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| **Gram A 🡪 Gram B** | Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

*Answer the following questions on a separate piece of paper.*

**Part I**

Given the following equation for the combustion of hexane (C6H14):

C6H14 + O2 🡪 CO2 + H2O

1. What is the balanced equation?
2. What mass of CO2 is produced by burning 268 g of C6H14?
3. What mass of oxygen is consumed when 3.00 kg of hexane reacts?
4. If burning a quantity of hexane produces 78.0 grams of H2O, what mass of CO2 would be produced at the same time?
5. Carbon dioxide is a greenhouse gas. What mass of carbon dioxide is produced by burning 20.0 moles of hexane?

The balanced equation for hexamine combustion is:

4 C6H15N + 43 O2 🡪 24 CO2 + 30 H2O + 4 NO2

1. Calculate the molar mass for each compound.
2. What mass of oxygen is required to react with 763.2 g of C6H15N?
3. Calculate the mass of water produced when 253 g of O2 are consumed.
4. What mass of C6H15N is required to produce 4.60 kg of CO2?
5. How many moles of O2 are consumed is 426 g of NO2 are produced?
6. A reaction between potassium and chlorine produced 250.0 grams of the product. How many grams of potassium and chlorine were needed for the reaction?
7. Aluminum reacts with Fe3O4 to give Al2O3 and iron. If 40.2 g of iron are produced, find the masses of the other chemicals involved.
8. Sulphur and oxygen react together to produce SO2. If 356 g of SO2 is produced, find the masses of the two reactants.
9. When isopropanol (C3H8O) burns in oxygen, carbon dioxide and water are produced. Determine how many grams of carbon dioxide and water are produced when 5682 kg of isopropanol is burned.
10. Sodium metal reacts with iron (II) chloride. How many grams of both products are produced when 5.00g of sodium metal is reacted?

**Part II**

1. Determine the mass of lithium hydroxide produced when 0.38 grams of lithium nitride reacts with water according to the following **unbalanced** chemical equation:

Li3N (s) + H2O (l) **🡪** NH3 (g) + LiOH (aq)

1. What mass of sodium chloride is produced when chlorine gas reacts with 0.29 grams of sodium iodide? The **unbalanced** equation is given below:

NaI (s) + Cl2 (g) **🡪** NaCl (s) + I2 (g)

1. Determine the mass of carbon dioxide produced when 0.85 grams of butane (C4H10) reacts with oxygen according to the following balanced chemical equation:

2 C4H10 (l) + 13 O2 (g) **🡪** 8 CO2 (g) + 10 H2O (g)

1. Determine the mass of antimony produced when 0.46 grams of antimony (III) oxide reacts with carbon according to the following balanced equation:

Sb2O3 (s) + 3 C (s) **🡪** 2 Sb (s) + 3 CO (g)

1. Hydrogen peroxide *decomposes* to produce oxygen gas and water. What mass of hydrogen peroxide (H2O2) must decompose to produce 0.77 grams of water?
2. In the combustion of carbon monoxide, what mass of CO is required to produce 0.69 grams of carbon dioxide? The **unbalanced** equation is shown below:

CO (g) + O2 (g) **🡪** CO2 (g)

1. Determine the mass of sodium nitrate produced when 0.73 grams of nickel (II) nitrate reacts with sodium hydroxide according to the following **unbalanced** chemical equation:

Ni(NO3)2 (aq) + NaOH (aq) **** Ni(OH)2 (aq) + NaNO3 (aq)

8. Determine the mass of calcium hydroxide produced when calcium carbide (CaC2) reacts with 0.64 grams of water according to the following balanced chemical equation:

CaC2 (s) + 2 H2O (l) **** Ca(OH)2 (aq) + C2H2 (g)