Chemistry CP
Stoichiometry Quiz

Name: Key

1. What is a LIMITING REACTANT? (2 points)

the reactant that runs out (used up) first which stops the reaction and limits the amt. of product.

2. According to the following balanced equation, 2 $FePO_4$ + 3 Na_2SO_4 → $Fe_2(SO_4)_3$ + 2 Na_3PO_4, how many **grams** of iron (III) sulfate ($Fe_2(SO_4)_3$) can be produced from 30 **grams** of iron (III) phosphate ($FePO_4$) and 40 grams of sodium sulfate (Na_2SO_4)? (12 Points)

$$30\text{g } FePO_4 \left/ \frac{1\text{mol}}{151\text{g}} \right. = 0.1987\text{mol } FePO_4 \left/ \frac{1\text{mol } Fe_2(SO_4)_3}{2\text{mol } FePO_4} \right. = 0.099338\text{mol } Fe_2(SO_4)_3 \left/ \frac{400\text{g}}{1\text{mol}} \right.$$

$$39.74\text{g } Fe_2(SO_4)_3$$

$$40\text{g } Na_2SO_4 \left/ \frac{1\text{mol}}{142\text{g}} \right. = 0.28169\text{mol } Na_2SO_4 \left/ \frac{1\text{mol } Fe_2(SO_4)_3}{3\text{mol } Na_2SO_4} \right. = .09389\text{mol } Fe_2(SO_4)_3 \left/ \frac{400\text{g}}{1\text{mol}} \right.$$

$$37.56\text{g } Fe_2(SO_4)_3$$

3. In the above reaction, which substance is the limiting reactant? (1 points)

Na_2SO_4

4. How much excess (IN GRAMS) remains of the non limiting reactant? (3 points)

$$40\text{g } Na_2SO_4 \left/ \frac{1\text{mol}}{142\text{g}} \right. = 0.28169\text{mol } Na_2SO_4 \left/ \frac{2\text{mol } FePO_4}{3\text{mol } Na_2SO_4} \right. = 0.18779\text{mol } FePO_4 \left/ \frac{151\text{g}}{1\text{mol}} \right.$$

$$28.35\text{g used}$$

$30 - 28.35$

$1.643\text{g } FePO_4$ Leftover

5. If Dexter performed this experiment in his laboratory and actually obtained 30 grams of $Fe_2(SO_4)_3$, what is the percent yield of the reaction? (2 points)

$$\frac{30}{37.56} \times 100$$

79.87% yield

Atomic and Molar Masses You MAY need for the above problems

$FePO_4$: 151 g = 1 mole, Na_2SO_4: 142 g = 1mole, $Fe_2(SO_4)_3$: 400 g = 1 mole, Na_3PO_4: 164 g = 1 mole

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6. What is a STOICHIOMETRY? (2 points)

Using a balanced equation to predict the relative masses of reactants & products in a reaction.

7. According to the following balanced equation, 2 $FePO_4$ + 3 Na_2SO_4 → $Fe_2(SO_4)_3$ + 2 Na_3PO_4, how many **grams** of sodium phosphate (Na_3PO_4) can be produced from 25 **grams** of iron (III) phosphate ($FePO_4$) and 40 grams of sodium sulfate (Na_2SO_4)? (12 Points)

$25\text{ g } FePO_4 \left| \frac{1\text{ mol}}{151\text{ g}} \right. = 0.1656\text{ mol } FePO_4 \left| \frac{2\text{ mol } Na_3PO_4}{2\text{ mol } FePO_4} \right. = .1656\text{ mol } Na_3PO_4 \left| \frac{164\text{ g}}{1\text{ mol}} \right. =$

27.15 g Na_3PO_4

$40\text{ g } Na_2SO_4 \left| \frac{1\text{ mol}}{142\text{ g}} \right. = 0.28169\text{ mol } Na_2SO_4 \left| \frac{2\text{ mol } Na_3PO_4}{3\text{ mol } Na_2SO_4} \right. = .1877\text{ mol } Na_3PO_4 \left| \frac{164\text{ g}}{1\text{ mol}} \right.$

30.80 g Na_3PO_4

8. In the above reaction, which substance is the limiting reactant? (1 points)

$FePO_4$

9. How much excess (IN GRAMS) remains of the non limiting reactant? (3 points)

$25\text{ g } FePO_4 \left| \frac{1\text{ mol}}{151\text{ g}} \right. = 0.1656\text{ mol } FePO_4 \left| \frac{3\text{ mol } Na_2SO_4}{2\text{ mol } FePO_4} \right. = .2483\text{ mol } Na_2SO_4 \left| \frac{142\text{ g}}{1\text{ mol}} \right.$

35.26 g

40 g − 35.26 = 4.74 g Na_2SO_4 Leftover

10. If Dexter performed this experiment in his laboratory and actually obtained 20 grams of Na_3PO_4 what is the percent yield of the reaction? (2 points)

$\frac{20}{27.15} \times 100 =$ 73.66 % yield

Atomic and Molar Masses You MAY need for the above problems

$FePO_4$: 151 g = 1 mole, Na_2SO_4: 142 g = 1mole, $Fe_2(SO_4)_3$: 400 g = 1 mole, Na_3PO_4: 164 g = 1 mole