

CE 326 Principles of Environmental Engineering  
Water Chemistry Calculations  
Due 2-25-08

A water sample was analyzed and was found to have the following constituents:

Ca <sup>+2</sup> , mg/L	135	HCO <sub>3</sub> <sup>-</sup> , mg/L	340
Mg <sup>+2</sup> , mg/L	36	SO <sub>4</sub> <sup>-2</sup> , mg/L	122
Na <sup>+</sup> , mg/L	11.6	Cl <sup>-</sup> , mg/L	56
K <sup>+</sup> , mg/L	4.2	CO <sub>3</sub> <sup>-2</sup> , mg/L	1.8
Fe <sup>+2</sup> , mg/L	9.6		
Mn <sup>+2</sup> , mg/L	0.8	Temperature	25°C

1. Calculate each of the concentrations as mg/L as CaCO<sub>3</sub>.
2. Calculate the hydrogen ion concentration:
  - a. as moles/L.
  - b. as mg/L.
  - c. as mg/L as CaCO<sub>3</sub>.
  - d. as pH.
3. Calculate the hydroxide ion concentration:
  - a. as moles/L.
  - b. as mg/L.
  - c. as mg/L as CaCO<sub>3</sub>.
  - d. as pOH.
4. Calculate the concentration of CO<sub>2</sub> as mg/L as CaCO<sub>3</sub> (use the equilibrium equations for the carbonate system and assume that H<sub>2</sub>CO<sub>3</sub> concentration is equal to the CO<sub>2</sub> concentration).