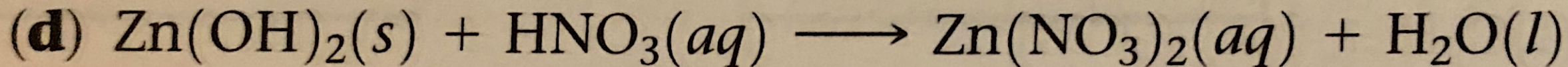
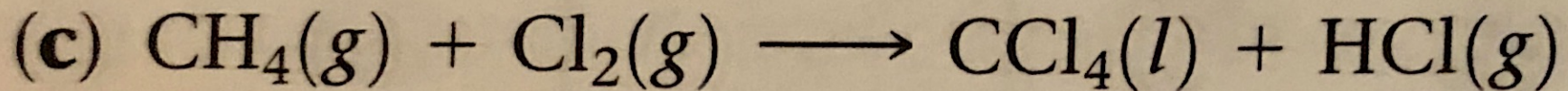
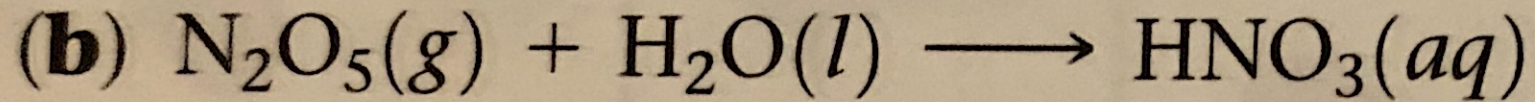
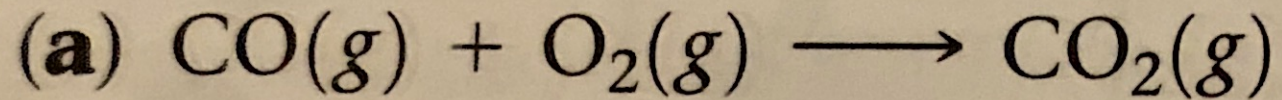
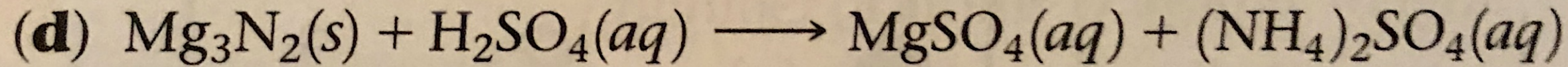
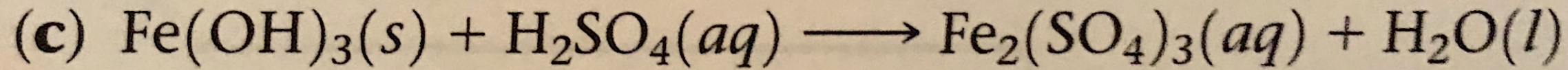
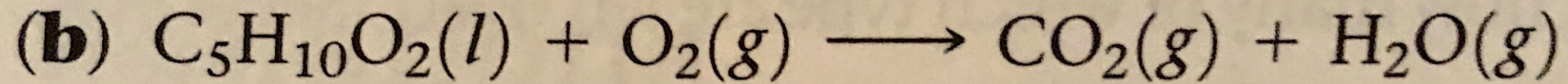
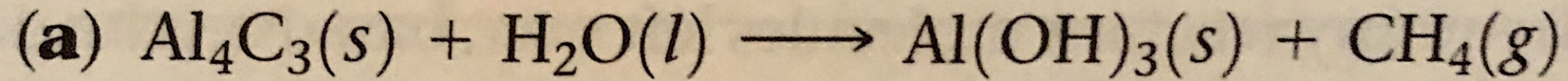


3.90 (a) The molecular formula of acetylsalicylic acid (aspirin), one of the most common pain relievers, is $C_9H_8O_4$. How many moles of $C_9H_8O_4$ are in a 0.500-g tablet of aspirin? Assume the tablet is composed entirely of aspirin. (b) How many molecules of $C_9H_8O_4$ are in this tablet? (c) How many carbon atoms are in the tablet?

3.11 Balance the following equations:



3.13 Balance the following equations:

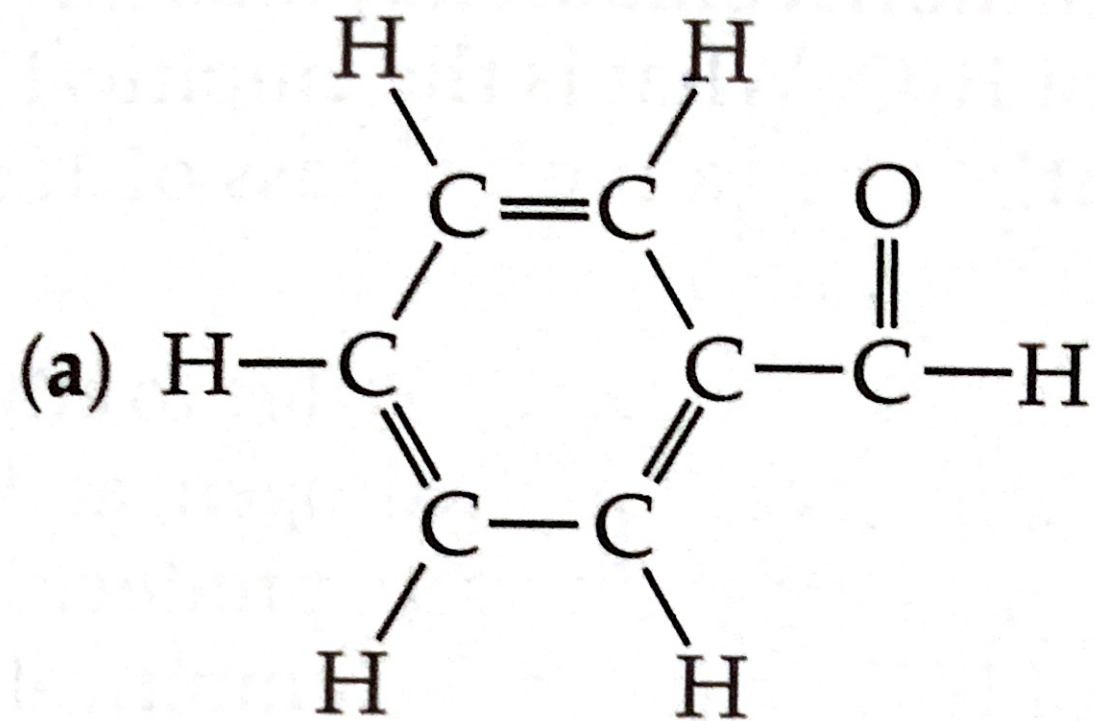


3.19 Write a balanced chemical equation for the reaction that occurs when **(a)** $\text{Mg}(s)$ reacts with $\text{Cl}_2(g)$; **(b)** barium carbonate decomposes into barium oxide and carbon dioxide gas when heated; **(c)** the hydrocarbon styrene, $\text{C}_8\text{H}_8(l)$, is combusted in air; **(d)** dimethylether, $\text{CH}_3\text{OCH}_3(g)$, is combusted in air.

3.23 Determine the formula weights of each of the following compounds: **(a)** nitric acid, HNO_3 ; **(b)** KMnO_4 ; **(c)** $\text{Ca}_3(\text{PO}_4)_2$; **(d)** quartz, SiO_2 ; **(e)** gallium sulfide, **(f)** chromium(III) sulfate, **(g)** phosphorus trichloride.

3.25 Calculate the percentage by mass of oxygen in the following compounds: **(a)** morphine, $C_{17}H_{19}NO_3$; **(b)** codeine, $C_{18}H_{21}NO_3$; **(c)** cocaine, $C_{17}H_{21}NO_4$; **(d)** tetracycline, $C_{22}H_{24}N_2O_8$; **(e)** digitoxin, $C_{41}H_{64}O_{13}$; **(f)** vancomycin, $C_{66}H_{75}Cl_2N_9O_{24}$.

3.27 Based on the following structural formulas, calculate the percentage of carbon by mass present in each compound:



Benzaldehyde
(almond fragrance)

Avogadro's Number and the Mole (Section 3.4)

- 3.29** (a) Write "true" or "false" for each statement. (a) A mole of horses contain a mole of horse legs. (b) A mole of water has a mass of 18.0 g. (c) The mass of 1 molecule of water is 18.0 g. (d) A mole of NaCl(s) contains 2 moles of ions.

3.35 Calculate the following quantities:

- (a) mass, in grams, of 0.105 mol sucrose ($\text{C}_{12}\text{H}_{22}\text{O}_{11}$)
- (b) moles of $\text{Zn}(\text{NO}_3)_2$ in 143.50 g of this substance
- (c) number of molecules in 1.0×10^{-6} mol $\text{CH}_3\text{CH}_2\text{OH}$
- (d) number of N atoms in 0.410 mol NH_3