

Solids 3

Essential Pre-Uni Chemistry B4.3

Subject & topics: Chemistry | Foundations | Stoichiometry **Stage & difficulty:** GCSE C2, A Level P1

Calculate the amount of substance in:

Part A

(a)

1.001 g of CaCO_3 (s), to 3 significant figures

Part B

(b)

197 kg of Au (s), to 3 significant figures

Part C

(c)

1.4 g of CO (g), to 2 significant figures

Part D
(d)

2.006 kg of Hg(l), to 4 significant figures

Part E
(e)

11.1 g of lithium carbonate, to 3 significant figures

Part F
(f)

10.0 mg of lead(II) iodide, to 3 significant figures

Reactions 1

Essential Pre-Uni Chemistry B6.1

Subject & topics: Chemistry | Foundations | Stoichiometry Stage & difficulty: GCSE P2, A Level P1

Calculate the amount of oxygen needed, and amount of carbon dioxide produced, in each of the cases below.

Part A



Calculate the amount of oxygen needed.

Calculate the amount of carbon dioxide produced.

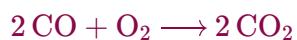
Part B



Calculate the amount of oxygen needed.

Calculate the amount of carbon dioxide produced.

Part C



$\text{2CO} + \text{O}_2 \longrightarrow \text{2CO}_2$, using 4.0 moles of CO

Calculate the amount of oxygen needed:

Calculate the amount of carbon dioxide produced:

Part D



$\text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{O}_2 \longrightarrow 6 \text{CO}_2 + 6 \text{H}_2\text{O}$, using 0.040 moles of $\text{C}_6\text{H}_{12}\text{O}_6$

Calculate the amount of oxygen needed:

Calculate the amount of carbon dioxide produced:

Part E



$\text{C}_2\text{H}_4\text{O}_2 + 2 \text{O}_2 \longrightarrow 2 \text{CO}_2 + 2 \text{H}_2\text{O}$, using 0.10 moles of $\text{C}_2\text{H}_4\text{O}_2$

Calculate the amount of oxygen needed:

Calculate the amount of carbon dioxide produced:

Question deck:

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Reactions 2

Essential Pre-Uni Chemistry B6.2

Subject & topics: Chemistry | Foundations | Stoichiometry **Stage & difficulty:** GCSE C2, A Level P1

By considering a balanced equation each time, calculate the amount of water produced by complete combustion of the following in oxygen.

Part A

(a)

1 mole of pentane, C_5H_{12}

Part B

(b)

2.5 moles of heptane, C_7H_{16}

Part C

(c)

200 moles of hydrogen, H_2

Part D
(d)

4.0 moles of butane

Part E
(e)

0.0030 moles of methane

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Reactions 3

Essential Pre-Uni Chemistry B6.3

Subject & topics: Chemistry | Foundations | Stoichiometry **Stage & difficulty:** GCSE C2, A Level P1

Consider the equation for each reaction and hence calculate the amount of acid required for complete reaction in each of the following cases.

Part A

(a)

0.10 mol NaOH reacting with H₂SO₄. Give your answer to 2 significant figures.

Part B

(b)

HCl reacting with 20 g of CaCO₃. Give your answer to 2 significant figures.

Part C

(c)

24 g CuO reacting with HNO₃. Give your answer to 2 significant figures.

Part D
(d)

5.6 g Fe reacting with HCl. Give your answer to 2 significant figures.

Part E
(e)

14.8 g of calcium hydroxide reacting with H₂SO₄. Give your answer to 3 significant figures.

Part F
(f)

10 g of magnesium oxide reacting with nitric acid. Give your answer to 2 significant figures.

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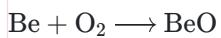
Balancing Equations

Subject & topics: Chemistry | Foundations | Stoichiometry **Stage & difficulty:** A Level P1

Part A

Be and O

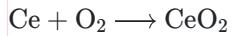
Balance the following equation, reducing coefficients to the smallest possible integers:



Part B

Ce and O

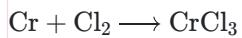
Balance the following equation, reducing coefficients to the smallest possible integers:



Part C

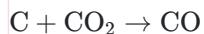
Cr and Cl

Balance the following equation, reducing coefficients to the smallest possible integers:



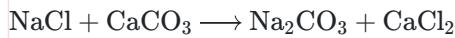
Part D
C and CO₂

Balance the following equation, reducing coefficients to the smallest possible integers:



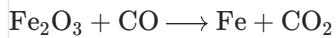
Part E
NaCl and CaCO₃

Balance the following equation, reducing coefficients to the smallest possible integers:



Part F
Fe₂O₃ and CO

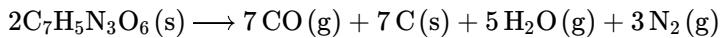
Balance the following equation, reducing coefficients to the smallest possible integers:



TNT

Subject & topics: Chemistry | Foundations | Stoichiometry **Stage & difficulty:** A Level P2

TNT is used as an explosive. It can decompose according to the following equation:



Part A

RMM

Calculate the relative molecular mass of TNT, rounding your answer to an integer.

Part B

Moles of gas

The volume of gas produced at 400 °C, when 10 g of TNT explode, is to be calculated.

How many moles of gas are produced from 1 mol of TNT?

Part C

Volume of gas

At 400 °C and 1 atm, 1 mol of gas occupies 55 dm³.

Calculate the volume of gas produced under these conditions from 10 g of TNT.

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Gases 1

Essential Pre-Uni Chemistry B3.1

Subject & topics: Chemistry | Foundations | Stoichiometry **Stage & difficulty:** GCSE C2, A Level P1

RTP = room temperature and pressure.

Any gas occupies 24 dm^3 per mole at RTP.

Avogadro's number, $N_A = 6.02 \times 10^{23} \text{ mol}^{-1}$.

Part A

(a)

Calculate the volume occupied by 4.0 moles of gas at RTP.

Part B

(b)

Calculate the volume occupied by 0.030 moles of gas at RTP.

Part C

(c)

Calculate the volume occupied by 5.0×10^{18} atoms of helium gas at RTP.

Part D
(d)

Calculate the volume occupied by 1.2×10^{24} molecules of ozone at RTP.

Part E
(e)

Calculate the volume occupied by 8.0 g of O₂ at RTP.

Part F
(f)

Calculate the volume occupied by 1.1 kg of carbon dioxide at RTP.

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Gases 2

Essential Pre-Uni Chemistry B3.2

Subject & topics: Chemistry | Foundations | Stoichiometry **Stage & difficulty:** GCSE P2, A Level P1

RTP = room temperature and pressure.

Any gas occupies 24 dm^3 per mole at RTP.

Avogadro's number, $N_A = 6.02 \times 10^{23}$.

Part A

(a)

Calculate the amount of gas (at RTP) in 4.8 dm^3 .

Part B

(b)

Calculate the amount of gas (at RTP) in 12 m^3 .

Part C

(c)

Calculate the amount of gas (at RTP) in 400 cm^3 . Give your answer to 2 significant figures.

Part D
(d)

Calculate the amount of gas (at RTP) in 18 ml.

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Gases 5

Essential Pre-Uni Chemistry B3.5

Subject & topics: Chemistry | Foundations | Stoichiometry **Stage & difficulty:** GCSE C2, A Level P1

RTP = room temperature and pressure.

Any gas occupies 24 dm³ per mole at RTP.

Avogadro's number, $N_A = 6.02 \times 10^{23}$.

Part A

(a)

Calculate the mass of 1.0 m³ of neon at RTP.

Part B

(b)

Calculate the mass of 20 cm³ of (CH₃)₂O at RTP.

Part C

(c)

Calculate the mass of 420 cm³ of ammonia at RTP. Give your answer to 2 significant figures.

Question deck:

STEM SMART Chemistry Week 5

Compounds TBC

Subject & topics: Chemistry | Foundations | Stoichiometry **Stage & difficulty:** A Level C2

When calcium oxide is heated with carbon, an ionic compound, **D**, containing 62.5% of calcium and 37.5% of carbon (by mass), is formed. Under similar conditions, aluminium metal and carbon produce compound **E** which contains 75% of aluminium and 25% of carbon.

When treated with cold water:

- compound **D** produces a gaseous hydrocarbon **F** containing 92.3% of carbon
- compound **E** produces another gaseous hydrocarbon **G** containing 75% of carbon

Part A

D

Determine the empirical formula of compound **D**.

Part B

E

Determine the empirical formula of compound **E**.

Part C

F

Determine the empirical formula of compound F.

Part D

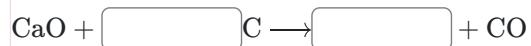
G

Determine the empirical formula of compound G.

Part E

Reaction to form D

Write a balanced equation for the reaction of calcium oxide with carbon, using the empirical formula for D you have previously deduced.



Items:

- 1
- 2
- 3
- 4
- 5
- D
- 2D
- 3D
- 4D
- 5D

Part F**Reaction to form E**

Write a balanced equation for the reaction of aluminium metal and carbon to form **E** (do not include state symbols).

Part G**Reaction of E with water**

Assuming the empirical formula you deduced for **G** is also its molecular formula, write a balanced equation for the reaction when compound **E** is treated with water.



Items:

- 1 2 3 4 6 8 12

Adapted with permission from UCLES, A Level Chemistry, November 1990, Special Paper, Question 5