Stoichiometry

1

$$Li_3N + 3H_2O \longrightarrow NH_3 + 3LiOH$$

Determine the mass of lithium hydroxide produced when 0.83 g of lithium nitride reacts with water.

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Stoichiometry

2

$$2C_2H_6 + 7O_2 \longrightarrow 4CO_2 + 6H_2O$$

How many moles of ethane (C_2H_6) would be needed to react with 1150 g of oxygen?

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Stoichiometry

3

$$5N_2H_4 + 2O_2 \longrightarrow 4H_2O + 3N_2 + 4NH_3$$

How many liters of N_2H_4 gas at STP are needed to react with 386.70 g O_2?

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Stoichiometry

4

$$Zn + 2HCl \longrightarrow ZnCl_2 + H_2$$

How many grams of Zinc are needed to produce 26.5 g $ZnCl_2$?

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Stoichiometry

5

$$Zn_3As_2 + 6HCl \longrightarrow 2AsH_3 + 3ZnCl_2$$

How many grams of hydrochloric acid is needed in order to obtain 12.3 L arsine (AsH_3) gas at STP?

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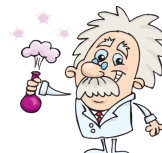
Stoichiometry

6

$$2HF + Ca(OH)_2 \longrightarrow CaF_2 + 2H_2O$$

How many grams of calcium hydroxide are needed to completely react with 18.7 moles of hydrofluoric acid?

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Stoichiometry

7

$$2NaCl + H_2SO_4 \longrightarrow Na_2SO_4 + 2HCl$$

How many liters of HCl at STP are produced by reacting 35 g NaCl completely with sulfuric acid?

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Stoichiometry

8

$$CaO + H_2O \longrightarrow Ca(OH)_2$$
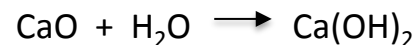
How many grams of CaO are needed to produce 25.75 g $Ca(OH)_2$?

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Stoichiometry

9

If 95.0 g Zn is added to an excess of H_2SO_4, how many liters of hydrogen gas will be produced at STP?

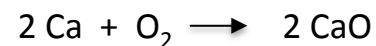Write and balance the equation. Then, calculate the liters of hydrogen produced.

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Stoichiometry

10

$$2\ Ca\ +\ O_2\ \longrightarrow\ 2\ CaO$$

How many grams of calcium will be needed to produce 13.6 mol CaO?

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Stoichiometry

11

A reaction between phosphorus, P_4, and an excess oxygen produces tetraphosphorus decoxide. If 74.3 g phosphorus is used, how many grams of tetraphosphorus decoxide will be produced?

Write and balance the equation. Then, calculate the grams of tetraphosphorus decoxide.
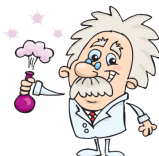
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Stoichiometry

12

$$2\ H_2O\ \longrightarrow\ 2\ H_2\ +\ O_2$$

How many moles of H_2O must be decomposed to form 200. mol H_2?

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Stoichiometry

13

If 40.0 grams of sulfur dioxide are formed in the reaction between sulfur and oxygen, what is the mass of oxygen used?

Write and balance the equation. Then, calculate the mass of oxygen used.

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Stoichiometry

14

$$Cu + 2\,AgNO_3 \longrightarrow 2\,Ag + Cu(NO_3)_2$$

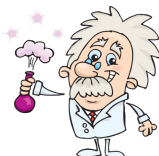If 7.00 moles silver nitrate reacts, what mass of copper (II) nitrate would be formed?

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Stoichiometry

15

If 17.6 L C_3H_8, propane gas, reacts with oxygen at STP, how many moles of oxygen are needed?

Write and balance the equation. Then, calculate the moles of oxygen needed.

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Stoichiometry

16

Challenge Question!
Carbon dioxide reacts with ammonia, NH_3, and water producing ammonium bicarbonate. How many <u>kilograms</u> of ammonium bicarbonate are produced if 4575 L of ammonia is reacted at STP?

Write and balance the equation. Then, calculate the moles of oxygen needed.

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Stoichiometry Scavenger Hunt Answer Sheet

Name _____

Date _____

Period _____

1.)

2.)

3.)

4.)

5.)

6.)

7.)

8.)

9.)	10.)	11.)	12.)	13.)	14.)	15.)	16.)

Solutions	Quick Answer	QR Code on Card #
1.) $\dfrac{0.83 \text{ g Li}_3\text{N}}{1} \times \dfrac{1 \text{ mol}}{34.83 \text{ g Li}_3\text{N}} \times \dfrac{3 \text{ mol LiOH}}{1 \text{ mol Li}_3\text{N}} \times \dfrac{23.95 \text{ g LiOH}}{1 \text{ mol LiOH}} = 1.7 \text{ g LiOH}$	1.7 g LiOH	9
2.) $\dfrac{1150 \text{ g O}_2}{1} \times \dfrac{1 \text{ mol}}{32.00 \text{ g O}_2} \times \dfrac{2 \text{ mol C}_2\text{H}_6}{7 \text{ mol O}_2} = 10.3 \text{ mol C}_2\text{H}_6$	10.3 mol C_2H_6	15
3.) $\dfrac{386.70 \text{ g O}_2}{1} \times \dfrac{1 \text{ mol O}_2}{32.00 \text{ g O}_2} \times \dfrac{5 \text{ mol N}_2\text{H}_4}{2 \text{ mol O}_2} \times \dfrac{22.4 \text{ L N}_2\text{H}_4}{1 \text{ mol N}_2\text{H}_4} = 676.73 \text{ L N}_2\text{H}_4 \text{ @ STP}$	676.73 L N_2H_4 @ STP	5
4.) $\dfrac{26.5 \text{ g ZnCl}_2}{1} \times \dfrac{1 \text{ mol ZnCl}_2}{136.29 \text{ g ZnCl}_2} \times \dfrac{1 \text{ mol Zn}}{1 \text{ mol ZnCl}_2} \times \dfrac{65.39 \text{ g Zn}}{1 \text{ mol Zn}} = 12.7 \text{ g Zn}$	12.7 g Zn	14
5.) $\dfrac{12.3 \text{ L AsH}_3}{1} \times \dfrac{1 \text{ mol AsH}_3}{22.4 \text{ L AsH}_3} \times \dfrac{6 \text{ mol HCl}}{2 \text{ mol AsH}_3} \times \dfrac{36.46 \text{ g HCl}}{1 \text{ mol HCl}} = 60.1 \text{ g HCl at STP}$	60.1 g HCl @ STP	1
6.) $\dfrac{18.7 \text{ mol HF}}{1} \times \dfrac{1 \text{ mol Ca(OH)}_2}{2 \text{ mol HF}} \times \dfrac{74.10 \text{ g Ca(OH)}_2}{1 \text{ mol Ca(OH)}_2} = 693 \text{ g Ca(OH)}_2$	693 g $Ca(OH)_2$	16
7.) $\dfrac{35 \text{ g NaCl}}{1} \times \dfrac{1 \text{ mol NaCl}}{58.44 \text{ g NaCl}} \times \dfrac{2 \text{ mol HCl}}{2 \text{ mol NaCl}} \times \dfrac{22.4 \text{ L}}{1 \text{ mol HCl}} = 13 \text{ L HCl at STP}$	13 L HCl @ STP	11
8.) $\dfrac{25.75 \text{ g Ca(OH)}_2}{1} \times \dfrac{1 \text{ mol Ca(OH)}_2}{74.10 \text{ g Ca(OH)}_2} \times \dfrac{1 \text{ mol CaO}}{1 \text{ mol Ca(OH)}_2} \times \dfrac{56.08 \text{ g CaO}}{1 \text{ mol CaO}} = 19.49 \text{ g CaO}$	19.49 g CaO	7

KEY

Solutions	Quick Answer	QR Code on Card #
9.) $Zn + H_2SO_4 \longrightarrow ZnSO_4 + H_2$ $\dfrac{95.0 \text{ g Zn}}{1} x \dfrac{1 \text{ mol Zn}}{65.39 \text{ g Zn}} x \dfrac{1 \text{ mol H}_2}{1 \text{ mol Zn}} x \dfrac{22.4 \text{ L H}_2}{1 \text{ mol H}_2} = 32.5 \text{ L H}_2 \text{ at STP}$	32.5 L H_2 @ STP	10
10.) $\dfrac{13.6 \text{ mol CaO}}{1} x \dfrac{2 \text{ mol Ca}}{2 \text{ mol CaO}} x \dfrac{40.08 \text{ g Ca}}{1 \text{ mol Ca}} = 545 \text{ g Ca}$	545 g Ca	2
11.) $P_4 + 5 O_2 \longrightarrow P_4O_{10}$ $\dfrac{74.3 \text{ g P}_4}{1} x \dfrac{1 \text{ mol P}_4}{123.88 \text{ g P}_4} x \dfrac{1 \text{ mol P}_4O_{10}}{1 \text{ mol P}_4} x \dfrac{141.94 \text{ g P}_4O_{10}}{1 \text{ mol P}_4O_{10}} = 85.1 \text{ g P}_4O_{10}$	85.1 g P_4O_{10}	13
12.) $\dfrac{200. \text{ mol H}_2}{1} x \dfrac{2 \text{ mol H}_2O}{2 \text{ mol H}_2} = 200. \text{ mol H}_2O$	200. mol H_2O	3
13.) $S + O_2 \longrightarrow SO_2$ $\dfrac{40.0 \text{ g SO}_2}{1} x \dfrac{1 \text{ mol SO}_2}{64.07 \text{ g SO}_2} x \dfrac{1 \text{ mol O}_2}{1 \text{ mol SO}_2} x \dfrac{32.00 \text{ g O}_2}{1 \text{ mol O}_2} = 20.0 \text{ g O}_2$	20.0 g O_2	12
14.) $\dfrac{7.00 \text{ mol AgNO}_3}{1} x \dfrac{1 \text{ mol Cu(NO}_3)_2}{2 \text{ mol AgNO}_3} x \dfrac{187.57 \text{ g Cu(NO}_3)_2}{1 \text{ mol Cu(NO}_3)_2} = 656 \text{ g Cu(NO}_3)_2$	656 g Cu(NO$_3$)$_2$	6
15.) $C_3H_8 + 5 O_2 \longrightarrow 3 CO_2 + 4 H_2O$ $\dfrac{17.6 \text{ L C}_3H_8}{1} x \dfrac{1 \text{ mol C}_3H_8}{22.4 \text{ L C}_3H_8} x \dfrac{5 \text{ mol O}_2}{1 \text{ mol C}_3H_8} = 3.93 \text{ mol O}_2 \text{ at STP}$	3.93 mol O_2 @ STP	4
16.) $CO_2 + NH_3 + H_2O \longrightarrow NH_4HCO_3$ $\dfrac{4575 \text{ L NH}_3}{1} x \dfrac{1 \text{ mol NH}_3}{22.4 \text{ L NH}_3} x \dfrac{1 \text{ mol NH}_4HCO_3}{1 \text{ mol NH}_3} x \dfrac{79.07 \text{ g NH}_4HCO_3}{1 \text{ mol NH}_4HCO_3} x \dfrac{1 \text{ kg NH}_4HCO_3}{1000 \text{ g NH}_4HCO_3} = 16.15 \text{ kg NH}_4HCO_3 \text{ @ STP}$	16.15 kg NH_4HCO_3 @ STP	8