AQA GCSE Chemistry

Chemical analysis · Higher tier

Questions only

The newest questions on the Higher papers, about an hour. All 6 are in the exam generator.

Questions	Total marks	Time allowed
5	**49**	**51 min**

Name _____ Class or teacher _____ Date _____

Instructions

- Answer all questions in the spaces provided.
- Use black ink. Show your working for every calculation.
- You may use a scientific calculator and the periodic table insert.
- Print the separate mark scheme when you are ready to mark your answers.

For marking

Q	Source	Marks	Score
1	2023 P2H Q3 / P2F Q10	8	
2	2023 P2H Q6	9	
3	2024 P2H Q4	13	
4	2025 P2H Q6	11	
5	2021 P2H Q3 / P2F Q10	8	

Total _____ / 49 **Percentage** _____ %

Questions from AQA GCSE past papers, 2021–2025, reproduced for revision. Practise these topics online, with instant marking:
`whiteboardchemistry.com/revision/gcse-chemistry/exam-questions?topics=c8-chemical-analysis&demand=standard,high&len=0`

Questions

Chemical analysis · Higher tier · 5 questions · 49 marks · time allowed 51 min

Q1 · June 2023 · Paper 2 Foundation · Q10 · Paper 2 Higher · Q3 · [8 marks]

This question is about chemical analysis.

Potassium bromide is used in medicine.

A scientist tested a sample of medicine to show the presence of potassium ions and of bromide ions.

The sample is soluble in water.

10.1 Plan a method the scientist could use to show that the sample of medicine contains potassium ions **and** bromide ions.

The scientist has:

- a Bunsen burner
- a metal wire
- test tubes
- a dropping pipette
- distilled water
- dilute nitric acid
- silver nitrate solution.

You should give the results of the tests.

[6 marks]

10.2 The scientist could also use an instrumental method to show the presence of potassium ions in the medicine.

Which instrumental method could be used to show the presence of potassium ions in the medicine?

[1 mark]

10.3 Give **one** advantage of using this instrumental method instead of a chemical test.

[1 mark]

Q2 · June 2023 · Paper 2 Higher · Q6 · [9 marks]

This question is about chromatography.

A student investigated an orange food colouring using two different types of chromatography paper.

The food colouring:

- contained a mixture of red and yellow dyes
- was soluble in water.

This is the method used.

1. Draw a start line on a piece of type A chromatography paper.

2. Put a spot of orange food colouring on the line.

3. Put the paper into a beaker containing water as a solvent.

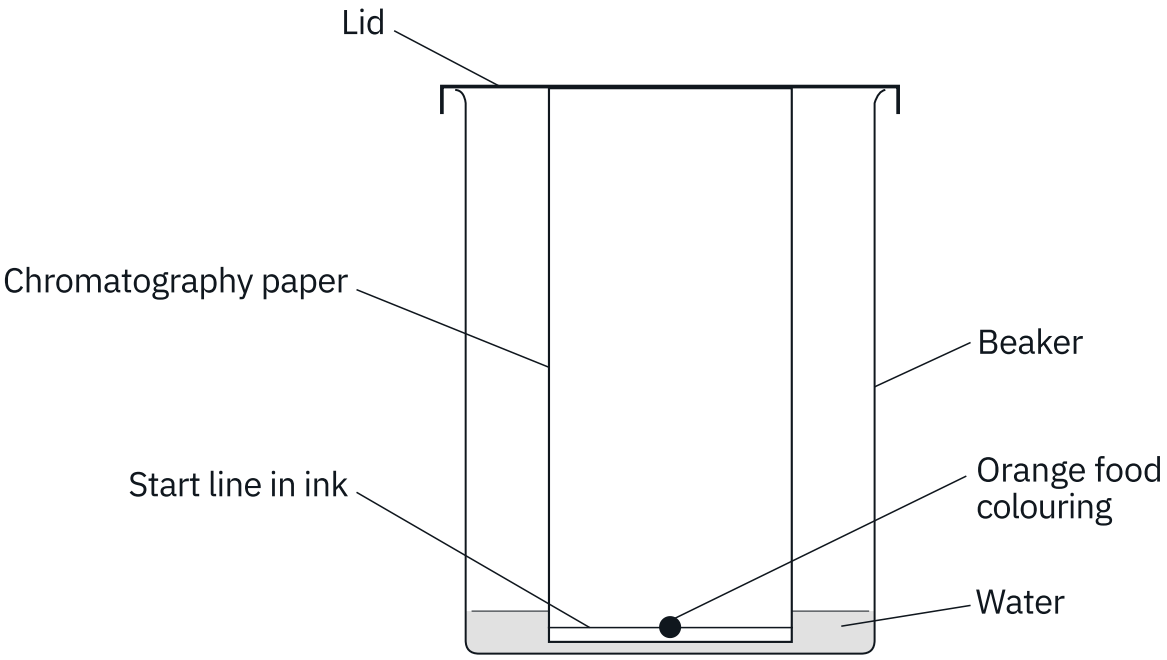
4. Wait for the water to travel up the paper.

5. Measure the distance above the start line moved by the red and yellow dyes and the water.

6. Repeat steps 1 to 5 using type B chromatography paper.

Figure 3 shows how the student set up the apparatus.

Figure 3



06.1 The student made **two** mistakes when setting up the apparatus.

Give **two** mistakes the student made.

[2 marks]

1

2

06.2 Another student set up the apparatus correctly.

Table 3 shows the results.

Table 3

	Type A chromatography paper: red dye	**Type A chromatography paper: yellow dye**	**Type B chromatography paper: red dye**	**Type B chromatography paper: yellow dye**
Distance moved by dye in cm	4.8	6.6	5.4	X
Distance moved by water in cm	12.0	12.0	12.0	12.0
R_f value	0.40	0.55	0.45	0.60

Determine value X in Table 3.

X = _____ cm

[3 marks]

06.3 Changing the type of chromatography paper resulted in different R_f values for the red dye.

Explain why the R_f values for the red dye are different using the two types of chromatography paper.

Use Table 3.

[3 marks]

06.4 What other change to the investigation could result in a different R_f value for the red dye?

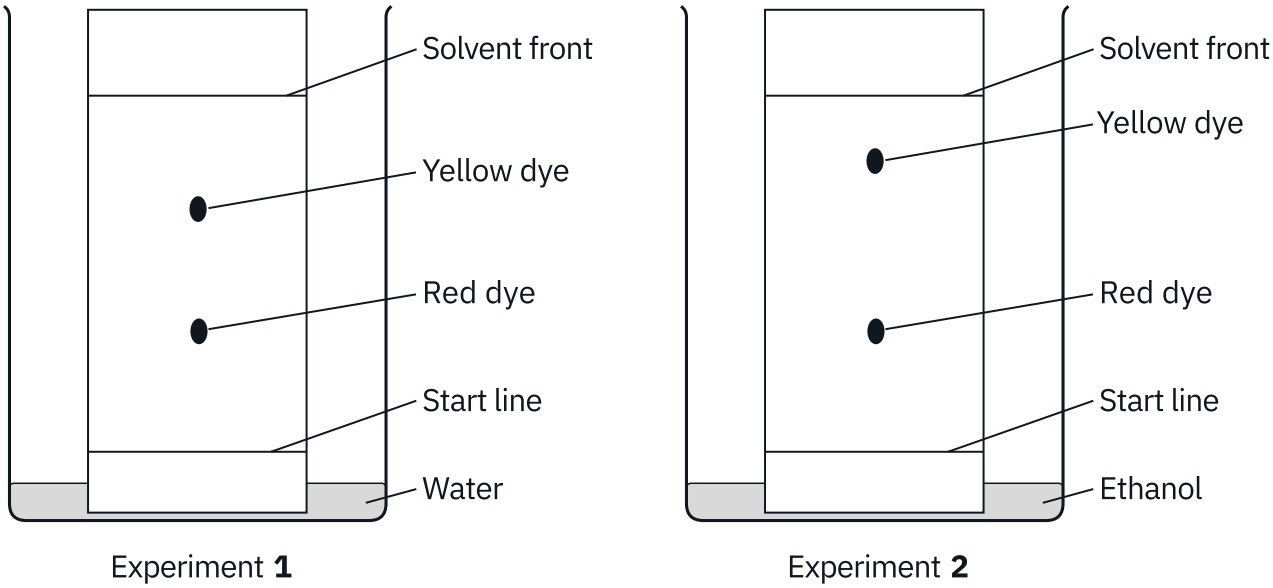
[1 mark]

Q3 · June 2024 · Paper 2 Higher · Q4 · [13 marks]

A student investigated an orange dye (A) using paper chromatography.

Figure 4 shows the results of Experiment 1 and Experiment 2 using orange dye A.

Figure 4



04.1 Explain why the yellow dye and red dye travel different distances in Experiment 1.

Refer to forces of attraction between the dyes and the chromatography paper in your answer.

[2 marks]

04.2 The student used the same type of chromatography paper in Experiment 1 and in Experiment 2.

Explain why the yellow dye is in different positions in Experiment 1 and in Experiment 2.

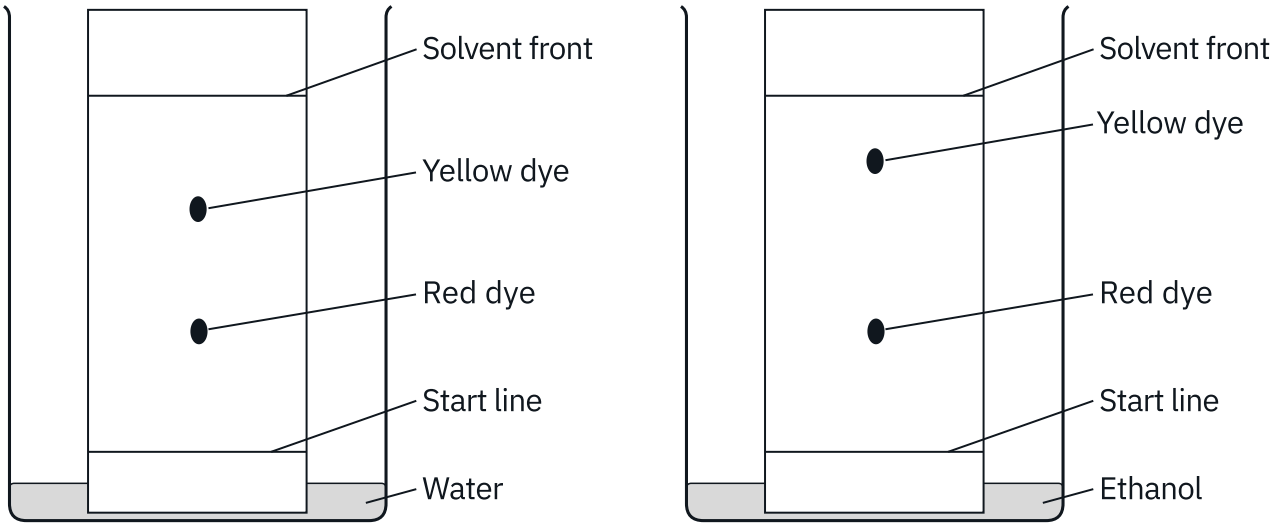
Use Figure 4.

[3 marks]

04.3 Figure 4 is repeated below.

Figure 4 shows the results of Experiment 1 and Experiment 2 using orange dye A.

Figure 4

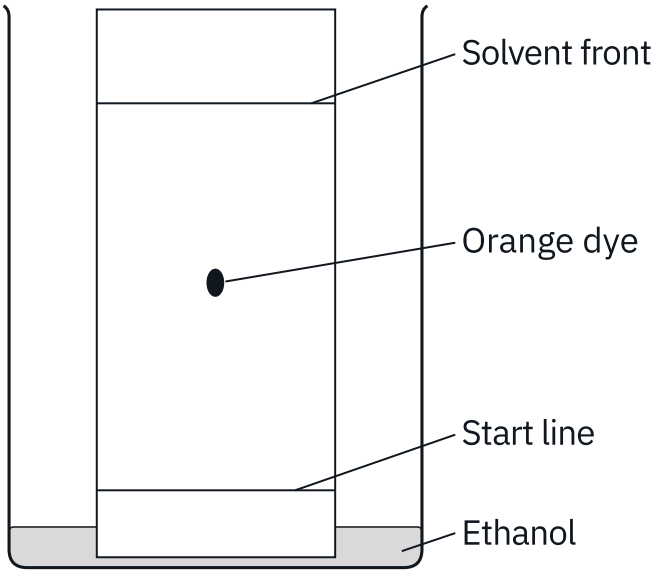


Experiment **1** Experiment **2**

The student investigated a different orange dye (B).

Figure 5 shows the results of Experiment 3 using orange dye B.

Figure 5



Experiment **3**

Compare the purity of the orange dyes A and B.

Give reasons for your answer.

Use Figure 4 and Figure 5.

[2 marks]

04.4 The student calculated that the R_f value of the orange dye in the experiment shown in Figure 5 was 0.48

Calculate the distance moved by the solvent front when the orange dye had moved 5.4 cm.

Distance moved by solvent front = _____ cm

[3 marks]

04.5 Why is the R_f value of a dye **not** affected by how far the solvent front is allowed to travel?

[1 mark]

04.6 Another type of chromatography is called gas chromatography.

Gas chromatography is an instrumental method of chemical analysis.

Scientists tested the orange dyes using gas chromatography.

Suggest **two** advantages of using the instrumental method of gas chromatography rather than paper chromatography.

[2 marks]

1

2

Q4 · June 2025 · Paper 2 Higher · Q6 · [11 marks]

This question also needs Bonding, structure, and the properties of matter.

A student analysed three solutions, A, B and C.

Each solution contained one ionic compound.

The student added a few drops of sodium hydroxide solution to solution A.

Solution A produced a white precipitate.

Aluminium ions produce a white precipitate with a few drops of sodium hydroxide solution.

06.1 Name **one other** metal ion which produces a white precipitate with a few drops of sodium hydroxide solution.

[1 mark]

06.2 Describe how the student could confirm the presence of aluminium ions in solution A.

Give the result of the test.

[2 marks]

Test

Result

06.3 The student tested solution B to identify the ions present.

The student did a flame test on solution B.

An orange-red flame was produced.

Write the symbol for the metal ion in solution B.

[1 mark]

06.4 The student added dilute nitric acid followed by silver nitrate solution to solution B.

A white precipitate was produced.

Write the symbol for the non-metal ion in solution B.

[1 mark]

06.5 The student added 1.0 mol/dm^3 nitric acid to solution C.

Bubbles of gas were produced.

Describe a test on the bubbles of gas that confirms that solution C contained carbonate ions.

Give the result of the test.

[2 marks]

Test

Result

06.6 The student repeated the test on solution C using 1.0 mol/dm^3 ethanoic acid instead of 1.0 mol/dm^3 nitric acid.

Bubbles of gas were produced more slowly using ethanoic acid.

Explain why.

[4 marks]

Q5 · November 2021 · Paper 2 Foundation · Q10 · Paper 2 Higher · Q3 · [8 marks]

This question is about paper chromatography.

A food colouring contains a dye.

10.1 Plan an investigation to determine the R_f value for the dye in this food colouring.

R_f = (distance moved by substance)/(distance moved by solvent)

Your plan should include the use of:

- a beaker
- a solvent
- chromatography paper.

[6 marks]

10.2 Two students investigated a dye in a food colouring using paper chromatography.

Each student did the investigation differently.

The R_f values they determined for the **same** dye were different.

How did the students' investigations differ?

Tick (✓) **one** box.

Different length of paper used	☐
Different period of time used	☐
Different size of beaker used	☐
Different solvent used	☐

[1 mark]

10.3 Paper chromatography involves a stationary phase.

What is the stationary phase in paper chromatography?

Tick (✓) **one** box.

Beaker	☐
Dye	☐
Paper	☐
Solvent	☐

[1 mark]

Source: AQA GCSE Chemistry past papers. Reproduced for revision at whiteboardchemistry.com.

Mark scheme:
whiteboardchemistry.com/revision/gcse-chemistry/exam-questions/pdf/c8-chemical-analysis-higher-mark-scheme.pdf