Che111: Chapter 6 Practice Problems

1. Are the electrons in the following redox reactions transferred completely from the atoms of one element to the atoms of another or are they only partially transferred?
   a. $4\ Al(s) + 3\ O_2(g) \rightarrow 2\ Al_2O_3(s)$
   b. $C(s) + O_2(g) \rightarrow CO_2(g)$

2. Determine the oxidation number for the atoms of each element in the following formulas

a.	P_4	P-		
b.	P_2O_3	P-	O-	
c.	PF_3	P-	F-	
d.	H_3PO_4	H-	P-	O-
e.	PH_3	P-	H-	
f.	HSO_3	H-	S-	O-
g.	$Cu_3(PO_4)_2$	Cu-	P-	O-
h.	$Cu(NO_3)_2$	Cu-	N-	O-

3. Potassium nitrate is used in the production of fireworks, explosives, and matches. It is also used in curing foods and to modify the burning properties of tobacco. The reaction for the industrial production of KNO3 is summarized below. Determine the oxidation number for each atom, and decide whether the reaction is a redox reaction or not. If it is redox, identify which substance is oxidized, which substance is reduced, the oxidizing agent, and the reducing agent.

$$4\ KCl + 4\ HNO_3 + O_2 \rightarrow 4\ KNO_3 + 2\ Cl_2 + 2\ H_2O$$

4. For each of the following equations, determine the oxidation number for each atom in the equation and identify whether the reaction is a redox reaction or not. If the reaction is redox, identify what is oxidized, what is reduced, the oxidizing agent, and the reducing agent.

   a. $2\ Na(s) + 2\ H_2O(l) \rightarrow 2\ NaOH(aq) + H_2(g)$

b. $HCl(aq) + NH_3(aq) \rightarrow NH_4Cl(aq)$

c. $2\ Cr(s) + 3\ CuSO_4(aq) \rightarrow Cr_2(SO_4)_3(aq) + 3\ Cu(s)$

5. Classify each of these reactions with respect to the following categories: combination reaction, decomposition reaction, combustion reaction, and single−displacement reaction.
   a. $4\ B(s) + 3\ O_2(g) \rightarrow 2\ B_2O_3(s)$
   b. $(C_2H_5)_2O(l) + 6\ O_2(g) \rightarrow 4\ CO_2(g) + 5\ H_2O(l)$
   c. $2\ Cr_2O_3(s) + 3\ Si(s) \rightarrow 4\ Cr(s) + 3\ SiO_2(s)$
   d. $C_6H_{11}SH(l) + 10\ O_2(g) \rightarrow 6\ CO_2(g) + 6\ H_2O(l) + SO_2(g)$
   e. $2\ NaHCO_3(s) \rightarrow Na_2CO_3(s) + H_2O(l) + CO_2(g)$