Exercise 7.32 – The pH scale and hydrogen ion concentration

Q732-01 What is the pH of a solution with a hydronium ion (H_3O^+) concentration of 0.01 mole per litre?

A. 1
B. 2
C. 10
D. 14

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. $[H^+]$ in X is half that in Y
B. $[H^+]$ in X is twice that in Y
C. $[H^+]$ in X is one tenth that in Y
D. $[H^+]$ in X is ten times that in Y

Q732-03 The hydrogen ion concentration corresponding to a pH of 8.64 is

A. 5.36
B. 4.4×10^{-8}
C. 4.4×10^{-9}
D. 2.3×10^{-9}

Q732-04 What is the pH of a 1.0×10^{-9} molar HCl solution?

A. 5
B. 6
C. 7
D. 9

Q732-05 Which change in $[H^+]$ causes the biggest increase in pH?

A. A change in $[H^+(aq)]$ from 1×10^{-3} to 1×10^{-2} mol dm^{-3}
B. A change in $[H^+(aq)]$ from 1×10^{-3} to 1×10^{-4} mol dm^{-3}
C. A change in $[H^+(aq)]$ from 1×10^{-4} to 1×10^{-2} mol dm^{-3}
D. A change in $[H^+(aq)]$ from 1×10^{-4} to 1×10^{-6} mol dm^{-3}

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

Q732-07 How does the $[H^+]$ in an aqueous solution with pH = 4 compare with the $[H^+]$ in a solution with a pH = 2? The $[H^+]$ is:

A. Twice as great
B. Half as much
C. 1/10 of the value
D. 1/100 of the value

Q732-08 10 cm^3 of an HCl solution with a pH value of 2 was mixed with 90 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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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

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

$$CO_2(g) + H_2O(l) \rightleftharpoons H+(aq) + HCO_3-(aq)$$

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