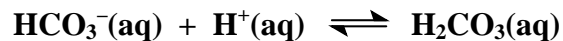


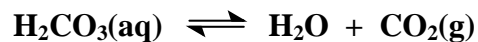
**Marks**  
**4**

- Explain the role played by the lungs and the kidneys in maintaining blood pH at a constant value of 7.4.

**The most important buffer system in the blood is the hydrogencarbonate / carbonic acid system:**



**If the amount of  $\text{H}^+$  exceeds the capacity of the buffering system (*e.g.* during vigorous exercise), the lungs can help by removing  $\text{CO}_2(\text{g})$ .  $\text{CO}_2$  is linked to the buffer system via**



**Thus removal of  $\text{CO}_2(\text{g})$  will shift the  $\text{HCO}_3^-/\text{H}_2\text{CO}_3$  equilibrium to the right, reducing  $\text{H}^+$ .**

**If the blood becomes too basic, the kidneys can help by excreting  $\text{HCO}_3^-$ . This will shift the buffer equilibrium to the left, producing more  $\text{H}^+$ .**