



## AP Chemistry Summer Assignment Summer 2018

Welcome to AP Chemistry, a course unlike anything you have ever experienced. AP Chemistry is a course that is equivalent to a freshmen college chemistry course, but you have the advantage that we have the entire year to complete the curriculum. Most of the material is new, but still builds on topics you have already done. This course will require dedication, organization, and a lot of patience and persistence. This assignment is to alleviate some of the stress associated with adjusting to a new course and allow us to start right off.

The purpose of this assignment is not to ruin your summer vacation, but to:

- level the playing field for those students coming from a different teacher;
- review concepts from Chemistry 1 that you should know so we don't have to waste time on topics you've already had;
- allow us to start on topics that are new to you or enhance topics you already know.

This assignment is not designed nor should it take a long time to complete. Instead, it is a review of significant digits (yes, a necessary evil in the world of AP Chemistry), writing and naming formulas, balancing equations and simple mole problems (one and two step). We will not do anything in class with significant digits, formulas and balancing equations, except answer your specific questions. I will assume, unless you ask, that you understand and/or remember significant digits, formulas and balancing equations. We begin in August with empirical formulas, after a quick review of basic ones, by combustion analysis. My suggestion is to begin the attached review in early to mid August. All of the problems are coming from your text (end of chapter problems); if you would like a copy of the book before summer, you are more than welcome to come and get a copy. Otherwise should you need a review of a topic, Kahn Academy or Bozeman Science are always good. When you solve the problems, please do so on notebook paper, not on the paper where the problem is. You must show your work for any mole problems.

If you run into serious difficulties over the summer, you can email me at school at the following address: [bmasters@wls4kids.org](mailto:bmasters@wls4kids.org). I check my email, usually daily, and can respond fairly quickly. Keep in mind, if the district is upgrading anything, email will not be available to check. If you don't hear from me within a day or two, that is most likely the reason. Most importantly, *don't stress* over any of the problems...if anything, skip that one, move on and then ask in the fall. I have 2 mottos that I live by: 1) when in doubt, convert to moles, and 2) there is no problem...or test...worth stressing or crying over...seriously. Remember that, it will serve you well.

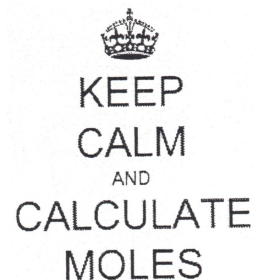
The one thing you need to keep in mind, the "secret" to AP Chem if there is one, the biggest key to success in AP Chemistry is this:

(dramatic drum roll, please....)

*Stay caught up, do not fall behind and do not overly stress out....I'm always around to help you catch up & to teach it another way until you figure it out.*

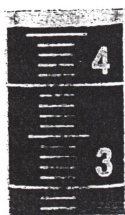
*Remember, with stress.....this, too, shall pass :)  
(unless you listen to Gandalf....please tell me you know who Gandalf is.....)*

*And, when in doubt, convert to moles.----Mrs Masters*



page 40	#77,78,80,83,84,85,86,87(?)
page 82	#85,86,88a,91
page 131	#41,42,43,44,47,49,50,60,64b,67a,109,110

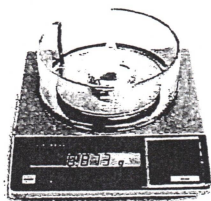
74. Read each measurement to the correct number of significant figures. Laboratory glassware should always be read from the bottom of the meniscus. Digital balances normally display mass to the correct number of significant figures for that particular balance.



(a)



(b)



(c)

75. For each number, underline the zeroes that are significant and draw an x through the zeroes that are not.
- a. 1,050,501 km                      b. 0.0020 m  
c. 0.000000000000002 s            d. 0.001090 cm
76. For each number, underline the zeroes that are significant and draw an x through the zeroes that are not.
- a. 180,701 mi                          b. 0.001040 m  
c. 0.005710 km                        d. 90,201 m
77. How many significant figures are in each number?
- a. 0.000312 m                        b. 312,000 s  
c.  $3.12 \times 10^5$  km                      d. 13,127 s  
e. 2000
78. How many significant figures are in each number?
- a. 0.1111 s                              b. 0.007 m  
c. 108,700 km                         d.  $1.563300 \times 10^{11}$  m  
e. 30,800
79. Which numbers are exact (and therefore have an unlimited number of significant figures)?
- a.  $\pi = 3.14$   
b. 12 inches = 1 foot  
c. EPA gas mileage rating of 26 miles per gallon  
d. 1 gross = 144
80. Indicate the number of significant figures in each number. If the number is an exact number, indicate an unlimited number of significant figures.
- a. 305,435,087 (2008 U.S. population)  
b. 2.54 cm = 1 in  
c. 11.4 g/cm<sup>3</sup> (density of lead)  
d. 12 = 1 dozen
81. Round each number to four significant figures.
- a. 156.852                                b. 156.842  
c. 156.849                                d. 156.899
82. Round each number to three significant figures.
- a. 79,845.82                              b.  $1.548937 \times 10^7$   
c. 2.3499999995                        d. 0.000045389

### Significant Figures in Calculations

83. Calculate to the correct number of significant figures.
- a.  $9.15 \div 4.970$   
b.  $1.54 \times 0.03060 \times 0.69$   
c.  $27.5 \times 1.82 \div 100.04$   
d.  $(2.290 \times 10^6) \div (6.7 \times 10^4)$
84. Calculate to the correct number of significant figures.
- a.  $89.3 \times 77.0 \times 0.08$   
b.  $(5.01 \times 10^5) \div (7.8 \times 10^2)$   
c.  $4.005 \times 74 \times 0.007$   
d.  $453 \div 2.031$

85. Calculate to the correct number of significant figures.
- a.  $43.7 - 2.341$   
b.  $17.6 + 2.838 + 2.3 + 110.77$   
c.  $19.6 + 58.33 - 4.974$   
d.  $5.99 - 5.572$

86. Calculate to the correct number of significant figures.
- a.  $0.004 + 0.09879$                       b.  $1239.3 + 9.73 + 3.42$   
c.  $2.4 - 1.777$                               d.  $532 + 7.3 - 48.523$

87. Calculate to the correct number of significant figures.
- a.  $(24.6681 \times 2.38) + 332.58$   
b.  $(85.3 - 21.489) \div 0.0059$   
c.  $(512 \div 986.7) + 5.44$   
d.  $[(28.7 \times 10^5) \div 48.533] + 144.99$

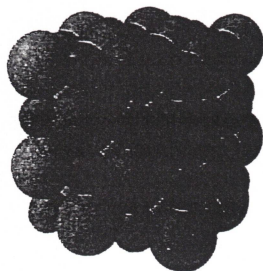
88. Calculate to the correct number of significant figures.
- a.  $[(1.7 \times 10^6) \div (2.63 \times 10^5)] + 7.33$   
b.  $(568.99 - 232.1) \div 5.3$   
c.  $(9443 + 45 - 9.9) \times 8.1 \times 10^6$   
d.  $(3.14 \times 2.4367) - 2.34$

### Unit Conversions

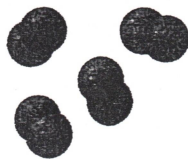
89. Perform each unit conversion.
- a. 27.8 L to cm<sup>3</sup>                              b. 1898 mg to kg  
c. 198 km to cm
90. Perform each unit conversion.
- a. 28.9 nm to  $\mu$ m                              b. 1432 cm<sup>3</sup> to L  
c. 1211 Tm to Gm
91. Perform each unit conversion.
- a. 154 cm to in                                b. 3.14 kg to g  
c. 3.5 L to qt                                 d. 109 mm to in
92. Perform each unit conversion.
- a. 1.4 in to mm                                b. 116 ft to cm  
c. 1845 kg to lb                                d. 815 yd to km
93. A runner wants to run 10.0 km. She knows that her running pace is 7.5 miles per hour. How many minutes must she run?
94. A cyclist rides at an average speed of 18 miles per hour. If she wants to bike 212 km, how long (in hours) must she ride?
95. A European automobile has a gas mileage of 17 km/L. What is the gas mileage in miles per gallon?
96. A gas can holds 5.0 gallons of gasoline. Express this quantity in cm<sup>3</sup>.
97. A house has an area of 195 m<sup>2</sup>. What is its area in each unit?  
a. km<sup>2</sup>    b. dm<sup>2</sup>    c. cm<sup>2</sup>
98. A bedroom has a volume of 115 m<sup>3</sup>. What is its volume in each unit?  
a. km<sup>3</sup>    b. dm<sup>3</sup>    c. cm<sup>3</sup>
99. The average U.S. farm occupies 435 acres. How many square miles is this? (1 acre = 43,560 ft<sup>2</sup>, 1 mile = 5280 ft)
100. Total U.S. farmland occupies 954 million acres. How many square miles is this? (1 acre = 43,560 ft<sup>2</sup>, 1 mile = 5280 ft). Total U.S. land area is 3.537 million square miles. What percentage of U.S. land is farmland?
101. An acetaminophen suspension for infants contains 80 mg/0.80 mL suspension. The recommended dose is 15 mg/kg body weight. How many mL of this suspension should be given to an infant weighing 14 lb? (Assume two significant figures.)
102. An ibuprofen suspension for infants contains 100 mg/5.0 mL suspension. The recommended dose is 10 mg/kg body weight. How many mL of this suspension should be given to an infant weighing 18 lb? (Assume two significant figures.)



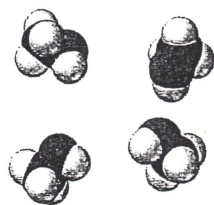
32. Based on the molecular views, classify each substance as an atomic element, a molecular element, an ionic compound, or a molecular compound.



(a)



(b)



(c)

### Formulas and Names for Ionic Compounds

33. Write a formula for the ionic compound that forms between each pair of elements.
- calcium and oxygen
  - zinc and sulfur
  - rubidium and bromine
  - aluminum and oxygen
34. Write a formula for the ionic compound that forms between each pair of elements.
- silver and chlorine
  - sodium and sulfur
  - aluminum and sulfur
  - potassium and chlorine
35. Write a formula for the compound that forms between calcium and each polyatomic ion.
- hydroxide
  - chromate
  - phosphate
  - cyanide
36. Write a formula for the compound that forms between potassium and each polyatomic ion.
- carbonate
  - phosphate
  - hydrogen phosphate
  - acetate
37. Name each ionic compound.
- $Mg_3N_2$
  - KF
  - $Na_2O$
  - $Li_2S$
  - CsF
  - KI
38. Name each ionic compound.
- $SnCl_4$
  - $PbI_2$
  - $Fe_2O_3$
  - $CuI_2$
  - $HgBr_2$
  - $CrCl_2$
39. Give each ionic compound an appropriate name.
- SnO
  - $Cr_2S_3$
  - RbI
  - $BaBr_2$
40. Give each ionic compound an appropriate name.
- BaS
  - $FeCl_3$
  - $PbI_4$
  - $SrBr_2$
41. Name each ionic compound containing a polyatomic ion.
- $CuNO_2$
  - $Mg(C_2H_3O_2)_2$
  - $Ba(NO_3)_2$
  - $Pb(C_2H_3O_2)_2$
42. Name each ionic compound containing a polyatomic ion.
- $Ba(OH)_2$
  - $NH_4I$
  - $NaBrO_4$
  - $Fe(OH)_3$
43. Write a formula for each ionic compound.
- sodium hydrogen sulfite
  - lithium permanganate
  - silver nitrate
  - potassium sulfate
  - rubidium hydrogen sulfate
  - potassium hydrogen carbonate

44. Write a formula for each ionic compound.

- copper(II) chloride
- copper(I) iodate
- lead(II) chromate
- calcium fluoride
- potassium hydroxide
- iron(II) phosphate

45. Write the name from the formula or the formula from the name for each hydrated ionic compound.

- $CoSO_4 \cdot 7H_2O$
- iridium(III) bromide tetrahydrate
- $Mg(BrO_3)_2 \cdot 6H_2O$
- potassium carbonate dihydrate

46. Write the name from the formula or the formula from the name for each hydrated ionic compound.

- cobalt(II) phosphate octahydrate
- $BeCl_2 \cdot 2H_2O$
- chromium(III) phosphate trihydrate
- $LiNO_2 \cdot H_2O$

### Formulas and Names for Molecular Compounds and Acids

47. Name each molecular compound.

- CO
- $NI_3$
- $SiCl_4$
- $N_4Se_4$

48. Name each molecular compound.

- $SO_3$
- $SO_2$
- $BrF_5$
- NO

49. Write a formula for each molecular compound.

- phosphorus trichloride
- chlorine monoxide
- disulfur tetrafluoride
- phosphorus pentafluoride

50. Write a formula for each molecular compound.

- boron tribromide
- dichlorine monoxide
- xenon tetrafluoride
- carbon tetrabromide

51. Name each acid.

- $HI(aq)$
- $HNO_3(aq)$
- $H_2CO_3(aq)$

52. Name each acid.

- $HCl(aq)$
- $HClO_2(aq)$
- $H_2SO_4(aq)$

53. Write formulas for each acid.

- hydrofluoric acid
- hydrobromic acid
- sulfurous acid

54. Write formulas for each acid.

- phosphoric acid
- hydrocyanic acid
- chlorous acid

### Using the Nomenclature Flow Chart

55. Use the nomenclature flow chart (Figure 3.10) to name each compound.

- $SrCl_2$
- $SnO_2$
- $P_2S_5$
- $HC_2H_3O_2(aq)$

56. Use the nomenclature flow chart (Figure 3.10) to name each compound.

- $HNO_2(aq)$
- $B_2Cl_2$
- $BaCl_2$
- $CrCl_3$

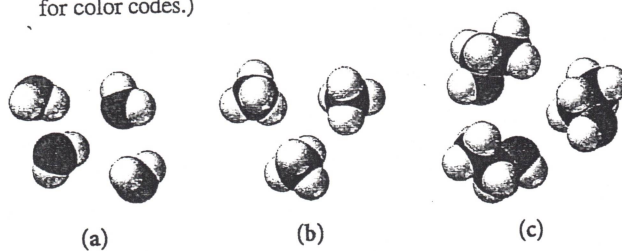
57. Use the nomenclature flow chart (Figure 3.10) to name each compound.  
 a.  $\text{KClO}_3$       b.  $\text{I}_2\text{O}_5$       c.  $\text{PbSO}_4$
58. Use the nomenclature flow chart (Figure 3.10) to name each compound.  
 a.  $\text{XeO}_3$       b.  $\text{KClO}$       c.  $\text{CoSO}_4$

### Formula Mass and the Mole Concept for Compounds

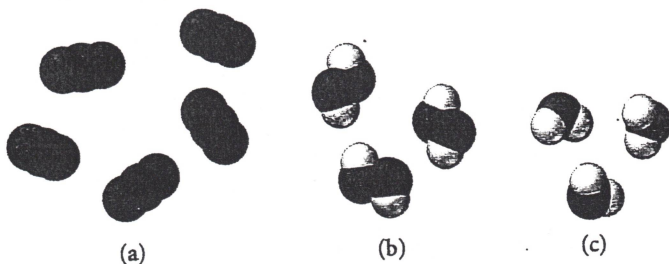
59. Calculate the formula mass for each compound.  
 a.  $\text{NO}_2$       b.  $\text{C}_4\text{H}_{10}$   
 c.  $\text{C}_6\text{H}_{12}\text{O}_6$       d.  $\text{Cr}(\text{NO}_3)_3$
60. Calculate the formula mass for each compound.  
 a.  $\text{MgBr}_2$       b.  $\text{HNO}_2$   
 c.  $\text{CBr}_4$       d.  $\text{Ca}(\text{NO}_3)_2$
61. Calculate the number of moles in each sample.  
 a. 72.5 g  $\text{CCl}_4$   
 b. 12.4 g  $\text{C}_{12}\text{H}_{22}\text{O}_{11}$   
 c. 25.2 kg  $\text{C}_2\text{H}_2$   
 d. 12.3 g of dinitrogen monoxide
62. Calculate the mass of each sample.  
 a. 15.7 mol  $\text{HNO}_3$   
 b.  $1.04 \times 10^{-3}$  mol  $\text{H}_2\text{O}_2$   
 c. 72.1 mmol  $\text{SO}_2$   
 d. 1.23 mol xenon difluoride
63. Determine the number of moles (of molecules or formula units) in each sample.  
 a. 25.5 g  $\text{NO}_2$   
 b. 1.25 kg  $\text{CO}_2$   
 c. 38.2 g  $\text{KNO}_3$   
 d. 155.2 kg  $\text{Na}_2\text{SO}_4$
64. Determine the number of moles (of molecules or formula units) in each sample.  
 a. 55.98 g  $\text{CF}_2\text{Cl}_2$   
 b. 23.6 kg  $\text{Fe}(\text{NO}_3)_2$   
 c. 0.1187 g  $\text{C}_8\text{H}_{18}$   
 d. 195 kg  $\text{CaO}$
65. How many molecules are in each sample?  
 a. 6.5 g  $\text{H}_2\text{O}$   
 b. 389 g  $\text{CBr}_4$   
 c. 22.1 g  $\text{O}_2$   
 d. 19.3 g  $\text{C}_8\text{H}_{10}$
66. How many molecules (or formula units) are in each sample?  
 a. 85.26 g  $\text{CCl}_4$   
 b. 55.93 kg  $\text{NaHCO}_3$   
 c. 119.78 g  $\text{C}_4\text{H}_{10}$   
 d.  $4.59 \times 10^5$  g  $\text{Na}_3\text{PO}_4$
67. Calculate the mass (in g) of each sample.  
 a.  $5.94 \times 10^{20}$   $\text{SO}_3$  molecules  
 b.  $2.8 \times 10^{22}$   $\text{H}_2\text{O}$  molecules  
 c. 1 glucose molecule ( $\text{C}_6\text{H}_{12}\text{O}_6$ )
68. Calculate the mass (in g) of each sample.  
 a.  $4.5 \times 10^{25}$   $\text{O}_3$  molecules  
 b.  $9.85 \times 10^{19}$   $\text{CCl}_2\text{F}_2$  molecules  
 c. 1 water molecule
69. A sugar crystal contains approximately  $1.8 \times 10^{17}$  sucrose ( $\text{C}_{12}\text{H}_{22}\text{O}_{11}$ ) molecules. What is its mass in mg?
70. A salt crystal has a mass of 0.12 mg. How many  $\text{NaCl}$  formula units does it contain?

### Composition of Compounds

71. Calculate the mass percent composition of carbon in each carbon-containing compound.  
 a.  $\text{CH}_4$       b.  $\text{C}_2\text{H}_6$   
 c.  $\text{C}_2\text{H}_2$       d.  $\text{C}_2\text{H}_3\text{Cl}$
72. Calculate the mass percent composition of nitrogen in each nitrogen-containing compound.  
 a.  $\text{N}_2\text{O}$       b.  $\text{NO}$   
 c.  $\text{NO}_2$       d.  $\text{HNO}_3$
73. Most fertilizers consist of nitrogen-containing compounds such as  $\text{NH}_3$ ,  $\text{CO}(\text{NH}_2)_2$ ,  $\text{NH}_4\text{NO}_3$ , and  $(\text{NH}_4)_2\text{SO}_4$ . The nitrogen content in these compounds is used for protein synthesis by plants. Calculate the mass percent composition of nitrogen in each of the fertilizers named. Which fertilizer has the highest nitrogen content?
74. Iron in the earth is in the form of iron ore. Common ores include  $\text{Fe}_2\text{O}_3$  (hematite),  $\text{Fe}_3\text{O}_4$  (magnetite), and  $\text{FeCO}_3$  (siderite). Calculate the mass percent composition of iron for each of these iron ores. Which ore has the highest iron content?
75. Copper(II) fluoride contains 37.42% F by mass. Calculate the mass of fluorine (in g) contained in 55.5 g of copper(II) fluoride.
76. Silver chloride, often used in silver plating, contains 75.27% Ag by mass. Calculate the mass of silver chloride required to plate 155 mg of pure silver.
77. The iodide ion is a dietary mineral essential to good nutrition. In countries where potassium iodide is added to salt, iodine deficiency (or goiter) has been almost completely eliminated. The recommended daily allowance (RDA) for iodine is 150  $\mu\text{g}/\text{day}$ . How much potassium iodide (76.45% I) should you consume if you want to meet the RDA?
78. The American Dental Association recommends that an adult female should consume 3.0 mg of fluoride ( $\text{F}^-$ ) per day to prevent tooth decay. If the fluoride is consumed in the form of sodium fluoride (45.24% F), what amount of sodium fluoride contains the recommended amount of fluoride?
79. Write a ratio showing the relationship between the molar amounts of each element for each compound. (See Appendix IIA for color codes.)



80. Write a ratio showing the relationship between the molar amounts of each element for each compound. (See Appendix IIA for color codes.)



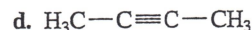
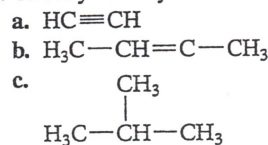
105. Write a balanced chemical equation for each reaction.
- Solid lead(II) sulfide reacts with aqueous hydrobromic acid to form solid lead(II) bromide and dihydrogen monosulfide gas.
  - Gaseous carbon monoxide reacts with hydrogen gas to form gaseous methane ( $\text{CH}_4$ ) and liquid water.
  - Aqueous hydrochloric acid reacts with solid manganese(IV) oxide to form aqueous manganese(II) chloride, liquid water, and chlorine gas.
  - Liquid pentane ( $\text{C}_5\text{H}_{12}$ ) reacts with gaseous oxygen to form carbon dioxide and liquid water.
106. Write a balanced chemical equation for each reaction.
- Solid copper reacts with solid sulfur to form solid copper(I) sulfide.
  - Solid iron(III) oxide reacts with hydrogen gas to form solid iron and liquid water.
  - Sulfur dioxide gas reacts with oxygen gas to form sulfur trioxide gas.
  - Gaseous ammonia ( $\text{NH}_3$ ) reacts with gaseous oxygen to form gaseous nitrogen monoxide and gaseous water.
107. Write a balanced chemical equation for the reaction of aqueous sodium carbonate with aqueous copper(II) chloride to form solid copper(II) carbonate and aqueous sodium chloride.
108. Write a balanced chemical equation for the reaction of aqueous potassium hydroxide with aqueous iron(III) chloride to form solid iron(III) hydroxide and aqueous potassium chloride
109. Balance each chemical equation.
- $\text{CO}_2(g) + \text{CaSiO}_3(s) + \text{H}_2\text{O}(l) \longrightarrow \text{SiO}_2(s) + \text{Ca}(\text{HCO}_3)_2(aq)$
  - $\text{Co}(\text{NO}_3)_3(aq) + (\text{NH}_4)_2\text{S}(aq) \longrightarrow \text{Co}_2\text{S}_3(s) + \text{NH}_4\text{NO}_3(aq)$
  - $\text{Cu}_2\text{O}(s) + \text{C}(s) \longrightarrow \text{Cu}(s) + \text{CO}(g)$
  - $\text{H}_2(g) + \text{Cl}_2(g) \longrightarrow \text{HCl}(g)$
110. Balance each chemical equation.
- $\text{Na}_2\text{S}(aq) + \text{Cu}(\text{NO}_3)_2(aq) \longrightarrow \text{NaNO}_3(aq) + \text{CuS}(s)$
  - $\text{N}_2\text{H}_4(l) \longrightarrow \text{NH}_3(g) + \text{N}_2(g)$
  - $\text{HCl}(aq) + \text{O}_2(g) \longrightarrow \text{H}_2\text{O}(l) + \text{Cl}_2(g)$
  - $\text{FeS}(s) + \text{HCl}(aq) \longrightarrow \text{FeCl}_2(aq) + \text{H}_2\text{S}(g)$

### Organic Compounds

111. Classify each compound as organic or inorganic.
- $\text{CaCO}_3$
  - $\text{C}_4\text{H}_8$
  - $\text{C}_4\text{H}_6\text{O}_6$
  - $\text{LiF}$
112. Classify each compound as organic or inorganic.
- $\text{C}_8\text{H}_{18}$
  - $\text{CH}_3\text{NH}_2$
  - $\text{CaO}$
  - $\text{FeCO}_3$

113. Classify each hydrocarbon as an alkane, alkene, or alkyne.
- $\text{H}_2\text{C}=\text{CH}-\text{CH}_3$
  - $\text{H}_3\text{C}-\text{CH}_2-\text{CH}_3$
  - $\text{HC}\equiv\text{C}-\text{CH}_3$
  - $\text{H}_3\text{C}-\text{CH}_2-\text{CH}_2-\text{CH}_3$

114. Classify each hydrocarbon as an alkane, alkene, or alkyne.



115. Write a formula based on the name, or a name based on the formula, for each hydrocarbon.

- propane
- $\text{CH}_3\text{CH}_2\text{CH}_3$
- octane
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$

116. Write a formula based on the name, or a name based on the formula, for each hydrocarbon:

- $\text{CH}_3\text{CH}_3$
- pentane
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$
- heptane

117. Classify each organic compound as a hydrocarbon or a functionalized hydrocarbon. For functionalized hydrocarbons, identify the family to which the compound belongs.

- $\text{H}_3\text{C}-\text{CH}_2\text{OH}$
- $\text{H}_3\text{C}-\text{CH}_3$
- $$\begin{array}{c} \text{O} \\ || \\ \text{H}_3\text{C}-\text{C}-\text{CH}_2-\text{CH}_3 \end{array}$$
- $\text{H}_3\text{C}-\text{NH}_2$

118. Classify each organic compound as a hydrocarbon or a functionalized hydrocarbon. For functionalized hydrocarbons, identify the family to which the compound belongs.

- $$\begin{array}{c} \text{O} \\ || \\ \text{H}_3\text{C}-\text{CH}_2-\text{C}-\text{OH} \end{array}$$
- $$\begin{array}{c} \text{O} \\ || \\ \text{H}_3\text{C}-\text{CH} \\ | \\ \text{CH}_3 \end{array}$$
- $$\begin{array}{c} \text{H}_3\text{C}-\text{C}-\text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$$
- $\text{H}_3\text{C}-\text{CH}_2-\text{O}-\text{CH}_3$

## Cumulative Problems

119. How many molecules of ethanol ( $\text{C}_2\text{H}_5\text{OH}$ ) (the alcohol in alcoholic beverages) are present in 145 mL of ethanol? The density of ethanol is  $0.789 \text{ g/cm}^3$ .
120. A drop of water has a volume of approximately 0.05 mL. How many water molecules does it contain? The density of water is  $1.0 \text{ g/cm}^3$ .
121. Determine the chemical formula of each compound and then use it to calculate the mass percent composition of each constituent element.
- potassium chromate
  - lead(II) phosphate
  - sulfurous acid
  - cobalt(II) bromide
122. Determine the chemical formula of each compound and then use it to calculate the mass percent composition of each constituent element.
- perchloric acid
  - phosphorus pentachloride
  - nitrogen triiodide
  - carbon dioxide
123. A Freon leak in the air-conditioning system of an old car releases 25 g of  $\text{CF}_2\text{Cl}_2$  per month. What mass of chlorine does this car emit into the atmosphere each year?