

1.a) 2525 Bikes with wheels

3013 Bikes with frames

2455 Bikes with handlebars

b) 558 frames leftover

$70 \times 2 = 140$ wheels leftover

0 handlebars leftover

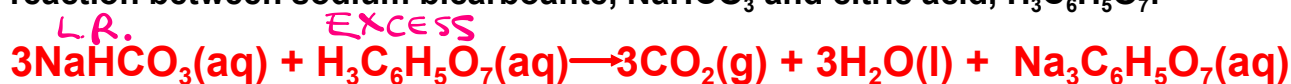
c) Handle Bars

2.a) NaHCO_3 = limiting reactant

b) 0.524 g CO_2

c) 1.23×10^{-3} mol $\text{H}_3\text{C}_6\text{H}_5\text{O}_7$ excess

The fizz produced when an Alka-Seltzer tablet is dissolved in water is due to the reaction between sodium bicarbonate, NaHCO_3 and citric acid, $\text{H}_3\text{C}_6\text{H}_5\text{O}_7$:



In a certain experiment, 1.00g of sodium bicarbonate and 1.00 g of citric acid are allowed to react.

a. Which reactant is the limiting reactant?

$$\frac{1.00 \text{ g NaHCO}_3}{84.01 \text{ g/mol}} = \overset{\text{Limiting Reactant}}{0.01190 \text{ mol NaHCO}_3} \quad \frac{1.00 \text{ g H}_3\text{C}_6\text{H}_5\text{O}_7}{192.14 \text{ g/mol}} = 0.00520 \text{ mol C.A.}$$

Coefficient $\rightarrow 3$
 $= .00397 \leftarrow \text{Smallest} = \text{L.R.}$

b. How many grams of carbon dioxide form?

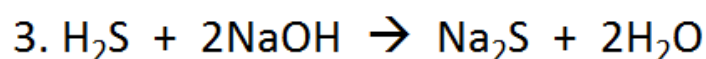
$$\text{L.R.} \rightarrow 0.01190 \text{ mol NaHCO}_3 \times \frac{3 \text{ mol CO}_2}{3 \text{ mol NaHCO}_3} = 0.01190 \text{ mol CO}_2$$

$$0.01190 \text{ mol CO}_2 \times 44.01 \text{ g/mol CO}_2 = 0.524 \text{ g CO}_2$$

c. How much of the excess reactant remains after the limiting reactant is completely consumed?

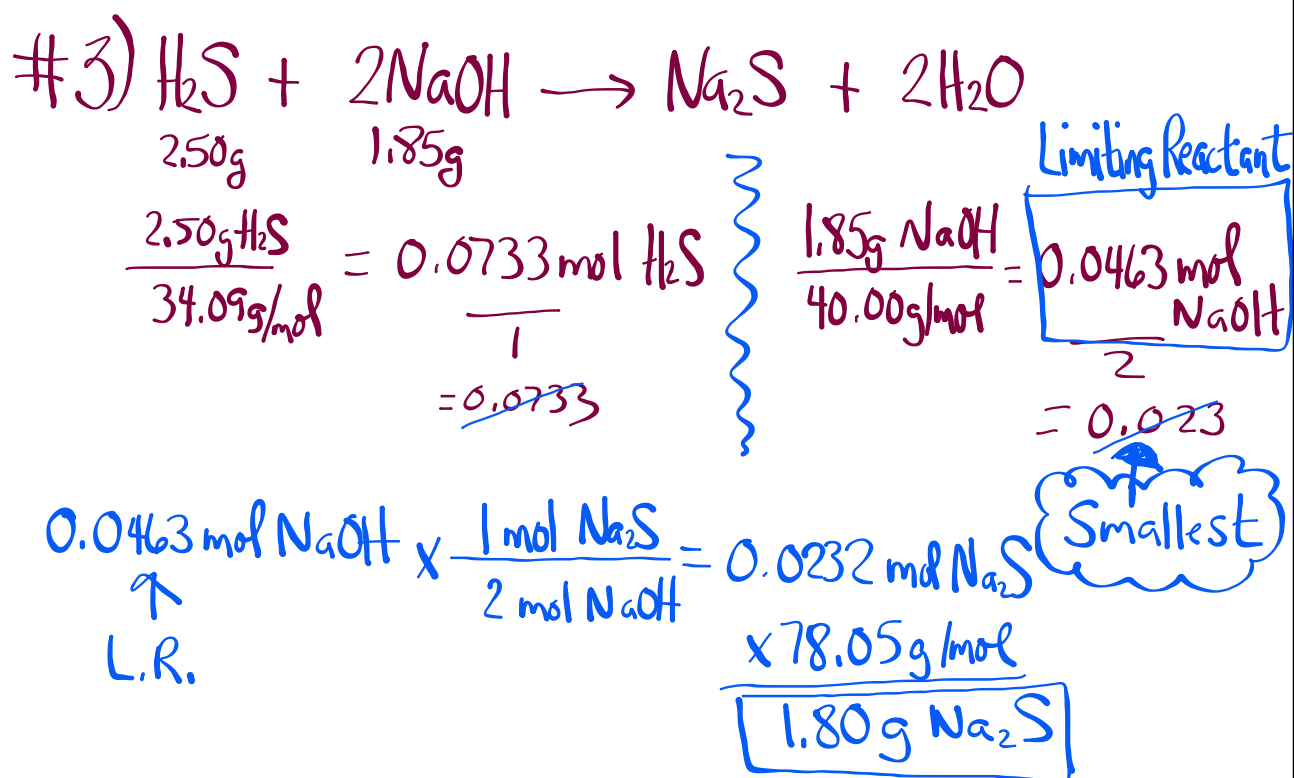
$$\text{L.R.} \rightarrow 0.01190 \text{ mol NaHCO}_3 \times \frac{1 \text{ mol H}_3\text{C}_6\text{H}_5\text{O}_7}{3 \text{ mol NaHCO}_3} = 0.00397 \text{ mol C.A. used}$$

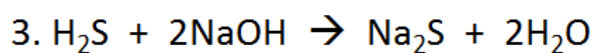
$$\begin{array}{r} 0.00520 \text{ mol C.A. present} \\ - 0.00397 \text{ mol C.A. used} \\ \hline 0.00123 \text{ mol C.A. in excess} \end{array}$$



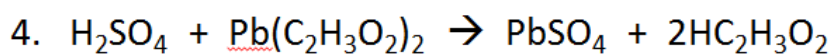
NaOH is LR, 1.80 g Na_2S

#4) ACIDS ALWAYS START WITH H.
ICKY & I ATE IT } Polyatomic ion
BITE WAS DELICIOUS } with H.
Hydro _____ acid - binary (2 element) acid





NaOH is LR, 1.80 g Na_2S



7.0 g H_2SO_4

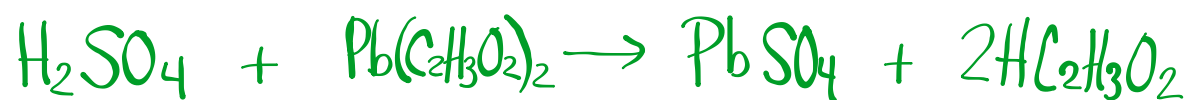
0 g $\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2$

9.31 g PbSO_4

3.69 g $\text{HC}_2\text{H}_3\text{O}_2$

5.a) 60.3 g $\text{C}_6\text{H}_5\text{Br}$

b) 94.0%



$$\frac{10.0\text{g}}{98.09\text{g/mol}}$$

$$= \frac{0.102\text{mol}}{1}$$

$$= 0.102$$

$$\frac{10.0\text{g}}{325.30\text{g/mol}}$$

$$= \boxed{0.0307\text{mol}} \text{ Limiting Reactant } \boxed{0.0\text{g remain}}$$

$$= 0.0307 \leftarrow \text{Smallest}$$

$$0.0307\text{mol Pb}(\text{C}_2\text{H}_3\text{O}_2)_2 \times \frac{1\text{mol H}_2\text{SO}_4}{1\text{mol Pb}(\text{C}_2\text{H}_3\text{O}_2)_2} = 0.0307\text{mol H}_2\text{SO}_4 \text{ used}$$

↑
L.R.

$$0.102\text{mol H}_2\text{SO}_4 \text{ present}$$

$$- 0.0307\text{mol H}_2\text{SO}_4 \text{ consumed}$$

$$0.071\text{mol H}_2\text{SO}_4 \text{ remain after rxn.}$$

$$\times 98.09\text{g/mol}$$

$$\boxed{7.0\text{g remain}}$$

$$0.0307\text{mol Pb}(\text{C}_2\text{H}_3\text{O}_2)_2 \times \frac{1\text{mol PbSO}_4}{1\text{mol Pb}(\text{C}_2\text{H}_3\text{O}_2)_2} = 0.0307\text{mol PbSO}_4$$

↑
L.R.

$$\times 303.27\text{g/mol}$$

$$\boxed{9.31\text{g PbSO}_4 \text{ produced}}$$

$$0.0307\text{mol Pb}(\text{C}_2\text{H}_3\text{O}_2)_2 \times \frac{2\text{mol HC}_2\text{H}_3\text{O}_2}{1\text{mol Pb}(\text{C}_2\text{H}_3\text{O}_2)_2}$$

↑
L.R.

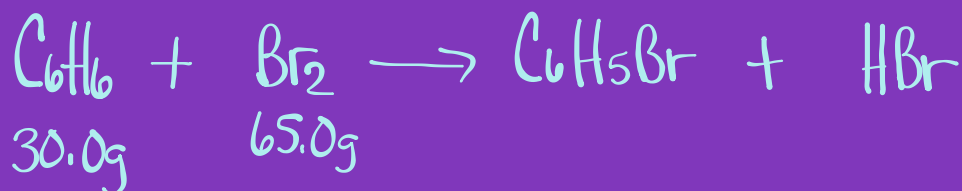
$$0.0614\text{mol HC}_2\text{H}_3\text{O}_2$$

$$\times 60.06\text{g/mol}$$

$$\boxed{3.69\text{g HC}_2\text{H}_3\text{O}_2 \text{ produced}}$$

5.a) 60.3 g C_6H_5Br

b) 94.0%



$\frac{30.0\text{g C}_6\text{H}_6}{78.12\text{g/mol}}$ <p style="text-align: center;"><i>Limiting Reactant</i></p> $= 0.384\text{ mol C}_6\text{H}_6$ <p style="text-align: center;"> </p> $= 0.384$ <p style="text-align: center;"><i>Smallest</i></p>	}	$\frac{65.0\text{g Br}_2}{159.80\text{g/mol}}$ $= 0.407\text{ mol Br}_2$ <p style="text-align: center;"> </p> $= 0.407$
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$$0.384\text{ mol C}_6\text{H}_6 \times \frac{1\text{ mol C}_6\text{H}_5\text{Br}}{1\text{ mol C}_6\text{H}_6} = 0.384\text{ mol C}_6\text{H}_5\text{Br}$$

$$\times 157.01\text{g/mol}$$

$$= 60.3\text{ g C}_6\text{H}_5\text{Br}$$

b)

$$\frac{56.7\text{g}}{60.3\text{g}} \times 100 = 94.0\%$$

↑
Theoretical Yield