

CE 326 Principles of Environmental Engineering
Water Chemistry Calculations
due March 3, 2003

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

Ca^{+2} , mg/L	120	HCO_3^- , mg/L	422
Mg^{+2} , mg/L	39	SO_4^{-2} , mg/L	101
Na^+ , mg/L	12.8	Cl^- , mg/L	32
K^+ , mg/L	3.4	CO_3^{-2} , mg/L	1.2
Fe^{+2} , mg/L	6.2		
Mn^{+2} , mg/L	0.3	Temperature	25/C

1. Calculate the alkalinity (exactly).
2. Calculate the total, carbonate, and non-carbonate hardness of the water (include contributions made by iron and manganese).
3. How many mL of 0.02N H_2SO_4 would be required to neutralize the bicarbonate alkalinity in a 50 mL sample?
4. Draw a bar chart for the water (see page 181 for an example).
5. Based on the solubility product for calcium carbonate, how much calcium (mg/L as CaCO_3) should be soluble in this water? Is the water under-saturated or over-saturated with respect to calcium?
6. Based on the solubility product for magnesium hydroxide, how much magnesium (mg/L as CaCO_3) should be soluble in this water? Is the water under-saturated or over-saturated with respect to magnesium?