AQA GCSE Chemistry | 8462

SPECIFICATION POINT 4.8.3.7

Flame emission spectroscopy

Past-paper questions

Tier	**Foundation**
Question groups	**3**
Available paper years	**2010–2018**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.8.3.7 Flame emission spectroscopy

Question 01

June 2010 | CHY3F | Original Q4 | Legacy

4 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!

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

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

4 (a) (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 marks)

4.8.3.7 Flame emission spectroscopy

Question 01 · continued

4 (a) (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 marks)

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

How do you carry out a flame test?

.....

.....

(1 mark)

4 (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 mark)

8

4.8.3.7 Flame emission spectroscopy

Question 02

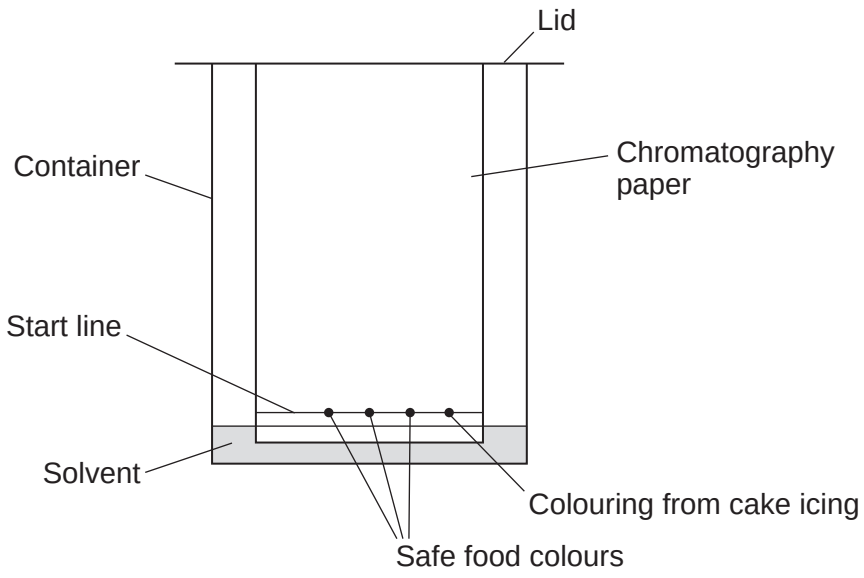
June 2012 | CH2FP | Original Q6 | Legacy

6 Icing on cakes is tested to check that safe colours were used when they were made.



Paper chromatography is one method of testing which colours are in cake icing.

6 (a) The diagram shows an experiment a student did.



6 (a) (i) Suggest why there is a lid on the container.

.....

.....

(1 mark)

6 (a) (ii) The start line should be drawn in pencil **not** in ink.
Suggest why.

.....

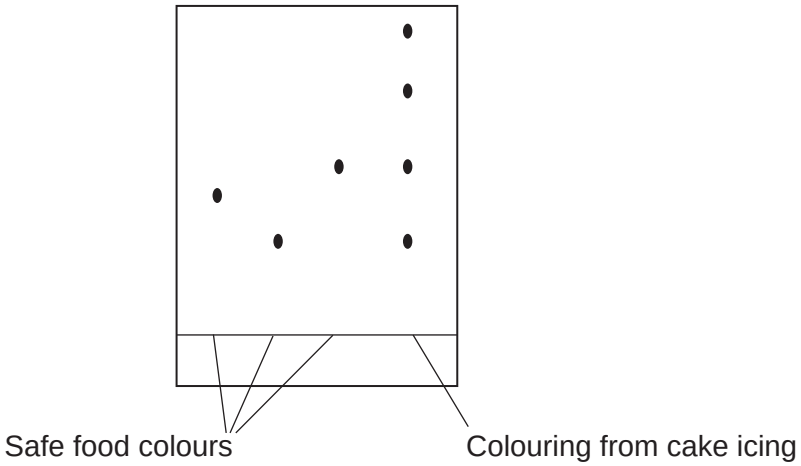
.....

(1 mark)

4.8.3.7 Flame emission spectroscopy

Question 02 · continued

6 (b) The diagram shows the results of the paper chromatography experiment.



6 (b) (i) How many different food colours were used in the colouring from the cake icing?

.....

(1 mark)

6 (b) (ii) Is the cake icing safe to eat?

Give a reason for your answer.

.....

.....

(1 mark)

Question 6 continues on the next page

4.8.3.7 Flame emission spectroscopy

Question 02 · continued

6 (c) Gas chromatography linked to mass spectroscopy is an example of an instrumental method. This method was used on a mixture of solvents.

6 (c) (i) Give **two** advantages of gas chromatography compared with paper chromatography.

.....

.....

.....

.....

(2 marks)

6 (c) (ii) What does gas chromatography do to the mixture of solvents?

.....

.....

(1 mark)

6 (c) (iii) What information does mass spectroscopy give?

.....

.....

(1 mark)

8

4.8.3.7 Flame emission spectroscopy

Question 03

June 2018 | 8462/2F | Original Q8

0 8 This question is about chemicals in fireworks.

Coloured flames are produced because of the metal ions in the fireworks.

0 8 . 1 What colour flame would sodium ions produce?

[1 mark]

0 8 . 2 Name a metal ion that would produce a green flame.

[1 mark]

0 8 . 3 Some fireworks contain a mixture of metal ions.

Why is it difficult to identify the metal ions from the colour of the flame?

[1 mark]

4.8.3.7 Flame emission spectroscopy

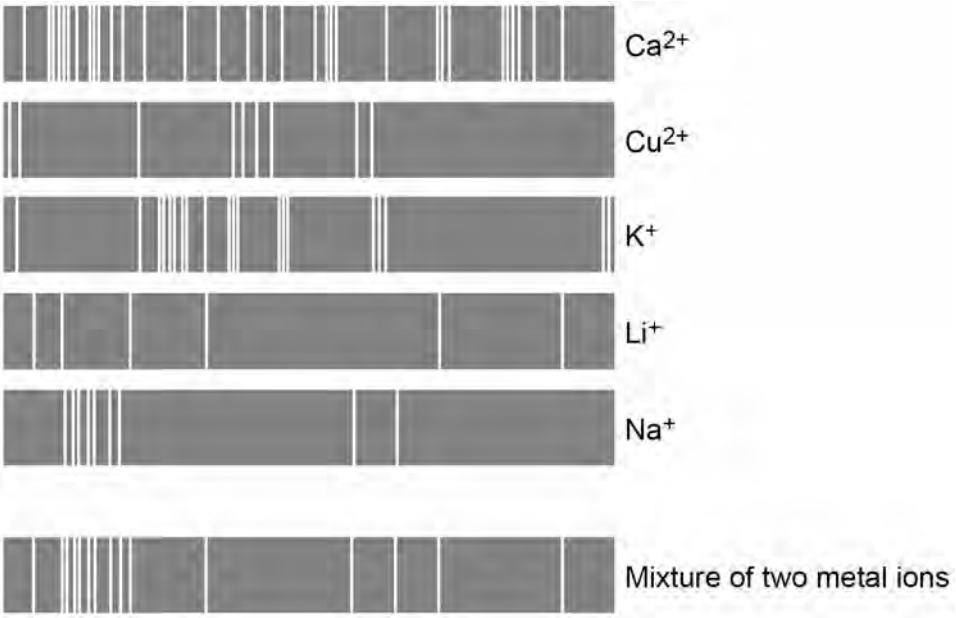
Question 03 · continued

0 8 . 4 Flame emission spectroscopy is used to identify metal ions in a firework.

Figure 8 shows:

- the flame emission spectra of five individual metal ions
- a flame emission spectrum for a mixture of two metal ions.

Figure 8



Which **two** metal ions are in the mixture?

[2 marks]

Tick **two** boxes.

Ca^{2+} ☐

Cu^{2+} ☐

K^+ ☐

Li^+ ☐

Na^+ ☐

Question 8 continues on the next page

4.8.3.7 Flame emission spectroscopy

Question 03 · continued

The compounds in fireworks also contain non-metal ions.

A scientist tests a solution of the chemicals used in a firework.

0 8 . 5 Silver nitrate solution and dilute nitric acid are added to the solution.

A cream precipitate forms.

Which ion is shown to be present by the cream precipitate?

[1 mark]

_____

0 8 . 6 Describe a test to show the presence of sulfate ions in the solution.

Give the result of the test if there are sulfate ions in the solution.

[3 marks]

Test _____

_____

_____

_____

Result _____

_____