General Certificate of Secondary Education

Science B 4462 / Biology 4411

BLY1H   Unit Biology 1

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.

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.

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Question 1

question	answers	extra information	mark
1(a)		**1** mark for each correct line mark each line from left hand box two lines from left hand box cancels mark for that box	3

Question 1 continues on the next page . . .

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Question 1 cont'd

question	answers	extra information	mark
1(b)	any **three** from: • reference to reliability, eg only a small number of mice tested **or** trial too short **or** investigation not repeated • reference to control, eg mice given caffeine <u>not</u> coffee **or** 6 cups (equivalence) is more than 1 dose • (and) the effect on mice might not be same as on humans • (also) text suggests that the treatment improves memory loss (rather than delays it) **or** mice already have memory loss **or** experiment only showed improvement in memory **or** does not show **delays** Alzheimer's **or** experiment not done on old mice	Students have been informed that the headline is not justified allow only tested on mice accept text suggests disease cured allow reference to the fact that mice engineered to have it	3

| **Total** | | | **6** |

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Question 2

question	answers	extra information	mark
2(a)	3.75	accept answers in range 3.6 – 3.9	1
2(b)	(Paranthropus) aethiopicus		1
2(c)	(Homo) ergaster		1
2(d)	any **two** from: • Homo erectus fossils found in other parts of the world • (too many) gaps in fossil record • Homo erectus on different branch of 'tree' **or** no evidence of other 'humans' developing from Homo erectus **or** no link shown between Homo erectus to Homo sapiens / modern humans **or** (fossils show that) H. sapiens evolved from H. heidelbergensis / H. mauritanicus / H. ergaster	ignore references to H. floresiensis or not enough data allow **only** 50 fossils found in China ignore the two species were alive at the same time allow diagram shows they are not closely related	2

Question 2 continues on the next page . . .

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Question 2 continued

question	answers	extra information	mark
2(e)	any **two** from: • 'religious' reasons • insufficient evidence at that time • Darwin was not a respected / well known scientist • mechanism of inheritance / variation not known at that time	 allow people did not wish to believe they had evolved from apes allow took a long time to get evidence **or** communications not as good at that time ignore **no** evidence / could not prove it ignore references to Lamarck allow (people) did not know about genes / genetics / DNA / chromosomes / mutations	2
Total			**7**

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Question 3

question	answers	extra information	mark
3(a)(i)	diet not balanced	allow lacks a nutrient / named nutrient / food group allow 'wrong kinds of food' ignore not enough nutrients ignore lack of food / unhealthy diet	1
3(a)(ii)	any **two** from: • too fat • too thin / stunted growth / weight loss • deficiency disease / named deficiency disease / deficiency symptom • allow tiredness / weakness / insufficient energy • allow weak / brittle bones / osteoporosis as symptoms of vitamin D / calcium deficiency • allow bloated stomach • allow reduced resistance to infection / weak immune system	accept two deficiency diseases / symptoms for **2** marks accept muscle wastage ignore irregular periods ignore anorexia / diabetes / arthritis / heart disease	2

Question 3 continues on the next page . . .

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Question 3 continued

question	answers	extra information	mark
3(b)(i)	Zambia		1
3(b)(ii)	any **two** from: • irregular period • reduced resistance to infection • tiredness / weakness / weight loss / stunted growth / muscle wastage	ignore starvation / death allow weak immune system do **not** accept anorexia ignore deficiency diseases	2
Total			**6**

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Question 4

question	answers	extra information	mark
4	there are no / few predators of the lionfish **or** spines protect lionfish from predation **or** no / fewer disease organisms	allow warning colouration / poisonous	1
	predators / prey in Atlantic do not recognise lionfish **or** not fished by humans	allow high reproduction	1
	also there is abundant food in Atlantic **or** there is no / less competition in Atlantic	ignore adaptation to new environment	1
Total			**3**

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Question 5

question	answers	extra information	mark
5(a)	chance of getting pregnant decreases with age	ignore figures	1
	chance of infertility increases with age		1
5(b)(i)	causes eggs to mature	allow growth do **not** accept produced do **not** accept releases egg ignore references to oestrogen / LH / uterus / womb	1
5(b)(ii)	causes egg release	do **not** accept matures egg / growth of egg / produces egg ignore references to other hormones and uterus / womb	1
5(c)	embryo	allow (fertilised) egg divides	1
	insert (embryo) into womb / uterus	ignore electric shock	1
Total			**6**

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Question 6

question	answers	extra information	mark
6(a)	seeds produced by sexual reproduction / fusion of gametes / fertilisation	allow produced by pollination / crossing	1
	<u>mixture</u> of genes / genetic information / chromosomes / DNA **or** from two parents / apple trees		1
		if no other mark obtained allow **1** mark for apples had different genes / genetic information / chromosomes / DNA **or** mutation occurred	
		ignore environmental effects / cloned	
6(b)(i)	cuttings / tissue culture	accept grafting	1
		allow adult cell cloning	
		ignore cloning unqualified	
		ignore genetic engineering	
		ignore asexual reproduction	
6(b)(ii)	asexual reproduction	allow produced by cloning / mitosis	1
	have identical genes / genetic information / chromosomes / DNA **or** no mixing of genes / genetic information /chromosomes /DNA		1
Total			**5**

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Question 7

question	answers	extra information	mark
7(a)	18.06 / 18 / 18.1	correct answer gains **2** marks if answer incorrect evidence of (4131 – 3499) ÷ 3499 x 100 **or** 632 ÷ 3499 x 100 **or** ((4131 ÷ 3499) x 100) – 100 **or** 0.18 gains **1** mark	2
7(b)	antibiotics kill non-resistant strain **or** resistant strain bacteria survive	accept resistant strain the successful competitor do **not** accept intentional adaptation ignore strongest / fittest survive ignore mutation ignore people do not finish antibiotic course	1
	resistant strain bacteria reproduce **or** resistant strain bacteria pass on genes		1
	population of resistant strain increases **or** proportion of resistant bacteria increases **or** people more <u>likely</u> to be infected by resistant strain (than non-resistant strain)	allow high numbers of resistant bacteria	1
Total			**5**

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Question 7

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Question 8

question	answers	extra information	mark
8(a)	860	correct answer gains **2** marks if answer incorrect evidence of $(6100 – 1800) \div 5$ **or** $4300 \div 5$ **or** $(900 + 600 + 1000 + 700 + 1100) \div 5$ gains **1** mark allow ecf from 1 incorrect graph reading	2
8(b)		ignore references to oxygen / sulfur dioxide / nitrogen oxides / acid rain ignore global warming	
	Effects of deforestation deforestation increases the amount of carbon dioxide in the atmosphere	award this point only if linked to deforestation	1
	any **two** from:		2
	• due to less photosynthesis **or** less carbon dioxide taken in **or** carbon dioxide not locked up in (forest) trees		
	• due to burning of forest / from machinery		
	• due to activity of microorganisms / decay		
	Effects of growing palm for fuel carbon dioxide released when palm oil used as fuel		1
	(eventually) CO_2 intake and output might balance out **or** burning palm oil carbon neutral	accept less carbon dioxide than from burning fossil fuels	1
Total			**7**

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