AQA GCSE Chemistry

Chemical analysis mark scheme · goes with “Chemical analysis · Higher tier” · whiteboardchemistry.com/revision/gcse-chemistry/exam-questions

Mark schemes

Chemical analysis · Higher tier · 5 questions

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

10.1

Level 3 (5–6 marks): The method would lead to the production of a valid outcome. The key steps are identified and logically sequenced.

Level 2 (3–4 marks): The method would not necessarily lead to a valid outcome. Most steps are identified, but the plan is not fully logically sequenced.

Level 1 (1–2 marks): The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.

No relevant content (0 marks)

Indicative content

(potassium ions)

- **place sample on (clean metal) wire**
- **introduce into (blue / non-luminous) flame**
- using (Bunsen) burner
- **observe lilac flame colour**
- which shows presence of potassium (ions)

(bromide ions)

- **dissolve sample**
- in (distilled) water
- in test tube
- add (dilute) nitric acid
- **add silver nitrate (solution)**
- using (dropping) pipette
- **observe cream precipitate (formed after addition of silver nitrate solution)**
- which shows presence of bromide (ions)

[6 marks]

10.2

flame emission spectroscopy

[1 mark]

10.3

any **one** from:

- (more) accurate
- (more) sensitive
- fast(er)
- determine the concentration of ions present

allow requires a small(er) sample

[1 mark]

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

06.1

the start line is drawn in ink

allow the start line should be drawn in pencil

the start line is below the water level

allow the start line should be above the water level

[2 marks]

06.2

$$0.60 = \frac{\text{distance moved by dye}}{12.0}$$

(distance moved by dye =)

0.60 × 12.0

= 7.2 (cm)

[3 marks]

06.3

allow converse

the R_f value is smaller for Paper

A

(because the red dye) is more attracted to Paper A (than to Paper B)

(so the red dye) spends a greater (proportion of the) time distributed in Paper A (than in Paper B)

*if no other mark awarded allow **1***

mark for the dye has a different attraction to each paper

[3 marks]

06.4

use a different solvent

allow use ethanol (as the solvent)

[1 mark]

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

04.1

allow converse argument

allow stationary phase for paper

the yellow dye travels further

(because the yellow) dye has a weaker attraction to the (chromatography) paper

if no other mark awarded

*allow for **1** mark the weaker the attraction to the (chromatography) paper the greater the distance travelled (by the dye)*

[2 marks]

04.2

allow mobile phase for solvent

(in Experiment **2**) the yellow dye travels further

(because) the solvents are different

(and) the yellow dye is more soluble in ethanol (than water)

or

(and) the yellow dye is more attracted to ethanol (than water)

allow the yellow dye is less soluble in water (than ethanol)

allow the yellow dye is less attracted to water (than ethanol)

OR

(in Experiment **1**) the yellow dye does not travel as far (1)

(because) the solvents are different (1)

(and) the yellow dye is less soluble in water (than ethanol)

allow (and) the yellow dye is more soluble in ethanol (than water)

or

(and) the yellow dye is less attracted to water (than ethanol) (1)

allow (and) the yellow dye is more attracted to ethanol (than water)

[3 marks]

04.3

A is an impure (substance)

and

B is a pure (substance)

allow A is a mixture

and

B is a pure (substance)

(because) A contains two dyes

and

B contains one dye

allow (because) A produces two spots

and

B produces one spot

if no other mark awarded

*allow **1** mark for*

A contains two dyes (so) is impure (substance)

or

A contains two dyes (so) is a mixture

or

B contains one dye (so) is pure (substance)

[2 marks]

04.4

$0.48 = \frac{5.4}{\text{distance moved by solvent}}$

(distance moved by solvent =)

$\frac{5.4}{0.48}$

=11.25 (cm)

allow 11.25 correctly rounded to at least 2 significant figures

[3 marks]

04.5

the ratio / proportion of spot distance (moved) to solvent distance (moved) is fixed / constant

allow the distance travelled by the spot relative to the distance travelled by the solvent is constant

allow the distance travelled by the spot is (directly) proportional to the distance travelled by the solvent

[1 mark]

04.6

any **two** from:

- (more) sensitive
- (more) accurate
- fast(er)

allow small(er) sample

allow greater resolution

[2 marks]

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

06.1

calcium (ions)

or

magnesium (ions)

allow Ca^{2+} (ion)

allow Mg^{2+} (ion)

allow zinc / Zn^{2+} (ion)

[1 mark]

06.2

(test)

add excess sodium hydroxide (solution)

(result)

with sodium hydroxide the (white) precipitate dissolves

allow with sodium hydroxide a colourless solution is produced

[2 marks]

06.3

Ca^{2+}

ignore calcium

[1 mark]

06.4

Cl^{-}

ignore chloride

[1 mark]

06.5

(test)

(bubble the gas through) limewater

allow (bubble the gas through) calcium hydroxide solution

(result)

(which) turns milky / cloudy

MP2 is dependent upon MP1 being awarded

[2 marks]

06.6

allow converse argument

(using ethanoic acid)

the rate of reaction is lower

(because) ethanoic acid is a weak(er) acid

(so) the concentration of hydrogen ions is lower

allow (so) ethanoic acid is (only) partially ionised

(and) the frequency of collisions is lower

[4 marks]

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

10.1

Level 3 (5–6 marks): The design/plan would lead to the production of a valid outcome. All key steps are identified and logically sequenced.

Level 2 (3–4 marks): The design/plan would not necessarily lead to a valid outcome. Most steps are identified, but the plan is not fully logically sequenced.

Level 1 (1–2 marks): The design/plan would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.

No relevant content (0 marks)

Indicative content

Method

- draw (pencil) start line on (chromatography) paper
- place spot of food colouring on start line
- use of suitable solvent
- place solvent in beaker / container
- place (chromatography) paper in beaker / container
- so (chromatography) paper is in solvent
- but solvent is below start line
- use a lid
- wait for solvent to travel up the (chromatography) paper (until near top)
- mark solvent front
- dry the (chromatography) paper

Measurements

- measure distance between start line and centre of spot
- measure distance between start line and solvent front
- use of measurements to determine R_f value

[6 marks]

10.2

different solvent used

[1 mark]

10.3

paper

[1 mark]

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