AQA Qualifications

GCSE

BIOLOGY

BL3HP

Mark scheme

4401

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Version: 1.0 Final

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this Mark Scheme are available from aqa.org.uk

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 Assessment Objectives and specification content that each question is intended to cover.

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 and underlining

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 bullet points 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.

2.4 Any wording that is underlined is essential for the marking point to be awarded.

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which students 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)

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

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

Student	Response	Marks awarded
1	Neptune, Mars, Moon	1
2	Neptune, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a student 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, 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 or by each stage of a longer calculation.

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 is 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.

3.8 Ignore / Insufficient / Do <u>not</u> allow

Ignore or insufficient are used when the information given is irrelevant to the question or not enough to gain the marking point. Any further correct amplification could gain the marking point.

Do **not** allow means that this is a wrong answer which, even if the correct answer is given, will still mean that the mark is not awarded.

Quality of Written Communication and levels marking

In Question 2 students 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.

Students 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.

Question	Answers	Extra information	Mark	AO / spec ref.
1(a)(i)	76.0 / 76	correct answer with or without working gains 2 marks allow 76.04 for 2 marks allow 76.04 with extra decimal places eg 76.042 for 1 mark $\frac{465}{611.5}$ for 1 mark	2	AO2 3.4.4c
1(a)(ii)	mass of fish declines (until 2008) (due to an) increase in fishing / overfishing and then rises (until 2010) (which could be due to) quotas / net restrictions working	ignore use of numbers allow number of fish decline (until 2008) allow any reasonable suggestion, such as countries swapping quotas or restrictions on fishing during breeding seasons ignore less fishing if no other marks awarded allow 1 mark for a decrease in mass **and** an increase in mass if answer relates to sustainable fishing	1 1 1 1	AO2 / AO3 3.4.4c
1(a)(iii)	(this is due to) public awareness / demand	allow legislation / rules	1	AO3 3.4.4c
1(b)	fishing quotas / bans (small) net / mesh size	 if size of net is stated then it must be smaller if size of mesh is stated then it must be larger	1 1	AO1 3.4.4c

1(c)	(fish) cannot move freely / as much		1	AO1 / AO2 3.4.4b
	(therefore) less <u>energy</u> loss from the fish	do **not** allow 'no energy is lost' ignore references to less heat loss though controlling body temperature ignore references to respiration	1	
	(there is) more food available / better quality food / fed more often	accept 'high-protein food for making cells'	1	
	(so) there is more energy for growth **or** (more food) is converted to biomass		1	
Total			13	

Question	Answers	Extra information	Mark	AO / spec ref.
2			6	AO1 3.3.1

Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5 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	There is at least one reason for deforestation **or** an attempt at a description of at least one way deforestation is affecting the atmosphere.	There is at least one reason for deforestation **and** a description of the way deforestation is affecting one gas in the atmosphere **or** the process that causes an effect.	There are reasons for deforestation **and** a clear description of the way deforestation is affecting one gas in the atmosphere **and** the process that causes this.

examples of the points made in the response	extra information
Reasons for deforestation • timber for construction / furniture / boat building / paper production • growing plants for biofuels for motor fuel / aviation / lawnmowers • use of wood as a fuel • land for building or agriculture to provide food, such as rice fields and cattle ranching	
Effects of deforestation • increase in carbon dioxide in atmosphere o due to burning o due to activities of microbes o less carbon dioxide taken in / locked up (by trees) o less photosynthesis • increase in methane in atmosphere due to rice production / cattle	ignore references to oxygen accept explanations of the effect of water (vapour)

Question	Answers	Extra information	Mark	AO / spec ref.
3(a)	any **three** from: • (water through a) partially permeable • membrane • from dilute to (more) concentrated solution • (it's a) passive (process)	 accept 'semi permeable' / selectively permeable allow 'from a high concentration of water to a lower concentration (of water)' allow 'from high water potential to low water potential' allow 'down a concentration gradient of water' do **not** accept 'along a concentration gradient of water' allow requires no energy	3	AO1 3.1.1b
3(b)	(there are) many <u>hairs</u> **or** thin <u>hairs</u> **or** <u>hairs</u> are one cell thick (which gives) large / increased surface area **or** short diffusion pathway (so there is) more diffusion / osmosis (of water into the root)	 ignore absorption	1 1 1	AO1 / AO2 3.1.1h, 3.1.3b
Total			6	

Question	Answers	Extra information	Mark	AO / spec ref.
4(a)(i)	defence against **or** destroy pathogens / bacteria / viruses / microorganisms	do **not** allow 'destroy disease' accept engulf pathogen / bacteria / viruses / microorganism accept phagocytosis accept produce antibodies / antitoxins allow immune response	1	AO1 3.2.2d
4(a)(ii)	they are small fragments of cells		1	AO1 3.2.2e
4(b)	liver kidney(s)	in this order only	1 1	AO1 3.2.2b
4(c)	any **two** from: • that it doesn't cause an immune response **or** isn't rejected / damaged by white blood cells • whether it is a long lasting material / doesn't decompose / corrode / inert • if it is strong (to withstand pressure) • it will open at the right pressure • that it doesn't cause clotting • that it doesn't leak **or** it prevents backflow • non toxic	ignore correct size	2	AO3 3.2
Total			6	

Question	Answers	Extra information	Mark	AO / spec ref.
5(a)(i)	guard (cells)	allow phonetic spelling	1	AO1 3.1.3e
5(a)(ii)	any **one** from: • allow carbon dioxide to enter • allow oxygen to leave.	ignore reference to cells allow control loss / evaporation of water **or** control transpiration rate allow 'gaseous exchange'	1	AO1 3.1.3a, c,e
5(b)(i)	200	correct answer gains 2 marks with or without working allow 1 mark for 0.1 × 0.1 = 0.01 (mm^2)	2	AO2 3.1.3
5(b)(ii)	more / a lot of / increased water loss	allow plant more likely to wilt (in hot / dry conditions)	1	AO3 3.1.3d
5(c)(i)	0.12		1	AO2 3.1.3
5(c)(ii)	the lower surface has most stomata stomata are now covered / blocked (by grease) so water cannot escape / evaporate from the stomata	 ignore waterproof to gain credit stomata must be mentioned at least once	1 1 1	AO3 3.1.3c, d
Total			9	

Question	Answers	Extra information	Mark	AO / spec ref.
6(a)(i)	1 hour 15 mins / 1.25 hours / 75 mins	allow 1:15 ignore 1.15 hours	1	AO3 3.3.2
6(a)(ii)	increase in (core / body) temperature	ignore numbers	1	AO1 / AO2 / AO3
	(due to an) increase in <u>respiration</u> **or** more <u>muscle</u> contraction		1	3.3.2a
	releasing energy (as a waste product)	allow produces 'heat' do **not** allow making energy	1	
	skin temperature decreases		1	
	(because there is) sweating		1	
	(which) evaporates and cools the skin		1	
		ignore references to vasodilation or vasoconstriction		
6(a)(iii)	(there is) dilation of vessels (supplying skin capillaries)	allow vasodilation allow blood vessels widen ignore expand do **not** accept dilating capillaries or moving vessels	1	AO1 / AO2 3.3.2d
	(so) more blood flows (near skin) (surface) **or** blood is closer (to the skin)	ignore ref to heat	1	
6(b)	pancreas detects (low) blood glucose		1	AO1 3.3.3b
	produces glucagon	do **not** allow glucagon made in the liver	1	
	(so) glycogen is converted to glucose		1	
		allow adrenaline released which increases conversion of glycogen to glucose **or** reduced insulin production so less glucose into cells / less glucose converted to glycogen for 1 mark		
Total			12	

Question	Answers	Extra information	Mark	AO / spec ref.
7(a)(i)	(initially there is) oxygen	accept: oxygen hasn't been used up yet (so not anaerobic conditions yet)	1	AO1 / AO2 3.4.3c
	(so) <u>aerobic</u> respiration (by microorganisms)	(because) methane is produced in anaerobic (fermentation)	1	
	producing CO_2 (which does not burn)	there is no methane ignore inflammable	1	
7(a)(ii)	(peelings had) the most carbohydrate / organic material	answer must be comparative accept contained more microorganisms / decomposers / bacteria ignore water do **not** allow fat or protein	1	AO3 3.4.3c
7(b)(i)	0.22 / 0.221	correct answer with or without working gains 2 marks allow 0.2 for 1 mark allow 22.1 for 1 mark allow 0.34 × 65 / 0.65 for 1 mark	2	AO2 3.4.3c
7(b)(ii)	(sheep manure) produces a higher volume of biogas / almost double **or** produces 0.27 (m^3 per kg) more	accept 0.408(7) / 0.41 / 0.409 (m^3) from sheep for 2 marks accept 0.1877 / 0.188 / 0.19 (m^3) more than cow's manure for 2 marks	1	AO2 3.4.3c
	(sheep manure) produces biogas with a higher percentage methane **or** produces 2% more methane	allow correct difference in volume calculated using 0.408(7) / 0.41 / 0.409 minus answer given in 7(b)(i) for 2 marks	1	
Total			8	