Chemistry I Name Teacher

Chapter 11 Test Date

SHOW ALL WORK!!!!

1. Given the reaction,

$$2H_{2(g)} + O_{2(g)} \text{ --------> } 2H_2O_{(1)}$$

to produce 0.800 moles of $H_2O_{(1)}$:

a.) how many moles of $H_{2(g)}$ are needed?

$H_2O : H_2 = 1:1$

$\therefore$ 0.800 mole H_2

b.) how many liters of $O_{2(g)}$ are needed?

$H_2O : O_2 = 2:1$

$\therefore$ $0.400 \text{ mole } O_2 \left(\frac{22.4 \text{ L}}{1 \text{ mol}}\right) = 8.96 \text{ L } O_2$

2. For the reaction,

$$2SO_{2(g)} + O_{2(g)} \text{ --------> } 2SO_{3(1)}$$

how many moles of SO_3 liquid will be formed reacting with 3.1973×10^{20} molecules of $O_{2(g)}$?

$3.1973 \times 10^{20} \left(\frac{1 \text{ mole}}{6.02 \times 10^{23}}\right) = 5.31 \times 10^{-4} \text{ mole } O_2$

$\text{mole } O_2 \left(\frac{2 \text{ SO}_3}{1 \text{ O}_2}\right) = 1.06 \times 10^{-3} \text{ mole } SO_3$

3. If the following reaction occurs,

$$Al_2(SO_4)_3 + 3BaCl_2 \text{ --------> } 2AlCl_3 + 3BaSO_4$$

how many grams of barium chloride will be needed to react with 376 grams of aluminum sulfate?

376 g

$\div$ 342.14 g/m

1.099 mole $\xrightarrow[\times 3]{}$ 3.297 mole

$\times$ 208.23 g/m

687 g

4. If the following reactions occurs,

$$Al_4C_{3(s)} + 12H_2O_{(l)} \rightarrow 3CH_{4(g)} + 4Al(OH)_{3(s)}$$

How many grams of aluminum hydroxide are produced along with 16.0 liters of CH_4?

$$16.0\,L\,CH_4\left(\frac{1\,mole}{22.4\,L}\right) = 0.7143\,mole\,CH_4$$

$$0.7143\,mole\,CH_4\left(\frac{4\,Al(OH)_3}{3\,CH_4}\right) = 0.9524\,mole\,Al(OH)_3$$

$$0.9524\,mole\,Al(OH)_3\left(\frac{78.00\,g}{1\,mole}\right) = 74.3\,g\,Al(OH)_3$$

5. If 68.0 liters of oxygen are consumed when a candle made from paraffin ($C_{25}H_{52}$) is burned, what volume of carbon dioxide is produced? (Water is the other product.)

$$C_{25}H_{52(s)} + 38O_{2(g)} \longrightarrow 25CO_{2(g)} + 26H_2O_g$$

$$68.0\,L\,O_2\left(\frac{25\,CO_2}{38\,O_2}\right) = \boxed{44.7\,L\,CO_2}$$

6. In a double replacement reaction, when 6.52 grams of barium hypophosphite reacts with 6.52 g of silver peroxalate, what mass of silver compound is produced?

$3\times 137.33 = 411.99$
$2\times 30.97 = 61.94$
64.00

$$Ba_3(PO_2)_2 + 3Ag_2C_2O_5 \longrightarrow 3BaC_2O_5 + 2Ag_3PO_2$$

6.52g ÷ 537.93g/n → 0.01212 mole

6.52g ÷ 319.76g/n → 0.02039 mole

Not 1:3 ∴ (Limiting) → 0.02039 mole

0.02039 mole × 241.35g/mol → 4.92g

0.02039 mole × 2/3 → 0.01359 mole

0.01359 mole × 386.58 → 5.25g

What reactant, and what mass of it, is in excess?

For $Ba_3(PO_2)_2$: 0.01212 (start) $- (0.02039 \div 3)$ (used) $=$ mole Remain

$0.01212 - 0.006797 = 0.00532$ mole $Ba_3(PO_2)_2$

$\times 537.93$

2.86g Left