



General Certificate of Secondary Education

Biology 4411

BLY3H

Unit Biology 3

Mark Scheme

2010 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 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.

BLY3H**Question 1**

question	answers	extra information	mark
1(a)(i)	B or D		1
1(a)(ii)	A or B		1
1(b)	any four from: <ul style="list-style-type: none"> • increased blood (flow) • (more) oxygen supplied or aerobic respiration • (more) glucose / sugar / food supplied • (higher rate of) respiration • (more) energy needed / released • (more) carbon dioxide <u>removed</u> • (muscles) doing (more) work or muscles contracting • remove heat / cooling • remove lactic acid or less lactic acid formed 	more / faster must be implied at least once for full marks ignore reference to breathing allow less anaerobic (respiration) or and prevents oxygen debt ignore feeding allow made	4
Total			6

BLY3H**Question 2**

question	answers	extra information	mark
2(a)	sugar / named eg / energy supply / respiration	allow aerobic respiration	1
	decreasing / less	allow running out if no other marks awarded allow less oxygen / starch / food or toxins produced for 1 mark	1
2(b)	any three from: <ul style="list-style-type: none"> • starch → sugar / named eg or more sugars • by enzyme • (sugar can be used) by yeast • in respiration / respiration increases 	NB yeast respire faster = 2 marks	3
Total			5

BLY3H**Question 3**

question	answers	extra information	mark
3(a)	C		1
3(b)(i)	guard (cell)		1
3(b)(ii)	water movement / transpiration through stomata / pores / holes / (region) X		1
	or petroleum jelly blocks / covers stomata / pores / holes / X		1
	stomata / pores / holes / X found on lower surface		
Total			4

BLY3H**Question 4**

question	answers	extra information	mark
4(a)	methane / CH ₄	allow CH ⁴ / CH4 / H4C	1
4(b)(i)	any two from: <ul style="list-style-type: none"> • less visual impact • less heat loss or (better) insulated or temperature will be less variable / keeps warm / keeps cool or easier to maintain optimum temperature • withstand pressure build-up • ease of adding material / slurry 	ignore reference to smell	2
4(b)(ii)	any one from: <ul style="list-style-type: none"> • to keep anaerobic • to prevent oxygen / air entering • to prevent biogas escaping • to maintain pressure / to allow removal of biogas 		1
4(c)	any two from: <ul style="list-style-type: none"> • to maintain optimum temperature • to speed up production of biogas or reference to faster microbial action / named microbial process • UK temperature is low/below 25 °C • self sufficient / sustainable 	ignore to keep warm if reference to specific temperature accept any value in range 26 – 40°C as optimum UK temperature is below optimum = 2 marks	2
Total			6

BLY3H**Question 5**

question	answers	extra information	mark
5(a)	insufficient / no oxygen available for (just) aerobic <u>respiration</u> or <u>respires</u> anaerobically		1 1
5(b)(i)	any two from: • can run further if intermittent exercise / rest breaks in exercise or continuous exercise is worst • runs further with shorter exercise • runs further with shorter rests • 10 s exercise + 5 s rest → can run furthest		2
5(b)(ii)	any two from: • longer rest period enables (more) oxygen content (of muscles) to be replenished • enables (more) aerobic respiration or less / no anaerobic respiration • enables breakdown / removal of lactic acid or oxygen debt paid off		2
5(b)(iii)	surface area (of alveoli / number of alveoli / air sacs) or width of bronchioles / bronchi	ignore rate / depth of breathing allow size if qualified eg volume / 'space' / description of vital capacity accept width of air tubes	1
Total			7

BLY3H**Question 6**

question	answers	extra information	mark
6(a)(i)	protein		1
6(a)(ii)	(protein molecules too) large cannot pass through filter or can't leave blood or can't pass into kidney tubule / named part	NB holes in the filter are too small = 2 marks	1 1
6(b)	any four from: <ul style="list-style-type: none"> • use of partially permeable membrane or only small molecules can pass through membrane • dialysis fluid has 'ideal' concentrations of solutes • diffusion of waste substances out of blood or waste passes from <u>high to low concentration</u> • reference to equilibrium (between plasma & dialysis fluid) 	allow correct named example accept named example – eg urea accept reference to counterflow to maintain concentration gradient	4
Total			7

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Question 7

question	answers	extra information	mark
7(a)(i)	to mix in oxygen / air or to allow aerobic respiration / prevent anaerobic	allow stops olive oil separating out	1
7(a)(ii)	so <i>Fusarium</i> not limiting or so can see effect of protein / oil (concentration)		1
7(b)(i)	300	correct answer with or without working = 2 marks $\frac{(8000 - 800)}{24} \text{ or } \frac{7200}{24}$ if one error only eg or $\frac{8000 - 1000}{24}$ allow 1 mark	2
7(b)(ii)	cannot tell how accurate / precise / reliable the values are or there may be a wide range results may overlap with values for other conditions or may not be significantly different from other conditions	do not allow – to make it more accurate / precise / reliable allow suitable reference to anomalies	1 1

Question 7 continues on the next page...

BLY3H**Question 7 continued**

question	answers	extra information	mark
7(c)(i)	<u>description:</u> <i>Fusarium</i> grows (mainly) before lipase production starts	each point made must compare <i>Fusarium</i> growth and lipase production allow correct use of figures	1
	as <i>Fusarium</i> growth slows lipase production speeds up		1
7(c)(ii)	<u>explanation:</u> any two from: <ul style="list-style-type: none"> • need sufficient growth of <i>Fusarium</i> before it can release / make / produces (detectable) lipase • initial <i>Fusarium</i> growth uses protein (from reaction mixture) or protein more important than lipid for <i>Fusarium</i> growth • later <i>Fusarium</i> growth uses lipid / oil (from reaction mixture) 	allow no lipase production until 'nutrients' used up / limiting	2
Total			10