AQA GCSE Chemistry

Chemical analysis · Foundation tier

Questions only

All 6 chemical analysis questions on the Foundation papers

Questions	Total marks	Time allowed
6	**57**	**1 h**

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 P2F Q10 / P2H Q3	8	
2	2023 P2F Q3	10	
3	2024 P2F Q3	9	
4	2025 P2F Q1	10	
5	2025 P2F Q5	12	
6	2021 P2F Q10 / P2H Q3	8	

Total _____ / 57 **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=low,standard&len=0`

Questions

Chemical analysis · Foundation tier · 6 questions · 57 marks · time allowed 1 h

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]

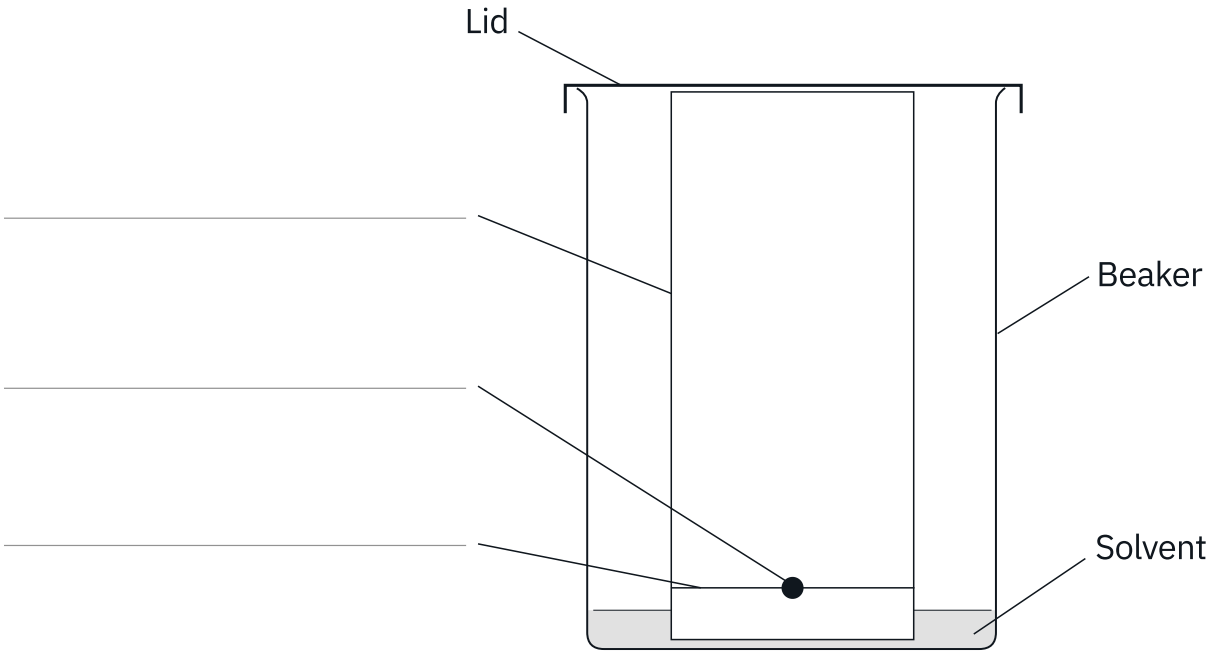
Q2 · June 2023 · Paper 2 Foundation · Q3 · [10 marks]

This question is about chromatography.

A student investigated an orange dye using paper chromatography.

03.1 Figure 3 shows the apparatus at the start of the investigation.

Figure 3



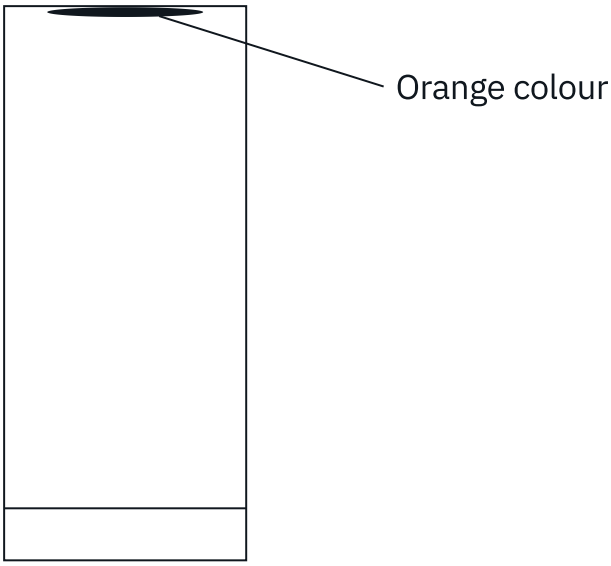
Complete the labels on Figure 3.

[3 marks]

Draw your answer on the figure above.

03.2 Figure 4 shows the results at the end of the investigation.

Figure 4



The student made a mistake in the investigation.

What mistake did the student make to produce the results shown in Figure 4?

Tick (✓) **one** box.

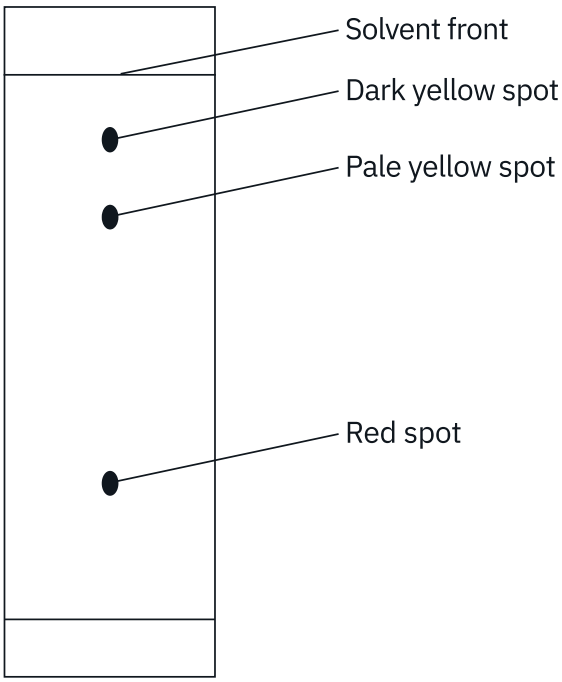
Left the investigation for too long	☐
Used a lid on the beaker	☐
Used a solvent which did not dissolve the dye	☐

[1 mark]

03.3 A different student did the investigation correctly.

Figure 5 shows the results.

Figure 5



How do the results in Figure 5 show that the orange dye is **not** a pure substance?

[1 mark]

03.4 Determine the R_f value for the red spot.

You should measure:

- the distance moved by the red spot
- the distance moved by the solvent.

Use Figure 5 and the equation:

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

[4 marks]

Distance moved by red spot _____ cm

Distance moved by solvent _____ cm

R_f = _____

03.5 Which spot had the greatest R_f value?

Use Figure 5.

Tick (✓) **one** box.

Dark yellow spot	☐
Pale yellow spot	☐
Red spot	☐

[1 mark]

Q3 · June 2024 · Paper 2 Foundation · Q3 · [9 marks]

This question is about paper chromatography.

A student investigated substance Y using paper chromatography.

This is the method used.

1. Draw a start line in ink on a piece of chromatography paper.

2. Put spots of four different dyes, A, B, C and D, and a spot of substance Y on the start line.

3. Dip the paper into water so that the water level is below the start line.

4. Wait until the water has risen to near the top of the paper.

03.1 The student's method contains a mistake in Step 1.

What is the mistake in Step 1?

Give **one** reason for your answer.

[2 marks]

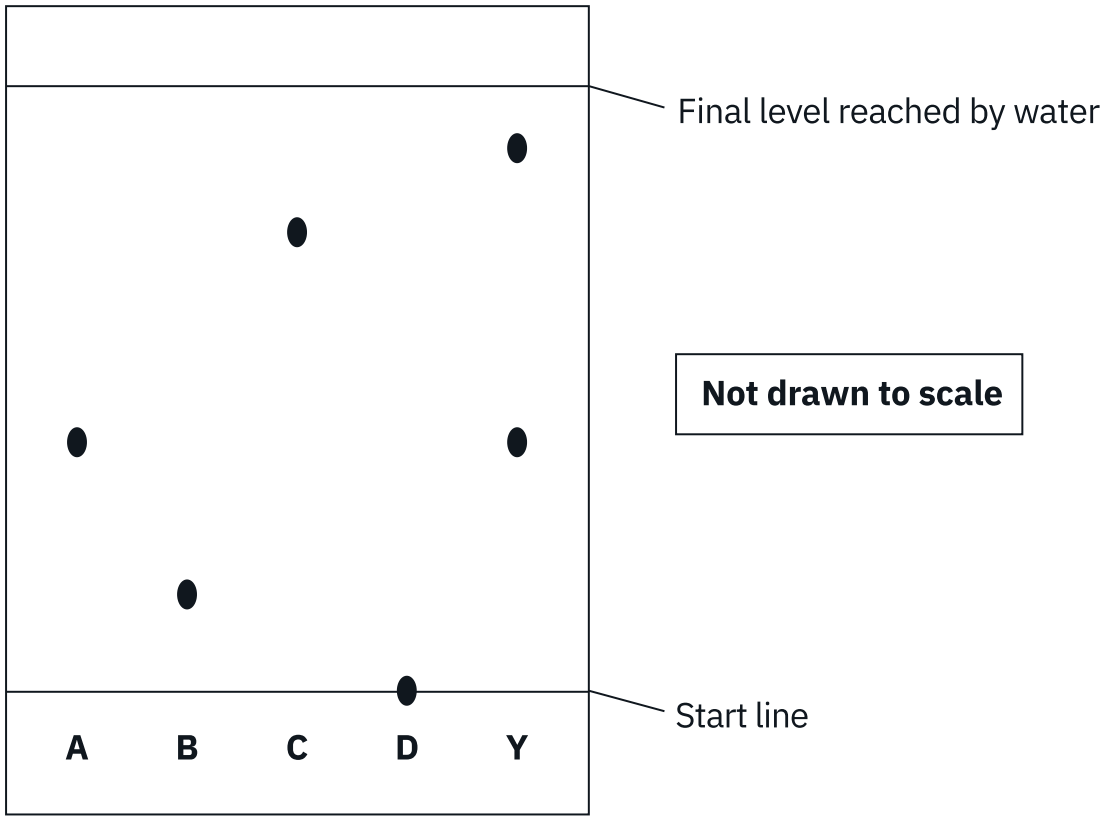
Mistake

Reason

03.2 A different student used a method which gave valid results.

Figure 4 shows the results.

Figure 4



How many different dyes are in substance Y?

Use Figure 4.

[1 mark]

03.3 Which of the four dyes, A, B, C and D, could be in substance Y?

Give **one** reason for your answer.

Use Figure 4.

[2 marks]

Dye

Reason

03.4 Suggest why dye D remained on the start line at the end of the investigation.

Use Figure 4.

[1 mark]

03.5 The student determined that:

- the distance moved by the water was 6.0 cm
- the distance moved by dye A was 2.4 cm.

Calculate the R_f value of dye A.

Use the equation:

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

R_f = _____

[2 marks]

03.6 Complete the sentence.

Choose the answer from the box.

solute solution solvent

The water in step 3 is used as a _____ .

[1 mark]

Q4 · June 2025 · Paper 2 Foundation · Q1 · [10 marks]

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

This question is about chemical analysis.

Some metal ions can be identified using a flame test.

01.1 Describe how to do a flame test using a metal wire and a Bunsen burner.

[2 marks]

01.2 Draw **one** line from each metal ion to the flame colour produced by the metal ion.

Metal ion	Flame colour
	Crimson
	Green
Lithium	
	Lilac
Potassium	
	Orange-red
	Yellow

[2 marks]

Draw your answer on the figure above.

01.3 Which gas is produced when carbonates are reacted with dilute acids?

Tick (✓) **one** box.

Carbon dioxide	☐
Hydrogen	☐
Oxygen	☐

[1 mark]

01.4 Which solution is used to test for sulfate ions?

Tick (✓) **one** box.

Barium chloride solution	☐
Magnesium chloride solution	☐
Sodium chloride solution	☐

[1 mark]

01.5 Precipitates are used to identify some ions.

Complete the sentence.

Choose the answer from the box.

gas liquid solid

A precipitate is a _____ .

[1 mark]

01.6 Some metal ions in solution can be identified by adding sodium hydroxide solution.

Draw **one** line from each metal ion to the colour of the precipitate produced by the metal ion.

Metal ion	Colour of precipitate
Copper(II)	Blue
Magnesium	Brown
	Green
	White
	Yellow

[2 marks]

Draw your answer on the figure above.

01.7 Dilute nitric acid and silver nitrate solution were added to a solution containing iodide ions.

Complete the sentence.

Choose the answer from the box.

brown green yellow

The colour of the precipitate produced is _____ .

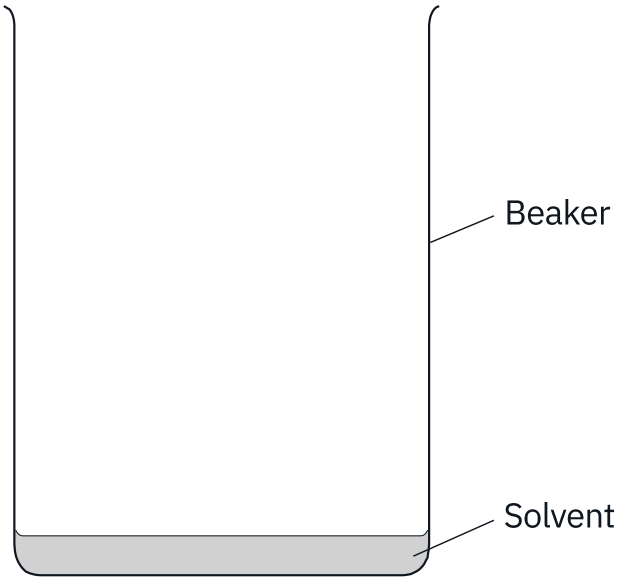
[1 mark]

Q5 · June 2025 · Paper 2 Foundation · Q5 · [12 marks]

This question is about chromatography.

Figure 4 shows some equipment used for paper chromatography.

Figure 4



05.1 Complete Figure 4 to show how the equipment can be used to separate the dyes in an ink.

You should draw and **label**:

- a piece of chromatography paper **in the beaker**
- a start line on the chromatography paper
- a spot of the ink on the chromatography paper at the **start** of the experiment.

[3 marks]

Draw your answer on the figure above.

05.2 Why should a pencil be used to draw the start line on the chromatography paper?

[1 mark]

05.3 The R_f value of a dye was 0.80

A spot of the dye moved a distance of 5.2 cm.

Calculate the distance moved by the solvent.

Use the equation:

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

Distance moved by solvent = _____ cm

[3 marks]

05.4 How is the distance moved by the spot of the dye measured?

Tick (✓) **one** box.

From the start line to the bottom of the spot	☐
From the start line to the centre of the spot	☐
From the start line to the top of the spot	☐

[1 mark]

05.5 Which **two** changes could produce a different R_f value for this dye?

Tick (✓) **two** boxes.

Use a different beaker.	☐
Use a different length of time.	☐
Use a different sized spot of dye.	☐
Use a different solvent.	☐
Use a different type of chromatography paper.	☐

[2 marks]

05.6 A different dye is a pure substance.

How many spots will this dye produce during chromatography?

[1 mark]

05.7 Which is an advantage of using gas chromatography instead of paper chromatography?

Choose the answer from the box.

less sensitive more accurate slower

Gas chromatography is _____ .

[1 mark]

Q6 · 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-foundation-mark-scheme.pdf