

Name Key Name \_\_\_\_\_  
 Sign \_\_\_\_\_ Print \_\_\_\_\_

Please show work on all questions for full credit & partial credit. (20 total pts) Green

1. Given the following balanced chemical reaction: BA = bad attempt  
 $C + 2 Cl_2 \rightarrow CCl_4$  NA = not attempt

(a) Calculate the theoretical yield of  $CCl_4$  (FW  $CCl_4 = 154.01$  g/mole) in grams if you start with 80.2 grams of C. (carbon, FW C = 12.01 g/mol) (show work) (7 pts)

$$80.2 \underset{C}{g} \times \frac{1 \text{ mol } C}{12.01 \underset{C}{g}} \times \frac{1 \text{ mol } CCl_4}{1 \text{ mol } C} \times \frac{154.01 \underset{CCl_4}{g}}{1 \text{ mol } CCl_4} = 1028.44 \underset{CCl_4}{g}$$

1.03 x 10<sup>3</sup> g CCl<sub>4</sub>

BA - 3 1/2

(b) Calculate the theoretical yield of  $CCl_4$  if you start with 80.2 grams of  $Cl_2$  (FW  $Cl_2 = 71.00$  g / mole) (show work). (7 pts)

$$80.2 \underset{Cl_2}{g} \times \frac{1 \text{ mol } Cl_2}{71.00 \underset{Cl_2}{g}} \times \frac{1 \text{ mol } CCl_4}{2 \text{ mol } Cl_2} \times \frac{154.01 \underset{CCl_4}{g}}{1 \text{ mol } CCl_4} = 86.98 \underset{CCl_4}{g}$$

(86.97 g CCl<sub>4</sub>)  
3 s.f.

BA - 3 1/2 attempt - 2

(c) Which is the limiting reagent [ (C) or ( $Cl_2$ ) ] (circle one) (3 pts) (show work)

Graded consistent w above @ 16

attempt - 1

(d) what is the percentage yield if you experimentally made 90.2 grams of the  $CCl_4$ ? (3 pts) (show work)

$$\frac{90.2 \text{ g } CCl_4}{87.0 \text{ g } CCl_4} \times 100 = 104 \%$$

Graded consistent w above

Extra Credit: (4 pts)

used inconsistent # - 1/2

If you made up a solution of  $Na_2CO_3$  (FW  $Na_2CO_3 = 106.01$  grams / mol) in water by dissolving 380.2 grams to make up 250.5 mL of solution, what is the molarity of the solution? (Molarity = moles solute / liter solution) (show work)

$$380.2 \underset{Na_2CO_3}{g} \times \frac{1 \text{ mol } Na_2CO_3}{106.01 \underset{Na_2CO_3}{g}} = 3.586 \text{ mol } Na_2CO_3$$

$$250.5 \text{ mL} \times \frac{1 \text{ L}}{1000 \text{ mL}} = 0.2505 \text{ L}$$

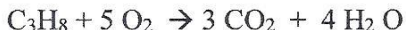
$$M = \frac{3.586 \text{ mol}}{0.2505 \text{ L}} = 14.32 \text{ M } Na_2CO_3$$

BA - 2

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Please **show work on all questions** for full credit & partial credit. (20 total pts)

1. Given the following balanced chemical reaction:



*NA = not attempt*  
*BA - 3 1/2*

(a) calculate the theoretical yield of H<sub>2</sub>O (FW H<sub>2</sub>O = 18.02 g / mole) in grams if you start with 80.2 grams of C<sub>3</sub>H<sub>8</sub> (FW C<sub>3</sub>H<sub>8</sub> = 39.06 g / mole) (show work) (7 pts)

$$80.2 \text{ g } \text{C}_3\text{H}_8 \times \frac{1 \text{ mol } \text{C}_3\text{H}_8}{39.06 \text{ g } \text{C}_3\text{H}_8} \times \frac{4 \text{ mol } \text{H}_2\text{O}}{1 \text{ mol } \text{C}_3\text{H}_8} \times \frac{18.02 \text{ g } \text{H}_2\text{O}}{1 \text{ mol } \text{H}_2\text{O}} = 147.998 \text{ g } \text{H}_2\text{O}$$

*148 g H<sub>2</sub>O*  
*3 sig. 1pt*  
*1pt* (for 80.2)  
*2pt* (for 39.06)  
*3pt* (for 4 mol H<sub>2</sub>O)  
*1pt* (for 18.02)

(b) calculate the theoretical yield of H<sub>2</sub>O if you start with 80.2 grams of O<sub>2</sub> (FW O<sub>2</sub> = 32.00 g/mole). (show work) (7 pts)

$$80.2 \text{ g } \text{O}_2 \times \frac{1 \text{ mol } \text{O}_2}{32.00 \text{ g } \text{O}_2} \times \frac{4 \text{ mol } \text{H}_2\text{O}}{5 \text{ mol } \text{O}_2} \times \frac{18.02 \text{ g } \text{H}_2\text{O}}{1 \text{ mol } \text{H}_2\text{O}} = 36.1 \text{ g } \text{H}_2\text{O}$$

*1pt* (for 80.2)  
*2pt* (for 32.00)  
*2pt* (for 4 mol H<sub>2</sub>O)  
*1pt* (for 18.02)  
*1pt* (for 36.1)

(c) Which is the limiting reagent [ (C<sub>3</sub>H<sub>8</sub>) or (O<sub>2</sub>) ] (circle one) (3 pts)

*BA - 3 1/2*  
*1pt* (for circle)  
*used inconsistent - 1/2*  
*graded consistent w above*

(d) If you made experimentally 25.2 grams of the product H<sub>2</sub>O, what is the percent yield? (3 pts) (show work)

$$\left( \frac{25.2 \text{ g}}{36.1 \text{ g}} \right) * 100 = 69.8\%$$

$$M = \frac{72.28 \text{ mol NaOH}}{1.37 \text{ L}} = 52.76 \text{ M}$$

**Extra Credit:** (4 pts)

If you made up a solution of Na OH (FW NaOH = 40.01 grams / mol) in water by dissolving 2.892 kilograms to make up 1.37 Liters of solution, what is the molarity of the solution? (Molarity = moles solute / liter solution) (show work)

$$2.892 \text{ kg} \times \frac{1000 \text{ g}}{1 \text{ kg}} \times \frac{1 \text{ mol NaOH}}{40.01 \text{ g NaOH}} = 72.28 \text{ mol NaOH}$$

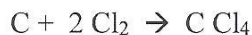
*BA - 2*

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Please **show work on all questions** for full credit & partial credit. (20 total pts)

*green*

1. Given the following balanced chemical reaction:



(a) Calculate the theoretical yield of  $\text{CCl}_4$  (FW  $\text{CCl}_4 = 154.01 \text{ g/mole}$ ) in grams if you start with 80.2 grams of C. (carbon, FW C = 12.01 g/mol) (show work) (7 pts)

(b) Calculate the theoretical yield of  $\text{CCl}_4$  if you start with 80.2 grams of  $\text{Cl}_2$  (FW  $\text{Cl}_2 = 71.00 \text{ g / mole}$ ) (show work) . (7 pts)

(c) Which is the limiting reagent [ (C) or ( $\text{Cl}_2$ ) ] (circle one) (3 pts) (show work)

(d) what is the percentage yield if you experimentally made 90.2 grams of the  $\text{CCl}_4$  ? (3 pts) (show work)

**Extra Credit:** (4 pts)

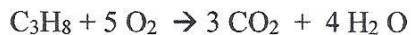
If you made up a solution of  $\text{Na}_2\text{CO}_3$  (FW  $\text{Na}_2\text{CO}_3 = 106.01 \text{ grams / mol}$ ) in water by dissolving 380.2 grams to make up 250.5 mL of solution, what is the molarity of the solution ? (Molarity = moles solute / liter solution) (show work)



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Please **show work on all questions** for full credit & partial credit. (20 total pts)

1. Given the following balanced chemical reaction:



(a) calculate the theoretical yield of  $\text{H}_2\text{O}$  (FW  $\text{H}_2\text{O} = 18.02 \text{ g / mole}$ ) in grams if you start with 80.2 grams of  $\text{C}_3\text{H}_8$  (FW  $\text{C}_3\text{H}_8 = 39.06 \text{ g / mole}$ ) (show work) (7 pts)

(b) calculate the theoretical yield of  $\text{H}_2\text{O}$  if you start with 80.2 grams of  $\text{O}_2$  (FW  $\text{O}_2 = 32.00 \text{ g/mole}$ ). (show work) (7 pts)

(c) Which is the limiting reagent [ ( $\text{C}_3\text{H}_8$ ) or ( $\text{O}_2$ ) ] (circle one) (3 pts)

(d) If you made experimentally 25.2 grams of the product  $\text{H}_2\text{O}$ , what is the percent yield ? (3 pts) (show work)

**Extra Credit:** (4 pts)

If you made up a solution of  $\text{NaOH}$  (FW  $\text{NaOH} = 40.01 \text{ grams / mol}$ ) in water by dissolving 2.892 kilograms to make up 1.37 Liters of solution, what is the molarity of the solution ? (Molarity = moles solute / liter solution) (show work)