

Stoichiometry

Question Paper 1

Level	IGCSE
Subject	Chemistry (0620/0971)
Exam Board	Cambridge International Examinations (CIE)
Topic	Stoichiometry
Sub-Topic	Stoichiometry
Booklet	Question Paper 1

Time Allowed: 35 minutes

Score: /29

Percentage: /100

Grade Boundaries:

9	8	7	6	5	4	3	2	1
>85%	75%	68%	60%	53%	48%	40%	33%	<25%

- 1 For each atom of carbon present in a molecule, there is an equal number of atoms of oxygen but twice as many atoms of hydrogen.

What is the formula of the molecule?

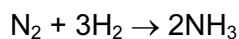
- A** C₂H₂O₂ **B** C₂H₂O₄ **C** C₂H₄O₂ **D** C₂H₆O

- 2 Water is formed when 48 g of oxygen combine with 6 g of hydrogen.

What mass of oxygen combines with 2 g of hydrogen?

- A** 12 g **B** 16 g **C** 96 g **D** 144 g

- 3 Nitrogen and hydrogen react together to form ammonia.



When completely converted, 7 tonnes of nitrogen gives 8.5 tonnes of ammonia.

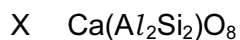
How much nitrogen will be needed to produce 34 tonnes of ammonia?

- A** 7 tonnes **B** 8.5 tonnes **C** 28 tonnes **D** 34 tonnes

- 4 Which relative molecular mass, M_r , is **not** correct for the molecule given?

	molecule	M_r
A	ammonia, NH ₃	17
B	carbon dioxide, CO ₂	44
C	methane, CH ₄	16
D	oxygen, O ₂	16

5 The chemical compositions of two substances, W and X, are given.

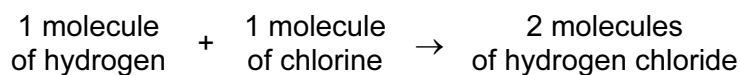


Which statements are correct?

- 1 W and X contain the same amount of oxygen.
- 2 W contains three times as much silicon as X.
- 3 X contains twice as much aluminium as W.

A 1 and 2 **B** 1 and 3 **C** 2 and 3 **D** 1, 2 and 3

6 Hydrogen and chlorine react as shown.



What is the equation for this reaction?

- A** $2\text{H} + 2\text{Cl} \rightarrow 2\text{HCl}$
- B** $2\text{H} + 2\text{Cl} \rightarrow \text{H}_2\text{Cl}_2$
- C** $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$
- D** $\text{H}_2 + \text{Cl}_2 \rightarrow \text{H}_2\text{Cl}_2$

7 The relative formula mass, M_r , of copper(II) sulfate, CuSO_4 , is 160.

Which mass of sulfur is present in 160 g of copper(II) sulfate?

A 16 g **B** 32 g **C** 64 g **D** 128 g

8 What is the relative molecular mass (M_r) of HNO_3 ?

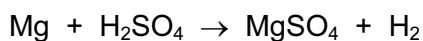
A 5 **B** 31 **C** 32 **D** 63

- 9 A compound has the formula $\text{CH}_3\text{CO}_2\text{H}$.

How should the relative molecular mass, M_r , of this compound be calculated?

- A** $12 + 1 + 16$
B $3(12 + 1) + 2(12 + 16) + 1$
C $(4 \times 12) + (2 \times 1) + 16$
D $(2 \times 12) + (4 \times 1) + (2 \times 16)$

- 10 The equation for the reaction between magnesium and dilute sulfuric acid is shown.



M_r of MgSO_4 is 120

Which mass of magnesium sulfate will be formed if 12 g of magnesium are reacted with sulfuric acid?

- A** 5 g **B** 10 g **C** 60 g **D** 120 g
- 11 Methane, CH_4 , burns in the air to form carbon dioxide and water.

What is the balanced equation for this reaction?

- A** $\text{CH}_4(\text{g}) + \text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{g})$
B $\text{CH}_4(\text{g}) + 2\text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{g})$
C $\text{CH}_4(\text{g}) + 2\text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{g})$
D $\text{CH}_4(\text{g}) + 3\text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{g})$

12 The formulae of compounds W, X and Y are shown.



Which statement is correct?

- A W contains twice as many hydrogen atoms as oxygen atoms.
- B X contains the most oxygen atoms.
- C Y contains the most hydrogen atoms.
- D Y contains the same number of hydrogen and oxygen atoms.

13 Which relative molecular mass, M_r , is **not** correct for the molecule given?

	molecule	M_r
A	ammonia, NH_3	17
B	carbon dioxide, CO_2	44
C	methane, CH_4	16
D	oxygen, O_2	16

14 A compound with the formula XF_2 has a relative formula mass of 78.

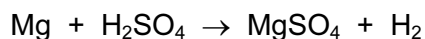
What is element X?

- A argon
- B calcium
- C neon
- D zirconium

15 What is the balanced chemical equation for the reaction between calcium and water?

- A $\text{Ca} + \text{H}_2\text{O} \rightarrow \text{CaOH} + \text{H}_2$
- B $\text{Ca} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2 + \text{H}_2$
- C $\text{Ca} + 2\text{H}_2\text{O} \rightarrow \text{CaOH} + \text{H}_2$
- D $\text{Ca} + 2\text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2 + \text{H}_2$

- 16 The equation shows the reaction between magnesium and sulfuric acid.



(Mg = 24, H = 1, S = 32, O = 16)

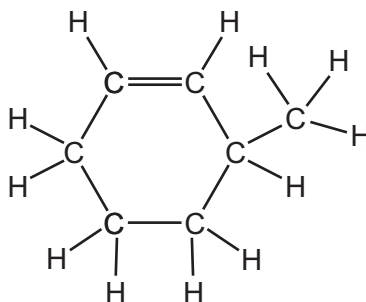
In this reaction, what mass of magnesium sulfate will be formed when 6 g of magnesium reacts with excess sulfuric acid?

- A** 8 **B** 24 **C** 30 **D** 60
- 17 Iron forms an oxide with the formula Fe_2O_3 .

What is the relative formula mass of this compound?

- A** 76 **B** 100 **C** 136 **D** 160

- 18 The structure of an organic compound, X, is shown.



What is the molecular formula of X?

- A** C_6H_9 **B** C_6H_{12} **C** C_7H_{12} **D** C_7H_{14}
- 19 What is the relative molecular mass, M_r , of nitrogen dioxide?

- A** 15 **B** 23 **C** 30 **D** 46

- 20 In athletics, banned drugs such as nandrolone have been taken illegally to improve performance. Nandrolone has the molecular formula $C_{18}H_{26}O_2$.

What is the relative molecular mass, M_r , of nandrolone?

(Relative atomic mass: H = 1; C = 12; O = 16)

- A** 46 **B** 150 **C** 274 **D** 306

- 21 A compound contains one atom of calcium, two atoms of hydrogen and two atoms of oxygen.

What is the correct chemical formula of the compound?

- A** CaO_2H_2 **B** $HOCaOH$ **C** H_2CaO_2 **D** $Ca(OH)_2$

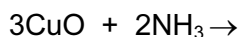
- 22 Two atoms of magnesium, Mg, react with one molecule of oxygen, O_2 .

What is the formula of the product?

- A** MgO **B** MgO_2 **C** Mg_2O **D** Mg_2O_2

- 23 Copper(II) oxide reacts with ammonia.

The left hand side of the balanced equation for this reaction is:



What completes the equation?

- A** $3Cu + 2HNO_3$
B $3Cu + 2N + 3H_2O$
C $3Cu + N_2 + 3H_2O$
D $3Cu + 2NO + 3H_2O$

24 What is the relative formula mass, M_r , of CaCO_3 ?

- A** 50 **B** 68 **C** 100 **D** 204

25 A molecule, Z, contains two atoms of oxygen, six atoms of hydrogen and three atoms of carbon.

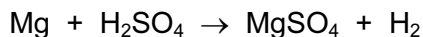
What is the formula of Z?

- A** $\text{CH}_3\text{CH}_2\text{CHO}$
B CH_3COCH_3
C $\text{C}_2\text{H}_5\text{CO}_2\text{H}$
D $\text{C}_3\text{H}_6\text{CO}_2\text{H}$

26 Aluminium oxide has the formula Al_2O_3 .

Which statement about aluminium oxide is correct?

- A** 2g of aluminium atoms are combined with 3g of oxygen atoms.
B 2g of aluminium atoms are combined with 3g of oxygen molecules.
C Aluminium oxide has a relative molecular mass of 102.
D Pure aluminium oxide contains a higher mass of oxygen than of aluminium.
- 27 The equation shows the reaction between magnesium and sulfuric acid.
[A_r : H, 1; O, 16; Mg, 24; S, 32]



In this reaction, which mass of magnesium sulfate is formed when 6g of magnesium react with excess sulfuric acid?

- A** 8 **B** 24 **C** 30 **D** 60

28 The compound magnesium nitrate has the formula $\text{Mg}(\text{NO}_3)_2$.

What is the relative formula mass of magnesium nitrate?

- A** 86 **B** 134 **C** 148 **D** 172

29 Which quantities of chemicals will react exactly with no reactants left over?

- A** 12 g of carbon and 12 g of oxygen
B 12 g of carbon and 48 g of oxygen
C 12 g of magnesium and 16 g of oxygen
D 24 g of magnesium and 16 g of oxygen