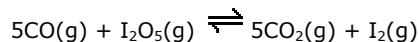


## Exercise 6.24 – Le Chatelier's principle

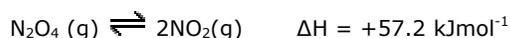
**Q624-01** Consider the endothermic reaction below:



According to Le Chatelier's principle, which change would result in an increase in the amount of  $\text{CO}_2$ ?

- A. Increasing the temperature
- B. Decreasing the temperature
- C. Increasing the pressure
- D. Decreasing the pressure

**Q624-02** The compounds  $\text{N}_2\text{O}_4$  and  $\text{NO}_2$  produce an equilibrium mixture according to the equation below:



An increase in the equilibrium concentration of  $\text{NO}_2$  can be produced by increasing which of the following factors:

- I - Pressure
- II - Temperature

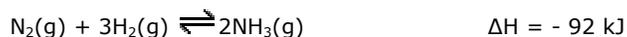
- A. I only
- B. II only
- C. I and II
- D. Neither I nor II

**Q624-03** For the following system at equilibrium, which change will shift the position of equilibrium to the right?



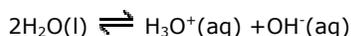
- A. Adding a catalyst
- B. Increasing the pressure
- C. Removing water
- D. Increasing the temperature

**Q624-04** Which change will shift the position of equilibrium to the right in this reaction?



- A. Increasing the temperature.
- B. Decreasing the pressure.
- C. Adding a catalyst.
- D. Removing the ammonia from the equilibrium mixture.

**Q624-05**

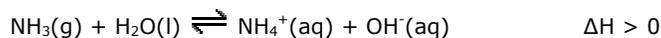


The equilibrium constant for the reaction above is  $1.0 \times 10^{-14}$  at  $25^\circ\text{C}$  and  $2.1 \times 10^{-14}$  at  $35^\circ\text{C}$ . What can be concluded from this information?

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

## Exercise 6.24 – Le Chatelier’s principle

**Q624-06** Which change increases the amount of  $\text{NH}_4^+$  in the below reaction?



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

**Q624-07** Consider the equilibrium reaction:



Which change will cause the reaction to shift to the right?

- A. Increase the temperature
- B. Decrease the volume of the container.
- C. Add a catalyst to speed up the reaction.
- D. Remove the gaseous water by allowing it to react and be absorbed by KOH.

**Q624-08** Which changes will shift the position of equilibrium to the right in the following reaction?



- I - adding a catalyst
- II - decreasing the oxygen concentration
- III - increasing the volume of the cylinder

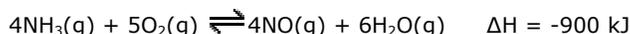
- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II and III

**Q624-09** The reaction below is an important step in the production of sulphuric acid. An increase in which of the following, will increase the ratio of  $\text{SO}_3(\text{g})$  to  $\text{SO}_2(\text{g})$  at equilibrium?



- A. Pressure only
- B. Temperature
- C. Both pressure and temperature
- D. Neither pressure nor temperature

**Q624-10** The equation for a reaction used in the manufacture of nitric acid is:



Which changes occur when the temperature of the reaction is increased?

	Position of equilibrium	Value of $K_c$
A.	shifts to the left	increases
B.	shifts to the left	decreases
C.	shifts to the right	increases
D.	shifts to the right	decreases