1.a) 2525 Bikes with wheels

3013 Bikes with frames

2455 Bikes with handlebars

b) 558 frames leftover

70 x 2 = 140 wheels leftover

0 handlebars leftover

c) Handle Bars

Apr 5-8:51 AM

2.a) $NaHCO_3$ = limiting reactant

b) 0.524 g CO_2

c) 1.23×10^{-3} mol $H_3C_6H_5O_7$ excess

Apr 5-8:51 AM

The fizz produced when an Alka-Seltzer tablet is dissolved in water is due to the reaction between sodium bicarboante, $NaHCO_3$ and citric acid, $H_3C_6H_5O_7$:

L.R. EXCESS

$$3NaHCO_3(aq) + H_3C_6H_5O_7(aq) \longrightarrow 3CO_2(g) + 3H_2O(l) + Na_3C_6H_5O_7(aq)$$

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

C.A. EXCESS PRESENT

a. Which reactant is the limiting reactant?

$\frac{1.00\,g\,NaHCO_3}{84.01\,g/mol} = 0.01190\,mol\,NaHCO_3$ (Limiting Reactant)

$\frac{1.00\,g\,H_3C_6H_5O_7}{192.14\,g/mol} = 0.00520\,mol\,C.A.$

Coefficient → 3

$= .0039$ ← Smallest = L.R.

$\frac{0.00520}{1}$ ← Coefficient

$= .00520$

b. How many grams of carbon dioxide form?

L.R. → $0.01190\,mol\,NaHCO_3 \times \frac{3\,mol\,CO_2}{3\,mol\,NaHCO_3} = 0.01190\,mol\,CO_2 \times 44.01\,g/mol\,CO_2 = 0.524\,g\,CO_2$

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

EXCESS REACTANT

L.R. → $0.01190\,mol\,NaHCO_3 \times \frac{1\,mol\,H_3C_6H_5O_7}{3\,mol\,NaHCO_3} = 0.00397\,mol\,C.A.\ used$ ← L.R.

$0.00520\,mol\,C.A.\ present$

$-0.00397\,mol\,C.A.\ used$

$0.00123\,mol\,C.A.\ in\ excess$

3. $H_2S + 2NaOH \rightarrow Na_2S + 2H_2O$

NaOH is LR, 1.80 g Na_2S

#4) ACIDS ALWAYS START WITH H.

ICKY & I ATE IT } Polyatomic ion with H.

BITE WAS DELICIOUS }

Hydro ____ acid - binary (2 element) acid

#3) $H_2S + 2NaOH \rightarrow Na_2S + 2H_2O$

2.50g 1.85g

$\frac{2.50\text{g } H_2S}{34.09\text{g/mol}} = 0.0733\text{ mol } H_2S$

$\frac{0.0733}{1} = 0.0733$

$\frac{1.85\text{g NaOH}}{40.00\text{g/mol}} = 0.0463\text{ mol NaOH}$

$\frac{0.0463}{2} = 0.023$

Limiting Reactant

Smallest

$0.0463\text{ mol NaOH} \times \frac{1\text{ mol } Na_2S}{2\text{ mol NaOH}} = 0.0232\text{ mol } Na_2S$

L.R.

$\times 78.05\text{ g/mol}$

$1.80\text{ g } Na_2S$

3. $H_2S + 2NaOH \rightarrow Na_2S + 2H_2O$

NaOH is LR, 1.80 g Na_2S

4. $H_2SO_4 + Pb(C_2H_3O_2)_2 \rightarrow PbSO_4 + 2HC_2H_3O_2$

7.0 g H_2SO_4

0 g $Pb(C_2H_3O_2)_2$

9.31 g PbSO4

3.69 g $HC_2H_3O_2$

5.a) 60.3 g C_6H_5Br

b) 94.0%

Apr 5-8:52 AM

$H_2SO_4 + Pb(C_2H_3O_2)_2 \rightarrow PbSO_4 + 2HC_2H_3O_2$

$\frac{10.0\,g}{98.09\,g/mol} = 0.102\,mol$

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

$\frac{10.0\,g}{325.30\,g/mol} = 0.0307\,mol$ Limiting Reactant

$\frac{0.0307\,mol}{1} = 0.0307$ ← smallest

0.0 g remain

$0.0307\,mol\,Pb(C_2H_3O_2)_2 \times \frac{1\,mol\,H_2SO_4}{1\,mol\,Pb(C_2H_3O_2)_2} = 0.0307\,mol\,H_2SO_4$ used

L.R.

0.102 mol H_2SO_4 present

− 0.0307 mol H_2SO_4 consumed

0.071 mol H_2SO_4 remain after rxn.

× 98.09 g/mol

7.0 g remain

$0.0307\,mol\,Pb(C_2H_3O_2)_2 \times \frac{1\,mol\,PbSO_4}{1\,mol\,Pb(C_2H_3O_2)_2} = 0.0307\,mol\,PbSO_4$

L.R.

× 303.27 g/mol

9.31 g $PbSO_4$ produced

$0.0307\,mol\,Pb(C_2H_3O_2)_2 \times \frac{2\,mol\,HC_2H_3O_2}{1\,mol\,Pb(C_2H_3O_2)_2} = 0.0614\,mol\,HC_2H_3O_2$

L.R.

× 60.06 g/mol

3.69 g $HC_2H_3O_2$ produced

5.a) 60.3 g C_6H_5Br

b) 94.0%

Apr 5-8:52 AM

$C_6H_6 + Br_2 \longrightarrow C_6H_5Br + HBr$

30.0g 65.0g

$\frac{30.0\,g\,C_6H_6}{78.12\,g/mol} = 0.384\,mol\,C_6H_6$ ← Limiting Reactant

$\frac{0.384}{1} = 0.384$ ← Smallest

$\frac{65.0\,g\,Br_2}{159.80\,g/mol} = 0.407\,mol\,Br_2$

$\frac{0.407}{1} = 0.407$

$0.384\,mol\,C_6H_6 \times \frac{1\,mol\,C_6H_5Br}{1\,mol\,C_6H_6} = 0.384\,mol\,C_6H_5Br$

$\times 157.01\,g/mol$

$60.3\,g\,C_6H_5Br$ ← Theoretical Yield

b) $\frac{56.7\,g}{60.3\,g} \times 100 = 94.0\%$