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General Certificate of Secondary Education

Biology 4411

BLY3H Unit Biology 3

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.

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Question 1

question	answers	extra information	mark
1(a)(i)	6 peaks in heart rate	accept 6 increases / spikes **or** goes very high 6 times allow heart rate increases each time he runs	1
1(a)(ii)	2.5 / 2½	allow 2 minutes 30 seconds do **not** accept 2.3 / 2:3 / 2.30	1
1(b)		more / faster / a lot **must** be stated at least once for full marks	
	(more) oxygen supplied / needed **or** (more) aerobic respiration	allow less anaerobic (respiration) **or** prevents oxygen debt	1
	(more) glucose / sugar / food supplied / needed	ignore feeding	1
	(more) energy needed / released	allow energy produced / made	1
	(more) carbon dioxide / heat / lactic acid removed (from muscles) **or** more cooling **or** less lactic acid formed		1
Total			**6**

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Question 2

question	answers	extra information	mark
2(a)	(biogas / methane is made) by fermentation / anaerobic respiration	accept reverse argument accept for **1** mark so no oxygen in jar **or** so oxygen can't enter **or** makes conditions anaerobic ignore references to keeping other microbes out ignore air	2
2(b)(i)	carbon dioxide	accept CO_2 / CO2 do **not** accept CO^2	1
2(b)(ii)	0.62 look for answer in table	correct answer with or without working gains **2** marks allow 62% for **2** marks but 62 for **1** mark if incorrect / no answer 426 gains **1** mark 686	2
2(b)(iii)	(more fat → much) more biogas / methane (more fat →) only small increase in proportion / concentration / percentage of methane **or** approximately constant **or** no change above 5%	allow more implied by giving two numbers or a subtraction / division allow increases only from 0.60 to 0.63 **or** only changes by 0.03	1 1
2(b)(iv)	fat (too) expensive **or** fat (too) expensive to transport (from coast to farm)	accept any suitable reference to extra cost / effect on environment eg more pollution from transport	1
Total			**8**

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Question 3

question	answers	extra information	mark
3(a)(i)	aerobic respiration	ignore fermentation anaerobic respiration gains **1** mark aerobic fermentation gains **1** mark	1 1
3(a)(ii)	<u>better</u> mixing with / <u>more</u> absorption of <u>nutrients</u> / <u>oxygen</u>	ignore references to heat / temperature	1
3(a)(iii)	paddles would damage fibres of Fusarium **or** bubbles are more gentle	allow Fusarium could get tangled in the paddle ignore references to oxygen	1
3(b)(i)	chicken has higher / more protein (for making muscle) **or** chicken has higher / more energy	 allow 'produces' energy	1
3(b)(ii)	any **two** from: • mycoprotein has less fat – so less chance of heart disease / circulatory problems • mycoprotein has less / no cholesterol – so less chance of heart disease / circulatory problems • mycoprotein has more fibre – so less chance of (colon) cancer • mycoprotein has less energy – so less weight gain	 ignore fat linked to weight gain allow other correct effects of fibre eg prevent constipation **or** absorb less fat	2
Total			**7**

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Question 4

question	answers	extra information	mark
4(a)(i)	diffusion is down the concentration gradient	for a description of diffusion ignore along / across gradients	1
	to enter must go up / against the concentration gradient **or** concentration higher in the root / plant **or** concentration lower in the soil	accept by diffusion ions would leave the root	1
4(a)(ii)	active transport	allow active uptake	1
4(b)(i)	(root hairs →) large surface / area		1
4(b)(ii)	(aerobic) respiration	do **not** allow anaerobic	1
	releases / supplies / provides / gives energy	accept make ATP (for active transport) do **not** allow 'makes / produces / creates' energy	1
4(b)(iii)	starch is energy source / store (for active transport)	allow starch can be used in respiration do **not** allow 'makes / produces / creates' energy	1
Total			**7**

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Question 5

question	answers	extra information	mark
5(a)	any **two** from: • urea • ions / salt(s) / correct named example • second correct named example • hormones / named example • allow ammonia • allow creatinine • allow uric acid • allow bile pigment	allow 2 correctly named substances for **2** marks ignore water ignore minerals	2
5(b)(i)	glucose filtered (into kidney tubule) glucose reabsorbed **or** glucose taken back into blood all glucose taken back into blood / all reabsorbed	accept Bowman's capsule	1 1 1
5(b)(ii)	not all glucose reabsorbed because not enough time / length **or** too high a concentration in tubule / not enough carriers		1 1
Total			**7**

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Question 6

<table>
<tr><th>question</th><th>answers</th><th>extra information</th><th>mark</th></tr>
<tr><td>6(a)</td><td>DAS decreases percentage of alcohol produced

DAS has no effect on the use of glucose <u>and</u> fructose

the more DAS the less maltose is used

any reasonable manipulation of data eg

<table>
<tr><td></td><td></td><td>subtraction</td><td>% decrease</td></tr>
<tr><td rowspan="3">table</td><td>0 – 5</td><td>1.48</td><td>36.9%</td></tr>
<tr><td>5 – 15</td><td>2.43</td><td>60.6%</td></tr>
<tr><td>0 – 15</td><td>3.91</td><td>97.5%</td></tr>
<tr><td rowspan="2">graph</td><td>0 – 5</td><td></td><td>52%</td></tr>
<tr><td>0 – 15</td><td></td><td>98%</td></tr>
</table>
</td><td>allow numerical description of decrease eg from 4.01 to 0.10 at 15 μg or from 4.01 to 2.53 at 5 μg

allow halved at 5 μg
or
98 % inhibited at 15 μg</td><td>1

1

1

1</td></tr>
<tr><td>6(b)(i)</td><td>too large (to pass through cell membrane)</td><td></td><td>1</td></tr>
<tr><td>6(b)(ii)</td><td>able to break down maltose (outside the cell)

produces <u>glucose</u>

glucose / product is small enough to enter cell</td><td></td><td>1

1

1</td></tr>
</table>

Question 6 continues on the next page . . .

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Question 6 continued

question	answers	extra information	mark
6(c)	without DAS any **two** from: • more fermentation / more alcohol produced **or** otherwise DAS / fungi might reduce yield • so more maltose used (in beer) • so flavour of beer unaffected • so no toxins / poisons	 allow <u>all</u> (3) sugar<u>s</u> are used ignore harmful / dangerous	2
Total			**10**

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