Solutions

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

2.1

- the forward and reverse rates are equal; the concentrations of reactants and products stay constant

2.2

- $K_c = \dfrac{[\mathrm{NH_3}]^2}{[\mathrm{N_2}][\mathrm{H_2}]^3}$

3.1 B

- Raising T shifts an exothermic equilibrium towards the reactants (endothermic direction)

3.2 C

- A catalyst speeds both directions equally — no shift

3.3

(a)

- $K_c = \dfrac{[\mathrm{NO_2}]^2}{[\mathrm{N_2O_4}]} = \dfrac{0.20^2}{0.10} = 0.40 \text{ mol dm}^{-3}$

(b)

- no change — only temperature changes K_c

3.4

- total moles = 4.0; mole fraction of $\mathrm{SO_2}$ = 3.0/4.0 = 0.75; $p(\mathrm{SO_2}) = 0.75 \times 400 =$ 300 kPa