

**Marks**  
**5**

- The concentration of a dissolved gas is related to its partial pressure by  $c = kp$ . What is the concentration of  $\text{CO}_2$  dissolved in blood if the partial pressure of  $\text{CO}_2$  in the lungs is 0.053 atm? The  $k$  for  $\text{CO}_2$  is  $0.034 \text{ mol L}^{-1} \text{ atm}^{-1}$ .

Answer:

Calculate the pH of blood if all of this  $\text{CO}_2$  reacted to give  $\text{H}_2\text{CO}_3$ .  
The  $K_a$  of  $\text{H}_2\text{CO}_3$  is  $4.5 \times 10^{-7}$ .

Answer:

Hyperventilation results in a decrease in the partial pressure of  $\text{CO}_2$  in the lungs. What effect will this have on the pH of the blood? Use a chemical equation to illustrate your answer.

The pH of blood is maintained around 7.4 by the  $\text{H}_2\text{CO}_3 / \text{HCO}_3^-$  buffer system. Explain how a buffer works, illustrating your answer with chemical equations.