Review

1. What is the formula for a hydronium ion?____ hydroxide? ___

2. a.Write the dissociation equation for water:

b. What is the K_w for water? _____

3. In an acidic solution:
   a. the pH is _____ (range)
   b. Which has a higher concentration:
      hydronium or hydroxide?
4. In an alkaline solution:
   a. the pH is _____ (range)
   b. Which has a higher concentration:
      H_3O^{+1} or OH^{-1}?
5. What is the factor in concentration (M) between each pH unit?

Apr 27-8:19 AM

Review

1. What is the formula for a hydronium ion? H_3O^+ hydroxide? OH^-

2. a. Write the dissociation equation for water:

$$2H_2O \rightleftharpoons H_3O^+ + OH^-$$

b. What is the K_w for water? 1×10^{-14}

$$K_w = [H_3O^+] \cdot [OH^-] = 1 \times 10^{-14}$$

3. In an acidic solution:
   a. the pH is 0 to less than 7 (range) 0 - 6.9
   b. Which has a higher concentration: hydronium or hydroxide? less than 7

HCl H_3O^+

4. In an alkaline solution: Basic
   a. the pH is more than 7 to 14 (range) 7.1 to 14
   b. Which has a higher concentration: H_3O^{+1} or OH^{-1}?

NaOH Base

5. What is the factor in concentration (M) between each pH unit?

pH	$[H_3O^+]$	$[H_3O^+]$
0	1 M	
1	0.1 M	> 10x's difference
2	0.01 M	
3	0.001 M	

most conc ↓ less

$pH = -\log[H_3O^{+1}]$ $[H_3O^{+1}] = 10^{-pH}$

- Log H3O+ or H30+ Log - **2nd Log - pH or pH - 2nd Log**

$pOH = -\log[OH^{-1}]$ $[OH^{-1}] = 10^{-pOH}$

$pH + pOH = 14$ $[H_3O^{+1}] \cdot [OH^{-1}] = 1 \times 10^{-14}$

a. Identify equation. b. Solve.

A solution has:

1. pOH = 7 pH = answer?
   equation?
2. pOH = 9.5 pH = answer?
   equation?
3. $[OH^{-1}] = 1.0 \times 10^{-6}M$ pOH = answer?
   equation?
4. $[H_3O^{+1}] = 1.5 \times 10^{-4}$ pH = answer?
   equation?

$pH = -\log[H_3O^{+1}]$ $[H_3O^{+1}] = 10^{-pH}$

- Log H3O+ or H30+ Log - **2nd Log - pH or pH - 2nd Log**

$pOH = -\log[OH^{-1}]$ $[OH^{-1}] = 10^{-pOH}$

$pH + pOH = 14$ $[H_3O^{+1}] \cdot [OH^{-1}] = 1 \times 10^{-14}$

a. Identify equation. b. Solve.

A solution has:

1. pOH = 7 pH = 7

pH + pOH = 14

answer?

equation?

2. pOH = 9.5 pH = 4.5

pH + pOH = 14

answer?

equation?

3. $[OH^{-1}] = 1.0 \times 10^{-6}M$ pOH = 6

$pOH = -\log[OH^{-1}]$

answer?

equation?

4. $[H_3O^{+1}] = 1.5 \times 10^{-4}$ pH = 3.8

$pH = -\log[H_3O^{+1}]$

answer?

equation?

$pH = -\log[H_3O^{+1}]$ $[H_3O^{+1}] = 10^{-pH}$

- Log pH or pH Log - **2nd Log - pH or pH - 2nd Log**

$pOH = -\log[OH^{-1}]$ $[OH^{-1}] = 10^{-pOH}$

$pH + pOH = 14$ $[H_3O^{+1}]\ [OH^{-1}] = 1 \times 10^{-14}$

1. pH = 7 $[H_3O^{+1}]$ = answer?

equation?

2. pOH = 5.5 $[OH^-]$ = answer?

equation?

3. $[H_3O^{+1}] = 1.0 \times 10^{-4}$M $[OH^-]$ = answer?

equation?

H30+ = H+

4. $[H^+] = 2.8 \times 10^{-5}$ M $[OH^-]$ = answer?

equation?

$pH = -\log[H_3O^{+1}]$ $[H_3O^{+1}] = 10^{-pH}$

- Log pH or pH Log - **2nd Log - pH or pH - 2nd Log**

$pOH = -\log[OH^{-1}]$ $[OH^{-1}] = 10^{-pOH}$

$pH + pOH = 14$ $[H_3O^{+1}]\ [OH^{-1}] = 1 \times 10^{-14}$

1. pH = 7 0.0000001 $[H_3O^{+1}] = 1.0 \times 10^{-7}M$

$[H_3O^{+1}] = 10^{-pH}$

equation?

2. pOH = 5.5 $[OH^{-}] = 3.2 \times 10^{-6}M$

$[OH^{-1}] = 10^{-pOH}$ 0.00000032

answe

3. $[H_3O^{+1}] = 1.0 \times 10^{-4}M$ $[OH^{-}] = 1.0 \times 10^{-10}M$

answ

$[H_3O^{+1}] \cdot [OH^{-1}] = 1 \times 10^{-14}$

$\frac{1\times10^{-4}\cdot(OH^-) = 1\times10^{-14}}{1\times10^{-4}} \quad \frac{1\times10^{-14}}{1\times10^{-4}}$

H30+ = H+

4. $[H^{+}] = 2.8 \times 10^{-5}\ M$ $[OH^{-}] = 3.6 \times 10^{-10}M$

ans

$[H_3O^{+1}] \cdot [OH^{-1}] = 1 \times 10^{-14}$

$\frac{(2.8\times10^{-5})(OH-) = 1\times10^{-14}}{2.8\times10^{-5}} \quad \frac{1\times10^{-14}}{2.8\times10^{-5}}$ (EE, EE)