



Figure 9-1. The pH chart.

QUESTIONS

Answer the following questions using Figure 9-1 above.

1. What is the pH of a solution whose H^+ ion concentration is 0.0001 mole per liter?

(1) 1 (2) 10 (3) 14 (4) 4
2. What is the concentration of H^+ ions, in moles per liter, of a 0.0001 M HCl solution?

(1) 1×10^{-1} (2) 1×10^{-2} (3) 1×10^{-3} (4) 1×10^{-4}
3. What is the pH of a solution that has a hydrogen ion concentration of 1×10^{-10} mole per liter?

(1) 1 (2) 10 (3) 14 (4) 4

4. What is the hydroxide ion concentration of a solution that has a hydronium ion concentration of 1×10^{-9} mole per liter at 298 K?
- (1) 1×10^{-5} mole per liter (2) 1×10^{-7} mole per liter
(3) 1×10^{-9} mole per liter (4) 1×10^{-14} mole per liter
5. Which concentration indicates a basic solution at 298K?
- (1) $[\text{OH}^-] > 1.0 \times 10^{-7}$ (2) $[\text{OH}^-] = 1.0 \times 10^{-7}$
(3) $[\text{H}_3\text{O}^+] > 1.0 \times 10^{-7}$ (4) $[\text{H}_3\text{O}^+] = 1.0 \times 10^{-7}$
6. What is the H^+ ion concentration of an aqueous solution that has a pH of 11?
- (1) 1.0×10^{-11} mol/L (2) 1.0×10^{-3} mol/L
(3) 3.0×10^{-1} mol/L (4) 11×10^{-1} mol/L
7. If a solution has a hydronium ion concentration of 1×10^{-9} M, the solution is
- (1) basic and has a pH of 9 (2) basic and has a pH of 5
(3) acidic and has a pH of 9 (4) acidic and has a pH of 5
8. When equal volumes of 0.5 M HCl and 0.5 M NaOH are mixed, the pH of the resulting solution is
- (1) 1 (2) 2 (3) 7 (4) 4
9. Adding 0.1 M NaOH to a 0.1 M solution of HCl will cause the pH of the solution to
- (1) decrease (2) increase (3) remain the same
10. The $[\text{H}^+]$ of a solution is 1×10^{-2} at 298 K. What is the $[\text{OH}^-]$ of this solution?
- (1) 1×10^{-14} (2) 1×10^{-12} (3) 1×10^{-7} (4) 1×10^{-2}
11. As a solution of NaOH is diluted from 0.1 M to 0.001 M, the pH of the solution
- (1) decreases (2) increases (3) remains the same
12. Which 0.1M solution has the highest concentration of H_3O^+ ions?
- (1) CH_3COOH (2) NaCl (3) KBr (4) $\text{Ba}(\text{OH})_2$
13. Which could be the pH of a solution whose H^+ ion concentration is less than the OH^- ion concentration?
- (1) 9 (2) 2 (3) 3 (4) 4

- Which substance is an electrolyte?
 (1) C_2H_5OH (2) $C_6H_{12}O_6$ (3) $C_{12}H_{22}O_{11}$ (4) CH_3COOH
- Which of the following is the best conductor of electricity?
 (1) $NaCl(s)$ (2) $NaCl(aq)$ (3) $CH_4(g)$ (4) $CH_4O(aq)$
- Which of the following 0.1 M solutions is the best conductor of electricity?
 (1) $H_2S(aq)$ (2) $HCl(aq)$ (3) $C_6H_{12}O_6(aq)$ (4) $C_{12}H_{22}O_{11}(aq)$
- Which type of reaction will occur when equal volumes of 0.1 M HCl and 0.1 M $NaOH$ are mixed?
 (1) neutralization (2) ionization (3) electrolysis (4) hydrolysis
- The OH^- ion concentration is greater than the H_3O^+ ion concentration in a water solution of
 (1) CH_3OH (2) $Ba(OH)_2$ (3) HCl (4) H_2SO_4
- Which is a characteristic of an aqueous solution of HNO_3 ?
 (1) It conducts electricity. (2) It forms OH^- ions.
 (3) It turns litmus blue. (4) $[H^+]$ is less than $[OH^-]$
- Which solution will change litmus from blue to red?
 (1) $NaOH(aq)$ (2) $NH_4OH(aq)$ (3) $CH_3OH(aq)$ (4) $CH_3COOH(aq)$
- Which solution will turn litmus from red to blue?
 (1) $H_2S(aq)$ (2) $NH_4OH(aq)$ (3) $H_2SO_3(aq)$ (4) $CO_2(aq)$
- Which substance is always produced in the reaction between hydrochloric acid and sodium hydroxide?
 (1) water (2) hydrogen gas (3) oxygen gas (4) a precipitate
- Which compound reacts with an acid to form a salt and water?
 (1) CH_3Cl (2) CH_3COOH (3) KCl (4) KOH
- Which equation represents a neutralization reaction?
 (1) $H^+(aq) + OH^-(aq) \rightarrow H_2O(l)$
 (2) $Ag^+(aq) + I^-(aq) \rightarrow AgI(s)$
 (3) $Zn(s) + 2HCl(aq) \rightarrow ZnCl_2(aq) + H_2(g)$
 (4) $NaCl(aq) + AgNO_3(aq) \rightarrow NaNO_3(aq) + AgCl(s)$

