

Name : \_\_\_\_\_ Date : \_\_\_\_\_



## pH and pOH Worksheet



1. A solution has a hydrogen ion concentration of  $2.8 \times 10^{-6}$  M. What is the pOH of its solution ?

2. A solution has a  $[\text{OH}^-]$  of  $5.8 \times 10^{-7}$ . What is the pH of this solution ?

3. A 450 mL beaker is 0.00045 M HCl. What is the pH of this solution ?

4. A 320 mL solution contains 2.30 mg of NaOH. What is the pH of this solution ?

5. Complete the following table.

pH	$[\text{H}^+]$	$[\text{OH}^-]$	pOH
3.5			
	$5.8 \times 10^{-7}$		
		$4.2 \times 10^{-2}$	
			8.2
	$4.2 \times 10^{-5}$		
			2.4
10.1			
		$7.2 \times 10^{-3}$	

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## pH and pOH Worksheet



1. A solution has a hydrogen ion concentration of  $2.8 \times 10^{-6}$  M. What is the pOH of its solution ?

$$\text{pH} = -\log [\text{H}^+] = -\log (2.8 \times 10^{-6}) = 5.6$$

$$\text{pOH} = 14 - \text{pH} = 14 - 5.6 = 8.4$$

2. A solution has a  $[\text{OH}^-]$  of  $5.8 \times 10^{-7}$ . What is the pH of this solution ?

$$\text{pOH} = -\log [\text{OH}^-] = -\log (5.8 \times 10^{-7}) = 6.2$$

$$\text{pH} = 14 - \text{pOH} = 14 - 6.2 = 7.8$$

3. A 450 mL beaker is 0.00045 M HCl. What is the pH of this solution ?

Because this is a strong acid, the molarity of the solution is equal to  $[\text{H}^+]$ . Also, volume is not important here.

$$\text{pH} = -\log [\text{H}^+] = -\log [0.00045] = 3.3$$

4. A 320 mL solution contains 2.30 mg of NaOH. What is the pH of this solution ?

$$2.30 \text{ mg NaOH} = 0.0023 \text{ g NaOH} = 1/40 \text{ g mol}^{-1} \text{ NaOH} = 0.000058 \text{ mol NaOH}$$

$$\text{Concentration} = 0.000058 \text{ mol NaOH} / 0.320 \text{ L} = 0.00018 \text{ M} = [\text{OH}^-]$$

$$\text{pOH} = -\log [\text{OH}^-] = -\log (0.00018) = 3.7$$

$$\text{pH} = 14 - \text{pOH} = 14 - 3.7 = 10.3$$

5. Complete the following table.

pH	$[\text{H}^+]$	$[\text{OH}^-]$	pOH
3.5	$3.2 \times 10^{-4}$	$3.2 \times 10^{-11}$	10.5
3.2	$5.8 \times 10^{-7}$	$1.7 \times 10^{-11}$	10.5
12.6	$2.4 \times 10^{-13}$	$4.2 \times 10^{-2}$	1.4
5.8	$1.6 \times 10^{-6}$	$6.3 \times 10^{-9}$	8.2
4.4	$4.2 \times 10^{-5}$	$2.5 \times 10^{-12}$	9.6
11.6	$2.5 \times 10^{-12}$	$4 \times 10^{-3}$	2.4
10.1	$7.9 \times 10^{-12}$	$1.3 \times 10^{-4}$	3.9
11.9	$1.3 \times 10^{-12}$	$7.2 \times 10^{-3}$	2.1