



**AQA Level 1/2 Certificate in Science:
Double Award**

BIOLOGY PAPER 2H

SPECIMEN MARK SCHEME

MARK SCHEME

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example:

where consequential marking needs to be considered in a calculation;
or the answer may be on the diagram or at a different place on the script.

In general the right hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

- 2.1** In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following lines is a potential mark.
- 2.2** A bold **and** is used to indicate that both parts of the answer are required to award the mark.
- 2.3** Alternative answers acceptable for a mark are indicated by the use of **or**. (Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.)

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which candidates have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

Example 1: What is the pH of an acidic solution? (1 mark)

Candidate	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Candidate	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a candidate writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, as shown in the column 'answers', without any working shown.

However if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column.

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(.....) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

4. Quality of communication and levels marking

In Question 5a candidates are required to produce extended written material in English, and will be assessed on the quality of their written communication as well as the standard of the scientific response.

Candidates will be required to:

- use good English
- organise information clearly
- use specialist vocabulary where appropriate.

The following general criteria should be used to assign marks to a level:

Level 1: basic

- Knowledge of basic information
- Simple understanding
- The answer is poorly organised, with almost no specialist terms and their use demonstrating a general lack of understanding of their meaning, little or no detail
- The spelling, punctuation and grammar are very weak.

Level 2: clear

- Knowledge of accurate information
- Clear understanding
- The answer has some structure and organisation, use of specialist terms has been attempted but not always accurately, some detail is given
- There is reasonable accuracy in spelling, punctuation and grammar, although there may still be some errors.

Level 3: detailed

- Knowledge of accurate information appropriately contextualised
- Detailed understanding, supported by relevant evidence and examples
- Answer is coherent and in an organised, logical sequence, containing a wide range of appropriate or relevant specialist terms used accurately.
- The answer shows almost faultless spelling, punctuation and grammar.

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question	answers	extra information	mark
1(a)	A palisade mesophyll		1
	B spongy mesophyll		1
1(b)(i)	evidence of $18 \div 4$		1
	4.5	correct answer with or without working gains 2 marks	1
1(b)(ii)	evidence of $(1 \div 0.01) \times 4.5$		1
	450	correct answer with or without working gains 2 marks allow ecf from part (b)(i)	1
1(b)(iii)	evidence of $0.1 \div$ (eg 4 / 5 / 6)		1
	0.02	allow answers in range 0.015 – 0.025 inclusive answer that is in range with or without working gains 2 marks	1
1(c)(i)	X		1
	because it has the low(est) number of stomata or no stomata on upper surface or <u>only</u> 8 (on lower surface)		1
	which means there will be less transpiration / evaporation / water loss via stomata		1

Question 1 continues on the next page . . .

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Question 1 continued . . .

question	answers	extra information	mark
1(c)(ii)	it reduces amount of water (vapour) or reduces transpiration (from upper surface)		1
	because lower surface is cooler or in the shade or covered by (folded) wilted leaf		1
Total			13

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question	answers	extra information	mark
2(a)	towards spinal cord by A and away from spinal cord by B		1
2(b)	by chemicals		1
2(c)	muscle labelled X		1
2(d)(i)	distance moved by hammer		1
2(d)(ii)	permanent record of results provides means of measuring the very short time the hammer moved		1 1
2(d)(iii)	circle around distance in trial 5 eg hammer did not hit tendon fully		1 1
2(d)(iv)	increasing the speed of hammer increases the distance the toe moved up to a maximum of 10 cm		1 1
Total			10

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question	answers	extra information	mark
3(a)(i)	the darker blue colour produced absorbs more light		1
3(a)(ii)	colorimeter will have better resolution than eye		1
	less chance of human error		1
3(b)(i)	6.7 – 7 (minutes)	correct answer with or without working gains 2 marks if final answer incorrect award 1 mark for evidence of selection of 40(% light intensity) either in working or in graph 2	2
3(b)(ii)	all starch broken down		1
3(c)	because 40°C is the optimum temperature for the enzyme's action		1
	and the enzyme is denatured / destroyed / damaged at higher temperatures		1
3(d)	fructose is sweeter than glucose therefore needed in smaller quantities		1
	or so fewer calories in the slimming food		1
Total			10

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question	answers	extra information	mark
4(a)(i)	6		1
4(a)(ii)	4		1
4(b)	'X' anywhere between >1 and ≤ 2 hours		1
Total			3

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question	answers	extra information	mark
5(a)	Marks awarded for this answer will be determined by the quality of communication as well as the standard of the scientific response. Examiners should also refer to the information on page 4 and apply a best-fit approach to the marking.		
0 marks	Level 1 (1–2 marks)	Level 2 (3–4 marks)	Level 3 (5–6 marks)
No relevant content	The method described is basic but shows some understanding of the sequence of an investigation.	The method described is clear and will enable valid results to be collected.	The method described is clear and detailed and will enable valid results to be collected.

examples of biology points made in the response:

- use of scalpel to cut chips to same dimensions
- use of range of sodium chloride concentrations
- use of forceps to transfer chips
- use of balance to measure mass of chips before immersion
- chips blotted dry before weighing
- use of balance to measure mass of chips after immersion
- chips left in solutions for same length of time

5(b)(i)	both X and Y axes with suitable scales and labels		1
	points or bars plotted correctly to within ± 1 mm	deduct 1 mark for each incorrect plot up to a maximum of 2	2
	suitable line of best fit drawn on graph		1
5(b)(ii)	0.3	allow correct reading from student graph	1

Question 5 continues on the next page . . .

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Question 5 continued . . .

question	answers	extra information	mark
5(b)(iii)	there is a higher concentration of solutes outside the cylinders than inside or the solution outside is hypertonic compared with the inside of the cylinders	allow higher concentration of water inside cylinders than outside	1
	so water molecules will move through partially permeable membranes (by osmosis)		1
	from the potato cylinder to the outside (solution)		1
Total			14

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question	answers	extra information	mark
6(a)	some animals not dislodged or some animals missed / escaped through net		1
6(b)	mayfly indicate unpolluted water but do not indicate how much sewage pollution there is freshwater shrimps could not be used as indicators since their numbers were the same in unpolluted water and heavily polluted water water hoglice are found in small numbers in both pure and heavily polluted water; however they increase in numbers downstream of the pollution so could be considered as indicators of moderately polluted water blackfly larvae are a good indicator of pollution; however they increase in numbers further downstream of the pollution than hoglice so could be considered as indicators of lightly polluted water		1 1 1 1
6(c)	240–260		1

Question 6 continues on the next page . . .

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Question 6 continued . . .

question	answers	extra information	mark
6(d)(i)	(C) 50% killed at lowest / low copper concentration		1
6(d)(ii)	argued evaluation: using invertebrates involves counting and is therefore easier to do than chemical analysis using invertebrates gives 'long term picture' rather than 'snapshot' but the use of chemical method gives more accurate determination of copper concentration		1 1 1
Total			10