Name _____ Block: _____ Date: _____

Key

Chemistry 12

KW CALCULATIONS

1. Find the $[H_3O^+]$ in 0.00256 M HBr.

strong acid

$[H_3O^+] = [HBr]$

$= .00256\,M$

$= \boxed{2.56 \times 10^{-3}\,M}$

$K_W = [H_3O^+][OH^-]$

$K_W = 1.00 \times 10^{-14}$

2. Find the $[H_3O^+]$ in 0.80 M LiOH.

strong base $[OH^-] = [LiOH]$

$[H_3O^+] = \frac{K_W}{[OH^-]} = \frac{1.00 \times 10^{-14}}{0.80}$

$= \boxed{1.3 \times 10^{-14}\,M}$

3. Find the $[H_3O^+]$ in 0.45 M BaO.

$O^{2-} + H_2O \rightarrow 2OH^-$

$[O^{2-}] = 0.45M$

$[OH^-] = 0.90M$

$[H_3O^+] = \frac{K_W}{[OH^-]} = \frac{1.00 \times 10^{-14}}{0.90} = \boxed{1.1 \times 10^{-14}\,M}$

4. Find the $[OH^-]$ in 0.150 M $HClO_4$.

$[H_3O^+] = 0.150M$

$[OH^-] = \frac{K_W}{[H_3O^+]} = \frac{1.00 \times 10^{-14}}{0.150} = \boxed{6.67 \times 10^{-14}\,M}$

5. Find the $[OH^-]$ in 0.87 M HNO_3.

$[H_3O^+] = 0.87M$

$[OH^-] = \frac{KW}{[H_3O^+]} = \frac{1.00 \times 10^{-14}}{0.87} = \boxed{1.1 \times 10^{-14} M}$

6. What is the $[H_3O^+]$ and $[OH^-]$ in 0.0010 M HCl(aq)?

$[H_3O^+] = \boxed{0.0010M}$

$[OH^-] = \frac{KW}{[H_3O^+]} = \frac{1.00 \times 10^{-14}}{0.0010} = \boxed{1.0 \times 10^{-11} M}$

7. What is the $[H_3O^+]$ of a 0.01 M NaOH at 25°C?

$[OH^-] = 0.01M$

$[H_3O^+] = \frac{KW}{[OH^-]} = \frac{1.00 \times 10^{-14}}{0.01} = \boxed{1 \times 10^{-12} M}$

8. Find $[H_3O^+]$ at 25°C of 2.0 M $Sr(OH)_2$?

$[OH^-] = 2(2.0) = 4.0 M$

$Sr(OH)_2 \rightarrow Sr^{2+} + 2OH^-$

2.0 M 4.0 M

$[H_3O^+] = \frac{KW}{[OH^-]} = \frac{1.00 \times 10^{-14}}{4.0M} = \boxed{2.5 \times 10^{-15} M}$