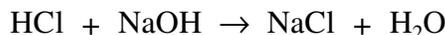


Problems of Stoichiometry of chemical reactions

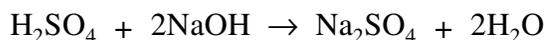
1) In a receptacle we have 32 g of hydrochloric acid that react with an excess of sodium hydroxide according the following equation:



Calculate:

- a) Mass of water obtained.
- b) How many moles of sodium chloride are obtained?

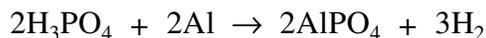
2) In a receptacle we have 40 g of sulfuric acid that react with an excess of sodium hydroxide according the following equation:



Find out:

- a) Mass of water obtained.
- b) How many moles of sodium sulfate are obtained?

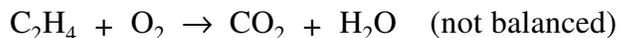
3) In a receptacle we have 460 g of phosphoric acid that react with an excess of aluminium according the following equation:



Determine:

- a) Mass of aluminium phosphate formed.
- b) How many moles of hydrogen are obtained?

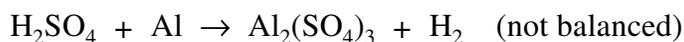
4) In a flask we have 2.6 mol of ethene that react with an excess of oxygen according the following equation:



Find out:

- a) Mass of water obtained.
- b) How many moles of carbon dioxide are formed?

5) In a flask we have 3.4 mol of sulfuric acid that react with an excess of aluminium according the following equation:

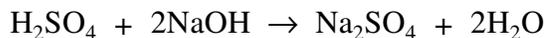


Find out:

- a) The volume obtained of hydrogen gas at a temperature of 18 °C and a pressure of 1 atm.
- b) Mass of aluminium sulfate formed.

Problems of Stoichiometry of chemical reactions

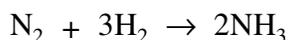
6) In a flask we have 7.6 mol of sodium hydroxide that react with a solution 1.3 mol/L in sulfuric acid according the following equation:



Determine:

- a) Volume needed of sulfuric acid solution.
- b) Mass of sodium sulfate formed.

7) We want obtain 94.05 g of ammonia. For that, we react nitrogen gas at a temperature of 0 °C and a pressure of 1 atm with an excess of hydrogen according the following equation:



Determine:

- a) Volume required of nitrogen gas at a temperature of 0 °C and a pressure of 1 atm.
- b) How many moles of ammonia are obtained?

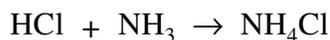
8) In a balloon flask we have 162.7 L of hydrogen gas at a temperature of 0 °C and a pressure of 1 atm that react with an excess of nitrogen according the following equation:



Determine:

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

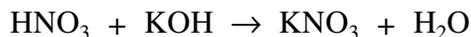
9) In a flask we have 136 L of ammonia gas at a temperature of 0 °C and a pressure of 1 atm that react with a solution 2.3 mol/L in hydrochloric acid according the following equation:



Find out:

- a) Volume needed of hydrochloric acid solution.
- b) Mass of ammonium chloride formed.

10) In a flask we have 3236 mL of solution 1.3 mol/L in nitric acid that react with an excess of potassium hydroxide according the following equation:

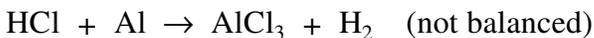


Determine:

- a) Mass of water formed.
- b) How many moles of potassium nitrate are obtained?

Problems of Stoichiometry of chemical reactions

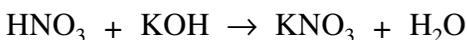
11) In a flask we have 303.3 mL of solution 2.8 mol/L in hydrochloric acid that react with an excess of aluminium according the following equation:



Find out:

- a) The volume obtained of hydrogen gas at a temperature of 0 °C and a pressure of 1 atm.
- b) Mass of aluminium chloride formed.

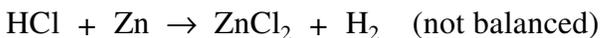
12) In a balloon flask we have 427.4 mL of solution 1.3 mol/L in potassium hydroxide that react with a solution 2.3 mol/L in nitric acid according the following equation:



Find out:

- a) Volume needed of nitric acid solution.
- b) Mass of water obtained.

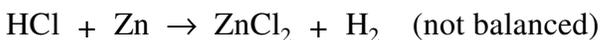
13) In a receptacle we have 51 g of hydrochloric acid that react with an excess of zinc according the following equation:



Determine:

- a) Mass of zinc chloride obtained.
- b) How many moles of hydrogen are obtained?

14) In a receptacle we have 12 g of hydrochloric acid that react with an excess of zinc according the following equation:



Find out:

- a) The volume obtained of hydrogen gas at a temperature of 0 °C and a pressure of 1 atm.
- b) Mass of zinc chloride formed.

15) 71 g of $\text{Pb}_3(\text{PO}_4)_4$ react with FeI_2 . Calculate:

- a) The balanced chemical equation.
- b) Mass and moles required of FeI_2 .
- c) Mass and moles of $\text{Fe}_3(\text{PO}_4)_2$ obtained.

16) 73 g of H_2S react with CaI_2 . Calculate:

- a) The balanced chemical equation.
- b) Mass and moles required of CaI_2 .
- c) Mass and moles of CaS obtained.

Problems of Stoichiometry of chemical reactions

17) 28 g of $\text{Fe}_2(\text{SO}_4)_3$ react with H_2CO_3 . Determine:

- The balanced chemical equation.
- Mass and moles required of H_2CO_3 .
- Mass and moles of H_2SO_4 obtained.

Answers:

- a) 15.78 g, b) 0.8767 mol.
- a) 14.69 g, b) 0.4082 mol.
- a) 572.7 g, b) 7.041 mol.
- a) 93.6 g, b) 5.2 mol.
- a) 81.23 L, b) 387.6 g.
- a) 2923 mL, b) 539.6 g.
- a) 62 L, b) 5.532 mol.
- a) 108.5 L, b) 82.27 g.
- a) 2638 mL, b) 324.6 g.
- a) 75.71 g, b) 4.206 mol.
- a) 9.518 L, b) 37.79 g.
- a) 241.5 mL, b) 10 g.
- a) 95.27 g, b) 0.6986 mol.
- a) 3.684 L, b) 22.42 g.
- a) $\text{Pb}_3(\text{PO}_4)_4 + 6\text{FeI}_2 \rightarrow 3\text{PbI}_4 + 2\text{Fe}_3(\text{PO}_4)_2$
b) 131.68 g, 0.4253 mol, c) 50.67 g, 0.1418 mol.
- a) $\text{H}_2\text{S} + \text{CaI}_2 \rightarrow 2\text{HI} + \text{CaS}$
b) 631.02 g, 2.147 mol, c) 154.8 g, 2.147 mol.
- a) $\text{Fe}_2(\text{SO}_4)_3 + 3\text{H}_2\text{CO}_3 \rightarrow \text{Fe}_2(\text{CO}_3)_3 + 3\text{H}_2\text{SO}_4$
b) 13.03 g, 0.2102 mol, c) 20.6 g, 0.2102 mol.