OCR GCSE GATEWAY CHEMISTRY A · J248

CHEMISTRY



EXAM QUESTION PACK

C4.2 IDENTIFYING THE PRODUCTS OF CHEMICAL REACTIONS

SCORE	PERCENTAGE
/63	%

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Gateway Chemistry A (9-1)

Identifying the products of chemical reactions

Please note that you may see slight differences between this paper and the original.

Candidates answer on the Question paper.

OCR supplied materials:
Additional resources may be supplied with this paper.

Other materials required:
- Pencil
- Ruler (cm/mm)

Duration: Not set

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions, unless your teacher tells you otherwise.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Where space is provided below the question, please write your answer there.
- You may use additional paper, or a specific Answer sheet if one is provided, but you must clearly show your candidate number, centre number and question number(s).

INFORMATION FOR CANDIDATES

- The quality of written communication is assessed in questions marked with either a pencil or an asterisk. In History and Geography a *Quality of extended response* question is marked with an asterisk, while a pencil is used for questions in which *Spelling, punctuation and grammar and the use of specialist terminology* is assessed.
- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this paper is **63**.
- The total number of marks may take into account some 'either/or' question choices.

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1 A student adds sodium hydroxide solution to a small sample of copper(II) chloride solution.

A precipitate is made.

What is the colour of the precipitate?

A blue
B green
C orange
D white

Your answer ☐

[1]

2 A student is testing sodium carbonate solution.

She adds barium chloride solution followed by excess dilute hydrochloric acid.

Which of these observations would **not** be seen?

A colourless solution at the end
B gas bubbles when the dilute acid is added
C white precipitate formed when the dilute acid is added
D white precipitate formed when the barium chloride solution is added

Your answer ☐

[1]

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3(a) Chemical tests are used to identify gases, anions and cations.

Draw straight lines to match the **gas** to the correct **chemical test** used in analysis.

gas	chemical test
	relights a glowing splint
carbon dioxide	turns moist red litmus blue
chlorine	turns moist blue litmus red and then white
ammonia	turns acidified potassium manganate(VII) solution olourless
hydrogen	turns lime water milky
oxygen	burns with a squeaky pop
	turns moist pH paper green

[5]

(b) Fahmida uses the flame test to identify the cations in a solid.

Describe how Fahmida should do a flame test.

---

[3]

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(c) Fahmida does three chemical tests on an unknown solution.

Look at her results.

Chemical test	Result
pH probe	pH value is 3
dilute hydrochloric acid followed by barium chloride solution	white precipitate
dilute nitric acid followed by silver nitrate solution	white precipitate

Which ions are present in the solution?

Choose from:

calcium **hydrogen** **iron(II)** **chloride** **sulfate**

Explain your answer.

---

[4]

4 A student is testing sodium carbonate solution.

She adds barium chloride solution followed by excess dilute hydrochloric acid.

Which of these observations would **not** be seen?

A colourless solution at the end
B gas bubbles when the dilute acid is added
C white precipitate formed when the dilute acid is added
D white precipitate formed when the barium chloride solution is added

Your answer ☐

[1]

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5 Chemical tests are used to identify gases, anions and cations.

Leila has an unknown solution.

She thinks that the solution contains copper(II) ions and bromide ions.

Describe the chemical tests she does to confirm the presence of these two ions in the solution.

[4]

6 Jed is testing potassium chloride and some unknown compounds.

He does some tests.

These are the tests that Jed does on solutions of the compounds:

- a flame test
- adding sodium hydroxide solution
- adding silver nitrate solution.

Look at his results.

Compound	Flame colour	Adding sodium hydroxide solution	Adding silver nitrate solution
potassium chloride	lilac	no reaction	white solid made
A	yellow	no reaction	white solid made
B	no colour	green solid made	cream solid made

Potassium chloride reacts with silver nitrate to make silver chloride and potassium nitrate.

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Write a **word** equation for this reaction.

Identify the unknown compounds **A** and **B** and explain your answers.

The quality of written communication will be assessed in your answer to this question.

[6]

7 Baking powder helps cakes rise.

Baking powder contains sodium hydrogencarbonate, $NaHCO_3$.

(i) Write down the number of different **elements** in sodium hydrogencarbonate.

answer _____

[1]

(ii) Chloe thinks that carbon dioxide is given off when sodium hydrogencarbonate is heated.

Describe how Chloe can show that carbon dioxide gas is given off.

[2]

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8 Pete analyses two water samples.

Look at Pete's results.

Sample	Addition of sodium hydroxide solution	Addition of barium chloride solution
A	blue solid made	white solid made
B	brown solid made	no reaction

Pete thinks that sample **A** is copper sulfate.

He thinks that sample **B** is iron(III) sulfate.

Is Pete right about **each** sample?

Explain your answer.

---

[4]

9 Pete analyses two samples.

Look at Pete's results.

Sample	Addition of sodium hydroxide solution	Addition of barium chloride solution
A	blue solid made	white solid made
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Pete thinks that sample **A** is copper sulfate.

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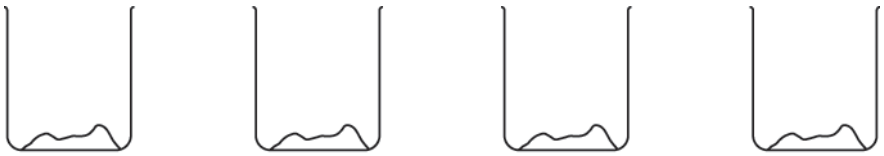
Is Pete right about **each** sample?

Explain your answer.

---

[4]

10 Oskar has four beakers containing different solids.



solid **A** solid **B** solid **C** solid **D**

He dissolves each solid in water to make a solution.

He tests each solution and records the results in a table.

Look at his results.

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Test	Result with A	Result with B	Result with C	Result with D
Reaction with barium chloride solution	no precipitate	no precipitate	white precipitate	white precipitate
Reaction with silver nitrate solution	cream precipitate	white precipitate	no precipitate	white precipitate
Reaction with sodium hydroxide solution	colourless solution	blue precipitate	blue precipitate	green precipitate

Oskar makes a conclusion.



Which solid was a mixture of two compounds?

Explain how Oskar came to this conclusion.

---[1]

11 Copper reacts with oxygen, O_2.

Copper oxide, CuO, is made.

Write a **balanced symbol** equation for this reaction.

---[2]

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12 Baking powder is used in cake mixes.

Baking powder makes carbon dioxide when heated.

Write about the chemical test for carbon dioxide.

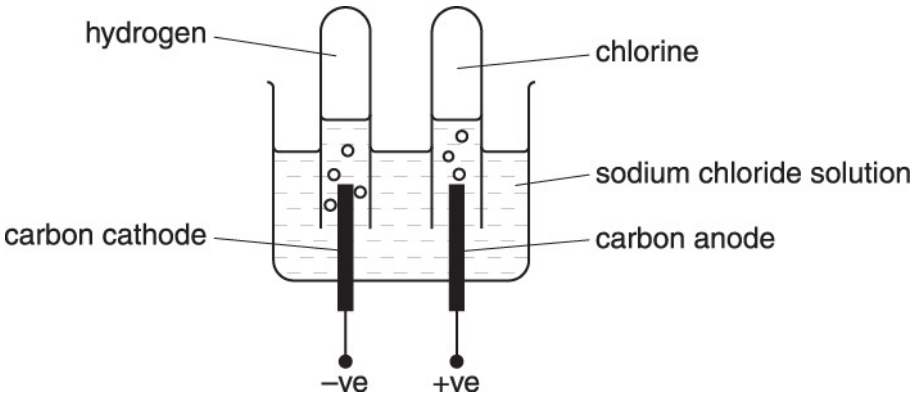
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[2]

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13(a) Molly investigates passing an electric current through sodium chloride solution.

Look at the apparatus she uses.



Look at the list. It shows the particles in sodium chloride solution.

H^+

H_2O

$OH^?$

$Cl^?$

Na^+

Which particle is a **molecule**?

Choose from the list.

answer _____

[1]

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(b) Chlorine is made in this experiment.

What is the **test** for chlorine gas?

---

[2]

14 Oskar investigates the thermal decomposition of zinc carbonate.

zinc carbonate → zinc oxide + carbon dioxide

Oskar wants to check that carbon dioxide is made during the reaction.

What is the chemical test for carbon dioxide?

---

[2]

15 Coal is a fossil fuel. It is a non-renewable fuel.

Karen burns some coal.

She wants to find out if any carbon dioxide is made.

Describe the chemical test she uses.

Name of chemical _____

Effect of carbon dioxide on the chemical _____

---

[2]

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16 Which statement describes the test for **chlorine gas**?

A A lighted splint makes a squeaky pop.
B Limewater turns milky.
C A glowing splint re-lights.
D Damp litmus paper is bleached.

Your answer [ ] [1]

17 The electrolysis of concentrated sodium chloride solution (brine) makes:

- hydrogen
- chlorine
- sodium hydroxide.

(i) Write down one **use** of **chlorine**.

---------- [1]

(ii) Describe the chemical test for chlorine and write down what you would see.

---------- ---------- ---------- [2]

18 Which statement describes the properties of **transition metals**?

A High melting point, shiny when freshly cut and brittle.
B Good conductors of electricity, low density and low melting point.
C Good conductors of electricity, strong and malleable.
D Strong, malleable and low density.

Your answer [ ] [1]

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19 Which statement describes the **advantages** of instrumental methods of analysis?

A Instruments can analyse very small amounts and carry out the analyses slowly.
B Instruments are very accurate and use large amounts of substances.
C Instruments are very accurate and carry out the analyses slowly.
D Instruments are very accurate and can run all the time.

Your answer [ ] [1]

20 A student tests a solution for **chloride ions**.

She adds dilute nitric acid to the solution. She then adds a few drops of silver nitrate solution.

Why does she need to add dilute nitric acid in this test?

A To increase the pH of the solution.
B Nitrate ions are needed for the test to work.
C To make sure that no carbonate ions are present.
D The test only works in alkaline conditions.

Your answer [ ] [1]

21 Which statement about a **mass spectrum** of a molecule is correct?

A Each peak represents an atom in the molecule.
B The charge to mass ratio of the molecular ion peak is equal to the relative formula mass of the molecule.
C The peak with the highest relative abundance represents the molecular ion.
D The peak on the far right of the spectrum represents the molecular ion.

Your answer [ ] [1]

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22 A student adds a few drops of sodium hydroxide solution to an unknown solution and a blue precipitate is made.

Which metal ion is present in the original solution?

A Calcium
B Copper(II)
C Iron(II)
D Iron(III)

Your answer ☐ [1]

23 The table shows the stages in a flame test.

Stage	Process
1	Dip a nichrome wire loop into the test solution.
2	Observe and record the flame colour.
3	Clean a nichrome wire loop with hydrochloric acid, then rinse with distilled water.
4	Hold the nichrome wire loop in the edge of a roaring blue flame.

Which is the correct order for the stages in a flame test?

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

Your answer ☐ [1]

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24(a) A student investigates a white solid.

Table 17.1 shows some of the results of the tests that the student does.

	Test	Results
Test 1	flame test	a lilac flame
Test 2	dilute hydrochloric acid added	effervescence
	gas given off passed into limewater	?

Table 17.1

Which **ion** is shown to be in the white solid by the result of **Test 1**?

[1]

(b)

(i) Which **ion** is shown to be in the white solid by the result of **Test 2**?

[1]

(ii) The **gas** given off in **Test 2** is carbon dioxide, CO_2.

What is the expected result with limewater?

[1]

END OF QUESTION PAPER

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