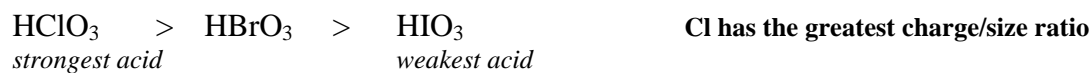
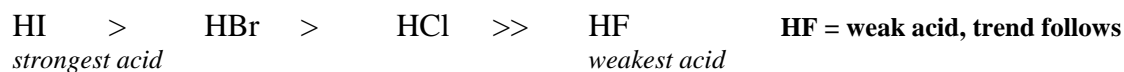


### Acids & Bases Notes #3

#### Acid Strength Trends: (Memorize)



#### 2. Explain the following observations:

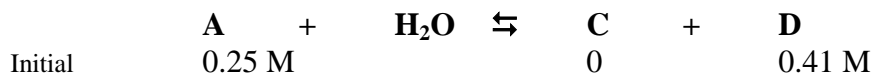
- (a)  $\text{HNO}_3$  is a stronger acid than  $\text{HNO}_2$
- (b)  $\text{H}_2\text{S}$  is a stronger acid than  $\text{H}_2\text{O}$
- (c)  $\text{H}_2\text{SO}_4$  is a stronger acid than  $\text{H}_2\text{SeO}_4$

#### 3. Complete the following table where $\text{pK}_a = -\log [\text{K}_a]$

Acid	pKa	Ka
A		$1.8 \times 10^{-3}$
B	4.12	
C	3.34	

4.  $\text{K}_a$  is related to the strength of an acid. The greater the  $\text{K}_a$  value, the stronger the acid. Which acid (A, B, or C) shown above would be the strongest?

Consider the following equilibrium system:



Which direction (right or left) will the equilibrium shift immediately?

What is the pH of a 0.30 M HC<sub>2</sub>H<sub>3</sub>O<sub>2</sub> solution? The K<sub>a</sub> for HC<sub>2</sub>H<sub>3</sub>O<sub>2</sub> is 1.8 x 10<sup>-5</sup>.

*pH = 2.64*

Consider the same reaction, but what will happen to the overall equilibrium pH if 0.30 moles of solid NaC<sub>2</sub>H<sub>3</sub>O<sub>2</sub> is added to 1 Liter of the 0.30 M HC<sub>2</sub>H<sub>3</sub>O<sub>2</sub> solution? (assume the solution volume remains 1 Liter)

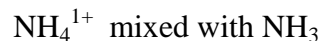
NaC<sub>2</sub>H<sub>3</sub>O<sub>2</sub> is a strong electrolyte which breaks apart to produce Na<sup>1+</sup> and C<sub>2</sub>H<sub>3</sub>O<sub>2</sub><sup>1-</sup> ions

## Buffers

Buffered Systems: resist changes in pH when small amounts of acids or bases are added.

Buffered Systems: contain combinations of **weak acids** and **weak bases**

### Common Buffer Combinations:



### **Buffer Example #1:**

What is the pH of a buffer that is 0.12 M  $\text{HC}_3\text{H}_5\text{O}_2$  and 0.10 M  $\text{NaC}_3\text{H}_5\text{O}_2$  ?  $K_a = 1.3 \times 10^{-5}$

### **Buffer Example #2:**

What is the pH of a buffer made from 0.12 M benzoic acid ( $\text{HC}_7\text{H}_5\text{O}_2$ ) and 0.20 M sodium benzoate ( $\text{NaC}_7\text{H}_5\text{O}_2$ ) ?  $K_a = 6.3 \times 10^{-5}$