**Reaction Types: Combustion**

Important notes to remember: (1) **NONE of the equations are balanced!! and (2) make sure to write correct formulas. DO NOT just copy the subscripts from the reactants over into the products.**

Combustion, at its most general, can mean the reaction of oxygen gas (O2) with anything.

However, we will understand combustion to mean the reaction of oxygen with an compound containing carbon and hydrogen. A common synonym for combustion is burn.

Written using generic symbols, it is usually shown as:

CxHy + O2 ---> CO2 + H2O

These are some examples:

CH4 + O2 ---> CO2 + H2O  
C2H6 + O2 ---> CO2 + H2O  
C6H12O6 + O2 ---> CO2 + H2O  
C2H5OH + O2 ---> CO2 + H2O

Notice that some compounds contain carbon, hydrogen AND oxygen. However, the products are all the same, in every reaction. Isn't that great? We could vary it a bit by adding nitrogen (burns to form NO2) to the compound formula or sulfur (burns to form SO2). Like this:

C21H24N2O4 + O2 ---> CO2 + H2O + NO2  
C2H5SH + O2 ---> CO2 + H2O + SO2

Here are some combustions:

1) C7H6O + O2 --->  
2) CH3COCH3 + O2 --->  
3) H2C2O4 + O2 --->

**Example #1**

How to figure out the right (or product side):

(1) Identify the reaction as combustion:

A carbon-hydrogen compound reacting with oxygen

(2) Know that the combustion products . . .

are always CO2 and H2O

So the final answer looks like this:

C7H6O + O2 ---> CO2 + H2O

**Example #2**

How to figure out the right (or product side):

(1) Identify the reaction as combustion:

A carbon-hydrogen compound reacting with oxygen

(2) Know that the combustion products . . .

are always CO2 and H2O

So the final answer looks like this:

CH3COCH3 + O2 ---> CO2 + H2O

**Example #3**

How to figure out the right (or product side):

(1) Identify the reaction as combustion:

A carbon-hydrogen compound reacting with oxygen

(2) Know that the combustion products . . .

are always CO2 and H2O

So the final answer looks like this:

H2C2O4 + O2 ---> CO2 + H2O

There are complexities with combustion as you get deeper into it. For example, a combustion with insufficient oxygen yields carbon monoxide rather than carbon dioxide. That, and other issues, will arise later in your chemical career.

**Practice Problems**

Note that none of the example problems above are balanced. Your teacher may require this, but the ChemTeam will only provide some of the following answers balanced. The rest are up to you!!

Write correct formulas for the products in these combustion reactions.

1) C6H6 + O2 --->

2) C12H22O11 + O2 --->

3) C25H52 + O2 --->

4) C2H5OC2H5 + O2 --->

5) C4H9OH + O2 --->

Hint: All combustion reactions produce CO2 and H2O. You just have to balance them.