

AP Chemistry – pH – 48

Name _____ Per ____

1. Calculate the $[\text{OH}^-]$ for each of the following solutions, and indicate whether the solution is acidic, basic or neutral:

(a) $[\text{H}^+] = 0.0041 \text{ M}$

(b) $[\text{H}^+] = 3.5 \times 10^{-9} \text{ M}$

(c) a solution in which $[\text{H}^+]$ is ten times greater than $[\text{OH}^-]$

2. Consider two solutions, A and B. $[\text{H}^+]$ in solution A is 500 times greater than that in solution B. What is the difference in the pH values of the two solutions?

3. Complete the following table by calculating the missing entries. In each case indicate whether the solution is acidic or basic.

pH	pOH	$[\text{H}^+]$	$[\text{OH}^-]$	acidic or basic
6.21				
	10.13			
		$3.5 \times 10^{-3} \text{ M}$		
			$5.6 \times 10^{-4} \text{ M}$	

4. Calculate the pH of each of the following strong acid solutions:

(a) 0.0575 M HNO_3

(b) 0.723 g of HClO_4 in 2.00 L of solution

(c) 5.00 mL of 1.00 M HCl diluted to 0.750 L

(d) a mixture formed by adding 50.0 mL of 0.020 M HCl to 125 mL of 0.010 M HI

5. A 0.100 M solution of chloroacetic acid, ClCH_2COOH , is 11.0% ionized. Calculate $[\text{ClCH}_2\text{COO}^-]$, $[\text{H}^+]$, $[\text{ClCH}_2\text{COOH}]$ and K_a for chloroacetic acid.

6. Calculate the $[\text{OH}^-]$ in a 1.15 M solution containing the hypobromite ion, BrO^- , $K_b = 4.0 \times 10^{-6}$. What is the pH of this solution?

7. Write a balanced chemical reaction for the complete combustion of octane, a component of gasoline.
8. How many moles of oxygen are needed to combust with 0.750 moles of octane?
9. How many grams of oxygen are needed to burn 5.00 g of octane?
10. How many milliliters of 0.120 M HCl are needed to completely neutralize 50.0 mL of 0.101 M Ba(OH)₂ solution?
11. How many milliliters of 0.125 M H₂SO₄ are needed to neutralize 0.200 g of NaOH?
12. If 55.8 mL of BaCl₂ solution is needed to precipitate all the sulfate ion in a 752 mg sample of Na₂SO₄, what is the molarity of the solution?
13. If 42.7 mL of 0.208 M HCl solution is needed to neutralize a solution of Ca(OH)₂, how many grams of Ca(OH)₂ must be in the solution?