



General Certificate of Secondary Education

Additional Science 4408 / Biology 4401

BL2FP Unit Biology 2

Mark Scheme

2012 examination – June series

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

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.

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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 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	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)

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, 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.

Quality of Written Communication and levels marking

In Question 8(b) 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.

BL2FP**Question 1**

question	answers	extra information	mark
1(a)(i)	(cell) membrane		1
1(a)(ii)	vacuole		1
1(b)	any two from: <ul style="list-style-type: none">• (cell) wall• chloroplast(s)• vacuole	ignore chlorophyll ignore cell sap	2
1(c)	diffusion		1
Total			5

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Question 2

question	answers	extra information	mark
2(a)	in sequence: 2 = tissue(s) 3 = organ(s) 4 = system(s)		1
2(b)		1 mark for each correct line extra line(s) from one tissue cancel	3
Total			4

BL2FP**Question 3**

question	answers	extra information	mark
3(a)	remains of an organism or bone / shell / hard part of an organism / impression		1
	further detail – eg in rock / from a long time ago	if numbers, greater or equal to hundreds of years allow made of minerals ignore over time ignore fossil are rocks	1
3(b)(i)	D		1
3(b)(ii)	B		1
3(b)(iii)	predation / disease / lack of food / competition / loss of habitat / climate change / catastrophic event – or volcanic eruption / flood / drought / temperature change / weather change / ice age / change in atmosphere	ignore human effects ignore pollution effects / acid rain ignore human effects allow natural disaster	1
3(c)	C = 'widest' thickest / wider thicker column or more fossils (of type C found)	allow biggest / er	1
3(d)	members of the groups have similar physical structures	extra box ticked – cancel	1
Total			7

BL2FP**Question 4**

question	answers	extra information	mark
4(a)(i)	23		1
4(a)(ii)	nucleus / 'the head'	allow phonetic spelling	1
4(b)(i)	X and X		1
4(b)(ii)	X and Y		1
4(c)	150 million / 150,000,000 / half (of them) / 50% / 1 in 2		1
Total			5

BL2FP**Question 5**

question	answers	extra information	mark
5(a)(i)	A		1
5(a)(ii)	hydrochloric (acid) / HCl		1
5(a)(iii)	alkali / suitable named example	accept sodium hydrogen carbonate / sodium bicarbonate / milk of magnesia / other brand names allow bile (salts) ignore antacid	1
5(b)	<ul style="list-style-type: none"> • amylase breaks down starch • (broken down) into sugars / glucose • digestion of starch in the mouth • (also) starch broken down in small intestine • amylase produced in salivary glands / small intestine / pancreas 		1 1 1 1 1
5(c)	<u>small</u> intestine	allow ileum / duodenum do not accept large intestine	1
Total			9

BL2FP**Question 6**

question	answers	extra information	mark
6(a)	(LHS) water / H ₂ O	allow H ₂ O do not accept H ² O	1
	(RHS) glucose / sugar / C ₆ H ₁₂ O ₆	allow starch / carbohydrate allow C ₆ H ₁₂ O ₆ do not accept C ⁶ H ¹² O ⁶	1
6(b)(i)	1 arbitrary unit	extra box ticked – cancel	1
6(b)(ii)	210		1
6(b)(iii)	carbon dioxide / CO ₂ / CO ₂ or temperature / heat / warmth	do not accept CO ² ignore mineral ions ignore water	1
Total			5

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Question 7

question	answers	extra information	mark
7(a)(i)	recessive allele		1
7(a)(ii)	carriers		1
7(b)(i)	6	allow nn	1
7(b)(ii)	1 in 4 / 0.25 / $\frac{1}{4}$ / 25% / 1:3	do not accept '3:1' / 1:4 / 1 in 3 / 25	1
7(c)	advantage: detect CF qualified – eg at early stage / before becoming pregnant or (only) healthy children produced	allow 'after <u>only</u> 3 days' allow reduces health care costs	1
	disadvantage: some embryos are destroyed / may damage embryo	allow increased risk of miscarriage ignore not natural ignore cost	1
Total			6

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Question 8

question	answers	extra information	mark	
8(a)(i)	(white) clover		1	
8(a)(ii)	reed sweet-grass	allow reed allow grass	1	
8(a)(iii)	(only) found in swamp <u>and</u> aquatic zones <u>or</u> <u>only</u> found in water <u>or</u> doesn't grow in marsh	ignore wet conditions	1	
8(b)	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 2, and apply a 'best-fit' approach to the marking.		6	
	0 marks	Level 1 (1-2 marks)	Level 2 (3-4 marks)	Level 3 (5-6 marks)
	No relevant content.	There is a basic description which describes how a quadrat <u>or</u> a metre tape could be used to collect data	There is a clear description of how a quadrat <u>and</u> a metre tape could be used to collect data along a line	There is a clear, logical and detailed description of a method that will produce valid, repeatable results across / at intervals along the stream.
<p>examples of procedural points made in the response:</p> <ul style="list-style-type: none"> • use of tape measure to produce transect • placing of quadrats • transect placed across stream • score presence of each plant species • use quadrat at regular intervals along tape • repeat transect several times (≥ 3) • along stream • at random <u>or</u> regular intervals 				
Total			9	

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Question 9

question	answers	extra information	mark
9(a)(i)	any three from: <ul style="list-style-type: none"> • age (of athlete) • gender (of athlete) • <u>starting</u> concentration of glycogen • type / intensity of exercise • length of exercise period • number of training sessions • time interval between exercise sessions • exercise at same time of day 	if diet given as answer = max 2 if none of these points gained amount of exercise = 1 mark if last four points not awarded allow time (for exercise) for 1 mark ignore references to amount of energy ignore they are both athletes	3
9(a)(ii)	any two from: <ul style="list-style-type: none"> • intensity of exercise • amount of exercise between sessions • <u>starting</u> concentration of glycogen • fitness / health • metabolic rate / respiration rate • amount / mass of <u>muscle</u> / physique • aspects of diet qualified, eg amount of food eaten 	do not accept amount of carbohydrate if no other marks awarded allow height / mass / weight for 1 mark	2

9(a)(iii)	(B has) less glycogen or (B's glycogen) fell more or (B's glycogen) built up less	he = B accept use of approximate figures allow other correct observations from graph eg A is lower at end of first session ignore rate of fall	1
9(b)	athlete A (no mark) athlete A had more glycogen / B has less (only if A chosen to complete marathon) (glycogen / glucose) used in respiration (more) energy released / available in athlete A and either energy used for movement / muscle action / to run or (extra) glycogen → (more) glucose	to gain full marks 'more' must be given at least once accept converse argument for B ignore anaerobic allow 'energy made'	1 1 1 1
Total			10

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