

Assignment 2: Finding pH

Answers

- What is pH a measure of? *the acidity/alkalinity of a solution*
- What is the equation used for finding pH? $pH = -\log[H^+]$
- What is the equation that relates to pH and pOH? $K_w = [H^+][OH^-] \Rightarrow 14 = pH + pOH$
- Complete the following table

$[H_3O^+]$	$[OH^-]$	pH	pOH	Acidic/Basic?
$1.0 \times 10^{-9} M$	$1.0 \times 10^{-5} M$	9.00	5.00	base
$2.4 \times 10^{-13} M$	$4.1 \times 10^{-2} M$	12.62	1.39	base
$1.8 \times 10^{-4} M$	$5.6 \times 10^{-11} M$	3.75	10.25	acid
2.8×10^{-9}	$3.5 \times 10^{-6} M$	8.55	5.45	base

- What would be the pH of each of the following:

- | | | | |
|------------------------------|--------------|-------------------------|--------------|
| a) 0.0010 M HCl | <u>3.00</u> | g) 0.024 M HCl | <u>1.62</u> |
| b) 0.0010 M HNO ₃ | <u>3.00</u> | h) 0.075 M KOH | <u>12.88</u> |
| c) 0.010 M NaOH | <u>12.00</u> | i) 0.000034 M HCl | <u>4.47</u> |
| d) 0.0035 M HCl | <u>2.46</u> | j) 0.000000000001 M HCl | <u>12</u> |
| e) 1.0 M HBr | <u>0</u> | | |
| f) 1.0 M KOH | <u>14</u> | | |

- A 2.63 g NaOH are dissolved in 156 mL of solution. Determine the NaOH concentration & the pH.

$$\frac{2.63 \text{ g NaOH}}{40.00 \text{ g NaOH}} \times \frac{1 \text{ mol}}{0.156 \text{ L}} = 0.421 \text{ mol OH}^- \quad pH = -\log(0.421) = 0.376$$

$$pH = 13.624$$

- List 3 strong acids and explain why these acids are considered strong acids.

HCl HNO₃ H₂SO₄ (1st H⁺)
 HBr HClO₄
 HI HClO₃ (lots of oxyhalogen acids)
 Strong acids completely dissociate

- List 3 weak acids and explain why these acids are considered weak acids.

HF
 H₂C₂O₄
 HCHO₂
 Weak acids only partially ionize

- List 2 strong bases and explain why these bases are considered strong bases.

NaOH
 LiOH
 These completely dissociated and are very soluble

- List 1 weak base and explain why it is considered a weak base.

Ammonia NH₃ - only partially ionizes to NH₄⁺

Others - find K_b table ex - Aniline C₆H₅NH₂
 Urea - (NH₂)₂CO