Solutions

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

2.1

- the ratio of the concentrations of a solute distributed between two immiscible solvents at equilibrium

2.2

- "like dissolves like" – a solute prefers the solvent of similar polarity

2.3

- **octan-1-ol**, since $K_{\text{pc}} > 1$ means a higher concentration in the solvent on the top of the ratio

2.4

- so that they form two separate layers, and the solute can distribute between them

3.1 B

- A non-polar solute dissolves better in the non-polar hexane

3.2 B

- It depends on the polarities of the solute and the solvents

3.3

(a)

- $K_{\text{pc}} = 0.80 / 0.20 = 4.0$

(b)

- solvent A; the higher concentration shows the solute is more soluble in A (it is of more similar polarity)

3.4

- a polar solute and water can form strong interactions (e.g. hydrogen bonds / dipole–dipole); hexane is non-polar and cannot, so the solute prefers the water

3.5

(a)

- $0.50 - 0.40 = \mathbf{0.10}$ g

(b)

- the volumes are equal, so the ratio of concentrations equals the ratio of masses: $K_{\text{pc}} = \dfrac{0.40}{0.10}$
- $K_{\text{pc}} = \mathbf{4.0}$

3.6

- ammonia forms hydrogen bonds with water, but only weaker forces with trichloromethane
- so it is more soluble in water, and K_{pc} (trichloromethane/water) is **less than 1**