What are Hydrolysis Reactions?

Worksheet

Hydrolysis occurs when water molecules split and donate H or OH to another species, breaking bonds. Common examples: salts of weak acids/bases hydrolyze, making solutions acidic or basic; esters + water carboxylic acid + alcohol.

Questions

1. Sodium acetate solution will be

A) Acidic
B) Basic
C) Neutral
D) Depends on concentration only

2. Which salt hydrolyzes to make an acidic solution?

A) NaCl (sodium chloride)
B) NHCl (ammonium chloride)
C) KCO (potassium carbonate)
D) NaOH (sodium hydroxide)

3. In ester hydrolysis (R-COO-R' + HO), the products are

A) Ketone + alcohol
B) Carboxylic acid + alcohol
C) Ester + water (reversible)
D) Salt + water

4. Hydrolysis of a strong acid salt (e.g., NaCl) will produce

A) Acidic solution
B) Basic solution
C) Neutral solution
D) No hydrolysis

5. Sodium acetate (NaCHCOO) is dissolved in water. Will the solution be acidic, basic, or neutral?

6. An ester (like ethyl acetate, CHCOOCH) reacts with water. What are the products?

7. Why is a solution of ammonium chloride (NHCl) acidic?

8. Define: What is hydrolysis?

9. Define: Example of salt hydrolysis?

10. Define: What makes a salt hydrolyze?

Answer Key

1. B) Basic - Acetate (CHCOO) is a weak base, accepting H from water and releasing OH.

2. B) NHCl (ammonium chloride) - NH is a weak acid; it donates H to water, lowering pH.

3. B) Carboxylic acid + alcohol - Ester hydrolysis produces carboxylic acid and alcohol.

4. C) Neutral solution - Neither Na nor Cl hydrolyze (both from strong base and strong acid), so solution remains neutral.

5. Acetate ion is the conjugate base of weak acetic acid. It will accept H from water: CHCOO + HO CHCOOH + OH OH is produced, making the solution basic (pH > 7). This is acid hydrolysis of a salt of a weak acid.

6. Ester hydrolysis: CHCOOCH + HO CHCOOH + CHOH (With catalyst or base, reaction is faster) Products: acetic acid + ethanol

7. NH is the conjugate acid of weak ammonia (NH). It donates H to water: NH NH + H H is released, lowering pH (pH < 7), making solution acidic. This is base hydrolysis of a salt of a weak base.

8. Hydrolysis is a reaction in which water molecules break bonds and become part of products.

9. Sodium acetate (NaCHCOO): acetate accepts H from water, releasing OH (solution becomes basic).

10. Salts hydrolyze if they contain ions from weak acids or weak bases.