

Lecture 7

Outline of Last Lecture

- A solution is a mixture in which one substance.
- The solute, is evenly dispersed in a larger quantity of another substance, the solvent.
- Molarity (M): the number of moles of solute in one liter of solution.
- The molar concentration of any solute is represented by the formula of the solute placed in square brackets[].
- $[\text{NaCl}]$ = the concentration of sodium chloride in mol/L.

Outline of Current Lecture

- Ionic compounds are strong electrolytes.
- Molecular compounds that are not acids are non-electrolytes.
- Acids are molecular compounds that transfer hydrogen ions to water to make hydronium ions (see page 148).
- Strong acids completely transfer the available hydrogen ions. They are strong electrolytes.
- There are six strong acids. You will need to know these six. There is a table of them somewhere in chapter 4. Find it!
- Weak acids only partially transfer the available hydrogen ions. They are weak electrolytes.
- A base accepts H from another substance. Hydroxide salts are strong bases (strong electrolytes). +
- Other bases (ammonia and carbonate, for example) are weak bases. They accept less H than + there are base molecules. They are weak electrolytes.

Current Lecture

Q: Classify the following as strong electrolytes, weak electrolytes or nonelectrolytes:

CH ₃ OH	nonelectrolytes	KOH	Strong
NaCl	Strong	FeCl ₃	Strong

HNO ₃	Strong	HCN	Weak
C ₆ H ₁₂ O ₆	nonelectrolytes	CaBr ₂	Strong
NH ₃	Weak	C ₂ H ₆ O ₂	Nonelectrolytes

- A titration (section 4.6) is applied stoichiometry:

Q: 33.06 mL of a 0.362 M KOH solution are required to neutralize 25.00 mL of a H₂SO₄ solution.



Calculate the concentration of the Sulfuric acid solution.

A: 0.03306L x 0.362 mol KOH/ 1L = 0.01196772 mol KOH

0.01196772 mol NaOH x 1mol H₂So₄ = 0.059836 mol H₂So₄

0.059838 mol/0.02500L = 0.2393 mol/L

- A "Molecular" equation is a standard chemical equation.
- Overall Ionic Equation - all ionic compounds in solution are shown as dissociated ions.
- Net Ionic Equation - only the ions that actually participate in the reaction are shown.
- Write molecular, complete ionic, and net ionic equations for the neutralization reaction from the titration.

Molecular equation:



Overall ionic equation:



Net ionic equation:



Q: Write molecular equations and net ionic equations for the following reactions:

- strontium hydroxide and hydrobromic acid



- sodium carbonate and hydrochloric acid

