

### Exercise 7.32 – The pH scale and hydrogen ion concentration

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**Q732-01** What is the pH of a solution with a hydronium ion ( $\text{H}_3\text{O}^+$ ) concentration of 0.01 mole per litre?

- A. 1
  - B. 2
  - C. 10
  - D. 14
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**Q732-02** The pH of a solution X is 1 and that of Y is 2. Which of the following statements is correct about the hydrogen ion concentration in the two solutions?

- A.  $[\text{H}^+]$  in X is half that in Y
  - B.  $[\text{H}^+]$  in X is twice that in Y
  - C.  $[\text{H}^+]$  in X is one tenth that in Y
  - D.  $[\text{H}^+]$  in X is ten times that in Y
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**Q732-03** The hydrogen ion concentration corresponding to a pH of 8.64 is

- A. 5.36
  - B.  $4.4 \times 10^{-8}$
  - C.  $4.4 \times 10^{-9}$
  - D.  $2.3 \times 10^{-9}$
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**Q732-04** What is the pH of a  $1.0 \times 10^{-9}$  molar HCl solution?

- A. 5
  - B. 6
  - C. 7
  - D. 9
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**Q732-05** Which change in  $[\text{H}^+]$  causes the biggest increase in pH?

- A. A change in  $[\text{H}^+(\text{aq})]$  from  $1 \times 10^{-3}$  to  $1 \times 10^{-2}$   $\text{mol dm}^{-3}$
  - B. A change in  $[\text{H}^+(\text{aq})]$  from  $1 \times 10^{-3}$  to  $1 \times 10^{-4}$   $\text{mol dm}^{-3}$
  - C. A change in  $[\text{H}^+(\text{aq})]$  from  $1 \times 10^{-4}$  to  $1 \times 10^{-2}$   $\text{mol dm}^{-3}$
  - D. A change in  $[\text{H}^+(\text{aq})]$  from  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$   $\text{mol dm}^{-3}$
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**Q732-06** Lime was added to a sample of soil and the pH changes from 4 to 6. What was the corresponding change in the hydrogen ion concentration?

- A. Increased by a factor of 2
  - B. Increased by a factor of 100
  - C. Decreased by a factor of 2
  - D. Decreased by a factor of 100
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**Q732-07** How does the  $[\text{H}^+]$  in an aqueous solution with  $\text{pH} = 4$  compare with the  $[\text{H}^+]$  in a solution with a  $\text{pH} = 2$ ? The  $[\text{H}^+]$  is:

- A. Twice as great
  - B. Half as much
  - C. 1/10 of the value
  - D. 1/100 of the value
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**Q732-08**  $10 \text{ cm}^3$  of an HCl solution with a pH value of 2 was mixed with  $90 \text{ cm}^3$  of water. What will be the pH of the resulting solution?

- A. 1
  - B. 3
  - C. 5
  - D. 7
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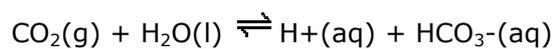
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**Q732-09** The pH of a solution is 2. If its pH is increased to 6, how many times greater is the  $[H^+]$  of the original solution?

- A. 3
- B. 4
- C. 1000
- D. 10000

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**Q732-10** What will happen if  $CO_2(g)$  is allowed to escape from the following reaction mixture at equilibrium?



- A. The pH will decrease
  - B. The pH will increase
  - C. The pH will remain constant
  - D. The pH will become zero
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