

## Acids & Bases

### I. Properties Of Acids & Bases

#### 1. Define the term acidic solution.

Acidic Solution - solution that contains more hydrogen ions than hydroxide ions

#### 2. List five characteristics of acids.

##### Examples

1. HCl (gastric)
2. Acetic Acid
3. Citric Acid
4. Carbonic Acid
5. Sulfuric Acid
6. Tartaric Acid (wine, foods)

1. Sour/Tart taste
2. Feel like water (may sting when touched)
3. React strongly with metals
4. Conduct electricity (ionize in solutions)
5. Turn blue litmus paper red

#### 3. Define the term basic solution.

Basic Solution - solution that contains more hydroxide ions than hydrogen ions

#### 4. List five characteristics of bases.

##### Examples

1. Sodium fluoride (toothpaste)
2. Sodium hydroxide (soap)
3. Sodium bicarbonate (Tums)
4. Magnesium hydroxide (acid neutralizer)
5. Calcium hydroxide (cement)
6. Ammonia

1. Bitter taste
2. Slippery + smooth
3. Do not usually react with metals
4. Conduct electricity
5. Turn red litmus paper blue

#### 5. All water solutions contain hydrogen ions (H<sup>+</sup>) and hydroxide ions (OH<sup>-</sup>).

Circle One :  True  False

#### 6. Self-ionization of water (H<sub>2</sub>O + H<sub>2</sub>O ↔ H<sub>3</sub>O<sup>+</sup> + OH<sup>-</sup>) produces which two ions?

1. H<sub>3</sub>O<sup>+</sup> (hydronium ion)
2. OH<sup>-</sup> (hydroxide ion)

### II. Identifying Acids & Bases

#### 1. According to the Arrhenius Model, identify an acid and a base and write an equation showing each type of solution.

Acid - substance that contains hydrogen and ionizes to produce hydrogen ions



Base - substance that contains a hydroxide group and dissociates to produce a hydroxide ion



2. According to the Bronsted-Lowry Model, an acid is a hydrogen-ion donor and a base is a hydrogen-ion acceptor.

Analogy  
 - Father + son playing catch with a ball  
 ball = hydrogen ion

3. Write the generic equation of an acid-base reaction.



4. Using this equation, identify each of the following :

Reactant Acid : HX      Reactant Base : H<sub>2</sub>O

Conjugate Acid (accepts hydrogen-ion) : H<sub>3</sub>O<sup>+</sup>

Conjugate Base (donates hydrogen-ion) : X<sup>-</sup>

5. Depending on what other substances are in a solution, water can be an acid or base.

Circle One :      True      False

6. Using hydrogen fluoride (HF) in water (H<sub>2</sub>O), write an equation and label the reactant acid, reactant base, conjugate acid, and conjugate base.

Used to make non-stick kitchenware



7. Using ammonia (NH<sub>3</sub>) in water (H<sub>2</sub>O), write an equation and label the reactant acid, reactant base, conjugate acid, and conjugate base.



8. According to the Lewis Model, an acid is an electron-pair acceptor and a base is an electron-pair donor.

9. Indicate the acids and bases in each of the following reactions :

