

Name:

Date:

C8 - Test 1
CHEMISTRY ANALYSIS
Beginner

GCSE

CHEMISTRY

AQA - Triple Science

Mark

Grade

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

(b) is a metal which floats on water and reacts violently to make an alkaline solution and hydrogen gas;

(1)

(c) is a gas which burns with a squeaky pop?

(1)

(Total 3 marks)

3.

Chemical tests can be used to identify compounds.

(a) List **A** gives the names of four compounds in solution. List **B** gives tests and the result of the tests.

Draw a straight line from each compound in List **A** to its test and test result in List **B**. The first one has been done for you.

List A Name of compound in solution	List B Test and result of the test
Calcium chloride	Add barium chloride solution and dilute hydrochloric acid. A white precipitate formed.
Lithium sulphate	Do the flame test. Yellow flame produced.
Potassium carbonate	Add silver nitrate solution and dilute nitric acid. A white precipitate formed.
Sodium nitrate	Add hydrochloric acid. Carbon dioxide gas given off.

(2)

- (b) State what you would **see** when sodium hydroxide solution reacts with copper sulphate solution.

(2)

(Total 4 marks)

4.

Chemical tests can be used to identify ions in solutions.

- (a) List **A** gives the names of two sulfates in solution.
List **B** gives the results of adding sodium hydroxide solution.

Draw a straight line from each sulfate in List **A** to its correct test result in List **B**.

List A

**Name of sulfate
in solution**

Copper sulfate

Iron(II) sulfate

List B

**Result of adding
sodium hydroxide solution**

A blue precipitate formed

A white precipitate formed

A green precipitate formed

(2)

- (b) Suggest why clean test tubes were used for each test.

(1)

- (c) Draw a ring around the correct colour to complete this sentence.

Sulfate solutions react with barium chloride solution to give a

blue

green

white

precipitate.

(1)

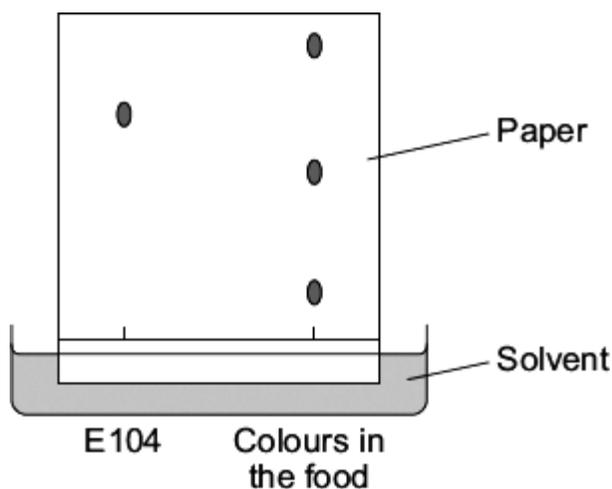
(Total 4 marks)

5. An article began:

Ban yellow additives

Quinoline yellow (E104) is suspected of causing hyperactivity, asthma and rashes in children.

- (a) A student tested a food to find out if it contained quinoline yellow (E104). The student's results are shown below.



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

This method of detecting and identifying colours is called

chromatography.

distillation.

electrolysis.

(1)

- (ii) Using the student's results, how many different colours are in the food? ____

(1)

- (iii) Using the student's results, how can you tell that the food does **not** contain quinoline yellow (E104)?

(1)

(b) Quinoline yellow (E104) is used in foods such as sweets, drinks and ice cream.

(i) Give **one** reason why quinoline yellow (E104) is added to foods.

(1)

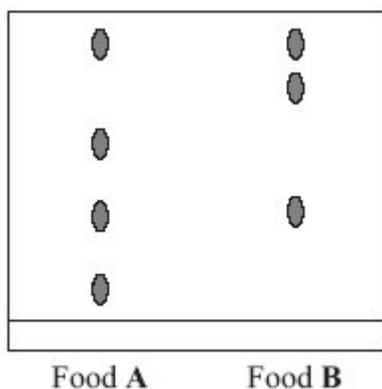
(ii) Suggest what should be done to decide if quinoline yellow (E104) should be banned.

(1)

(Total 5 marks)

6.

The result of a process used to detect and identify the colours in two foods, **A** and **B**, is shown.



(i) Describe the differences between the colours used in food **A** and food **B**.

(2)

(ii) Tick (✓) the name of the process used to detect and identify colours in food.

Process	(✓)
chromatography	
extraction	
hardening	

(1)

(Total 3 marks)

7.

Alums are salts. They have been used since ancient times in dyeing and medicine and still have many uses today.

Three alums are shown in the table:

Name	Ions present
Ammonium alum	NH_4^+ Al^{3+} SO_4^{2-}
Potassium alum	K^+ Al^{3+} SO_4^{2-}
Sodium alum	Na^+ Al^{3+} SO_4^{2-}

A student tested these alums to show which ions were present.

- (a) The student did a flame test on these alums. A sample of each alum was held on a wire in a colourless flame.

In (a)(i) and (a)(ii) use the correct word from the box to complete each sentence.

blue	lilac	yellow	green
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- (i) Sodium ions give a _____ flame.

(1)

- (ii) Potassium ions give a _____ flame.

(1)

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

The wire used in a flame test should have a high

density.
electrical conductivity.
melting point.

(1)

(b) Draw a ring around the correct word to complete the sentences.

(i) The student tested a solution of each salt for sulfate ions (SO_4^{2-}).

The student added dilute hydrochloric acid and

barium chloride
nitric acid
silver nitrate

solution and

a white

gas
liquid
solid

was formed.

(2)

(ii) The student tested a solution of each salt for aluminium ions (Al^{3+}).

The student added sodium hydroxide solution and a

green
red
white

precipitate

was formed. When excess sodium hydroxide solution was added, the

precipitate

boiled.
condensed.
dissolved.

(2)

(Total 7 marks)

8.

A bottle of washing soda was found in a school laboratory.
The chemical name of washing soda is sodium carbonate.



A student tested the washing soda to prove that it was sodium carbonate.

(a) The student did a flame test to show that washing soda is a sodium compound.
The student used a clean wire to put the washing soda into the flame.

(i) Why should the wire be clean when used for a flame test?

(1)

(ii) The table shows some properties of metals.

Two of these are properties that the wire must have if it is used for a flame test.

Tick (✓) the **two** correct properties.

Property	Tick (✓)
Good electrical conductor	
High density	
High melting point	
Low boiling point	
Unreactive	

(2)

(iii) Which **one** of the following flame colours shows that washing soda is a sodium compound?

Draw a ring around your answer.

brick-red

lilac

yellow-orange

(1)

(b) The student used dilute hydrochloric acid to show that washing soda was a carbonate. Carbon dioxide gas was given off.

(i) Describe what you **see** happening when a gas is given off.

(1)

(ii) The student used limewater to prove that the gas given off was carbon dioxide.

Complete this sentence by choosing the correct word from the box.

clear	colourless	milky
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When carbon dioxide reacts with limewater, the limewater turns

(1)

(c) Instrumental methods are used to identify chemicals.

Give **two** advantages of instrumental methods compared with chemical tests by considering:

- the length of time to carry out a test
- the amount of chemical used.

(2)

(Total 8 marks)

9.

Chemical tests can be used to detect and identify elements and compounds.

A jar of a chemical from 1870 is shown.



Copperas was a name used for iron(II) sulfate, FeSO_4 . It does not contain any copper!

(a) A student tested solutions of copperas to show which ions it contained.

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

(i) The student tested for iron(II) ions, Fe^{2+}

The student added a solution of

barium chloride.
silver nitrate.
sodium hydroxide.

The colour of the precipitate formed was

green
red.
white

The precipitate was a

liquid.
gas.
solid

(3)

(ii) The student tested for sulfate ions, SO_4^{2-}

The student added dilute hydrochloric acid and

barium chloride
silver nitrate
sodium hydroxide

solution.

The colour of the precipitate formed was

green
red.
white

Sulfuric acid (H_2SO_4) should **not** be used instead of hydrochloric acid (HCl) when testing for sulfate ions.

This is because sulfuric acid contains

chloride ions, Cl^-
nitrate ions, NO_3^-
sulfate ions, SO_4^{2-}

(3)

(b) A flame test can be used to identify the metal ions in a compound.

How do you carry out a flame test?

(1)

(c) The elements in a compound can also be detected and identified using instrumental methods of analysis.

State **one** advantage of using instrumental methods compared with chemical tests.

(1)

(Total 8 marks)

10.

A bottle of washing soda was found in a school laboratory. The modern name of washing soda is sodium carbonate.



A student tested the washing soda to prove that it was sodium carbonate.

(a) The student did a flame test to show that washing soda is a sodium compound.

The student used a clean wire to put the washing soda into the flame.

(i) Why should the wire be clean when used for a flame test?

(1)

(ii) The table shows some properties of metals.

Two of these are properties that the wire must have if it is used for a flame test.

Put a tick (✓) next to the **two** correct properties.

Property	(✓)
Good electrical conductor	
High density	
High melting point	
Low boiling point	
Unreactive	

(2)

(iii) Which **one** of the following flame colours shows that washing soda is a sodium compound?

Draw a ring around your answer.

brick-red

lilac

yellow-orange

(1)

(b) The student used dilute hydrochloric acid to show that washing soda was a carbonate. Carbon dioxide gas was given off.

(i) Describe what you **see** happening when a gas is given off.

(1)

(ii) The student used limewater to prove that the gas given off was carbon dioxide.

Complete this sentence by choosing the correct word from the box.

clear	colourless	milky
--------------	-------------------	--------------

When carbon dioxide reacts with limewater, the limewater turns

(1)

(c) Instrumental methods are used to identify chemicals.

Describe some advantages of instrumental methods compared with chemical tests by considering:

- the length of time needed to carry out a test
- the amount of chemical used.

(2)

(Total 8 marks)

11.

A student investigated the colours in three different flowers, **A**, **B** and **C**, using paper chromatography.

The colours are soluble in ethanol but are insoluble in water.

This is the method used.

1. Place ethanol in a beaker.
2. Add the flower.
3. Stir until the colours dissolve in the ethanol.
4. Filter the mixture.
5. Put spots of the coloured filtrate on the chromatography paper.

(a) The filtrate was a very pale coloured solution.

How could the student obtain a darker coloured solution?

Tick **two** boxes.

Crush the flower

Filter the mixture three times

Use a larger beaker

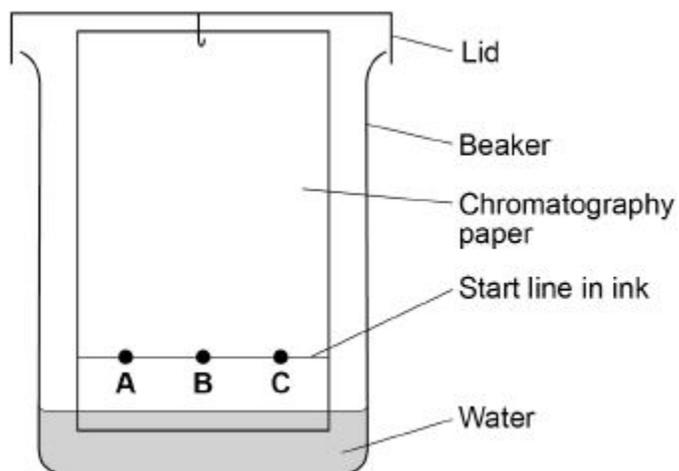
Use more ethanol

Use more flowers

(2)

(b) **Figure 1** shows the apparatus used.

Figure 1



What **two** mistakes did the student make in setting up the apparatus?

Tick **two** boxes.

The paper does not touch the beaker

The start line is drawn in ink

The water level is below the start line

Uses a lid on the beaker

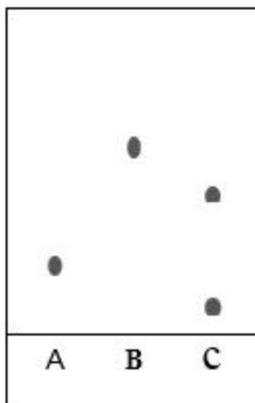
Uses water as the solvent

(2)

(c) Another student sets up the apparatus correctly.

Figure 2 represents the student's results.

Figure 2



What **two** conclusions can be made from **Figure 2**?

Tick **two** boxes.

Flower **A** contains a single pure colour

Flowers **A** and **B** contain the same colours

The colour in flower **C** is a mixture

The colour in flower **B** was the least soluble

Two of the colours have the same R_f value

(2)

(d) The student records some measurements.

The measurements are:

- the colour from flower **B** moves 7.2 cm
- the solvent moves 9.0 cm

Calculate the R_f value for the colour from flower **B**.

Use the equation:

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

(2)
(Total 8 marks)