

Name _____ Block: _____ Date: _____

Chemistry 12

KW CALCULATIONS

Key

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

'strong acid'

$$[H_3O^+] = [HBr]$$

$$= 0.00256 M$$

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

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

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

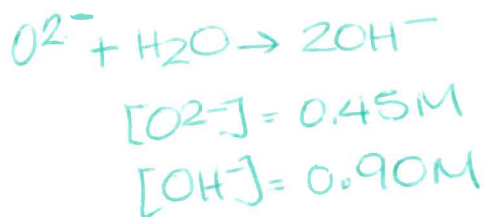
2. Find the
- $[H_3O^+]$
- in 0.80 M LiOH.

'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.



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

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

$$[H_3O^+] = 0.150 M$$

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

5. Find the $[\text{OH}^-]$ in 0.87 M HNO_3 .

$$[\text{H}_3\text{O}^+] = 0.87 \text{ M}$$

$$[\text{OH}^-] = \frac{K_w}{[\text{H}_3\text{O}^+]} = \frac{1.00 \times 10^{-14}}{0.87} = \boxed{1.1 \times 10^{-14} \text{ M}}$$

6. What is the $[\text{H}_3\text{O}^+]$ and $[\text{OH}^-]$ in 0.0010 M $\text{HCl}(\text{aq})$?

$$[\text{H}_3\text{O}^+] = \boxed{0.0010 \text{ M}}$$

$$[\text{OH}^-] = \frac{K_w}{[\text{H}_3\text{O}^+]} = \frac{1.00 \times 10^{-14}}{0.0010} = \boxed{1.0 \times 10^{-11} \text{ M}}$$

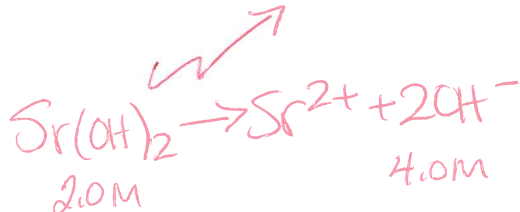
7. What is the $[\text{H}_3\text{O}^+]$ of a 0.01 M NaOH at 25°C ?

$$[\text{OH}^-] = 0.01 \text{ M}$$

$$[\text{H}_3\text{O}^+] = \frac{K_w}{[\text{OH}^-]} = \frac{1.00 \times 10^{-14}}{0.01} = \boxed{1 \times 10^{-12} \text{ M}}$$

8. Find $[\text{H}_3\text{O}^+]$ at 25°C of 2.0 M $\text{Sr}(\text{OH})_2$?

$$[\text{OH}^-] = 2(2.0) = 4.0 \text{ M}$$



$$[\text{H}_3\text{O}^+] = \frac{K_w}{[\text{OH}^-]} = \frac{1.00 \times 10^{-14}}{4.0 \text{ M}} = \boxed{2.5 \times 10^{-15} \text{ M}}$$