

- The pH of a solution is 7. When acid is added to the solution, the hydronium ion concentration becomes 100 times greater. What is the pH of the new solution?
A) 1 B) 5 C) 9 D) 14
- When the pH of an aqueous solution is changed from 1 to 2, the concentration of hydronium ions in the solution is
A) decreased by a factor of 2
B) decreased by a factor of 10
C) increased by a factor of 2
D) increased by a factor of 10
- When the pH of a solution is changed from 4 to 3, the hydronium ion concentration of the solution
A) decreases by a factor of 10
B) increases by a factor of 10
C) decreases by a factor of 100
D) increases by a factor of 100
- When the hydronium ion concentration of a solution is increased by a factor of 10, the pH value of the solution
A) decreases 1 pH unit
B) decreases 10 pH units
C) increases 1 pH unit
D) increases 10 pH units
- When the hydronium ion concentration of a solution is increased by a factor of 10, the pH value of the solution
A) decreases 1 pH unit
B) decreases 10 pH units
C) increases 1 pH unit
D) increases 10 pH units
- When the pH value of a solution is changed from 2 to 1, the concentration of hydronium ions
A) decreases by a factor of 2
B) increases by a factor of 2
C) decreases by a factor of 10
D) increases by a factor of 10
- A solution with a pH of 2.0 has a hydronium ion concentration ten times greater than a solution with a pH of
A) 1.0 B) 0.20 C) 3.0 D) 20
- Which change in pH represents a hundredfold increase in the concentration of hydronium ions in a solution?
A) pH 1 to pH 2 B) pH 1 to pH 3
C) pH 2 to pH 1 D) pH 3 to pH 1
- The pH of an aqueous solution changes from 4 to 3 when the hydrogen ion concentration in the solution is
A) decreased by a factor of $\frac{3}{4}$
B) decreased by a factor of 10
C) increased by a factor of $\frac{4}{3}$
D) increased by a factor of 10
- What is the pH of a solution that has a hydronium ion concentration 100 times greater than a solution with a pH of 4?
A) 5 B) 2 C) 3 D) 6
- As the pH of a solution is changed from 3 to 6, the concentration of hydronium ions
A) increases by a factor of 3
B) increases by a factor of 1000
C) decreases by a factor of 3
D) decreases by a factor of 1000
- Solution *A* has a pH of 3 and solution *Z* has a pH of 6. How many times greater is the hydronium ion concentration in solution *A* than the hydronium ion concentration in solution *Z*?
A) 100 B) 2 C) 3 D) 1000
- A hydrogen ion, H^+ , in aqueous solution may also be written as
A) H_2O B) H_2O_2
C) H_3O^+ D) OH^-
- Which pH change represents a hundredfold increase in the concentration of H_3O^+ ?
A) pH 5 to pH 7 B) pH 13 to pH 14
C) pH 3 to pH 1 D) pH 4 to pH 3

15. Which of these pH numbers indicates the highest level of acidity?
A) 5 B) 8 C) 10 D) 12
16. Which pH indicates a basic solution?
A) 1 B) 5 C) 7 D) 12
17. When the pH of a solution changes from a pH of 5 to a pH of 3, the hydronium ion concentration is
A) 0.01 of the original content
B) 0.1 of the original content
C) 10 times the original content
D) 100 times the original content
18. Given the following solutions:
Solution A: pH of 10
Solution B: pH of 7
Solution C: pH of 5
Which list has the solutions placed in order of increasing H^+ concentration?
A) A, B, C B) B, A, C
C) C, A, B D) C, B, A
19. Which of these 1 M solutions will have the highest pH?
A) NaOH B) CH_3OH
C) HCl D) NaCl
20. Which of the following pH values indicates the highest concentration of hydronium ions in a solution?
A) pH = 1 B) pH = 2
C) pH = 3 D) pH = 4
21. Which relationship is present in a solution that has a pH of 7?
A) $[H^+] = [OH^-]$ B) $[H^+] > [OH^-]$
C) $[H^+] < [OH^-]$ D) $[H^+] + [OH^-] = 7$
22. Which of the following 0.1 M solutions has the lowest pH?
A) 0.1 M NaOH B) 0.1 M CH_3OH
C) 0.1 M NaCl D) 0.1 M HCl
23. As HCl(g) is added to water, the pH of the water solution
A) decreases B) increases
C) remains the same
24. Which 0.1 M solution has a pH greater than 7?
A) $C_6H_{12}O_6$ B) CH_3COOH
C) KCl D) KOH
25. Which could be the pH of a solution whose H_3O^+ ion concentration is less than the OH^- ion concentration?
A) 9 B) 2 C) 3 D) 4
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