

Exercise 6.25 – The equilibrium constant

Q625-01 For a reaction which goes to completion the equilibrium constant K_c , is:

- A. $\gg 1$
- B. $\ll 1$
- C. $= 1$
- D. $= 0$

Q625-02 Hydrogen and carbon dioxide react as shown in the equation below:



For this reaction, the values of K_c at different temperatures are:

Temperature/K	K_c
500	7.76×10^{-3}
700	1.23×10^{-1}
900	6.01×10^{-1}

Which statement for the reaction is correct:

- A. The forward reaction is endothermic
- B. $\text{H}_2\text{O}(\text{g})$ and $\text{CO}_2(\text{g})$ are more stable than $\text{H}_2(\text{g})$ and $\text{CO}_2(\text{g})$
- C. The reaction goes almost to completion at high temperatures.
- D. The reverse reaction is favoured by high temperatures.

Q625-03 The expression for the equilibrium constant for a reaction is:

$$K_c = \frac{[\text{B}][\text{C}]}{[\text{A}]^2}$$

At a certain temperature the values of $[\text{A}]$, $[\text{B}]$ and $[\text{C}]$ are all 0.2 mol dm^{-3} . What happens to the value of K_c when all three values are doubled to 0.4 mol dm^{-3} ?

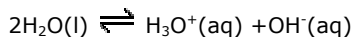
- A. It is halved
- B. It does not change
- C. It doubles
- D. It increases by a factor of four

Q625-04 A 1.0 dm^3 reaction vessel initially contains 6.0 mol of P and 6.0 mol of Q. At equilibrium 4.0 mol of R is present. What is the value of K_c for the following reaction:



- A. 0.11
- B. 0.25
- C. 0.44
- D. 4.00

Q625-05

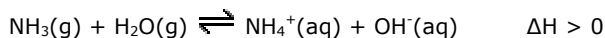


The equilibrium constant for the reaction above is 1.0×10^{-14} at 25°C and 2.1×10^{-14} at 35°C . What can be concluded from this information?

- A. $[\text{H}_3\text{O}^+]$ decreases as the temperature is raised
- B. $[\text{H}_3\text{O}^+]$ is greater than $[\text{OH}^-]$ at 35°C
- C. Water is a stronger electrolyte at 25°C
- D. The ionisation of water is endothermic.

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Q625-06 Which change increases the amount of NH_4^+ in the below reaction?



- A. Decreasing the temperature
- B. Decreasing the pressure
- C. Removing water
- D. Adding an acid

Q625-07



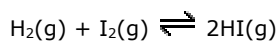
In an equilibrium mixture of these two gases, $[\text{N}_2\text{O}_4] = 5.0 \times 10^{-1} \text{ mol dm}^{-3}$. What is the equilibrium concentration of NO_2 in mol dm^{-3} ?

- A. 5.0×10^{-1}
- B. 5.0×10^{-2}
- C. 5.0×10^{-3}
- D. 2.5×10^{-4}

Q625-08 A 1.0 dm^3 reaction vessel contains initially 1.0 mol of $\text{NO}_2(\text{g})$ and 1.0 mol of $\text{N}_2\text{O}_4(\text{g})$. At equilibrium 0.75 mol of $\text{N}_2\text{O}_4(\text{g})$ are present. What is the value of K_c ?



Q625-09 For the reaction below:

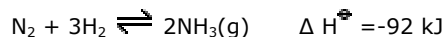


At a certain temperature the equilibrium concentrations are (in mol dm^{-3}):

$[\text{H}_2] = 0.30$, $[\text{I}_2] = 0.30$, $[\text{HI}] = 3.0$

What is the value of K_c ?

Q625-10 Consider the following reaction:



Which of the following affects the value of K_c ?

- A. Adding a catalyst
- B. Increasing the pressure
- C. Increasing the concentration of nitrogen and hydrogen
- D. Increasing the temperature