

Paper 9

[Atoms, elements, compounds, mixtures (and separation)]

Q1.(2018)

B ✓

Q2.(2018)

D ✓

Q3.(2018)

Al_2O_3 ✓

1

2.1

ALLOW O_3Al_2
DO NOT ALLOW Al^2O^3

Q4.(2018)

Teacher is wrong / student is right (no mark)

1

3.1b

Mark is for explanation – Who is right or wrong can be implied in response.

Any one from:

Formula should be $\text{Mg}(\text{NO}_3)_2$ ✓

Idea that charges do not balance as Mg ion is $2+$ and NO_3 is $1-$ ✓

The ratio of ions is 1:2 ($\text{Mg}:\text{NO}_3$) ✓

ALLOW MgNO_3 would be charged (+)

Q5.(2019)

D ✓

Q6.(2019)

C ✓

Q7.(2019)

<i>Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question</i> Level 3 (5–6 marks) Detailed description and explanation of mistakes that would mean the experiment would not give suitable data. Suggestions made to improve experiment including the correct processing of data. <i>There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.</i> Level 2 (3–4 marks) Description and explanation of some of the mistakes that would mean the experiment would not give suitable data. Suggestions made to improve experiment. This may include the correct processing of data. <i>There is a line of reasoning presented with some structure. The information presented is relevant and supported by some evidence.</i> Level 1 (1–2 marks) Limited description of the mistakes of the experiment. This may include limited explanation or suggestion(s) of improvements or the correct processing of data. <i>There is an attempt at a logical structure with a line of reasoning. The information is in the most part relevant.</i> 0 marks No response or no response worthy of credit.	6	3 x 3.2a 3 x 3.3b	AO3.2a Analyses the information to make judgements on chromatography method and R_f calculation Indicative science content that would not provide suitable data. If line drawn in pen: • Pen/ink will run/dissolve/mix into solvent • Pen/ink will mix with spots/stop spots from being seen If solvent is at the same level: • Spots will run/smudge/dissolve/mix with solvent • Spots won't move up the paper If incorrect R_f equation is used: • R_f value will be > 1 / R_f value should be < 1 Other indicative science content points If line is not near the bottom: • There may not be enough distance for spots to move and be able to calculate R_f values accurately If beaker isn't covered: • Solvent will evaporate If spots are too large: • Separation won't be clear AO3.3b Analyse information to suggest Improvements to chromatography method • Line on plate should be drawn with pencil • Solvent should be under the pencil line instead of at the same level • R_f calculation is distance moved by solute divided by distance moved by solvent / R_f values should be $X = 0.82$, $Y = 0.68$ and $Z = 0.54$
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Q8.(2020)

A ✓

Q9.a(2020)

Formulation ✓

Q9.b(2020)

FIRST CHECK ANSWER ON ANSWER LINE
If answer = 4.75 (g) award 2 marks

% of water = $(100 - 5.2 - 74.8 - 0.5 - 0.5) = 19(\%)$ ✓

mass of water = $\frac{25 \times 19}{100} = 4.75$ (g) ✓

2

2 x 2.2

ALLOW 4.8

ECF from incorrect % of water

Q9.c(2020)

Idea that its boiling point is (very) low / requires (very) little energy to evaporate ✓

1

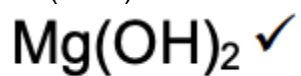
3.2b

ALLOW idea that intermolecular forces / forces between molecules are weak / require little energy to break

Q9.d(2020)

Idea that energy is required (for the alcohol to evaporate) ✓	2	2 x 3.2b	ALLOW 'body' for skin
Idea that energy is supplied by / absorbed from the skin ✓			

Q10.(2020)



Q11.(2021)



Q12.(2022)



Q13.(2022)



Q14.(2023)



Q15.(2023)



Q16.a(2023)

Stationary phase = silica gel on a TLC plate ✓**2****2 x 1.2****Mobile phase** = propanone ✓**ALLOW** solvent for the mobile phase

Q16.b(2023)

The amount of sample used.

☐

The size of the TLC chamber.

☐

The type of solvent used.

☒

✓

Q16.c(2023)

First check answer on answer line
If answer = 0.32 award 3 marks**3**

Maximum 2 marks for any rounding error within the response

$$R_f = 15 \div 47 \quad \checkmark$$

2 x 2.2**ALLOW** equation quoted correctly in words rather than substitution of numbers

$$= 0.319 \quad \checkmark$$

$$= 0.32 \quad \checkmark$$

1.2**ALLOW ECF** from incorrect calculation for decimal places mark

Q16.d(2023)

C ✓

Q17.(2024)

A