AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.1.3.1

Diffusion

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**2**
Available paper years	**2019–2025**

Using this booklet

1. Booklet answer numbers match the question booklet.
2. Use the original question number within marking tables.
3. Examiner comments are included where available.

Name: _____ **Date:** _____

Where a precise marking extract is unavailable, the full source document is included in an appendix. Any missing mark scheme is explicitly identified.

4.1.3.1 Diffusion

Answer 01 · Mark scheme

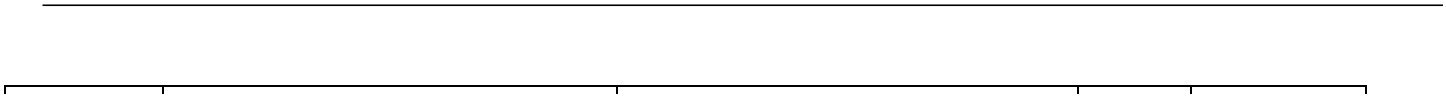
June 2019 | 8464/B/1F | Original Q2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	diffusion		1	AO1/1 4.1.3.1
02.2	(SA of one face = 2 × 2) =4 (Total SA = 4 × 6) = 24 (Volume = 2 × 2 × 2) =8 (SA:volume ratio =) 24:8 **or** 3:1	ignore units allow correct calculation using their calculated SA of 1 face x 6 ratio must be consistent with their figures	1 1 1 1	AO2 4.1.3.1
02.3	red (blood) cell(s)	allow erythrocyte(s)	1	AO1 4.2.2.3
02.4	carbon dioxide	name takes precedence allow CO_2 ignore CO^2 / CO2 ignore water (vapour)	1	AO2 4.2.2.2 4.2.2.3 4.4.2.1
02.5	any **two** from: • wall of alveolus (only) one cell thick • wall of capillary (only) one cell thick • cells of alveolus / capillary wall are flattened / thin • good blood supply • (well) ventilated	ignore large surface area ignore many alveoli ignore moist lining if none of these mentioned allow **1** mark for idea of short distance between (air in) alveolus and blood	2	AO1 4.1.3.1 4.2.2.2
Total			**9**	

4.1.3.1 Diffusion

Answer 01 · Mark scheme

June 2019 | 8464/B/1F | Original Q2



4.1.3.1 Diffusion

Answer 02 · Mark scheme

June 2025 | 8464/B/1F | Original Q3

Question 3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	any **two** from: • repeat (at each concentration) • use the same size cubes / potato • dry the cubes / potato (before weighing) • increase the number of concentrations • use the same volume of solutions • calculate a (percentage) change in mass • use more precise balance • control the temperature of the solutions	 allow use the same mass of cubes / potato allow blot the cubes / potato dry with paper towel (before taking the mass) allow repeat at 1.5 mol/dm^3 allow ensure the cubes / potato are (fully) submerged allow use weighing scales / balance to 2 decimal places	2	AO3 4.1.3.2 RPA2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.2	0.5 mol/dm^3		1	AO3 4.1.3.2 RPA2

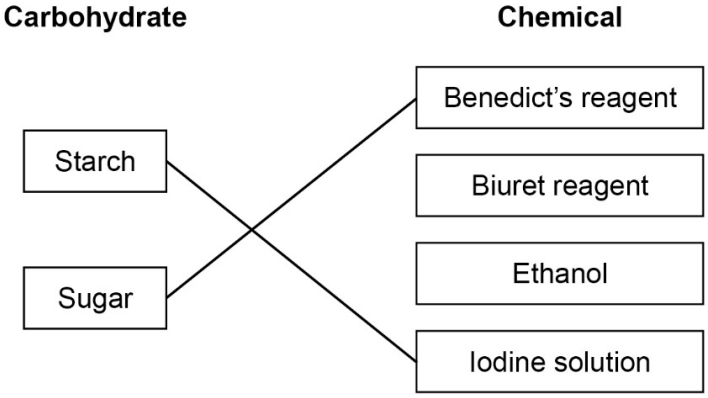
Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.3	osmosis		1	AO1 4.1.3.2

4.1.3.1 Diffusion

Answer 02 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.4	*calculation of area of one face* (3 × 3) = 9 *calculation of total surface area* (9 × 6) = 54 *unit* cm^2	 allow incorrectly calculated area of one face × 6 allow correct unit regardless of working or answer	1 1 1	AO2 4.1.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.5	cut the potato (into smaller pieces)		1	AO3 4.1.3.2

Question	Answers	Mark	AO / Spec. Ref.
03.6	 do **not** accept more than one line from a box on the left	1 1	AO1 4.2.2.1 RPA3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
3.7	sugar and starch		1	AO3 4.2.2.1 RPA3

Total Question 3	11

4.1.3.1 Diffusion

Answer 02 · Examiner comments

June 2025 | 8464/B/1F | Original Q3

Question 3 (Low and Standard demand)

03.1 Many students understood the importance of controlling variables in practical work, however more precision in the language used was required particularly around quantities and control methods to access full marks.

When describing the potato samples, the use of vague terms such as 'similar' or 'about the same size' were not sufficient to gain credit. Students often failed to describe how these would be standardised in size or mass.

A similar lack of precision was where students were expected to describe how to control the volume of the solution. Phrases like 'measure the volume' or 'record the volume' were insufficient.

03.2 48% of students gained the mark on this question.

03.3 68% of students gained the mark on this question.

03.4 This question proved challenging to most students where only 13% of students gained full marks for this calculation.

A wide range of responses was seen, with many students making errors with the method or units. The majority of incorrect answers were due to only calculating part of the surface area or confusing surface area with volume. Many students did not gain the unit mark by giving the final answer in cm^3. instead of cm^2. A common incorrect answer was 9, where students had calculated the area of only one face of the cube (i.e. $3 \times 3 = 9$)

03.5 Many students failed to gain credit due to either misinterpreting the question or using imprecise language. Less than 10% of students gained the mark.

Successful responses simply stated, 'cut it' or 'cut the potato'. Other valid suggestions included 'cutting off the edges', 'cutting it into smaller pieces', or 'cutting a hole in the cube'.

The most common incorrect response was 'cut the potato into larger pieces' or 'use a bigger cube'. While these actions would increase surface area, they would also alter the volume and invalidate the investigation.

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