the reaction feasible