



GCSE

Biology

BL3FP
Final Mark Scheme

4401
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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	Pluto, Mars, Moon	1
2	Pluto, 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 'ecf' 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 Accept / allow

Accept is used to indicate an equivalent answer to that given on the left-hand side of the mark scheme. Allow is used to denote lower-level responses that just gain credit.

3.9 Ignore / Insufficient / Do not 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.

4. Quality of Written Communication and levels marking

In Question 7 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)	8.0		1	AO2 3.4.2
1(a)(ii)	To provide land to grow crops.		1	AO1 3.4.1c 3.4.2a/c
	To provide space for building.		1	
1(b)	Carbon dioxide		1	AO1 3.4.3a
	Methane		1	
Total			5	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2(a)	The movement of water from a dilute solution to a more concentrated solution through a partially permeable membrane.		1	AO1 3.1.1b
2(b)	A = phloem B = xylem		1 1	AO2 3.2.3a
2(c)	transpiration		1	AO1 3.2.3a
2(d)(i)	mass before – mass after		1	AO2 3.2.3a
2(d)(ii)	A has the largest surface area		1 1	AO2/3 3.1.3b/ d
2(d)(iii)	any two from: <ul style="list-style-type: none"> • hot / warm(er) • dry / drier • windy 	allow turn on a heater / increase temperature allow turn on a fan	2	AO1 3.1.3d
Total			9	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
3(a)	A = red	allow lymphocyte / phagocyte	1	AO2 3.2.2a/c/d
	B = white		1	
3(b)(i)	low number of platelets	ignore abnormal unqualified	1	AO2/3 3.2.2e
	so blood doesn't clot		1	
3(b)(ii)	To prevent rejection of the new blood cells.		1	AO2 3.3.1i
3(c)	carbon dioxide	allow CO ₂	1	AO1 3.2.2b
	small intestine		1	
	kidneys	in this order only	1	
Total			8	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
4(a)	methane / CH ₄	additional answers negate mark	1	AO1 3.4.3c
4(b)	any two from: <ul style="list-style-type: none"> • (same) mass of material • (same) volume of water • (left for the same amount of) time • (kept at the same) temperature 	allow (same) amount of material allow (same) amount of water	2	AO2 3.4.3c
4(c)(i)	8.2 in manure, test 3 circled	allow if clearly indicated, eg arrow pointing at 8.2	1	AO3 3.4.3c
4(c)(ii)	14.3		1	AO2 3.4.3c
4(c)(iii)	manure and beans produces the most biogas	allow ecf from 4(c)(ii)	1 1	AO2/3 3.4.3c
4(d)	Advantage any one from: <ul style="list-style-type: none"> • constant supply • produces own gas • saves money • uses up manure • is a renewable energy source Disadvantage any one from: <ul style="list-style-type: none"> • fire risk • smell • risk of explosion 		1 1	AO3 3.4.3c
Total			9	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
5(a)(i)	alveolus / alveoli	allow air sac(s) allow phonetic spelling	1	AO1 3.1.1k
5(a)(ii)	out / outwards	in this order only ignore expand	1	AO1 3.1.2c
	down	allow to be flat	1	
	contract or shorten		1	
	decrease / drop / fall		1	
5(a)(iii)	capillary / capillaries		1	AO1 3.1.2b 3.2.1g
5(b)(i)	villus / villi / microvilli		1	AO2 3.1.1k/l
5(b)(ii)	any two from: <ul style="list-style-type: none"> large surface area thin or one cell thick or short diffusion pathway it contains many blood capillaries or has an efficient blood supply (continuous) blood flow maintains the concentration gradient 	allow many blood vessels	2	AO2 3.1.1k/l
Total			9	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
6(a)(i)	<u>left</u> ventricle		1	AO1 3.2.1c
6(a)(ii)	aorta	ignore artery allow aortic (artery)	1	AO1 3.2.1d
6(a)(iii)	(to keep) blood flowing in the right / one direction or prevent backflow (of blood)	ignore ref to veins	1	AO1 3.2.1e

6(b)	<p>Reasons for:</p> <ul style="list-style-type: none"> less likely to die (44% cf. 59%) lower risk of death from having a second operation lower risk of heart infections less chance of the valve stopping working longer lasting doesn't cause rejection avoids religious issues of using organs from a pig or no ethical issue from using part of a living organism <p>Reasons against:</p> <ul style="list-style-type: none"> chance of death by bleeding is increased offers no advantage against clots or equal risk of blood clots have to take anti-clotting drugs for life can be noisy 	<p>max 3 marks if only reasons for or reasons against given</p> <p>allow converse for each point if clearly referring to the pig tissue valve</p> <p>ignore cost</p> <p>allow doesn't stop working</p> <p>allow been used for a longer period of time</p> <p>ignore religion or ethical unqualified</p>	<p>4</p>	<p>AO3 3.2</p>
6(c)	<p>(inserted to) keep the (coronary) artery / arteries open</p> <p>allows more blood to flow (to the heart muscle) or return blood flow to normal</p>	<p>do not allow veins</p> <p>allow (more) glucose / oxygen to reach the heart (muscle)</p>	<p>1</p> <p>1</p>	<p>AO1 3.2.1f</p>
Total			<p>9</p>	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
7			6	AO1 3.3.1a/c 3.1.2b
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	The name (N) of a waste product is given or a process (P) that makes a waste product or an organ (O) involved	The name of a waste product is given which is linked to either the process that it is made in or the organ involved	The names of waste products are given of which at least one is correctly linked to the process it is made in and the organ(s) involved	
examples of the points made in the response		extra information		
<ul style="list-style-type: none"> • (N) urea • (P) from the breakdown of amino acids • (O) (amino acids broken down) in the liver • (O) removed by kidneys • (O) bladder removes <u>urine</u> (from the body) <ul style="list-style-type: none"> • (N) CO₂ • (P) from respiration • (O) in a named organ or in cells • (O) breathed out from lungs <ul style="list-style-type: none"> • (N) water • (P) from respiration • (O) in a named organ or in cells • (O) breathed out from lungs • (O) through skin (by sweating) • (O) by kidneys • (O) bladder removes <u>urine</u> (from the body) 		ignore faeces 'Give credit for any extra correct knowledge – eg toxins are broken down in the liver and the products removed in kidneys/urine.' <ul style="list-style-type: none"> • (N) ions • (P) from eating and drinking • (O) skin (through sweating) • (O) by kidneys • (O) bladder removes <u>urine</u> (from the body) 		
Total				6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
8(a)	Causes acid rain		1	AO1 3.4.1b
8(b)(i)	66(%) or 65.7(%)	allow 1 mark for 920 or ecf from first line	2	AO2 3.4.1b
8(b)(ii)	it rises and then falls maximum level in 2005 or maximum reached at 400 (thousand tonnes)		1 1	AO2 3.4.1b
Total			5	