

Name:

Date:

C8 - Test 2  
CHEMISTRY ANALYSIS  
Beginner

**GCSE**

**CHEMISTRY**

**AQA - Triple Science**

Mark

Grade

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### Materials

For this paper you must have:

- Ruler
- Pencil and Rubber
- Scientific calculator, which you are expected to use when appropriate

### Instructions

- Answer all questions
- Answer questions in the space provided
- All working must be shown

### Information

- The marks for the questions are shown in brackets

**1.** Ethene can be identified using instrumental methods.

(i) Name **one** instrumental method used to identify elements or compounds.

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(1)

(ii) Give **one** advantage of using instrumental methods compared with chemical tests.

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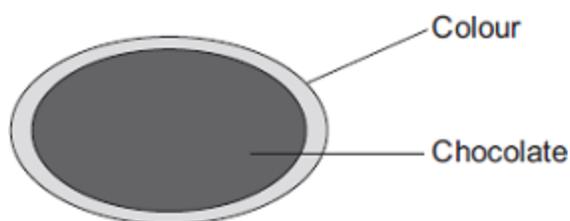
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(1)

(Total 2 marks)

**2.** Colours are used to coat some chocolate sweets.

Some of these colours are given E-numbers.



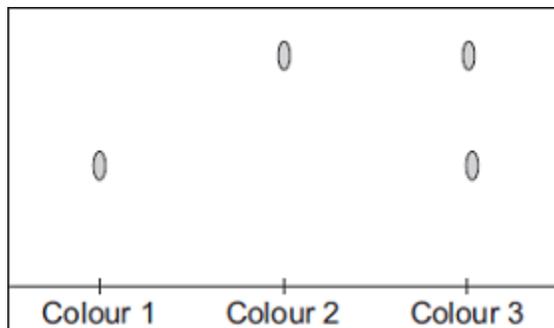
(a) Use the correct word from the box to complete the sentence.

<b>additive</b>	<b>element</b>	<b>fuel</b>
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An E-number is used to identify a permitted food \_\_\_\_\_

(1)

(b) Chromatography was used to compare three of the colours used to coat the chocolate sweets.



What do these results tell you about these three colours?

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(3)  
(Total 4 marks)

3.

A student investigated an egg shell.



Trish Steel [CC-BY-SA-2.0], via Wikimedia Commons

(a) Draw a ring around the correct answer to complete each sentence.

(i) **Test 1**

Dilute hydrochloric acid was added to the egg shell.

Carbon dioxide gas was produced which turned limewater

milky.

blue.

red.

This test shows that the egg shell must contain

carbonate ions.

chloride ions.

sulfate ions.

(2)

(ii) **Test 2**

The student then did a flame test.

He used the solution remaining after dilute hydrochloric acid was added to the egg shell.

The flame test showed that the egg shell contained calcium ions because

the flame was

red.
blue.
lilac.

(1)

- (b) Some scientists investigated the amount of lead found in egg shells. They used a modern instrumental method which was more *sensitive* and more *accurate* than older methods.

- (i) Draw a ring around the correct answer to complete the sentence.

The modern instrumental method is more *sensitive*, which means that

it can measure

larger
much larger
smaller

amounts of lead than older methods.

(1)

- (ii) Tick (✓) the meaning of more *accurate*.

	Tick (✓)
The measurement is given to more decimal places.	
The answer obtained is closer to the true value.	
The equipment used is more expensive.	

(1)

(Total 5 marks)

4.

This question is about mixtures and analysis.

(a) Which **two** substances are mixtures?

Tick **two** boxes.

Air

Carbon dioxide

Graphite

Sodium Chloride

Steel

(2)

(b) Draw **one** line from each context to the correct meaning.

**Context**

**Meaning**

**Pure** substance  
in chemistry

A substance that has had nothing  
added to it

A single element or a single compound

A substance containing only atoms which  
have different numbers of protons

**Pure** substance  
in everyday life

A substance that can be separated by  
filtration

A useful product made by mixing  
substances

(2)

(c) What is the test for chlorine gas?

Tick **one** box.

A glowing splint relights

A lighted splint gives a pop

Damp litmus paper turns white

Limewater turns milky

(1)

(d) A student tested a metal chloride solution with sodium hydroxide solution.

A brown precipitate formed.

What was the metal ion in the metal chloride solution?

Tick **one** box.

Calcium

Copper(II)

Iron(II)

Iron(III)

(1)

(Total 6 marks)

5.

This question is about chemical tests.

- (a) Solutions of copper(II) ions and iron(III) ions produce coloured precipitates with sodium hydroxide solution.

Draw **one** line from each metal ion to the colour of the precipitate it produces.

Metal ion	Colour of precipitate
Copper(II) ( $\text{Cu}^{2+}$ )	Blue
	Brown
	Green
Iron(III) ( $\text{Fe}^{3+}$ )	White

(2)

- (b) Sodium hydroxide solution was added to a solution containing ions of a metal.

A white precipitate was produced. The white precipitate dissolved in excess sodium hydroxide solution.

Use the correct answer from the box to complete the sentence.

aluminium      magnesium      potassium

The ions in the solution were ions of \_\_\_\_\_ .

(1)

(c) Low sodium salt contains sodium chloride and potassium chloride.

A student used a flame test on low sodium salt.

(i) What is the colour produced by sodium ions in a flame test?

\_\_\_\_\_

(1)

(ii) What is the colour produced by potassium ions in a flame test?

\_\_\_\_\_

(1)

(iii) Why is it **not** possible to tell from the flame test that both ions are present in low sodium salt?

\_\_\_\_\_

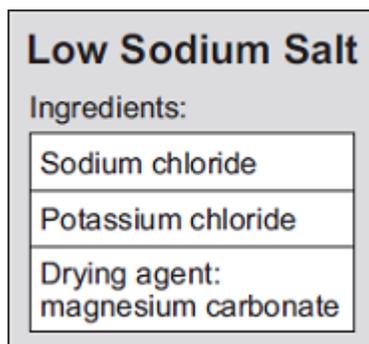
\_\_\_\_\_

(1)

(Total 6 marks)

6.

Low sodium salt is used on food. This label is from a packet of low sodium salt.



A chemist tests the low sodium salt for the substances on the label.

(a) The chemist tests for sodium ions and potassium ions using a flame test.

Draw a ring around the correct answer to complete each sentence.

(i) In a flame test, sodium ions produce a

lilac  
red  
yellow

colour.

(1)

(ii) In a flame test, potassium ions produce a

lilac
red
yellow

colour.

(1)

(b) The chemist added hydrochloric acid to low sodium salt. Carbon dioxide gas was produced.

Describe the test for carbon dioxide and give the result of the test.

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(2)

(c) The chemist made a solution of low sodium salt.

(i) Tick (✓) **one** box to show the chemical used to test for chloride ions.

	Tick (✓)
Barium chloride solution	
Silver nitrate solution	
Sodium sulfate solution	

(1)

(ii) Sodium hydroxide solution is used to test for magnesium ions.

Draw a ring around the colour of precipitate produced by this test.

**brown**

**green**

**white**

(1)

(Total 6 marks)

7. (a) The colours of fireworks are produced by chemicals.



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Three of these chemicals are lithium sulfate, potassium chloride and sodium nitrate.

- (i) A student wants to carry out flame tests on these three chemicals.

Describe how to carry out a flame test.

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(2)

- (ii) Draw **one** line from each chemical to the correct flame colour.

The first one has been done for you.

Chemical	Flame colour
<input type="checkbox"/> lithium sulfate	<input type="checkbox"/> green
<input type="checkbox"/> potassium chloride	<input type="checkbox"/> crimson
<input type="checkbox"/> sodium nitrate	<input type="checkbox"/> yellow
	<input type="checkbox"/> lilac

A line connects the 'lithium sulfate' box to the 'crimson' box.

(2)

- (iii) Dilute nitric acid and silver nitrate solution are added to solutions of the three chemicals.

A white precipitate forms in one of the solutions.

Which chemical produces the white precipitate?

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(1)

- (b) The student tests a fourth chemical, **X**.

- (i) The student adds sodium hydroxide solution to a solution of chemical **X**.

A blue precipitate is formed.

Which metal ion is in chemical **X**?

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(1)

- (ii) The student adds dilute hydrochloric acid to a solution of chemical **X** and then adds barium chloride solution.

A white precipitate is formed.

Which negative ion is in chemical **X**?

Draw a ring around the correct answer.

**chloride**

**nitrate**

**sulfate**

(1)

(Total 7 marks)

8.

This is part of an article about food additives.

## THE PERIL OF FOOD ADDITIVES

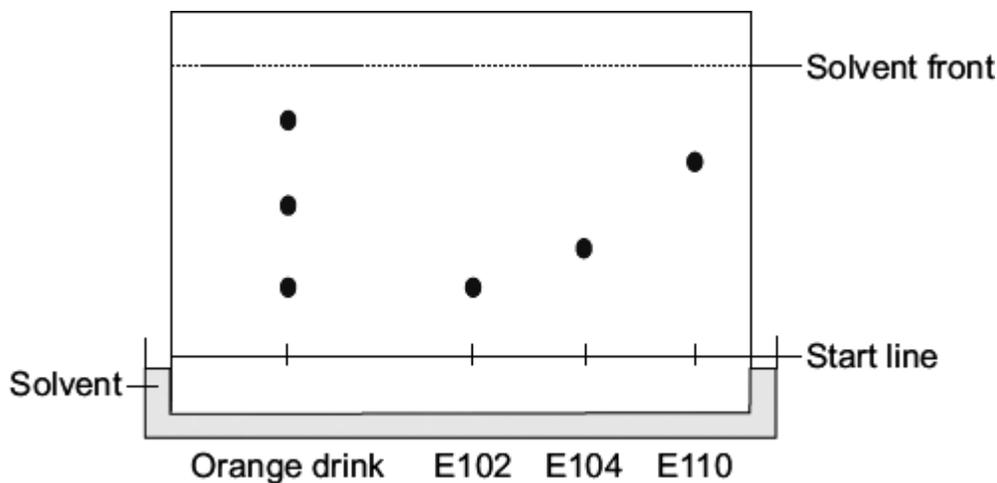
Some orange drinks contain the additives E102 (Tartrazine), E104 (Quinoline Yellow) and E110 (Sunset Yellow). These three additives are thought to cause hyperactivity in children.

- (a) Tick (✓) **two** reasons why a manufacturer of orange drinks uses these additives.

Reason	Tick (✓)
to make the drink healthier	
to improve the appearance of the drink	
because they are permitted colours	
because they are expensive	

(2)

- (b) A scientist tested an orange drink to find out if it contained these additives. The result of the test is shown.



- (i) Draw a ring around the correct answer to complete the sentence.

The test that the scientist did is called

chromatography.  
cracking.  
distillation.

(1)

(ii) How many coloured additives are there in the orange drink? \_\_\_\_\_

(1)

(iii) The scientist concluded that the orange drink contained only **one** of the additives E102, E104 and E110.

Explain why.

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(2)

(Total 6 marks)

9.

Read the information in the box and then answer the questions.

Seidlitz Powder is a medicine.

Seidlitz Powder comes as two powders. One powder is wrapped in white paper and contains tartaric acid. The other powder is wrapped in blue paper and contains sodium hydrogencarbonate.

The contents of the blue paper are dissolved in water and the contents of the white paper are added. This causes a reaction that produces carbon dioxide gas. The mixture is safe to drink when the reaction stops.

(a) Suggest why Seidlitz Powder comes as two separate powders.

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(1)

(b) The reaction produces carbon dioxide gas.

(i) What would you see during the reaction?

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(1)

(ii) Which state symbol in a chemical equation shows that carbon dioxide is a gas?

Draw a ring around **one** answer.

(s)

(l)

(aq)

(g)

(1)

(iii) Draw a ring around the correct answer to complete the sentence.

Carbon dioxide can be identified because it turns

limescale

limestone

limewater

milky.

(1)

(c) Sodium hydrogencarbonate contains sodium ions. Sodium ions can be identified by flame tests.

Draw a ring around the correct answer to complete the sentence.

Sodium ions give a

blue

red

yellow

flame.

(1)

(d) Some Seidlitz Powder was bought on the Internet for £5. However, when tested, it was found to be only magnesium sulfate, worth a few pence.

Draw a ring around the correct answer to complete each sentence.

(i) The test for sulfate ions uses

barium chloride

silver nitrate

sodium hydroxide

solution.

(1)

(ii) A positive test for sulfate ions produces a

blue

red

white

precipitate..

(1)

(iii) Suggest **one** disadvantage of buying medicines on the Internet.

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(1)

(Total 8 marks)

10.

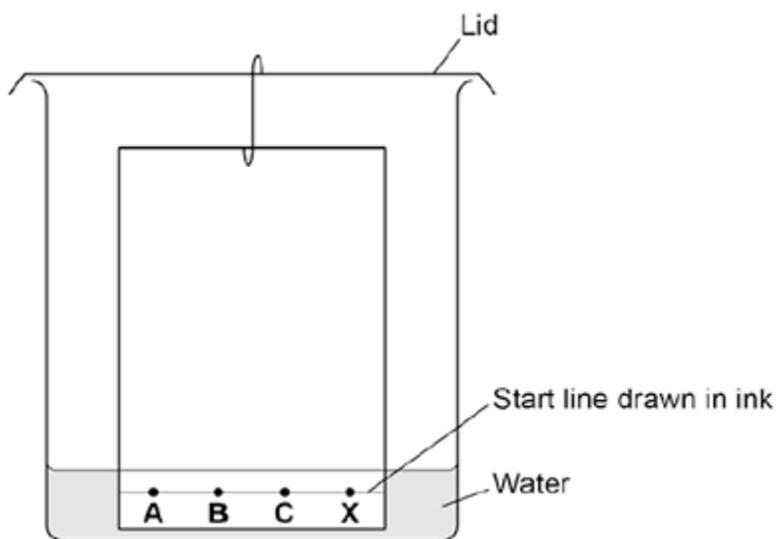
A student investigated a food colouring using paper chromatography.

This is the method used.

1. Put a spot of food colouring **X** on the start line.
2. Put spots of three separate dyes, **A**, **B** and **C**, on the start line.
3. Place the bottom of the paper in water and leave it for several minutes.

(a) **Figure 1** shows the apparatus the student used.

**Figure 1**



Give **two** mistakes the student made in setting up the experiment.

Tick **two** boxes.

The lid was on the beaker.

The paper did not touch the bottom of the beaker.

The spots were too small.

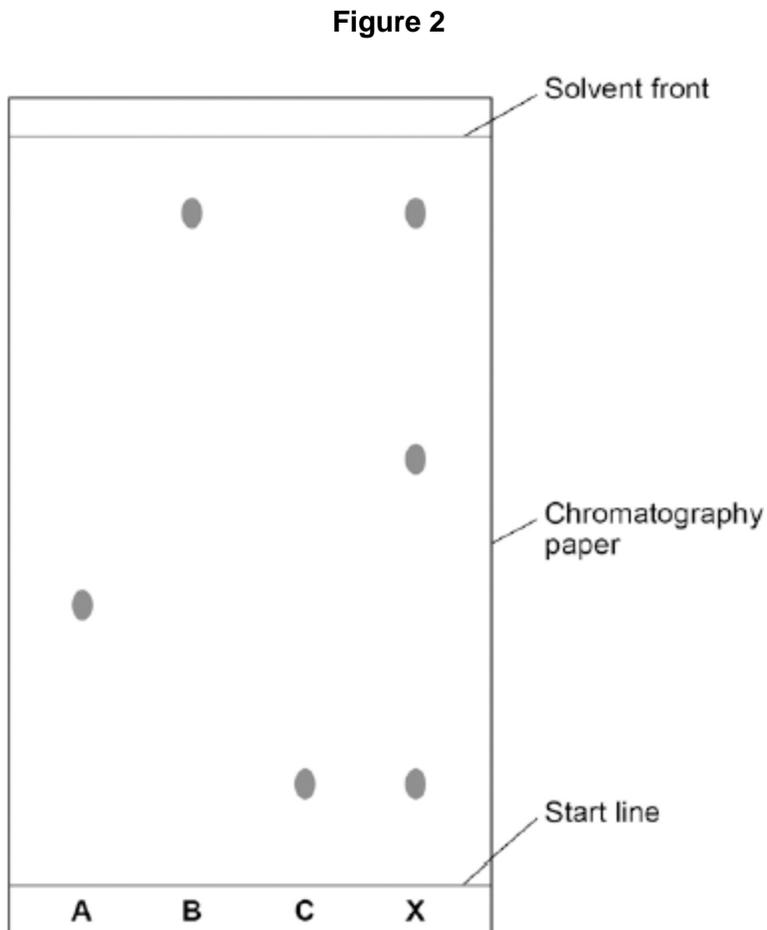
The start line was drawn in ink.

The water level was above the spots.

(2)

(b) Another student set the experiment up correctly.

**Figure 2** shows the student's results.



How many dyes were in **X**?

Tick **one** box.

1	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	6	<input type="checkbox"/>
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(1)

(c) Which dye, **A**, **B** or **C**, is **not** in **X**?

Write your answer in the box.

(1)

(d) Use **Figure 2** to complete the table below.

Calculate the value for  $R_f$  for dye **A**.

	Distance in mm
Distance moved by dye <b>A</b>	_____
Distance from start line to solvent front	_____

Use the equation:

$$R_f = \frac{\text{distance moved by dye A}}{\text{distance moved by solvent}}$$

Give your answer to two significant figures.

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$R_f$  value = \_\_\_\_\_

(5)  
(Total 9 marks)