

CP Chemistry: Stoichiometry Review (SEE BOLDED ANSWERS)

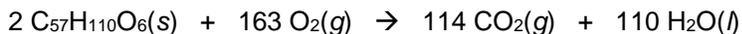
1. Calculate the mass of alumina (Al_2O_3) produced when 100 g of aluminum burns in excess oxygen. (Molar mass $\text{Al}_2\text{O}_3 = 101.958 \text{ g/mol}$)



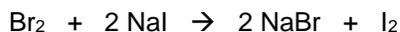
- (a) 46 g
(b) 0.13 g
(c) **189 g**
(d) 33 g
(e) 216
2. The empirical formula of a compound is CH_2F . The molar mass of this compound is 66.0 g. The molecular formula of the compound is:

- (a) $\text{C}_4\text{H}_8\text{F}_4$
(b) $\text{C}_4\text{H}_4\text{F}_4$
(c) **$\text{C}_2\text{H}_4\text{F}_2$**
(d) CH_2F
(e) $\text{C}_3\text{H}_4\text{F}$

3. Camels store the fat tristearin ($\text{C}_{57}\text{H}_{110}\text{O}_6$) in the hump. As well as being a source of energy, the fat is a source of water, because it can be metabolized in the following reaction. What mass of water is available from 1000 g of the fat?



- (a) **1111 g**
(b) 563 g
(c) 998 g
(d) 41 g
(e) 0.6 g
4. Given the balanced chemical equation



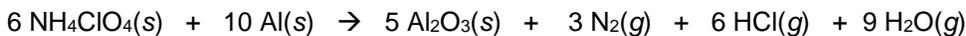
How many moles of sodium bromide (NaBr) could be produced from 0.172 mol of bromine (Br_2)?

- (a) 1.82 mol
(b) 0.0860 mol
(c) 16.7 mol
(d) **0.344 mol**
(e) 0.172 mol
5. 15.00 g aluminum sulfide and 10.00 g water react until the limiting reagent is used up. How much of the excess reagent will remain when the reaction is complete?



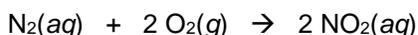
- (a) 13.89 g
(b) 4.620 g
(c) **1.108 g**
(d) 23.60 g
(e) 0.4813 g

6. The solid fuel in the booster stage of the space shuttle is a mixture of ammonium perchlorate and aluminum powder, which react as follows:



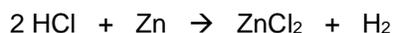
What mass of aluminum should be mixed with 5.0×10^6 g of ammonium perchlorate, if the reaction proceeds as stated? (Molar mass of ammonium perchlorate = 117.47 g/mol)

- (a) 13.99 kg
 - (b) 2461 kg
 - (c) 622.4 kg
 - (d) 1914 kg**
 - (e) 0.43 kg
7. Find the mass of nitrogen dioxide gas that could be produced from 200 mL of 15.85 M a nitrogen solution (N_2) according to this balanced chemical equation.



- (a) 292 g**
- (b) 0.921 g
- (c) 22.6 g
- (d) 714 g
- (e) 6.98 g

8. If 36.5 g of HCl and 73 g of Zn are put together:



Determine which reactant is the limiting reactant, and find the mass of ZnCl_2 formed.

- (a) HCl is limiting; 136.3 g of ZnCl_2
 - (b) HCl is limiting; 68.2 g of ZnCl_2**
 - (c) Zn is limiting; 152.1 g of ZnCl_2
 - (d) Zn is limiting; 38.0 g of ZnCl_2
 - (e) Zn is limiting; 76.1 g of ZnCl_2
9. What is the empirical formula of a compound that is 3.05% carbon, 0.26% hydrogen, and 96.69% iodine?
- (a) $\text{C}_1\text{H}_2\text{I}_2$
 - (b) $\text{C}_1\text{H}_1\text{I}_2$
 - (c) $\text{C}_4\text{H}_1\text{I}_2$
 - (d) $\text{C}_1\text{H}_2\text{I}_1$
 - (e) $\text{C}_1\text{H}_1\text{I}_3$**

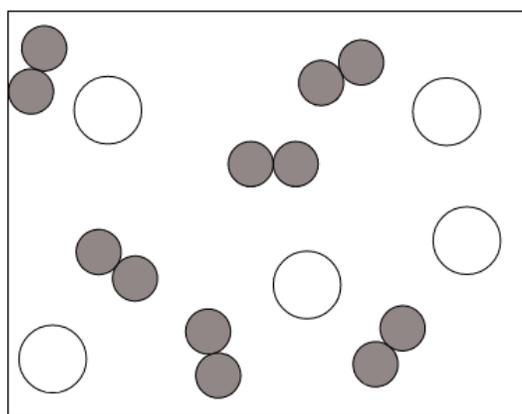
Stoichiometry Free Response Practice Name: _____

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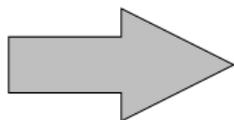
1. Below is a particulate diagram showing the reaction of calcium metal with bromine gas immediately before the reaction occurs.

Which element is represented by each dark colored circle? **bromine** Which element is represented by each white circle? **calcium**. Give an explanation for how you determined your answer. (+1) for both answers being correct.

(+1) bromine exist as a diatomic element in nature and dark colored circles appear as represented in the diagram in pairs.



Before Reaction



This box should show:

- 5 molecules made up of 1 white circle in the center and two dark circles attached. (+1)
- There should be 1 diatomic gray molecule. (+1)

After Reaction

2. Complete the "After Reaction" box. Pay close attention to the quantities of products and use the same symbols as those in the "Before Reaction" box.
3. What was the limiting reagent in the diagram? Explain how you determined your answer and define a limiting reagent in the process.

The limiting reagent was calcium. (+1) The calcium metal was completely consumed in the reaction. (+1)

4. Draw the balanced equation for the reaction below.

