***AP Chemistry***

***Acidic, Basic and Neutral Salts***

**List the common strong acids: List the common strong bases:**

**For a conjugate pair Ka \* Kb = Kw**

* If an acid is very strong, what can you say about the strength of its conjugate base?
* If a base is very strong, what can you say about the strength of its conjugate acid?

**Classifying Salts**

Acid + base → water + salt

A salt is formed when an acid and a base are mixed and the acid releases H+ ions while the base releases OH- ions. There are three types of salts:   acidic salts, basic salts, and neutral salts.

The acidic, basic or neutral nature of the salt depends on the strengths of the original acids and bases:

|  |  |  |
| --- | --- | --- |
| Acid | Base | Resulting Salt |
| Strong | Base | neutral |
| Weak | Strong | basic |
| Strong | Weak | acidic |
| Weak | Weak | Depends on which is stronger |

When placed in water, the salt can undergo hydrolysis, a reaction that produces very small amounts of either a weak acid or a weak base. These reactions can be considered a type of double displacement reaction in which either a molecular weak acid or molecular weak base are produced; they are often written as net ionic equations.

Salt + water → acid + base

For example, aqueous potassium fluoride undergoes hydrolysis when placed in water. Potassium fluoride is considered a basic salt because it generates molecular hydrofluoric acid and hydroxide ions.

F- + HOH → OH- + HF

**Predicting the acidic, basic or neutral character of salts**

ACIDIC SALT: A salt formed by the reaction between a strong acid and a weak base

*An acidic salt contains the conjugate acid of a weak base*  
Example: NH4Cl, CuSO4

weak base + strong acid → acidic salt + water  
NH3 + HCl → NH4Cl + H2O

BASIC SALT: Salt formed by the reaction between a strong base and a weak acid

*A basic salt contains the conjugate base of a weak acid*  
Example: NaC2H3O2, Na2S

strong base + weak acid → basic salt + water  
NaOH + HC2H3O2 → NaC2H3O2 + 2H2O

NEUTRAL SALT: Salt formed by the reaction between a strong acid and a strong base

*A neutral salt is has a cation that is the conjugate acid of a strong base and an anion that is the conjugate base of a strong acid*

Example: NaCl, KNO3

strong base + strong acid → neutral salt + water  
NaOH + HCl → NaCl + H2O

Problems: Predict the acidic, basic or neutral character of the solutions of the following salts.

* + Look at the cation, which is the conjugate acid of a base. Which base? Is the base strong or weak? Does the cation have any ability to act as an acid?
  + Look at the anion, which is the conjugate base of an acid. Which acid? Is this acid strong or weak? Does the anion have any ability to act as a base?

1. CrBr3
2. NH4ClO4
3. Ca(CN)2
4. LiNO3
5. K2CO3
6. RbC2H3O2
7. MgBr2
8. LiF
9. NaI