



General Certificate of Secondary Education

Additional Science 4463 / Biology 4411

BLY2H

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.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

Copyright © 2012 AQA and its licensors. All rights reserved.

COPYRIGHT

AQA retains the copyright on all its publications. However, registered schools / colleges for AQA are permitted to copy material from this booklet for their own internal use, with the following important exception: AQA cannot give permission to schools / colleges to photocopy any material that is acknowledged to a third party even for internal use within the school / college.

Set and published by the Assessment and Qualifications Alliance.

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.

BLY2H**Question 1**

question	answers	extra information	mark
1(a)	photosynthesis	do not accept other additional processes	1
1(b)(i)	any three from, eg: <ul style="list-style-type: none"> • mass of pondweed • volume of water • other reasonable features of the water • light intensity • light colour • carbon dioxide • temperature • pH 	ignore time / apparatus <u>type</u> of pondweed = max 2 accept amount / volume / length / size ignore number / surface area of leaves / pondweed unqualified accept amount accept distance between light source and tube / pondweed accept light if neither colour nor intensity is given	3

Question 1 continues on the next page

BLY2H**Question 1 continued**

question	answers	extra information	mark
1(b)(ii)	any one idea from, eg: <ul style="list-style-type: none"> • how much oxygen they give off • is pondweed poisonous to fish • will fish eat pondweed • is pondweed harmful to environment • how long the pondweed lives • growth rate / size of pondweed • reference to appearance / aesthetics • availability 	ignore reference to cost	1
1(c)	magnesium / Mg	accept iron / Fe ignore ion and ⁺ or ⁻ ignore nitrate	1
Total			6

BLY2H**Question 2**

question	answers	extra information	mark
2(a)(i)	insulin	accept glucagon (correct spelling only)	1
2(a)(ii)	pancreas	accept phonetic spelling allow pancrease	1
2(b)(i)	11(.0)	accept in range 10.5–11 (.0)	1
2(b)(ii)	any two from: <ul style="list-style-type: none"> • high(er) concentration (of blood glucose) (anywhere / any time) • large(r) increase (in concentration after the drink) • fast(er) / steep(er) rise • slow(er) fall 	ignore numbers unless comparative accept 115 <u>not</u> 88 139 <u>not</u> 99 accept increase by 24 <u>not</u> 11 / their b(i) accept it takes 3 hours <u>not</u> 1 ¼ hours to get back to original level accept it takes a long time to get back to normal	2
2(b)(iii)	any one from: <ul style="list-style-type: none"> • insulin present / produced • (used in) respiration • taken into cells 	accept glucagon not produced allow exercise allow converted to glycogen allow taken into liver (cells) / muscle (cells) allow produce / make energy	1
Total			6

BLY2H**Question 3**

question	answers	extra information	mark
3(a)(i)	(has) chloroplast(s)	accept chlorophyll	1
	vacuole		1
3(a)(ii)	any one from: <ul style="list-style-type: none"> • no (cell) wall • can move / has flagellum 	ignore reference to cell membrane	1
3(b)	water leaves or water diffuses out	do not accept solute / salt moves	1
	by osmosis	do not allow osmosis of salt	1
	or membrane partially / selectively / semi permeable	allow description of membrane	
	because concentration (of salt) is greater outside than inside	assume concentration refers to salt unless candidate indicates water concentration	1
		accept explanations in terms of water potential or concentration gradient	
		accept with gradient but not along gradient	
Total			6

BLY2H**Question 4**

question	answers	extra information	mark
4(a)	protease	allow trypsin / peptidase do not allow pepsin	1
	carbohydrase / amylase	do not allow sucrase / maltase / lactase	1
4(b)	no lipase produced / found		1
	in stomach / mouth / before small intestine OR accept lipase <u>only</u> produced / found (1) in small intestine / pancreas (1)	if no other mark is awarded lipid is not broken down in the stomach or lipid is digested in small intestine gains 1 mark	1
4(c)	enzymes only work in solution / when dissolved or because enzyme / lipase / it is dry	allow enzymes only work in presence of water or enzymes do not work when dry ignore other physical conditions	1
Total			5

BLY2H

Question 5

question	answers	extra information	mark
5(a)	<p>for super farm any three from:</p> <p>advantages:</p> <ul style="list-style-type: none"> • more <u>energy</u> efficient • more milk produced <u>per cow</u> • larger population needs more food / milk • produces electricity from renewable resource • high quality food (for cows) so improved quality of milk <p>disadvantages:</p> <ul style="list-style-type: none"> • cruel / unethical / equivalent because of limited movement / space • disease spreads <u>more</u> easily • <u>more</u> antibiotics needed or higher vet costs • consequence of more antibiotics eg resistance • fields get less / no fertiliser or need artificial fertiliser or crops grow less well (as less fertiliser) <p>final conclusion regarding personal choice based on comparison of at least one advantage and one disadvantage, eg The super farm is good idea because advantage xxx, outweighs disadvantage of yyy</p>	<p>must include at least one advantage and one disadvantage for all 3 marks ignore costs / profits except where stated below</p> <p>allow more milk per unit area</p> <p>accept don't have to use fossil fuel</p> <p>accept converse, ie 'a bad idea because...'</p>	<p>3</p> <p>1</p>

Question 5 continues on the next page...

BLY2H**Question 5 continued**

question	answers	extra information	mark
5(b)	any three from: <ul style="list-style-type: none"> • decay / decomposition / breakdown / digestion • microorganisms / microbes / bacteria / fungi / decomposers / detritus feeders / named • respiration (of / by microorganisms etc) • carbon dioxide released / produced (by respiration or by microorganisms) 	accept from clear diagram do not accept if respiration of faeces ignore reference to fossil fuels / combustion / photosynthesis	3
Total			7

BLY2H

Question 6

question	answers	extra information	mark
6(a)	in rainforest: (water from) sweat does not evaporate (as much)	accept converse max 1 if not clear whether desert or rainforest	1
	any one from: <ul style="list-style-type: none"> • (due to) less wind / higher moisture / humidity • <u>less</u> cooling effect 	ignore references to temperature	1
6(b)	blood vessels supplying capillaries dilate / widen or vasodilation	do not award mark if candidate refers only to blood vessels dilating or to capillaries dilating. accept 'arteries' or 'arterioles' for 'blood vessels supplying, capillaries' but do not accept 'veins'. ignore expand / get bigger / relax / open	1
	more blood (through skin / surface capillaries) leads to greater <u>heat loss</u>	do not accept idea of blood vessels moving	1
Total			4

BLY2H**Question 7**

question	answers	extra information	mark
7(a)	7.15 to 7.45 <u>am</u> and 7.15 to 7.45 <u>pm</u>	both required, either order accept in 24 hr clock mode	1
7(b) (i)	11		1
7(b) (ii)	32.5 to 33	allow answer to (b)(i) + 21.5 to 22	1
7(c)	any two from: <ul style="list-style-type: none"> • more photosynthesis than respiration • more biomass / carbohydrate made than used • so plant able to grow / flower 	allow more food made than used accept plant able to store food	2
Total			5

Question 8

question	answers	extra information	mark
8(a)	A = Hh B = Hh	may not be in answer space accept heterozygous or description	1
	(allele for) polydactyly is dominant or polydactyly is H,	for marking points 1, 2 and 3 accept evidence in clearly labelled / annotated genetic diagram	1
	cats with polydactyly have H	accept if polydactyly was recessive all offspring would have polydactyly	1
	E or (some) offspring of A and B , does not have polydactyly, so A and B must both have h		1
8(b)(i)	HH and Hh or homozygous dominant and heterozygous	both required, in either order allow description	1
8(b)(ii)	any one from: <ul style="list-style-type: none"> • polydactyly is dominant • parents are both Hh • if D is Hh all offspring <u>could</u> inherit H 	accept annotated genetic diagram to explain answer	1
Total			6

UMS Conversion Calculator www.aqa.org.uk/umsconversion