

CH101 Fall 2018  
Take Home Discussion Quiz #5

Name: \_\_\_\_\_

TF's Name: \_\_\_\_\_

Time: \_\_\_\_\_

**Work must be present to receive any credit. All work has to be done individually.**

1. (3 points) If 501 grams of  $\text{Cu}(\text{OH})_2$  reacts with 108 grams of ammonia, two products are formed. One product is water and the other is unknown. How many grams of the unknown compound will be formed? Assume 100% yield. *Hint: You do not need to know the formula for the unknown compound.*

	$\text{Cu}(\text{OH})_2$	+	$5 \text{NH}_3$	(LR)	→	Unknown	+	$5 \text{H}_2\text{O}$	(l)
Initially:	501g or 2.92 mol		108g or 6.34mol			0g/0mol		0	
Used/ Formed	-217.6g or -1.27mo		-108g or -6.34mol			?		+114.2g or 6.34mol	
End	283.4g		0g					114.2g	

Amount of unknown=(501+108) -289-114=**211.4g or 211g or 212g**

Amount of Unknown = **211g or 212g** g

2. (3 points) 80. grams of iron(III) oxide and 54 grams of aluminum react to form an elemental iron and aluminum oxide. In the lab you only manage to get 75% yield.

	$\text{Fe}_2\text{O}_3$ (s)	+	$2\text{Al}$ (s)	↔	$2\text{Fe}$ (s)	+	$\text{Al}_2\text{O}_3$ (s)
Initially:	80.g or 0.50mol		54g or 2mol		0		0
Change (100%yield):	-0.5mol or -80g		-1mol or -27grams		+1mol or 56g		+0.5mol or 51g
Change (75%yield):	-80g·0.75= -60g		-27g·0.75=-20.25g		56g·0.75=42g		51g·0.75=38g
End:	20g		33.75g		42g		38g

- a. How many in grams of the non-limiting reagent remains?  
**34g**
- b. How many in grams of the limiting reagent remains?  
**20. g**
- c. How many in grams of an elemental iron is formed?  
**42g**

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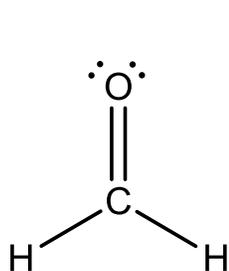
Name: \_\_\_\_\_

TF's Name: \_\_\_\_\_

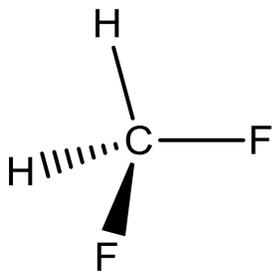
Time: \_\_\_\_\_

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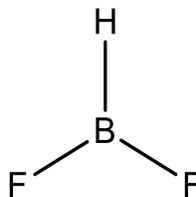
3. (2points) For each molecule write the **molecular shape** in the box below:



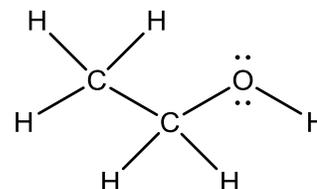
Trigonal planer



tetrahedral



Trigonal planer



Bent

4. (2 points) Consider the combustion reaction for butane:



If only 132 grams of  $\text{CO}_2$  was formed and it has a 75% yield what was initial amounts of the reagents in grams?

$$132\text{g is a } 75\% \text{ at } 100\% \text{ yield: } \frac{132}{75} \cdot 100 = 176\text{g of } \text{CO}_2$$

$$176\text{gCO}_2 \cdot \frac{1\text{molCO}_2}{44\text{gCO}_2} \cdot \frac{13\text{molO}_2}{8\text{molCO}_2} \cdot \frac{32\text{g}}{1\text{molO}_2} = 208\text{g}$$

$$176\text{gCO}_2 \cdot \frac{1\text{molCO}_2}{44\text{gCO}_2} \cdot \frac{2\text{molC}_4\text{H}_{10}}{8\text{molCO}_2} \cdot \frac{58\text{g}}{1\text{molC}_4\text{H}_{10}} = 58\text{g}$$

Amount of  $\text{C}_4\text{H}_{10}(l) = 58\text{g}$

Amount of  $\text{O}_2(g) = 208=210 \text{ g}$