## **Chapter Summary Worksheet**

## **Chapter 2 Entropy: how far?**

Print out and complete this worksheet to generate a summary for Chapter 2.

- **1** In which reaction is  $\Delta S_{\text{system}}$  positive?
  - $\square A CaO(s) + CO_2(g) \rightarrow CaCO_3(s)$
  - $\square B H_2O(g) \rightarrow H_2O(I)$
  - $\bigcirc C CuCO_3(s) + 2H^+(aq) \rightarrow Cu^{2+}(aq) + H_2O(I) + CO_2(g)$
  - $\square \mathsf{PCl}_3(\mathsf{I}) + \mathsf{Cl}_2(\mathsf{g}) \to \mathsf{PCl}_5(\mathsf{s})$
- **2** The value of  $\Delta S_{surr}$  at 25°C for a reaction with  $\Delta H = -123$  kJ mol<sup>-1</sup> is:
  - - **B** –4920 J K<sup>-1</sup> mol<sup>-1</sup>

3 Which is thermodynamically spontaneous at all temperatures?

- A a reaction in which  $\Delta H$  and  $\Delta S_{\text{system}}$  are both positive
- **B** a reaction in which  $\Delta H$  is negative and  $\Delta S_{system}$  is positive
- **C** a reaction in which  $\Delta H$  is positive and  $\Delta S_{\text{system}}$  is negative
- **D** a reaction in which  $\Delta H$  and  $\Delta S_{system}$  are both negative

**4** In which thermodynamically spontaneous reaction will the position of equilibrium be moved towards the side of the products when a higher temperature is used?

- A a reaction in which  $\Delta H$  and  $\Delta S_{\text{system}}$  both are positive
- **B** a reaction in which  $\Delta H$  is negative and  $\Delta S_{system}$  is positive
- **C** a reaction in which  $\Delta H$  is positive and  $\Delta S_{\text{system}}$  is negative
- **D** a reaction in which  $\Delta H$  and  $\Delta S_{system}$  are both negative

**5** Methanol is made from carbon monoxide and hydrogen:

## $CO(g) + 2H_2(g) \rightarrow CH_3OH(g)$

The standard entropies/J  $K^{-1}$  mol<sup>-1</sup> are: CO(g) = 198;  $H_2(g) = 131$ ; CH<sub>3</sub>OH(g) = 240.

The standard entropy change of the system for the reaction is:

- A –220 J K<sup>-1</sup> mol<sup>-1</sup> C –89 J K<sup>-1</sup> mol<sup>-1</sup>
- **B** +220 J K<sup>-1</sup> mol<sup>-1</sup> **D** + 89 J K<sup>-1</sup> mol<sup>-1</sup>

**6** Which has the highest standard entropy value?

- A H<sub>2</sub>O(g) at 100°C
- C CH<sub>3</sub>OH(g) at 100°C D C<sub>2</sub>H<sub>5</sub>OH(g) at 100°C

B H<sub>2</sub>O(l) at 100°C

**7** When the following anhydrous solids are dissolved in water, which causes the greatest ordering of the water?

- A MgCl<sub>2</sub>
- B CaCl<sub>2</sub>

C SrCl<sub>2</sub>