

Acid and Base Unit: pH and [H⁺], pOH and [OH⁻]

1. A pH meter probe immersed in a solution displays a reading of 4.21. The [OH⁻(aq)] of the solution is _____ mol/L

a	1.6×10^{-10}
b	6.2×10^{-5}
c	1.6×10^4
d	6.2×10^9

2. A barium hydroxide solution has a concentration of 1.0×10^{-2} mol/L this solution will have a pH of _____

a	1.70
b	12.03
c	12.30
d	13.07

3. An apple was analyzed and found to have a pH of 3.30. The [OH⁻(aq)] for this sample is _____ mol/L

a	1.0×10^{-3}
b	5.0×10^{-4}
c	2.0×10^{-11}
d	1.0×10^{-10}

4. The [H₃O⁺(aq)] in 0.020 mol/L Sr(OH)₂(aq) is _____ mol/L

a	2.5×10^{-13}
b	5.0×10^{-12}
c	4.0×10^{-2}
d	1.6×10^{-1}

5. A solution with a pH of 5 is _____ with _____ of 1.0×10^{-5} mol/L

a	Basic	[OH ⁻ (aq)]
b	Acidic	[H ₃ O ⁺ (aq)]
c	Acidic	[OH ⁻ (aq)]
d	basic	[H ₃ O ⁺ (aq)]

6. When 12.2 g of $\text{Sr}(\text{OH})_2(\text{aq})$ is dissolved and dissociated completely to make 4.00 L of aqueous solution, the pH of the solution is _____

a	12.70
b	12.40
c	1.60
d	1.30

7. A solution of an unknown substance has $[\text{H}_3\text{O}^+(\text{aq})]$ of $4 \times 10^{-8} \text{ mol/L}$. If $\text{HCl}(\text{aq})$ solution is added drop by drop, the pH _____ and the solution becomes more _____.

a	Increases	Basic
b	Decreases	Basic
c	Increases	Acidic
d	decreases	Acidic

8. A solution of 0.030 mol/L $\text{HCl}(\text{aq})$ has a pH of _____

a	2.48
b	2.00
c	1.52
d	0.48

9. The pH of a detergent solution is 9.60. Its $[\text{H}_3\text{O}^+(\text{aq})]$ is _____ mol/L

a	7.9×10^{-8}
b	4.0×10^{-5}
c	2.5×10^{-10}
d	1.3×10^{-7}

10. If 2.00 g of $\text{NaOH}(\text{s})$ is dissolved in enough water to make 500 mL of solution, the $[\text{H}_3\text{O}^+(\text{aq})]$ will be _____ mol/L

a	1.0×10^{-1}
b	5.0×10^{-2}
c	2.0×10^{-13}
d	1.0×10^{-13}

11. If 5.0g of NaOH(s) dissolves in enough water to form 0.60 L of solution, the pH of the solution would be_____

a	0.21
b	0.68
c	13.10
d	13.32

12. The pH of a basic solution that has an $[\text{OH}^-(\text{aq})]$ of $6.4 \times 10^{-3} \text{ mol/L}$ is _____

a	2.19
b	10.25
c	11.81
d	6.40

13. A $7.5 \times 10^{-5} \text{ mol/L}$ solution of $\text{Sr}(\text{OH})_2(\text{aq})$ will have a pH of _____.

a	3.82
b	4.12
c	9.88
d	10.18

14. As the pH of a solution decreases, the _____

a	$[\text{OH}^-(\text{aq})]$ increases
b	$[\text{H}_3\text{O}^+(\text{aq})]$ increases
c	Solution becomes more basic
d	Conductivity of the solution decreases

15. A $3.5 \times 10^{-3} \text{ mol/L}$ of $\text{Li}(\text{OH})(\text{aq})$ has a pH of _____

a	2.15
b	11.85
c	2.46
d	11.54

16. A drain cleaner was analyzed and found to have a pOH of 2.50. the $[\text{H}_3\text{O}^+(\text{aq})]$ for this sample is _____ mol/L

a	3.2×10^{-3}
b	3.2×10^{-12}
c	3.2×10^{-11}
d	3.2×10^{-4}

17. Matt and Richard dissolve 16 g of KOH(s) in 0.55 L of water. The pH of this solution will be _____

a	0.29
b	0.80
c	13.71
d	13.20

18. The pH of 7.5×10^{-5} mol/L $\text{Ba}(\text{OH})_2(\text{aq})$ is _____

a	10.18
b	9.88
c	4.12
d	3.82

19. In a 0.20 mol/L (aq) solution of $\text{HNO}_3(\text{aq})$, the concentration of the hydroxide ion is _____ mol/L

a	5.0×10^{-14}
b	2.0×10^{-14}
c	5.0×10^{-7}
d	1.0×10^{-7}

20. If a solution has a pH of 4.0, then the $[\text{OH}^-(\text{aq})]$ will be _____ mol/L

a	1×10^{-3}
b	1×10^{-4}
c	1×10^{-6}
d	1×10^{-10}

21. **Numerical response question**

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Left justify your answer in the boxes provided.

A solution has a hydronium ion concentration of 0.0050 mol/L. This solution will have a pOH of _____

Solutions:

1. A
2. C
3. C
4. A
5. B
6. A
7. D
8. C
9. C
10. D
11. D
12. C
13. D
14. B
15. D
16. B
17. C
18. A
19. A
20. D
21. 11.70