

## Molarity problems

- 1) If 6.73 g of  $\text{Na}_2\text{CO}_3$  are dissolved in enough water to make 250. mL of solution, what is the molar concentration of sodium carbonate? What are the molar concentrations of the  $\text{Na}^+$  and  $\text{CO}_3^{2-}$  ions? (ans:  $[\text{Na}_2\text{CO}_3] = 0.254 \text{ M}$ ;  $[\text{Na}^+] = 0.508 \text{ M}$ ;  $[\text{CO}_3^{2-}] = 0.254 \text{ M}$ )
- 2) What is mass of the solute in grams in 250. mL of a 0.0125 M solution of  $\text{KMnO}_4$ ? (ans: 0.494 g  $\text{KMnO}_4$ )
- 3) What volume of 0.123 M  $\text{NaOH}$ , in milliliters, contains 25.0 g of  $\text{NaOH}$ ? (ans:  $5.08 \times 10^3 \text{ mL}$ )
- 4) An experiment in your laboratory requires exactly 500 mL of a 0.200 M solution of  $\text{Na}_2\text{CO}_3$ . You are given solid  $\text{Na}_2\text{CO}_3$ , distilled water, and a 500 mL volumetric flask. Describe how to prepare the required solution. (ans: 1.06 g  $\text{Na}_2\text{CO}_3$ )
- 5) If you dilute 25.0 mL of 1.50 M hydrochloric acid to 500 mL, what is the molarity of the dilute acid? (ans: 0.0750 M)
- 6) One half liter (500 mL) of 2.50 M  $\text{HCl}$  is mixed with 250 mL of 3.75 M  $\text{HCl}$ . Assuming that the total final volume is 750 mL, what is the concentration of the hydrochloric acid in the resulting solution? (ans: 2.92 M)