

Key

Unit 11: Problem Set 2 (chap. 19)

1. What are the concentrations of H⁺ and OH⁻ ions in a neutral solution?

$1 \times 10^{-7} \text{ m/L}$ $1 \times 10^{-7} \text{ m/L}$

2. What is Kw? = water constant = $1 \times 10^{-14} \frac{\text{m}^2}{\text{L}^2}$

3. Calculate the OH⁻ concentration if the H⁺ concentration is equal to 8.6×10^{-9} mole/liter. Is the solution acidic, basic, or neutral?

$\frac{1 \times 10^{-14} \frac{\text{m}^2}{\text{L}^2}}{8.6 \times 10^{-9} \text{ m/L}} = 1.2 \times 10^{-6} \text{ m/L}$

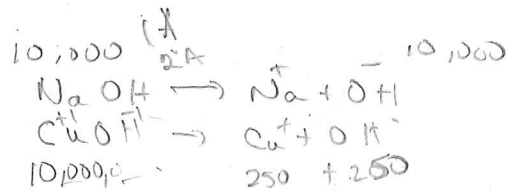
4. Given the pH of Tide detergent is 9.5, what is the pOH, [H⁺], and [OH⁻]? Is this an acid, base, or neutral substance?

pH = 9.5 [H⁺] = $3.98 \times 10^{-10} \text{ M}$
pOH = 4.5 [OH⁻] = $2.51 \times 10^{-5} \text{ M}$

5. Given that the OH⁻ concentration for orange juice is 6.3×10^{-8} moles/liter, what is the pOH, [H⁺], and pH? Is this an acid, base, or neutral substance?

[OH⁻] = $6.3 \times 10^{-8} \text{ m/L}$ pOH = 7.2
[H⁺] = $1.6 \times 10^{-7} \text{ m/L}$ pH = 6.8

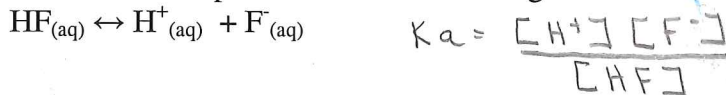
6. How does a strong base differ from a weak base?
A strong base dissociates completely.
A weak base dissociates partially.



7. Identify each compound as a strong or weak acid or base.

- a. NaOH strong
- b. H₂SO₄ strong
- c. Cu(OH)₂ weak

8. Write the Ka expression for the following reaction:



9. If a .30000 M of HF solution is made, and the ion concentration is .00015M, calculate the Ka.

$\text{HF} \leftrightarrow \text{H}^+ + \text{F}^-$
 $.30000 \text{ M} \leftrightarrow 0 + 0$
 $.00015 \text{ M}$
 $.29985 \text{ M} = [0.00015 \text{ M}] + [0.00015 \text{ M}]$
 $K_a = \frac{[0.00015][0.00015 \text{ M}]}{[.29985 \text{ M}]}$
 $K_a = 7.5 \times 10^{-8} \text{ m}$

10. If a .50000 M solution of AgOH is made and the ion concentration is .00078M, calculate the Kb.

$\text{AgOH} \leftrightarrow \text{Ag}^+ + \text{OH}^-$
 $.50000 \text{ M} \leftrightarrow 0 + 0$
 $.00075 \text{ M} \leftrightarrow .00075 \text{ M} + .00075 \text{ M}$
 $.49925 \text{ M}$
 $K_b = \frac{[\text{Ag}^+][\text{OH}^-]}{[\text{AgOH}]}$
 $K_b = \frac{[.00078 \text{ M}][.00078 \text{ M}]}{[.49922 \text{ M}]}$
 $K_b = 1.22 \times 10^{-6} \text{ M}$