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General Certificate of Secondary Education

Biology 4411

BLY3F Unit Biology 3

Mark Scheme

2011 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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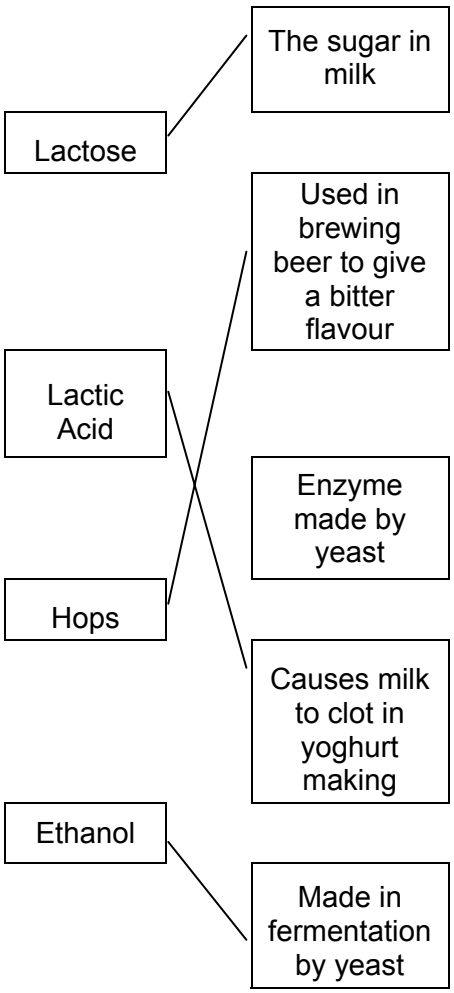
Question 1

question	answers	extra information	mark
1		all four correct = **4** marks three correct = **3** marks two correct = **2** marks one correct = **1** mark extra line from a statement cancels the mark	4
Total			**4**

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Question 2

question	answers	extra information	mark
2(a)	guard cells		1
2(b)(i)	2.00 / 2.0 / 2		1
2(b)(ii)	0.05 or 1/20		1
2(b)(iii)	(Q has) large(r) surface area / more stomata / thinner cuticle / larger leaves	it = Q accept other sensible answers	1
2(b)(iv)	wind 30	extra box ticked cancels the mark	1
2(c)	wilting	extra ring drawn cancels the mark	1
Total			**6**

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Question 3

question	answers	extra information	mark
3(a)(i)	cholesterol fat	in this order	1 1
3(a)(ii)	mycoprotein has (approx) half amount of protein / has 11.8 (g) protein while chicken has 22.0 (g)	accept has less protein ignore less fat	1
3(b)(i)	increased (±) constant rate **or** (from 0) to 9.2 / by 9.2(cm) **or** about 1 cm a day **or** increase slower at the beginning and / or at the end		1 1
3(b)(ii)	species **A** grows faster / more than species **B** **or** species **A** has larger diameter **or** is bigger **or** the growth of species **B** slows down after 6 weeks	accept use of approximate figures	1
3(c)	any **two** from: • pH / acidity / alkalinity • (speed of) stirring • oxygen (concentration) / aeration • ion concentration / named eg $-NH_4^+$ • pressure	 ignore references to carbon dioxide / waste products ignore time in the fermenter ignore initial amount of Fusarium allow ammonia	2
Total			**8**

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Question 4

question	answers	extra information	mark
4(a)(i)	glycogen		1
4(a)(ii)	respiration		1
4(b)(i)	483 kJ		1
4(b)(ii)	oxygen		1
4(b)(iii)	dilate		1
4(c)	supplies more / a lot of oxygen **or** removes more carbon dioxide **or** release more energy / faster respiration		1
Total			**6**

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Question 5

question	answers	extra information	mark
5(a)	to kill microorganisms / to sterilise / to show that any microorganisms present at the end had appeared during the investigation	allow microbes / bacteria / fungi do **not** allow viruses / germs allow destroyed for kill do **not** allow get rid of or remove microbes	1
5(b)(i)	**B** is sealed / closed / covered / has (rubber) bung **or A** is left open		1
5(b)(ii)	**A** has microorganisms **or B** has no microorganisms	ignore **B** is clear ignore reasons given	1
5(b)(iii)	microorganisms <u>enter</u> (from the air) **or** microorganisms only <u>enter</u> if flask is left open	do **not** allow nothing can enter flask **B**	1
5(b)(iv)	microorganisms grow / appear / present	allow bacteria / microbes / fungi	1
5(c)	living organisms are produced only by other living organisms		1
Total			**6**

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Question 6

question	answers	extra information	mark
6(a)	(protein molecules too) big **or** larger than pore size	allow cannot fit through the pores / hole / gaps	1
6(b)(i)	diffusion		1
6(b)(ii)	high to low concentration **or** high concentration in blood, low concentration in dialysis fluid **or** <u>down</u> concentration gradient **or** correct use of numbers	ignore along gradient / across gradient allow there is none in dialysis fluid	1
6(c)	any value between 3.15 and 3.25 (inclusive)		1
6(d)(i)	any **two** from: • kidney works all the time **or** dialysis works for short time **or** dialysis needs regular trips to hospital / regular treatment / long term treatment • kidney maintains correct concentration all the time **or** no build-up as between dialysis sessions • no need to regulate diet **or** correct example – eg low salt / low protein / low fluid intake as with dialysis • cheaper in the long term	ignore enables an active life accept kidney transplant is one off treatment	2

Question 6 continues on the next page . . .

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Question 6 continued . . .

question	answers	extra information	mark
6(d)(ii)	any **two** from: • rejection / described **or** need to use immunosuppressants **or** need to take drugs for life • susceptible to other infections • hazards of operation / anaesthetic • shortage of donors / match • high initial cost	allow may need later replacement	2
Total			**8**

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Question 7

question	answers	extra information	mark
7(a)(i)	methane	accept CH_4 / CH4 ignore CH^4 / Ch_4 / Ch^4	1
7(a)(ii)	70	correct answer with or without working if answer is incorrect **or** no answer 100 – (27 + 2 + 0.5 + 0.5) gains **1** mark	2
7(b)(i)	allows (better) mixing of microorganisms and organic matter **or** to maintain temperature for enzyme action / chemical reaction / microorganisms	accept allows microorganisms to get at organic matter	1
7(b)(ii)	any **one** from: • need anaerobic conditions / respiration • prevent aerobic respiration • biogas made in absence of O_2 / air • less methane would be made with air • more CO_2 would be made with air	accept biogas made by fermentation	1
7(c)	best / optimum temperature for named process (in microorganisms) eg growth / reproduction / digestion / respiration / chemical / enzyme reactions / decomposition / breakdown of organic matter causes high (rate of) biogas production		1 1
Total			**7**

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