Topic 9: Acids & Bases Outline

1. An electrolyte is a substance which when dissolved in water forms a solution capable of conducting an electric current. The ability of a solution to conduct an electric current depends upon the concentration of ions **present.**

✓ Ionic compounds are conductors of electricity when melted OR dissolved in water. Under these circumstances, the charged particles (ions in this case) are free to move (mobile).

✓ There are 3 categories of electrolytes: acids, bases and salts.

✓ Arrhenius theory states that an **acid** is an substance that dissolves in water to **produce H^+** (H_3O^+) ions (called "hydronium" ions on Table E).

✓ Arrhenius theory states that a **base** is an substance that dissolves in water to **produce OH^-** ions (called "hydroxide" ions on Table E).

✓ A salt is any ionic compound producing a positive ion other than H^+ and a negative ion other than OH^-.

✓ Common acid and base names and formulas are given on Tables K and L.

✓ You should be able to sort compounds as acids, bases or salts, given their chemical formulas

2. Properties of many acids and bases can be explained by the Arrhenius theory. Arrhenius acids and bases are electrolytes.

✓ Acid properties include sour taste, less than 7 pH, ability to neutralize bases, and ability to affect indicator colors. These properties are due to the H^+ ion.

✓ Base properties include bitter taste, greater than 7 pH, ability to neutralize acids, and ability to affect indicator colors. These properties are due to the OH^- ion.

✓ When given properties, you should be able to identify substances as Arrhenius acids or Arrhenius bases

3. The acidity or alkalinity of a solution can be measured by its pH value.

✓ For every change in pH of one unit, the acidity changes by a factor of 10. A pH 4 solution is 10 times more acidic that a pH 5 solution. A pH 4 solution is 100 times more acidic that a pH 6 solution.

✓ You should be able to identify solutions as acid, base, or neutral based upon the pH. Neutral is a pH of 7.

4. The relative level of acidity or alkalinity of a solution can be shown by using indicators.

✓ Various indicators are shown on Table M. Make sure you know how to interpret the info on it!

✓ Example: IF bromothymol blue is yellow in color, we know the pH is 6 OR LESS. If its color is blue, we know the pH of the solution is 7.6 OR GREATER.

5. In the process of neutralization, an Arrhenius acid reacts with an Arrhenius base to form a salt and water.

✓ Example: $Ba(OH)_2 + 2\ HBr \rightarrow BaBr_2 + 2\ H_2O$

✓ These reactions are double replacements.

✓ These reactions are NOT redox reactions.

✓ You should be able to write simple neutralization reactions when given the reactants

6. Titration is a laboratory process in which the volume of a solution of known concentration is used to determine the concentration of another solution.

- ✓ You should be able to calculate the concentration or volume of a solution, using titration data
- ✓ In order to do this, use the titration equation on Table T: $(MxV)_{acid} = (MxV)_{base}$

7. The Bronsted acid - base theory views acids as "H^+ donors", and bases as "H^+ acceptors."