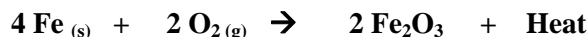


AR Chemistry Final Review Set 2

The reaction between iron and oxygen is shown below



1. How many moles of iron (III) oxide form if the following moles of iron and oxygen are combined?

- 4.0 moles Fe and 2.0 moles O_2
- 2.0 moles Fe and 1.0 moles O_2
- 1.0 moles Fe and 1.0 moles O_2
- 6.0 moles Fe and 12.0 moles O_2

2. Balance the following equations using whole numbers in your answer

- $\text{C}_{12}\text{H}_{22}\text{O}_{11} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{Heat}$
- $\text{N}_2 + \text{H}_2 \leftrightarrow \text{NH}_3 + \text{Heat}$
- $\text{NaHCO}_3 + \text{HC}_2\text{H}_3\text{O}_2 \rightarrow \text{NaC}_2\text{H}_3\text{O}_2 + \text{CO}_2 + \text{H}_2\text{O}$
- $\text{C}_8\text{H}_{18} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{Heat}$

3. You are given 40.0 gram samples of the transition metals Cr, Mn, Fe, and Co

- Which samples have the greatest mass? Least mass?
- Which samples have the greatest number of atoms? Least number of atoms?
- Which samples have the greatest number of moles? Least number of moles?

4. You are given a 10.0 gram sample of Aluminum and a 20.0 gram sample of aluminum?

- Which sample has the most mass?
- Which sample has the most volume?
- Which sample has the greatest concentration?
- Which sample has the smallest density?

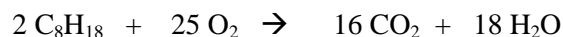
5. You are given 2.0 moles each of Mg, Ca, and Ba.

- Which samples have the greatest mass? Least mass?
- Which samples have the greatest number of atoms? Least number of atoms?
- Which samples have the greatest number of moles? Least number of moles?

6. You have 76.5 grams of ammonia gas (NH_3). How many

- molecules are present?
- moles are present?
- liters of gas at STP will the sample occupy?

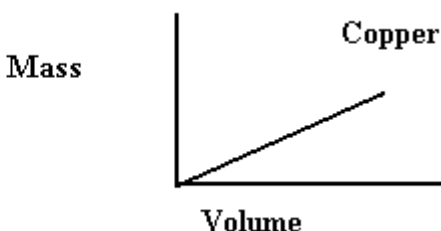
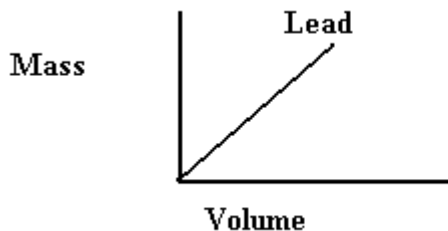
7. You are given 47.5 grams of octane (C_8H_{18}) and burn it in air as in the following equation



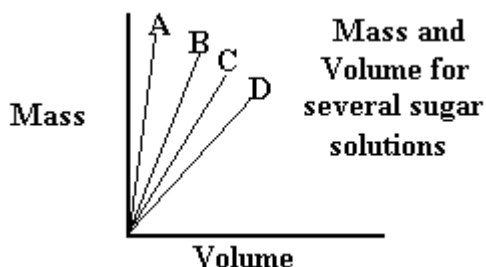
- How many grams of oxygen are needed?
- How many liters of CO_2 will form at STP?
- How many grams of water will form?

6. You are given the following charts made from measuring the mass and volume of many samples of lead and copper.

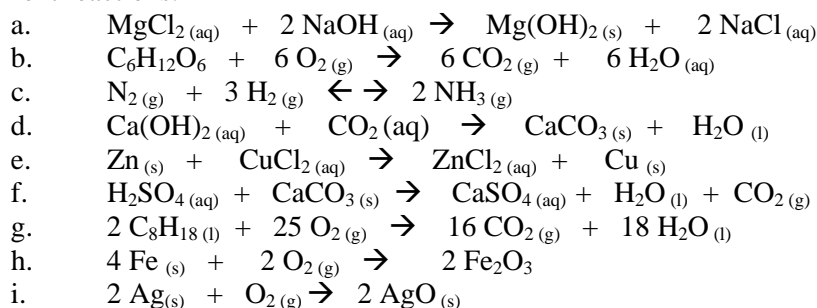
- What does the slopes of the lines measure?
- Which material is more dense?



7. You are given the following chart made from measuring 4 sugar solutions.
- Which solution is mostly likely to be thicker and yellowish (like molasses)?
 - Which solution will float on top of all the other solutions?
 - Which solution will have the best electrical conductivity?
 - Would water float above or below all of these solutions?

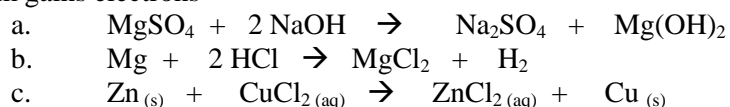


8. Identify the following reactions as either combustion, decomposition, formation, single replacement, or double replacement reactions.



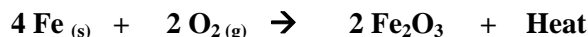
9. Identify the chemical reactions above as the following
- Identification of a base through a precipitate
 - Combustion of glucose to release energy to a muscle
 - Limewater test for carbon dioxide
 - Oxidation-Reduction reaction that forms rust
 - Acid Rain destruction of marble statues
 - Oxidation-Reduction demonstration that Zinc is more reactive than Copper
 - Haber Process for the preparation of ammonia
 - Energy released through the combustion of a hydrocarbon
 - Tarnishing of a metal

10. For the Reactions below, determine if electrons are transferred, and if so, what atom loses electrons and atom gains electrons

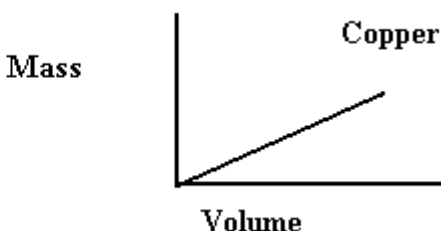
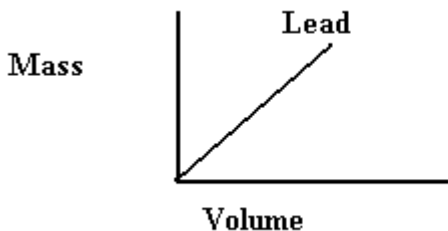


AR Chemistry Final Review Set 2

The reaction between iron and oxygen is shown below



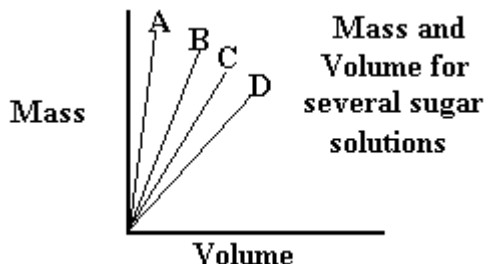
- How many moles of iron (III) oxide form if the following moles of iron and oxygen are combined?
 - 4.0 moles Fe and 2.0 moles O₂ **2**
 - 2.0 moles Fe and 1.0 moles O₂ **1**
 - 1.0 moles Fe and 1.0 moles O₂ **1/2**
 - 6.0 moles Fe and 12.0 moles O₂ **3**
- Balance the following equations using whole numbers in your answer
 - $\text{C}_{12}\text{H}_{22}\text{O}_{11} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{Heat}$ **1 - 11 - 12 - 11**
 - $\text{N}_2 + \text{H}_2 \leftrightarrow \text{NH}_3 + \text{Heat}$ **1 - 3 - 2**
 - $\text{NaHCO}_3 + \text{HC}_2\text{H}_3\text{O}_2 \rightarrow \text{NaC}_2\text{H}_3\text{O}_2 + \text{CO}_2 + \text{H}_2\text{O}$ **1 - 1 - 1 - 1 - 1 - 1**
 - $\text{C}_8\text{H}_{18} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{Heat}$ **2 - 25 - 16 - 18**
- You are given 40.0 gram samples of the transition metals Cr, Mn, Fe, and Co
 - Which samples have the greatest mass? Least mass? **all are the same**
 - Which samples have the greatest number of atoms? Least number of atoms? **Cr, Co**
 - Which samples have the greatest number of moles? Least number of moles? **Cr, Co**
- You are given a 10.0 gram sample of Aluminum and a 20.0 gram sample of aluminum?
 - Which sample has the most mass? **20 gram sample**
 - Which sample has the most volume? **20 gram sample**
 - Which sample has the greatest concentration? **both the same**
 - Which sample has the smallest density? **both the same**
- You are given 2.0 moles each of Mg, Ca, and Ba.
 - Which samples have the greatest mass? Least mass? **Ba, Mg**
 - Which samples have the greatest number of atoms? Least number of atoms? **all are the same**
 - Which samples have the greatest number of moles? Least number of moles? **all are the same**
- You have 76.5 grams of ammonia gas (NH₃). How many
 - molecules are present? **2.70 E 24**
 - moles are present? **4.49 moles**
 - liters of gas at STP will the sample occupy? **101**
- You are given 47.5 grams of octane (C₈H₁₈) and burn it in air as in the following equation
$$2 \text{C}_8\text{H}_{18} + 25 \text{O}_2 \rightarrow 16 \text{CO}_2 + 18 \text{H}_2\text{O}$$
 - How many grams of oxygen are needed? **166 g**
 - How many liters of CO₂ will form at STP? **74.5 L@STP**
 - How many grams of water will form? **67.4 g**
- You are given the following charts made from measuring the mass and volume of many samples of lead and copper.
 - What does the slopes of the lines measure? **Density (mass / volume)**
 - Which material is more dense? **Lead, more mass for the same volume**



7. You are given the following chart made from measuring 4 sugar solutions.

- Which solution is mostly likely to be thicker and yellowish (like molasses)?
- Which solution will float on top of all the other solutions?
- Which solution will have the best electrical conductivity?
- Would water float above or below all of these solutions?

A
D
None, nonelectrolytes
above



8. Identify the following reactions as either combustion, decomposition, formation, single replacement, or double replacement reactions.

- $\text{MgCl}_2(\text{aq}) + 2 \text{NaOH}(\text{aq}) \rightarrow \text{Mg}(\text{OH})_2(\text{s}) + 2 \text{NaCl}(\text{aq})$
- $\text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{O}_2(\text{g}) \rightarrow 6 \text{CO}_2(\text{g}) + 6 \text{H}_2\text{O}(\text{aq})$
- $\text{N}_2(\text{g}) + 3 \text{H}_2(\text{g}) \rightleftharpoons 2 \text{NH}_3(\text{g})$
- $\text{Ca}(\text{OH})_2(\text{aq}) + \text{CO}_2(\text{aq}) \rightarrow \text{CaCO}_3(\text{s}) + \text{H}_2\text{O}(\text{l})$
- $\text{Zn}(\text{s}) + \text{CuCl}_2(\text{aq}) \rightarrow \text{ZnCl}_2(\text{aq}) + \text{Cu}(\text{s})$
- $\text{H}_2\text{SO}_4(\text{aq}) + \text{CaCO}_3(\text{s}) \rightarrow \text{CaSO}_4(\text{aq}) + \text{H}_2\text{O}(\text{l}) + \text{CO}_2(\text{g})$
- $2 \text{C}_8\text{H}_{18}(\text{l}) + 25 \text{O}_2(\text{g}) \rightarrow 16 \text{CO}_2(\text{g}) + 18 \text{H}_2\text{O}(\text{l})$
- $4 \text{Fe}(\text{s}) + 2 \text{O}_2(\text{g}) \rightarrow 2 \text{Fe}_2\text{O}_3$
- $2 \text{Ag}(\text{s}) + \text{O}_2(\text{g}) \rightarrow 2 \text{Ag}_2\text{O}(\text{s})$

double replacement
combustion
formation

single replacement
DR w/partial decomposition
combustion
combustion / formation
combustion / formation

9. Identify the chemical reactions above as the following

- Identification of a base through a precipitate
- Combustion of glucose to release energy to a muscle
- Limewater test for carbon dioxide
- Oxidation-Reduction reaction that forms rust
- Acid Rain destruction of marble statues
- Oxidation-Reduction demonstration that Zinc is more reactive than Copper
- Haber Process for the preparation of ammonia
- Energy released through the combustion of a hydrocarbon
- Tarnishing of a metal

A
B
D
H
F
E
C
G
I

10. For the Reactions below, determine if electrons are transferred, and if so, what atom loses electrons and atom gains electrons

- $\text{MgSO}_4 + 2 \text{NaOH} \rightarrow \text{Na}_2\text{SO}_4 + \text{Mg}(\text{OH})_2$ **No electron transfer (no change in charges)**
- $\text{Mg} + 2 \text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2$ **Mg⁰ gives, H⁺¹ takes**
- $\text{Zn}(\text{s}) + \text{CuCl}_2(\text{aq}) \rightarrow \text{ZnCl}_2(\text{aq}) + \text{Cu}(\text{s})$ **Zn⁰ gives, Cu⁺² takes**