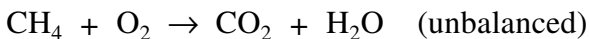**VAXA**
S O F T W A R E

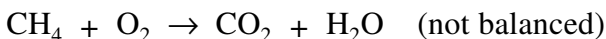## Problems of Yield of chemical reactions

1) In a balloon flask we have 58.4 L of methane gas at a temperature of 318 °C and a pressure of 1 atm that react with an excess of oxygen according the following equation:

$CH_4 + O_2 \rightarrow CO_2 + H_2O$ (unbalanced)

19.94 g of water are obtained. Determine:

    a) Percent yield of the reaction.

    b) Mass of carbon dioxide formed.

2) In a flask we have 3.4 mol of methane that react with an excess of oxygen according the following equation:

$CH_4 + O_2 \rightarrow CO_2 + H_2O$ (not balanced)

The percent yield of the reaction is 65 %. Calculate:

    a) The volume obtained of carbon dioxide gas at a temperature of 25 °C and a pressure of 1 atm.

    b) Mass of water obtained.

3) In a balloon flask we have 188.5 L of methane gas at a temperature of 0 °C and a pressure of 1 atm that react with an excess of oxygen according the following equation:

$CH_4 + O_2 \rightarrow CO_2 + H_2O$ (unbalanced)
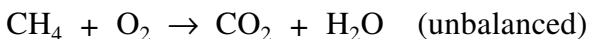
The percent yield of the reaction is 46 %. Determine:

    a) Mass of water obtained.

    b) How many moles of carbon dioxide are obtained?
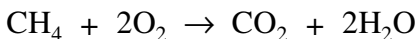
4) In a balloon flask we have 103.6 L of methane gas at a temperature of 374 °C and a pressure of 1 atm that react with an excess of oxygen according the following equation:

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

35.12 g of water are obtained. Calculate:

    a) Percent yield of the reaction.

    b) Mass of carbon dioxide formed.

5) In a balloon flask we have 164.1 L of ethene gas at a temperature of 25 °C and a pressure of 6.2 atm that react with an excess of oxygen according the following equation:
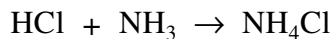
$C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O$
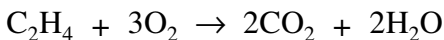
256 L of carbon dioxide gas are obtained at a temperature of 25 °C and a pressure of 6.2 atm. Determine:

    a) Percent yield of the reaction.

    b) Mass of carbon dioxide formed.

Problems of Yield of chemical reactions

6) In a receptacle we have 29 g of hydrochloric acid that react with an excess of ammonia according the following equation:

$HCl + NH_3 \rightarrow NH_4Cl$

The percent yield of the reaction is 54 %. Determine:

    a) Mass of ammonium chloride obtained.

   **b)** How many moles of ammonium chloride are formed?

7) In a receptacle we have 58 g of phosphoric acid that react with an excess of zinc according the following equation:

$H_3PO_4 + Zn \rightarrow Zn_3(PO_4)_2 + H_2$ (unbalanced)

2.677 L of hydrogen gas are obtained at a temperature of 188 °C and a pressure of 6.4 atm. Find out:

    a) Percent yield of the reaction.
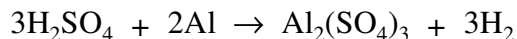
    b) Mass of hydrogen formed.

8) In a flask we have 3 mol of sodium hydroxide that react with an excess of carbon dioxide according the following equation:

$NaOH + CO_2 \rightarrow NaHCO_3$
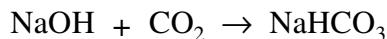
88.2 g of sodium bicarbonate are obtained. Calculate:

    a) Percent yield of the reaction.

9) In a flask we have 9 mol of sulfuric acid that react with an excess of aluminium according the following equation:

$3H_2SO_4 + 2Al \rightarrow Al_2(SO_4)_3 + 3H_2$

The percent yield of the reaction is 33 %. Find out:

    a) Mass of aluminium sulfate obtained.

    b) How many moles of hydrogen are obtained?

10) In a flask we have 8.1 mol of sulfuric acid that react with an excess of zinc according the following equation:

$H_2SO_4 + Zn \rightarrow ZnSO_4 + H_2$
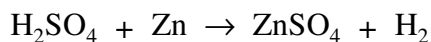
125.3 L of hydrogen gas are obtained at a temperature of 0 °C and a pressure of 1 atm. Calculate:

    a) Percent yield of the reaction.

    b) Mass of hydrogen obtained.

Problems of Yield of chemical reactions

11) In a receptacle we have 53 g of nitrogen that react with an excess of hydrogen according the following equation:

$N_2 + H_2 \rightarrow NH_3$ (unbalanced)

The percent yield of the reaction is 79 %. Calculate:

    a) The volume obtained of ammonia gas at a temperature of 0 °C and a pressure of 1 atm.

    b) Mass of ammonia obtained.

12) In a balloon flask we have 198.3 L of ethene gas at a temperature of 25 °C and a pressure of 6.6 atm that react with an excess of oxygen according the following equation:

$C_2H_4 + O_2 \rightarrow CO_2 + H_2O$ (not balanced)
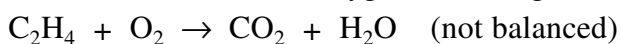
The percent yield of the reaction is 56 %. Determine:

    a) Mass of water formed.

    b) How many moles of carbon dioxide are obtained?

Answers:

1)	**a)** 46 %,	**b)** 24.37 g.
2)	**a)** 54.07 L,	**b)** 79.56 g.
3)	**a)** 139.3 g,	**b)** 3.869 mol.
4)	**a)** 50 %,	**b)** 42.92 g.
5)	**a)** 78 %,	**b)** 2854 g.
6)	**a)** 22.95 g,	**b)** 0.429 mol.
7)	**a)** 51 %,	**b)** 0.9055 g.
8)	**a)** 35 %.	
9)	**a)** 338.6 g,	**b)** 2.97 mol.
10)	**a)** 69 %,	**b)** 11.18 g.
11)	**a)** 67.03 L,	**b)** 50.84 g.
12)	**a)** 1078 g,	**b)** 59.91 mol.