Name _____

Date ___/___/___

13 • Properties of Solutions

13.4 Concentration Questions

1. Calculate the mass percentage of $CaCl_2$ in a solution containing 16.5 g $CaCl_2$ in 456 g water.

2. What is the concentration of chloride ion in percent in a solution that contains 35.0 ppm chloride?

    a) 3.5×10^{-5} percent
    b) 3.5×10^{-6} percent
    c) 3.5×10^{-2} percent
    d) 3.5×10^{2} percent
    e) 3.5×10^{-3} percent

3. What is the concentration in ppm of 0.042 g of CO_2 in 120. g of nitrogen, N_2, and 30.0 g of oxygen, O_2, all present in a gas?

    a) 0.028 ppm
    b) 28.0 ppm
    c) 4.2 ppm
    d) 280 ppm
    e) 350 ppm

4. What is the molality of a solution prepared by mixing 25.0 g ethylene glycol (molar mass = 62.1; CH_2OHCH_2OH) with 125 g of water?

    a) 200 m
    b) 20.0 m
    c) 2.68 m
    d) 3.13 m
    e) 3.22 m

5. What mass of phenol, C_6H_5OH (molar mass = 94.11), must be dissolved in 25.0 g of naphthalene to produce a solution that is 0.15 m in phenol?

6. Calculate the molality of methanol in a solution prepared by dissolving 75.0 mL methanol, CH_3OH, (density = 0.791 g/mL) in 150 g ethanol.

7. What is the mole fraction of ethanol, C_2H_5OH, if 25.0 g of it are dissolved in 100.0 g of water?

   a) 0.0978
   b) 0.00543
   c) 8.91
   d) 0.0891
   e) 0.200

8. What is the molarity of 25.0 g of KBr in 456 mL of water solution?

9. The density of acetonitrile, CH_3CN, is 0.786 g/mL, and the density of methanol, CH_3OH, is 0.791 g/mL. A solution is made by dissolving 15.0 g of methanol in 250.0 mL of acetonitrile. Assuming that the volumes of the solute and solvent are additive, what is the molarity of methanol in the solution?

   a) 1.74 M
   b) 24.7 M
   c) 1.87 M
   d) 1.74 x 10^{-3} M
   e) 1.87 x 10^{-3} M