

Name: _____

Period: ____

Lab: pH of Salts

Introduction:

Salts are ionic compounds and are composed of a cation and an anion. Some ions undergo reaction with water in a process called hydrolysis. When neither the cation nor the anion undergoes hydrolysis, the resulting solution will be neutral. When only the cation undergoes hydrolysis, the reaction produces an acidic solution. When only the anion undergoes hydrolysis, the reaction produces a basic solution. When both the cation and the anion undergo hydrolysis, the K_a and K_b values for the hydrolysis reactions must be compared in order to determine which is favoured and what the resulting pH will be. In this experiment, the pH of a series of 0.10 M salt solutions will be determined using universal indicator. The experiment pH values will be compared to calculated pH values.

Procedure:

- (1) Obtain a clean, dry well plate and a dropper bottle of universal indicator solution. Various 0.10 M salt solutions will be set up in the lab.
- (2) For each salt solution, add several drops to a well. Add several drops of universal indicator. Use the colour to determine the pH and record.
- (3) Discard the waste in the sink.

Data:

0.10 M Salt Solution	pH
NaCl	
NH_4Cl	
$\text{NaC}_2\text{H}_3\text{O}_2$	
KI	
$(\text{NH}_4)_2\text{SO}_4$	
$\text{NH}_4\text{C}_2\text{H}_3\text{O}_2$	
AlCl_3	
$\text{Na}_2\text{C}_2\text{O}_4$	

Questions:

- (1) (a) What types of cations *will not* undergo a hydrolysis reaction? What types of cations *will* undergo a hydrolysis reactions?
(b) What types of anions *will not* undergo a hydrolysis reaction? What types of anions *will* undergo a hydrolysis reactions?
- (2) For each salt solution:
 - (a) Determine if the cation and/or anion will undergo hydrolysis. Explain.
 - (b) For each ion that undergoes hydrolysis, write a hydrolysis reaction and appropriate K_a or K_b expression.
 - (c) Determine the pH of a 0.10 M solution of each salt.

Conclusion:

Create a table showing the classification of each salt as acidic, basic, or neutral.