

(Reversible reactions and dynamic equilibrium)

Q1. (2018)

2.0×10^3 moles

Q2. (2018)

smaller yield

(because) favours endothermic
reaction

Q3. a). (2020)

water

Q3.b). (2020)

becomes (more) red

(because the position of)
equilibrium moves to the right

(so that) the (increase in the)
concentration of thiocyanate
(ions) is reduced

Q4. (2020)

(the position of) equilibrium
moves to the left

(so that) the (increase in the)
temperature is reduced

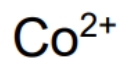
(therefore) the forward reaction
is exothermic

Q4. b). (2020)

no change in equilibrium
position

(because) no gases are present

Q4. c). (2020)



Q5. (2021)

Rate

- higher temperature gives higher rate
- because more frequent collisions
- higher pressure gives higher rate
- because more frequent collisions
- a catalyst can be used to give a higher rate
- because the activation energy is reduced

Yield

- higher temperature gives lower yield
- because the reaction is exothermic
- higher pressure gives higher yield
- because there are more molecules on left hand side

Other factors

- higher temperatures use more energy so costs increase
- higher pressures use more energy so costs increase
- higher pressures require stronger reaction vessels so costs increase

Compromise

- chosen temperature is a compromise between rate and yield
- chosen temperature is a compromise between rate and cost (of energy used)
- chosen pressure is a compromise between rate and cost (of energy used)
- chosen pressure is a compromise between yield and cost (of energy used)

Q6. a). (2022)

24.5 (g)

Q6. b). (2022)

water vapour was produced

(so) water (vapour) escaped
(from the tube)

Q6. c). (2022)

(so that) the reaction was complete

Q7. (2022)

endothermic (reaction)

Q8. (2023)

$$\begin{aligned} & \text{(mass of water in 4.68 g =} \\ & 4.68 - 2.99) \\ & = 1.69 \text{ (g)} \end{aligned}$$

$$\begin{aligned} & \text{(mass of water in 11.7 g =)} \\ & \frac{11.7}{4.68} \times 1.69 \end{aligned}$$

$$= 4.23 \text{ (g)}$$

Q9. (2023)

$$\begin{aligned} & \text{(energy =)} \\ & \frac{15.0}{2.99} \times 1.47 \end{aligned}$$

$$= 7.37 \text{ (kJ)}$$

Q10. (2024)

combustion

reversible

Q11. (2024)

water molecules break down
and reform at the same rate