

Instructional Objectives for Topic 1 (Chemistry Review)

After we conclude Topic 1 in the notes you should be able to do the following:

1. Basic analytical chemistry calculations. You should be able to calculate the following given the appropriate information:

mole, molarity, equivalent weight, normality, CEC (both $\text{meq } 100 \text{ g}^{-1}$ and $\text{cmol}_c \text{ kg}^{-1}$), ppt, ppm, ppb, ionic strength, activity coefficient, solubility product, and dilution calculations.

2. Explain in your own words the following terms: equilibrium constant, hydration, hydrolysis, activity, ion pair, ion complex, outer sphere complex, inner sphere complex, common ion effect, and diverse ion effect.

3. Distinguish between Arrhenius, Bronsted and Lewis acid/base theory and provide an example of each.

4. Explain the difference between hard/soft acids and bases and how this theory is used in analytical and soil chemistry.

5. Using the Henderson/ Hasselbach equation calculate the pH of a buffer solution.

6. Explain (In your own words) atomic periodic trends such as atomic radii, electronegativity, and ionization energy.

7. Distinguish between covalent, ionic, coordinate covalent, hydrogen, ion-dipole, and Van der Waals bonds and describe the relative strength of each bond.