Name

Chemical Relationships

$2H_2 + 1O_2 \rightarrow 2H_2O$

Determine the quantities produced or consumed. Show all work. Follow significant figures.

If 200.0 H_2 are consumed,

1. How many O_2 are consumed?
2. How many H_2O are consumed?

$200 H_2 \mid 1 O_2 \,/\, 2 H_2 = 100\ O_2$

$200 H_2 \mid 2 H_2O \,/\, 2 H_2 = 200\ H_2O$

$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$

If a person is producing CO_2 at a rate of 2.50E5 molecules per second:

3. What is the rate the O_2 is being consumed?
4. What is the rate the water is being produced?

$2.50E5\ CO_2 \mid 2 O_2 \,/\, 1 CO_2 = 5.00E5\ O_2$

$2.50E5\ CO_2 \mid 2 H_2O \,/\, 1 CO_2 = 5.00E5\ H_2O$

$Cu + AgNO_3 \rightarrow Cu(NO_3)_2 + Ag$

After a reaction has completed, 25,000. Ag atoms were produced,

5. How many $AgNO_3$ units must have been present?
6. How many Ag atoms can you extract from the answer from #5?

(5) $25{,}000\ Ag \mid 1 AgNO_3 \,/\, 1 Ag = 25{,}000\ AgNO_3$

(6) $25{,}000\ AgNO_3 \mid 1 Ag \,/\, 1 AgNO_3 = 25{,}000\ Ag$

$6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$

Note: $6CO_2$ have a mass of 264amu — $6\ CO_2 = 264$ amu

6 H_2O have a mass of 108 amu, — $6\ H_2O = 108$ amu

1 $C_6H_{12}O_6$ has a mass of 180 amu

O_2 = 32 amu, — $1\ O_2 = 32$ amu

7. If you have 250.0 CO_2 molecules, determine how many of every other reactant and product needed or produced.
8. With the given information, how much mass does 6 O_2 contain?
9. What is the mass of 1 CO_2?
10. What is the mass of 1 H_2O?
11. Why the difference?

$250 CO_2 \mid 6 H_2O \,/\, 6 CO_2 = 250\ H_2O$

$250 CO_2 \mid 1 C_6H_{12}O_6 \,/\, 6 CO_2 = 42\ C_6H_{12}O_6$

$6 O_2 \mid 32\text{amu} \,/\, 1 O_2 = 192\ \text{amu}$

$1 CO_2 \mid 264\text{amu} \,/\, 6 CO_2 = 44\ CO_2$

$1 H_2O \mid 108\text{amu} \,/\, 6 H_2O = 18\ \text{amu}$

C = 12amu, H = 1 amu, O = 16 amu — CO_2 have greater mass than $2H_2O$

(#5-2)

Chemical Ratios II

Answer the following questions relative to: $C_6H_{12}O_6$

1. If you have 1 $C_6H_{12}O_6$ how many Hydrogens are present? $1 \times 12 = 12$ H
2. If you have 10 $C_6H_{12}O_6$ how many hydrogens are present? $10 \times 12 = 120$ H
3. If you have 150 $C_6H_{12}O_6$ how many carbons are present? $150 \times 6 = 900$ C
4. If you have 500 H_2O molecules do you have more or less O then 100 $C_6H_{12}O_6$? $500\ H_2O \left|\frac{1\ O}{1\ H_2O}\right. = 500$ O

$100\ C_6H_{12}O_6 \left|\frac{6\ O}{1\ C_6H_{12}O_6}\right. = 600$ O

Answer the following question relative to: $6\ AgNO_3$ & $3(NH_4)_2O$

5. Which element is in equal quantities between the two substances? 6 N
6. Which substance contains the most particles? $6\ AgNO_3$

Answer the following questions relative to $AgNO_3$ (Ag = 107 amu, N = 14 amu, 0 = 16 amu)

7. What is the total mass of O? $3\ O \left|\frac{16\ amu}{1\ O}\right. = 48$ amu
8. What is the total mass (amu) of 1 $AgNO_3$? $107 + 14 + 48 = 169$ amu
9. How much mass of N is in 6 $AgNO_3$? $6\ AgNO_3 \left|\frac{1\ N}{1\ AgNO_3}\right| \frac{14\ amu}{1\ N} = 84$ amu
10. If a student has 200 amu of Ag, how much $AgNO_3$ can be made assuming rest of stuff is available.

$200\ amu\ Ag \left|\frac{1\ Ag}{107\ amu}\right| \frac{1\ AgNO_3}{1\ Ag} \left|\frac{169\ amu}{1\ AgNO_3}\right. = 316\ amu\ AgNO_3$