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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Biology 4411

BLY3H Unit 3 Biology

Mark Scheme

2009 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 candidates' 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 candidates' 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 candidates' 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 candidates 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)

Candidate	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)

Candidate	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a candidate 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)	A	no mark – can be specified in reason part if B given = no marks throughout if unspecified plus two good reasons = 1 mark	
	high(er) pressure in A	allow opposite for B do not accept 'zero pressure' for B	1
	pulse / described in A	accept fluctuates / 'changes' allow reference to beats / beating ignore reference to artery pumping	1
1(b)(i)	17		1
1(b)(ii)	68	accept correct answer from candidate's (b)(i) x 4	1
1(c)(i)	oxygen / oxygenated blood	allow adrenaline ignore air	1
	glucose / sugar	extra wrong answer cancels eg sucrose / starch / glycogen / glucagon / water allow fructose as an alternative to glucose ignore energy ignore food	1

Question 1 continues on the next page…

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Question 1 Continued

question	answers	extra information	mark
1(c)(ii)	carbon dioxide / CO_2 / lactic acid	allow CO2 / CO^2 ignore water	1
Total			**7**

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Question 2

question	answers	extra information	mark
2(a)(i)	any **two** from: • volume / amount of milk • type of milk • amount / volume of starter culture / yoghurt / bacteria • type of starter culture • temperature / 25°C • time <u>interval</u> / every 50 minutes	allow heat ignore ' time' unqualified	2
2(a)(ii)	(more) reliable / (more) representative / typical **or** detect / allow for / reduce effect of / anomalies / errors	do **not** accept accurate / precise / true ignore fair / valid	1
2(a)(iii)	(greater) accuracy of measurement **or** (greater) sensitivity **or** (more) precise / exact **or** can detect smaller changes	accept converse for pH papers allow paper obscured by yoghurt ignore vague answers eg clear / definite do **not** accept words such as reliable / valid	1
2(b)	flask 2 at 200 minutes / 5.8		1
2(c)	lactic acid production	 allow decrease in pH ignore extras	1 1
Total			**7**

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Question 3

question	answers	extra information	mark
3(a)	methane	accept CH_4 / CH4 / CH^4 extras cancel	1
3(b)	**anaerobic** respiration **or** fermentation	ignore decay / decomposition / digestion do **not** allow aerobic	1
3(c)(i)	in range 32 – 33		1
3(c)(ii)	keep cool(er) **or** keep below 40 (°C) **or** insulate from heat high(er) / optimum rate of biogas production **or** rate decreases at higher temperatures **or** works more efficiently	allow keep at optimum temperature if (c)(i) < 40 allow correct reference to rate of enzyme action eg high temperature would denature enzyme owtte	1 1
3(d)	increases rate / high rate insulates / keeps warm	allow 'works better' allow maintains optimum temperature	1 1
Total			**7**

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Question 4

question	answers	extra information	mark
4(a)	guard (cell)	ignore stoma / stomata	1
4(b)	<u>Species A :</u> • stomata open in dark / at night **or** close in light / in day • stomata closed during warm(est) period **or** open when cool(er) • heat (energy) / warmth increases evaporation / transpiration • reduces water loss / evaporation / transpiration	allow converse points for species B must give explicit link between heat and transpiration ignore photosynthesis	 1 1 1 1
Total			**5**

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Question 5

question	answers	extra information	mark
5(a)	No	no mark if yes max 1 for correct statement	
	diffusion is down the concentration gradient	accept by diffusion ions would leave the root	1
	to enter must go up / against the concentration gradient **or** concentration higher in the root **or** concentration lower in the soil		1
5(b)(i)	0.9 **or** 3.25	for correct answer with or without working if answer incorrect 1.3 **or** their rate – 0.4 gains 1 mark **or** 130 – 40 **or** 90 gains 1 mark	2
5(b)(ii)	(uptake) by active transport		1
	requires energy		1
	more energy from aerobic respiration **or** more energy when oxygen is present		1
Total			**7**

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Question 6

question	answers	extra information	mark
6(a)	sucrose → smaller (molecules) **or** it gives simple sugars / glucose / fructose (products) can be absorbed / taken in	 if answer refers to digestion, assume reference is to products	1 1
6(b)(i)	only small increase in yield at 25% **or** not much difference in yield at 25% extra cost / less economic if using 25% fungus		1 1

Question 6 continues on the next page…

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Question 6 Continued

question	answers	extra information	mark
6(b)(ii)	any sensible suggestion plus explanation eg • increased oxygen → increased respiration rate • less substrate available for making enzyme / toxic product made **or** • more respiration occurs which releases heat (1) • (increase in temperature) reduces amount of enzyme(1) **or** • anomalous result(1) • suggestion why eg zero error on instrument (1) **or** • initial aeration limiting factor (1) • later something else is limiting (1) **or** • 1.0 optimum fungus growth (1) • higher concentrations oxygen becomes toxic / inhibits growth of fungus (1) **or** • aeration at 2.0 too vigorous / damages fungus (1) • less fungus remains to make enzyme (1) **or** • higher aeration causes cooling (1) • less growth / enzyme production if cooler (1) **or** • air contaminated with microorgamisms (1) • microorganism compete **or** make toxin (1)	 suggestion explanation must mention heat or temperature	 1 1
Total			**6**

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Question 7

question	answers	extra information	mark
7(a)(i)	no effect / little effect		1
7(a)(ii)	reduced	ignore reference to later increase	1
7(b)(i)	more (re)absorption **or** more (material) taken into blood of water	do not allow if extra incorrect reference to filtration made allow **only** if linked to reabsorption do **not** accept water if in a list of substances	1 1
7(b)(ii)	ions in blood diluted **or** concentration of ions decreases increased water reabsorption **or** more water present in blood	 do not allow if extra incorrect reference to filtration made accept sensible alternative suggestion eg reabsorption of ions disrupted	1 1
Total			**6**