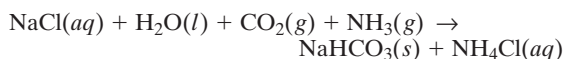


bon dioxide and ammonia are passed through concentrated salt brine. The following equation represents the reaction:



- What volume of NH_3 at 25°C and 1.00 atm pressure will be required if 38 000 L of CO_2 , measured under the same conditions, react to form NaHCO_3 ?
 - What mass of NaHCO_3 can be formed when the gases in (a) react with NaCl ?
 - If this reaction forms 46.0 kg of NaHCO_3 , what volume of NH_3 , measured at STP, reacted?
 - What volume of CO_2 , compressed in a tank at 5.50 atm and a temperature of 42°C , will be needed to produce 100.00 kg of NaHCO_3 ?
- 327.** The combustion of butane is represented in the following equation:
- $$2\text{C}_4\text{H}_{10}(g) + 13\text{O}_2(g) \rightarrow 8\text{CO}_2(g) + 10\text{H}_2\text{O}(l)$$
- If 4.74 g of butane react with excess oxygen, what volume of CO_2 , measured at 150°C and 1.14 atm, will be formed?
 - What volume of oxygen, measured at 0.980 atm and 75°C , will be consumed by the complete combustion of 0.500 g of butane?
 - A butane-fueled torch has a mass of 876.2 g. After burning for some time, the torch has a mass of 859.3 g. What volume of CO_2 , at STP, was formed while the torch burned?
 - What mass of H_2O is produced when butane burns and produces 3720 L of CO_2 , measured at 35°C and 0.993 atm pressure?

Concentration of Solutions: Chap. 12, Sec. 3

Percentage Concentration

- 328.** What is the percentage concentration of 75.0 g of ethanol dissolved in 500.0 g of water?
- 329.** A chemist dissolves 3.50 g of potassium iodate and 6.23 g of potassium hydroxide in 805.05 g of water. What is the percentage concentration of each solute in the solution?
- 330.** A student wants to make a 5.00% solution of rubidium chloride using 0.377 g of the substance. What mass of water will be needed to make the solution?
- 331.** What mass of lithium nitrate would have to be dissolved in 30.0 g of water in order to make an 18.0% solution?

Molarity

- 332.** Determine the molarity of a solution prepared by dissolving 141.6 g of citric acid, $\text{C}_3\text{H}_5\text{O}(\text{COOH})_3$, in water and then diluting the resulting solution to 3500.0 mL.
- 333.** What is the molarity of a salt solution made by dissolving 280.0 mg of NaCl in 2.00 mL of water? Assume the final volume is the same as the volume of the water.

- 334.** What is the molarity of a solution that contains 390.0 g of acetic acid, CH_3COOH , dissolved in enough acetone to make 1000.0 mL of solution?
- 335.** What mass of glucose, $\text{C}_6\text{H}_{12}\text{O}_6$, would be required to prepare 5.000×10^3 L of a 0.215 M solution?
- 336.** What mass of magnesium bromide would be required to prepare 720. mL of a 0.0939 M aqueous solution?
- 337.** What mass of ammonium chloride is dissolved in 300. mL of a 0.875 M solution?

Molality

- 338.** Determine the molality of a solution of 560 g of acetone, CH_3COCH_3 , in 620 g of water.
- 339.** What is the molality of a solution of 12.9 g of fructose, $\text{C}_6\text{H}_{12}\text{O}_6$, in 31.0 g of water?
- 340.** How many moles of 2-butanol, $\text{CH}_3\text{CHOHCH}_2\text{CH}_3$, must be dissolved in 125 g of ethanol in order to produce a 12.0 *m* 2-butanol solution? What mass of 2-butanol is this?

Mixed Review

- 341.** Complete the table below by determining the missing quantity in each example. All solutions are aqueous. Any quantity that is not applicable to a given solution is marked NA.

<i>Solution Made</i>	<i>Mass of Solute Used</i>	<i>Quantity of Solution Made</i>	<i>Quantity of Solvent Used</i>
a. 12.0% KMnO_4	? g KMnO_4	500.0 g	? g H_2O
b. 0.60 M BaCl_2	? g BaCl_2	1.750 L	NA
c. 6.20 <i>m</i> glycerol, $\text{HOCH}_2\text{CHOHCH}_2\text{OH}$? g glycerol	NA	800.0 g H_2O
d. ? M $\text{K}_2\text{Cr}_2\text{O}_7$	12.27 g $\text{K}_2\text{Cr}_2\text{O}_7$	650. mL	NA
e. ? <i>m</i> CaCl_2	288 g CaCl_2	NA	2.04 kg H_2O
f. 0.160 M NaCl	? g NaCl	25.0 mL	NA
g. 2.00 <i>m</i> glucose, $\text{C}_6\text{H}_{12}\text{O}_6$? g glucose	? g solution	1.50 kg H_2O

- 342.** How many moles of H_2SO_4 are in 2.50 L of a 4.25 M aqueous solution?
- 343.** Determine the molal concentration of 71.5 g of linoleic acid, $\text{C}_{18}\text{H}_{32}\text{O}_2$, in 525 g of hexane, C_6H_{14} .
- 344.** You have a solution that is 16.2% sodium thiosulfate, $\text{Na}_2\text{S}_2\text{O}_3$, by mass.
- What mass of sodium thiosulfate is in 80.0 g of solution?
 - How many moles of sodium thiosulfate are in 80.0 g of solution?
 - If 80.0 g of the sodium thiosulfate solution is diluted to 250.0 mL with water, what is the molarity of the resulting solution?