REVIEW QUESTIONS
Chapter 7

Calculate each of the following quantities:

1. Number of moles in 112 g of aspirin, $C_9H_8O_4$

$$112\ g\ \times\ \frac{1\ mol}{180.17\ g} = 0.622\ mol$$

2. Mass of 3.82 moles of silver acetate, $AgC_2H_3O_2$

$$3.82\ mol\ \times\ \frac{166.92\ g}{1\ mol} = 638\ g$$

3. Number of molecules in 1.75 moles of CO_2

$$1.75\ mol\ CO_2\ \times \frac{6.02\times10^{23}\ molecules}{1\ mol} = 1.05\times10^{24}\ molecules$$

4. Number of molecules in 20.0 g of CH_4

$$20.0\ g\ CH_4\ \times \frac{1\ mol}{16.05\ g} \times \frac{6.02\times10^{23}\ molecules}{1\ mol} = 7.50\times10^{23}\ molecules$$

5. Classify the type of each of the following reactions:

a) $(NH_4)_2SO_4 \rightarrow 2\ NH_3 + SO_2 + H_2O$ **decomposition**

b) $Br_2 + 2\ KI \rightarrow 2\ KBr + I_2$ **single replacement**

c) $2\ Na + Cl_2 \rightarrow 2\ NaCl$ **synthesis**

d) $Al(OH)_3 + 3\ HCl \rightarrow AlCl_3 + 3\ H_2O$ **double replacement**

6. Balance each of the equations shown below:

a) **5** C + **2** $SO_2 \rightarrow$ **1** CS_2 + **4** CO

b) **2** $Na_3N \rightarrow$ **6** Na + **1** N_2

c) **1** C_3H_8 + **5** $O_2 \rightarrow$ **3** CO_2 + **4** H_2O

d) **2** Al + **3** $H_2SO_4 \rightarrow$ **1** $Al_2(SO_4)_3$ + **3** H_2

7. Predict the products and write a balanced equation for each of the following:

a) Decomposition: **2** $NaCl\ (s) \rightarrow$ **2 Na (s)** + **Cl_2 (g)**

b) Combustion: $C_2H_4\ (g)$ + **3** $O_2\ (g) \rightarrow$ **2 CO_2 (g)** + **2 H_2O (l)**

c) Combination: **2** $Li\ (s)$ + $Br_2\ (l) \rightarrow$ **2 LiBr (s)**

d) Double replacement: $NiCl_2\ (aq)$ + **2** $NaOH\ (aq) \rightarrow$ **$Ni(OH)_2$ (s)** + **2 NaCl**

8. Each of the reactions below occur in the cells of the body. Identify each as endothermic or exothermic:

a) Succinyl CoA + $H_2O \rightarrow$ Succinate + CoA + 37 kJ **exothermic**

b) GDP + P_i + 34 kJ $\rightarrow$ GTP + H_2O **endothermic**

c) Phosphocreatine + $H_2O \rightarrow$ Creatine + P_i $\Delta H = -42.7$ kJ **exothermic**

9. In each reaction below, identify the **bold type** substance as oxidized or reduced:

a) **$C_6H_{12}O_6$** + 6 O_2 $\rightarrow$ 6 CO_2 + 6 H_2O **oxidized (gain of O)**

b) **Fe_2O_3** + 2 Al $\rightarrow$ Al_2O_3 + 2 Fe **reduced (loss of O)**

c) **6 CO_2** + 6 H_2O $\rightarrow$ $C_6H_{12}O_6$ + 6 O_2 **reduced (gain of H)**

10. Chromium and oxygen combine to form chromium (III) oxide.

a) Write a balanced equation for this reaction.

4 Cr (s) + 3 O_2 (g) $\rightarrow$ 2 Cr_2O_3 (s)

b) How many moles of O_2 react with 4.50 mol of Cr?

$$\mathbf{4.50\ mol\ Cr \times \frac{3\ mol\ O_2}{4\ mol\ Cr} = 3.38\ mol\ O_2}$$

c) How many grams of chromium (III) oxide are formed when 24.8g of Cr react?

$$\mathbf{24.8\ g\ Cr \times \frac{1\ mol}{52.00\ g} \times \frac{2\ mol\ Cr_2O_3}{4\ mol\ Cr} \times \frac{152.00\ g}{1\ mol} = 36.2\ g\ Cr_2O_3}$$