Quiz Review 2 week 8

1)How many grams of calcium nitrate, $Ca(NO_3)_2$, contains 24 grams of oxygen atoms?

2) Cobalt is a metal that is added to steel to improve its resistance to corrosion. Calculate both the number of moles in a sample of cobalt containing 5.00×10^{20} atoms and the mass of the sample.

3) What mass of Au is produced when 0.0500 mol of Au_2S_3 is reduced completely with excess H_2?

4) ... $C_{10}H_{12}O_4S(s)$ + ... $O_2(g) \rightarrow$ ... $CO_2(g)$ + ... $SO_2(g)$ + ... $H_2O(g)$

When the equation above is balanced and all coefficients are reduced to their lowest whole-number terms, the coefficient for $O_2(g)$ is:

5) Balance:

a) $NaHCO_3 \rightarrow Na_2CO_3 + H_2O + CO_2$

b) $Cu + HNO_3 \rightarrow Cu(NO_3)_2 + NO + H_2O$

6) $2\ N_2H_4(g) + N_2O_4(g) \rightarrow 3\ N_2(g) + 4H_2O(g)$

When 92 g of dinitrogen tetroxide and excess N_2H_4 and are mixed and react according to the equation above, what is the maximum mass of H_2O that can be produced?

7) Solid lithium hydroxide is used in space vehicles to remove exhaled carbon dioxide from the living environment by forming solid lithium carbonate and liquid water. What mass of gaseous carbon dioxide can be absorbed by 1.00 kg of lithium hydroxide?

8)

$2H_2O(l) + 4\ MnO_4^-(aq) + 3ClO_2^-(aq) \rightarrow 4\ MnO_2^-(s) + 3\ ClO_4^-(aq) + 4OH^-(aq)$

According to the balanced equation above, how many moles of $ClO_2^-(aq)$ are needed to react completely with 20. mL of 0.20 M KMnO4 solution?

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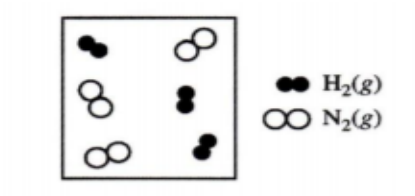
2) James reacts a metal chloride (M) with silver nitrate solution to give a precipitate of silver chloride according to following equation:

$$MCl_2(aq) + 2AgNO_3(aq) \rightarrow M(NO_3)_2(aq) + 2AgCl(s)$$

When a solution containing 0.4750 g of metal chloride is made to react with silver nitrate, 1.435 grams of silver chloride are formed. Identify the metal.

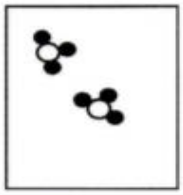
3) Look at the diagram shown below:



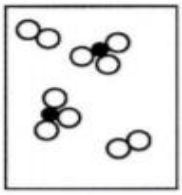
James shoves $H_2(g)$ and $N_2(g)$ into a closed container shown above. Which of the following diagrams would represent the results if the reaction shown before were to proceed to completion?

$$N_2(g) + 3\,H_2(g) \rightarrow 2\,NH_3(g)$$

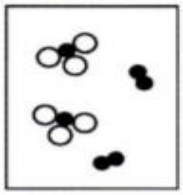
(A)



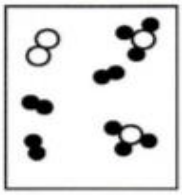
(B)



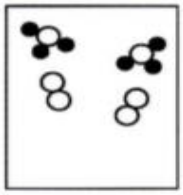
(C)



(D)



(E)



4) James synthesizes a new compound in an alternate universe. In this reaction, 2.3 moles of X reacts with 1.6 moles of Y, and 71 grams of Z are produced. What is the molar mass of Z?

$3X + 4Y \rightarrow 5Z$

This reaction has a 50% yield.

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9) Identify the physical properties (P) vs chemical properties (C)

Boiling Point	Iron Rusting	Combustion
Melting Point	Chopping a piece of wood	Salt dissolves into water
Flammability	Iron Rusting	Ice melting
Mass	Mixing oil and water	
Acidity	Changing of color when a solution is added	
Reactivity	Baking cookies	
Physical Color	burning wood	
Density	Decomposition	
Solid at room temperature	Volume	

10) What determines polarity? Of the following molecules, which of the following is the most polar?

CO CO_2 O_2 HF F_2

11) Draw an example of a molecule that would have an expanded octet. What is the hybridization on your molecule? Identify if your molecule would be polar or nonpolar.

Challenge Problems:

1) Mark is having tummy problems after eating too much ice cream and cheap mochi and decides to go to EBGB's to look for something to help his woozy stomach. He notices they have two antacids in the form of magnesia, an aqueous suspension of magnesium hydroxide, and baking soda, also known as sodium bicarbonate ($NaHCO_3$). Mark knows that magnesia and sodium bicarbonate are both basic compounds will neutralize the excess hydrochloric acid secreted by the stomach and alleviate his acid reflux. Which would be the most effective antacid per gram?