

Take home Discussion Quiz #5

Key

Work must be present to receive any credit

All calculations has to be f=done to the rigt number of significant figures.

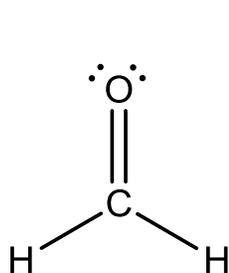
1. (2 points) If 501 grams of $\text{Ni}(\text{OH}_2)_6^{2+}$ reacts with 108 grams of ammonia, two products are formed. One product is water and the other one is an unknown. How many grams of unknown compound will be formed? Assume 100% yield. (Hint: you do not need to know the formula for the unknown compound)

		L.R.		
	$\text{Ni}(\text{OH}_2)_6^{2+}(\text{aq})$	+	$5 \text{NH}_3(\text{aq})$	\rightleftharpoons Unknown (aq) + $5 \text{H}_2\text{O}(\text{l})$
Initially	501g or 3mol		108g or 6.4mol	0g/0mol 0
Used/ Formed	-212.1g or -1.27mo		-108g or -6.4mol	? +114g (115g) or 6.4mol
End	289g		0g	114g(or 115g)

Amount of unknown=(501+108) -289-114=**206g (205g)**

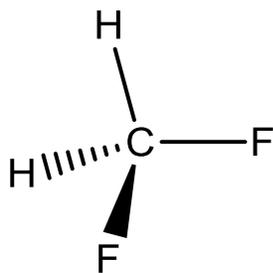
1 points for finding L.R. 1 points for the answer

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

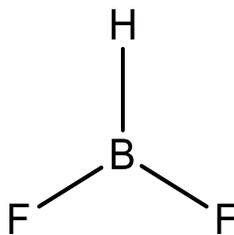


Trigonal planer

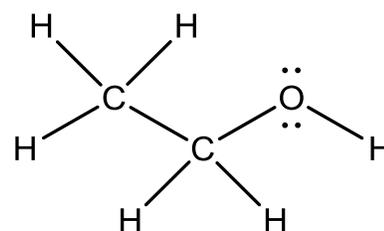
0.5point each



tetrahedral



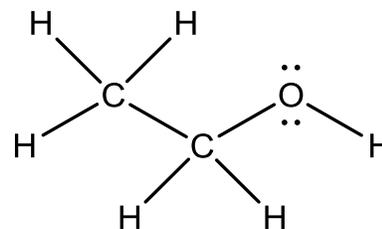
Trigonal planer



Molecular Shape around "O"

bent

- a) (1 points) Circle the molecule that will have the highest boiling point? Last one



Take home Discussion Quiz #5

Key

3. (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.

Initially:	$\text{Fe}_2\text{O}_3(\text{s})$ 80.g or 0.50mol	+	$2\text{Al}(\text{s})$ 54g or 2mol	\rightleftharpoons	$2\text{Fe}(\text{s})$ 0	+	$\text{Al}_2\text{O}_3(\text{s})$ 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

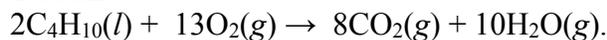
- b. How many in grams of the limiting reagent remains?

20. g

- c. How many in grams of an elemental iron is formed?

42g

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



If only 132 grams of CO_2 was formed and it was a 75% yield what was initial amounts of reagents in grams?

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

132g is a 75% at 100% yield: $\frac{132}{75} \cdot 100 = 176\text{g}$ of CO_2

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

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

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