Solutions

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

2.1

- the equilibrium constant for the formation of a complex ion from the metal ion and its ligands in solution

2.2

- the complex is very stable

2.3

- water is in large excess, so its concentration is effectively constant

2.4

- the values cover a huge range (many powers of ten), so logarithms make them easier to compare

3.1 C

- Water is omitted from the K_{stab} expression

3.2 B

- The equilibrium moves towards the complex with the larger K_{stab}

3.3

(a)

- $K_{\text{stab}} = \dfrac{[[\text{Cu}(\text{NH}_3)_4(\text{H}_2\text{O})_2]^{2+}]}{[[\text{Cu}(\text{H}_2\text{O})_6]^{2+}][\text{NH}_3]^4}$

(b)

- the ammonia complex is more stable, so the equilibrium lies far to the right and the exchange goes almost to completion

3.4

- the ammonia complex has a much larger K_{stab} (is more stable); so excess ammonia drives the equilibrium to replace the water ligands and form the ammonia complex

3.5

(a)

- $[\text{Cu}(\text{EDTA})]^{2-}$, which has the largest $\lg K_{\text{stab}}$

(b)

- the ammonia ligands are replaced by EDTA, forming $[\text{Cu}(\text{EDTA})]^{2-}$
- because its K_{stab} is much larger, the equilibrium lies far towards the EDTA complex

3.6

- $K_{\text{stab}} = \dfrac{[[\text{CuCl}_4]^{2-}]}{[[\text{Cu}(\text{H}_2\text{O})_6]^{2+}]\,[\text{Cl}^-]^4}$