CHM 152LL, Hydrolysis of Salt

Introduction:

A **salt** can be viewed as the non-water product formed between an acid-base neutralization reaction. Usually, a neutral salt is formed when a strong acid and a strong base is neutralized in the reaction and these ions have little tendency to react with water. A salt formed between a strong acid and a weak base is an acid salt and a salt formed between a weak acid and a strong base is a basic salt, these salts are acidic or basic due to their acidic or basic ions --- Ions that partically react with H_2O to produce H_3O^+ or OH^-. When weak acids and bases react, the relative strength of the conjugated acid-base pair in the salt determines the pH of its solutions. The salt, or its solution, so formed can be acidic, neutral or basic.

In this lab, you are going to make several 0.10 M salt solutions from its solid, measure their pH, write the equilibrium reaction equations account for the acid-base behavior of the non-neural salts, predict possible reaction between selected acidic and basic salts and address further questions.

Material:

Solids or Solid Hydrades of:
NH_4Cl:
KI
Na_3PO_4
$NaHCO_3$
$NaC_2H_3O_2$
$Fe(NO_3)_3$

500-mL volumetric flask

100-mL beakers

pH meter (or pH probe)

Universal pH paper

Procedure:

1) As a lab group, make one of the 0.10 M solutions as directed by the instructor. Your instructor will provide the correct volumetric flask for making the solutions. The solution made by each group will be shared.

(Directions on making solution from solid: 1) Weigh out the solid. 2) Dissolve the solid in a small amount of water in a clean beaker. 3) Transfer the dissolved solution into the volumetric flask. Rinse the beaker at least twice with small amounts of water and transfer to the volumetric flask. 4) Fill the volumetric flask with water to the line.)

2) Obtain 25 mL of each solution in separate 100-mL beakers. Measure their pH using a hand-held pH meter or computer-based pH probe. Also, measure their pH using the universal pH paper. on the blank area of the lab report sheet, design a table to report your findings.

3) for each of the solutions, explain their pH readings. Provide appropriate equilibrium reaction equation that account for their acid-base behaviors.

4) Select one acidic and basic salt from above. Predict what will happen when you mix them and what will be the pH reading. Explain why. Then mix the solution and measure the pH. Does the experimental finding agrees with your prediction?

CHM 152LL, Hydrolysis of Salt, Name _____

Part I. Group specific solution preparation

Salt solution assigned to be prepared by our group: 0.10 M _____

Formula of the starting solid sample: _____

Molar mass: _____

grams needed to make _____ mL of solution _____

Calculation setup:

Actual mass used: _____

Actual solution molarity _____

II. Data Table on the pH measurement of six salt solutions with their accurate molarities.

III. Explain the acid-base behavior of all six salt solutions. Give the ionic equilibrium reaction equations when needed.

NH₄Cl:	0.1 M KI
0.1 M Na₃PO₄	0.1 M NaHCO₃
0.1 M NaC₂H₃O₂	0.1 M Fe(NO₃)₃

III. Pick an acidic salt and a basic salt from above:

Acidic salt _____   Basic salt _____

What will be the pH if you mix equal volumes of the two salt solutions together?

Why ?

What is the actual pH measurement after you have mixed the two solutions?