10 CHEMICAL QUANTITIES

Practice Problems

In your notebook, solve the following problems.

SECTION 10.1 THE MOLE: A MEASUREMENT OF MATTER

1. What is the molar mass of sucrose ($C_{12}H_{22}O_{11}$)?
2. What is the molar mass of each of the following compounds?
   a. phosphorus pentachloride (PCl_5)
   b. uranium hexafluoride (UF_6)
3. Calculate the molar mass of each of the following ionic compounds:
   a. $KMnO_4$
   b. $Ca_3(PO_4)_2$
4. How many moles is 3.52×10^{24} molecules of water?
5. How many atoms of zinc are in 0.60 mol of zinc?
6. What is the mass of 1.00 mol of oxygen (O_2)?

SECTION 10.2 MOLE–MASS AND MOLE–VOLUME RELATIONSHIPS

1. What is the molar mass of each of the following compounds?
   a. $C_6H_{12}O_6$ b. $NaHCO_3$ c. C_7H_{12} d. KNH_4SO_4
2. Calculate the mass in grams of each of the following:
   a. 8.0 mol lead oxide (PbO)
   b. 0.75 mol hydrogen sulfide (H_2S)
   c. 0.00100 mol silicon tetrahydride (SiH_4)
   d. 1.50×10^{-2} mol molecular oxygen (O_2)
   e. 2.30 mol ethylene glycol ($C_2H_6O_2$)
3. How many grams are in 1.73 mol of dinitrogen pentoxide (N_2O_5)?
4. How many grams are in 0.658 mol of calcium phosphate [$Ca_3(PO_4)_2$]?
5. Calculate the number of moles in each of the following:
   a. 0.50 g sodium bromide (NaBr)
   b. 13.5 g magnesium nitrate [$Mg(NO_3)_2$]
   c. 1.02 g magnesium chloride ($MgCl_2$)
   d. 0.00100 g monochloromethane (CH_3Cl)
   e. 1.50×10^{-3} g propylene glycol [$C_3H_6(OH)_2$]
6. A chemist plans to use 435.0 grams of ammonium nitrate (NH_4NO_3) in a reaction. How many moles of the compound is this?
7. A solution is to be prepared in a laboratory. The solution requires 0.0465 mol of quinine ($C_{20}H_{24}N_2O_2$). What mass, in grams, should the laboratory technician obtain in order to make the solution?