Chapter 8 Practice Problems

1. Identify the solute in each of the following solutions.
2. 2 g of sugar and 100 mL of water
3. 60.0 mL of ethyl alcohol and 30.0 mL of methyl alcohol
4. 55.0 mL of water and 1.50 g of NaCl
5. Air: 200 mL of O2 and 800 mL of N2
6. Indicate whether solutions of each of the following contain only ions, only molecules, or mostly molecules and a few ions:
7. Na2SO4, a strong electrolyte
8. CH3OH, a nonelectrolyte
9. At 20°C, the solubility of KCl is 34 g/100 g of water. In the laboratory, a student mixes 75 g of KCl with 200. g of water at a temperature of 20°C.
10. How much of the KCl will dissolve?
11. Is the solution saturated or unsaturated?
12. What is the mass, in grams, of any solid KCl on the bottom of the container?
13. A solution is prepared by mixing 15.0 g of Na2CO3 and 235 g of H2O. Calculate the mass percent (% m/m) of the solution.
14. Write two conversion factors for each solution.
    1. 8.50% (m/m) NaOH
    2. 5.75% (v/v) ethanol
    3. 4.8% (m/v) HCl
15. How many grams of NaOH are needed to prepare 75.0 g of 14.0% (m/m) NaOH solution?

1. What is the molarity of 0.500 L of NaOH solution if it contains 6.00 g of NaOH?
2. What is the molarity of 0.225 L of a KNO3 solution containing 34.8 g of KNO3?
3. How many milliliters of a 5.75% (v/v) ethanol solution can be prepared from 2.25 mL of ethanol?
4. How many grams of AlCl3 are needed to prepare 125 mL of a 0.150 M solution?
5. A topical antibiotic is 1.0% (m/v) Clindamycin. How many grams of Clindamycin are in 60. mL of the 1.0% (m/v) solution?

1. How many liters of a 2.00 M NaCl solution are needed to provide 67.3 g of NaCl?
2. What volume (mL) of a 2.5% (m/v) KOH solution can be prepared by diluting 50.0 mL of a 12% (m/v) KOH solution?
3. What is the molarity of a solution prepared when 75.0 mL of a 4.00 M KCl solution is diluted to a volume of 500. mL?
4. The normal concentration of calcium in blood is 5.0 mEq/L. How many milligrams of calcium are in 1.0 L of blood?