

Stoichiometry

Question Paper 2

Level	IGCSE
Subject	Chemistry (0620/0971)
Exam Board	Cambridge International Examinations (CIE)
Topic	Stoichiometry
Sub-Topic	Stoichiometry
Booklet	Question Paper 2

Time Allowed: 27 minutes

Score: /22

Percentage: /100

Grade Boundaries:

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

1 What is the relative molecular mass, M_r , of butanol?

- A** 15 **B** 37 **C** 74 **D** 148

2 The equation shows the thermal decomposition of magnesium carbonate ($M_r = 84$).



Which mass of magnesium oxide is formed when 21.0 g of magnesium carbonate are completely decomposed?

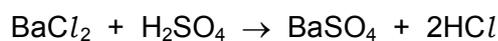
- A** 1.9g **B** 4.0g **C** 10.0g **D** 40.0g

3 A compound with the formula XO_2 has a relative formula mass of 64.

What is X?

- A** cadmium
B copper
C gadolinium
D sulfur

- 4 The equation for the reaction between barium chloride solution and dilute sulfuric acid is shown.



Which row shows the state symbols for this equation?

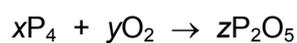
	BaCl_2	H_2SO_4	BaSO_4	2HCl
A	(aq)	(aq)	(s)	(aq)
B	(aq)	(l)	(s)	(aq)
C	(l)	(aq)	(s)	(l)
D	(aq)	(l)	(aq)	(l)

- 5 A compound is analysed and found to contain 85.7% carbon and 14.3% hydrogen.

What is its empirical formula?

- A** CH **B** CH_2 **C** C_2H_4 **D** C_6H

- 6 The equation for the reaction between phosphorus and oxygen is shown.



Which values of x, y and z balance the equation?

	x	y	z
A	1	5	2
B	1	10	2
C	2	5	2
D	2	10	1

- 7 The relative molecular mass of an alcohol is 88.

Its percentage composition by mass is: C, 54.5%; H, 9.1%; O, 36.4%.

Which row shows the empirical formula and molecular formula for this alcohol?

	empirical formula	molecular formula
A	C ₂ H ₄ O	C ₂ H ₄ O
B	C ₂ H ₄ O	C ₄ H ₈ O ₂
C	C ₄ H ₈ O ₂	C ₄ H ₈ O ₂
D	C ₄ H ₈ O ₂	C ₂ H ₄ O

- 8 The equation represents the reaction between solid magnesium oxide and dilute hydrochloric acid to form magnesium chloride and water.



Which row shows the state symbols for hydrochloric acid, magnesium chloride and water?

	HCl	MgCl ₂	H ₂ O
A	(aq)	(aq)	(l)
B	(aq)	(l)	(l)
C	(l)	(aq)	(aq)
D	(l)	(l)	(aq)

- 9 A compound contains 34.5% calcium, 24.1% silicon and 41.4% oxygen by mass.

What is its empirical formula?

- A** Ca₂SiO₃ **B** CaSiO₃ **C** CaSi₂O₃ **D** CaSiO₆

10 What is the relative formula mass of ammonium nitrate, NH_4NO_3 ?

- A 80 B 108 C 122 D 150

11 When chlorine reacts with hot concentrated aqueous sodium hydroxide one of the products formed is sodium chlorate(V).

The formula of sodium chlorate(V) is NaClO_3 .

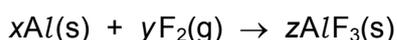
What is the relative formula mass of sodium chlorate(V), NaClO_3 ?

- A 52.0 B 74.5 C 106.5 D 223.5

12 What is the relative formula mass of aluminium oxide, Al_2O_3 ?

- A 43 B 70 C 102 D 113

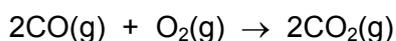
13 Aluminium reacts with fluorine.



Which values of x , y and z balance the equation?

	x	y	z
A	1	2	1
B	2	3	2
C	3	2	3
D	4	3	4

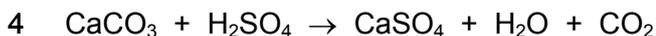
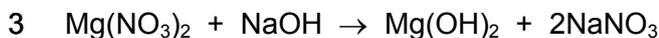
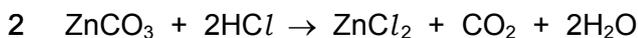
14 Carbon monoxide burns in oxygen to produce carbon dioxide.



Which mass of carbon dioxide is produced from 14 g of carbon monoxide?

- A 22g B 28g C 44g D 88g

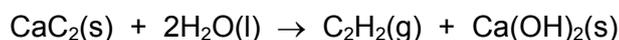
15 Which equations are balanced?



A 1 and 2 B 1 and 4 C 2 and 3 D 3 and 4

16 Calcium carbide, CaC_2 , reacts with water to form ethyne, C_2H_2 , and calcium hydroxide.

The equation for the reaction is shown.

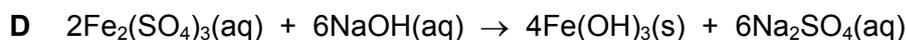
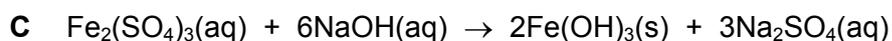
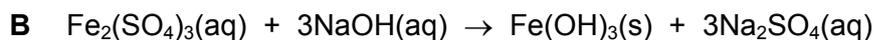
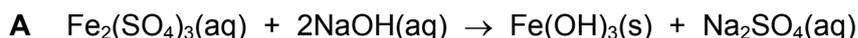


Which volume of ethyne is produced when 6 g of water react completely with calcium carbide?

A 4 dm^3 B 8 dm^3 C 36 dm^3 D 72 dm^3

17 Aqueous iron(III) sulfate and aqueous sodium hydroxide react to give a precipitate of iron(III) hydroxide and a solution of sodium sulfate.

What is the balanced equation for this reaction?



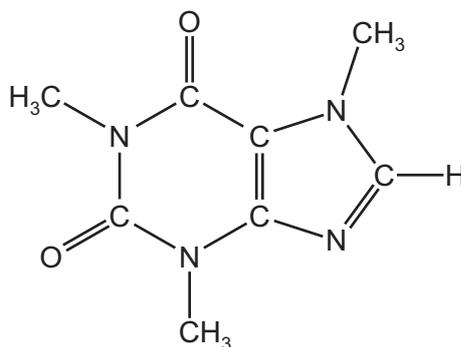
18 The equation for the reaction between sodium carbonate and dilute hydrochloric acid is shown.



What is the maximum volume of carbon dioxide produced when 26.5 g of sodium carbonate react with dilute hydrochloric acid?

A 6 dm^3 B 12 dm^3 C 18 dm^3 D 24 dm^3

19 Caffeine is a stimulant found in coffee.



caffeine

Which formula represents caffeine?

- A** $C_7H_{10}N_4O_2$
 B $C_8H_{10}N_3O_2$
 C $C_8H_{10}N_4O_2$
 D $C_8H_{11}N_4O_2$

20 The formulae of some ions are shown.

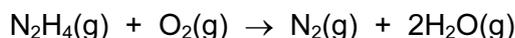
positive ions	negative ions
Al^{3+}	Br^-
Ca^{2+}	CO_3^{2-}
Cu^{2+}	NO_3^-
Fe^{3+}	S^{2-}
K^+	SO_4^{2-}

In which row is the formula **not** correct?

	compound	formula
A	aluminium sulfate	$Al_2(SO_4)_3$
B	calcium nitrate	$Ca(NO_3)_2$
C	iron(III) bromide	Fe_3Br
D	potassium sulfide	K_2S

21 The gas hydrazine has the molecular formula N_2H_4 .

Hydrazine burns in air to form nitrogen gas and steam.



Which statements are correct?

- 1 1 mole of hydrazine gives 72 dm^3 of gaseous products when it reacts with oxygen at room temperature and pressure.
- 2 The empirical formula of hydrazine is NH_2 .
- 3 The total number of atoms in 1 mole of hydrazine is $6 \times$ the Avogadro constant.
- 4 The volume of 1 mole of hydrazine at room temperature and pressure is $6 \times 24 \text{ dm}^3$.

A 1, 2 and 3 **B** 1 and 2 only **C** 2, 3 and 4 **D** 3 and 4 only

22 Copper(II) carbonate is broken down by heating to form copper(II) oxide and carbon dioxide gas.

The equation for the reaction is shown.



31.0 g of copper(II) carbonate are heated until all of the contents of the test-tube have turned from green to black.

The yield of copper(II) oxide formed is 17.5 g.

What is the percentage yield?

A 19.02% **B** 21.88% **C** 56.50% **D** 87.50%