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General Certificate of Secondary Education

Biology 4411

BLY3H Unit Biology 3

Mark Scheme

2012 examination – January 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	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, 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)(i)	carbon dioxide	accept CO_2 / CO2 do **not** accept CO^2	1
1(a)(ii)	fermentation / respiration	ignore aerobic / anaerobic	1
1(b)	most / more gas (produced) **or** liquid level lowest	do **not** allow 'a lot' allow alternative descriptions ignore name of gas	1
1(c)(i)	repeat **or** compare with results of others	ignore reference to average or mean	1
1(c)(ii)	if reliable – get same / similar results **or** small range	allow same pattern but **not** pattern alone allow no anomalies ignore anomalies unqualified	1
1(d)	use smaller intervals around 30°C **or** between 25°C and 35°C	can be implied do **not** allow for temperatures below 25°C above 35°C ignore references to sensitivity or precision (of thermometer) NB do at 28°C, 30°C and 32°C = **2** marks	1 1
Total			**7**

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Question 2

question	answers	extra information	mark
2(a)	<u>person with muscle disease:</u> any **three** from: • higher resting rate **or** higher at start • when exercise starts / then increases more / more rapidly • peaks (then falls) • levels off <u>later</u> than healthy person • higher rate during exercise • greater range	allow reverse argument for healthy person NB all points are comparative except peak (point 3) allow use of **two** approximate figures as a comparison accept description eg rise …. fall if no other marks awarded allow **1** mark for 'it's higher'	3
2(b)(i)	oxygen	accept adrenaline accept O_2 do **not** accept O, O2 or O^2	1
2(b)(ii)	cannot release sugar / glucose (from glycogen) **or** cannot store glucose / sugar (as glycogen) need to receive glucose / sugar (from elsewhere) for energy / respiration / cannot store energy	 ignore oxygen ignore aerobic / anaerobic	1 1 1
Total			**7**

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Question 3

question	answers	extra information	mark
3(a)(i)	water loss	extra substance(s) cancel if transpiration stream described max **1** mark	1
	as a vapour / by evaporation	ignore stomata	1
3(a)(ii)	stomata / stoma / guard cells	ignore epidermis	1
3(b)(i)	2.8	correct answer with or without working gains **2** marks if answer incorrect: allow **1** mark for (8.6 - 0.2) ÷ 3 **or** 8.4 ÷ 3	2
3(b)(ii)	warmer at 16:00 / gets cooler	**or** reverse argument for 19.00	1
	faster diffusion / evaporation **or**	accept sun setting as equivalent to heat or light marking points	1
	lighter at 16:00 / gets darker (1) stomata open / more open (1) **or**	if no environmental factor still allow reason mark eg 'stomata close later in the day'	
	(more) windy at 16:00 / gets less windy (1) removal of (more) water vapour / steeper gradient (1) **or**		
	air is less humid at 16.00 (1) faster diffusion **or** steeper gradient (1)	allow rain at 19.00	
Total			**7**

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Question 4

question	answers	extra information	mark
4(a)(i)	anaerobic respiration **or** fermentation		1
4(a)(ii)	oxygen is present aerobic respiration occurs CO_2 from respiration	accept O_2 do **not** accept O, O2 or O^2 ignore anaerobic allow from fermentation	1 1 1
4(b)	high methane after this time	ignore CO_2	1
4(c)	organic matter / food / nutrients / named eg used up / reactants	allow too hot / accumulation of toxins / named do **not** allow products ignore energy	1
Total			**6**

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Question 5

question	answers	extra information	mark
5(a)	lactose / 'milk sugar' used	ignore glucose / galactose	1
	produces (lactic) acid / low pH		1
	causes milk to clot / owtte	allow denatures proteins	1
5(b)	(killed by) lactic acid / acid conditions / low pH		1
Total			**4**

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Question 6

question	answers	extra information	mark
6(a)	proteins are not filtered		1
	glucose is filtered and (re)absorbed	allow glucose (completely) reabsorbed	1
	ions are filtered and some (re)absorbed	allow some ions are reabsorbed	1
	urea is filtered [and some / none (re)absorbed]	allow some / no urea is reabsorbed	1
6(b)	more / a lot of sweating occurred	accept converse arguments for cold day	1
	more / a lot of water loss (by sweating)		1
	more / a lot of water reabsorption / more water absorption by the kidney		1
	lower volume of urine	allow less urine / less water in urine	1
Total			**8**

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Question 7

question	answers	extra information	mark
7(a)	any **two** from: • concentration / amount of yeast extract • concentration / amount of peptone • species of bacterium	any **two** for **1** mark allow type / kind of bacterium	1
7(b)	to kill (other) microorganisms / to sterilise to reduce competition for resources **or** to prevent formation of toxic by-products / named **or** otherwise reduced yield	allow named example allow destroyed ignore germs	1 1

Question 7 continues on the next page . . .

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Question 7 continued . . .

question	answers	extra information	mark
7(c)	Pro: any **one** from: • with Ca^{2+} / $CaCl_2$ present (media 3 and 4) → higher enzyme yield • higher Ca^{2+} / $CaCl_2$ → higher enzyme yield (in 4 cf 3) Con: any **one** from: • 4 also has higher sucrose – (could be effect of sucrose) • 3 and 4 also have extra Cl^- / $MnCl_2$ (could be effect of Cl^-) Conclusion with reason: eg Pro since enhanced effect with extra Ca^{2+} **or** Con since too many variables **or** Con since not enough evidence to be sure		1 1 1
			6

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