



# **General Certificate of Secondary Education**

## **Biology 4411**

**BLY3H                  Unit Biology 3**

## **Mark Scheme**

*2010 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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## Marking Guidance for Examiners

### GCSE Science Papers

#### 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. Boldening

- 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 boldened. 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.

## BLY 3H

## Question 1

question	answers	extra information	mark
1(a)(i)	A = (cell) wall	ignore cellulose	1
	B = cytoplasm		1
1(a)(ii)	any <b>one</b> from <ul style="list-style-type: none"> <li>• bacterial cell / it has no nucleus</li> <li>• DNA free in cytoplasm</li> <li>• has no vacuole / no vesicles</li> </ul>	accept has DNA instead of a nucleus but <b>not</b> just has DNA allow no mitochondria ignore size ignore strands of DNA	1
1(b)(i)	<u>yeast</u> grows best / better / well <b>or</b> optimum temperature for <u>yeast</u> / more yeast present	allow <u>yeast</u> works best / better / well	1
	CO <sub>2</sub> made (by yeast) <b>or</b> respire / respiration (by yeast)	allow fermentation (ignore anaerobic/aerobic)	1
1(b)(ii)	<u>bacterium</u> grows best / better / well / more bacteria present <b>or</b> optimum temperature for <u>bacterium</u>	ignore micro organism / microbes allow works / respire best / better / well (ignore anaerobic/aerobic)	1
	(lactic) acid made (by bacterium)	do <b>not</b> allow wrong acid	1
1(b)(iii)	bread still rises (in acid conditions) <b>or</b> no need to control / monitor pH		1
<b>Total</b>			<b>8</b>

**BLY 3H****Question 2**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>2(a)(i)</b>	to kill (micro)organisms / bacteria / microbes <b>or</b> to sterilise	allow get rid of organisms etc allow kill germs	1
<b>2(a)(ii)</b>	(micro)organisms / they could not enter (the broth / flask) <b>or</b> (micro)organisms / they get trapped / stuck (in the bend)	apply list principle to air	1
<b>2(b)</b>	(more) reliable <b>or</b> to check if anomalous / consistent (same every time)	do <b>not</b> allow precise / accurate / valid / fair	1
<b>2(c)</b>	any <b>two</b> from: <ul style="list-style-type: none"> <li>• microorganisms now enter (the broth / flask)</li> <li>• microorganisms from air / bend / neck / x</li> <li>• food / nutrients / energy source for microorganisms (in broth)</li> </ul>	ignore oxygen / air	2
<b>2(d)</b>	biogenesis		1
<b>Total</b>			<b>6</b>

**BLY 3H****Question 3**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>3(a)(i)</b>	without <u>oxygen</u>	ignore reference to air	1
<b>3(a)(ii)</b>	otherwise difficult to stir / to pump / to transfer	allow prevent 'clogging' owtte	1
<b>3(a)(iii)</b>	need to stir / pump / heat		1
<b>3(b)(i)</b>	rises then falls  then levels / slight rise  quantitative descriptor eg to 80% / max. on day 4 / min. on day 16	accept other valid quantitative descriptor  allow accuracy $\pm \frac{1}{2}$ small square	1  1  1
<b>3(b)(ii)</b>	16 (15.5 to 16.4)		1
<b>3(c)</b>	oxygen present  (CO <sub>2</sub> produced) by <u>aerobic</u> respiration  <b>or</b> not much <u>anaerobic</u> respiration  <b>or</b> not much methane / CH <sub>4</sub> produced		1  1
<b>Total</b>			<b>9</b>

**BLY 3H****Question 4**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>4(a)(i)</b>	120		1
<b>4(a)(ii)</b>	11 760 <b>or</b> correct answer from candidate's answer to (a)(i)	correct answer with or without working  if answer incorrect 120 × 98 <b>or</b> candidate's answer to (a)(i) × corresponding SV gains <b>1</b> mark  if candidate uses dotted line / might have used dotted line(bod) in (a)(i) <b>and</b> (a)(ii) no marks for (a)(i) but allow full ecf in (a)(ii) eg 140 × 88 = 12320 gains <b>2</b> marks	2
<b>4(b)</b>	trained athlete has higher stroke volume / more blood per beat  same volume blood expelled with fewer beats  <b>or</b> for same heart rate more blood is expelled		1  1

**Question 4 continues on the next page**



## BLY 3H

## Question 4 continues

question	answers	extra information	mark
4(c)	increased <u>aerobic respiration</u> <b>or</b> decreased <u>anaerobic respiration</u>	allow correct equation for aerobic respiration accept don't have to respire anaerobically	1
	increased <u>energy</u> supply / need		1
	less lactic acid formed <b>or</b> to breakdown lactic acid <b>or</b> less O <sub>2</sub> -debt		1
	can do <u>more</u> work <b>or</b> can work harder / faster / longer <b>or</b> <u>less</u> fatigue / cramp / pain	accept muscle contraction for work	1
<b>Total</b>			<b>9</b>

**BLY 3H****Question 5**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>5</b>	<p>use of carbohydrase</p> <p>any <b>three</b> from:</p> <ul style="list-style-type: none"> <li>• conversion of starch to sugar / maltose / glucose <b>or</b> sugar / sucrose to glucose / fructose</li> <li>• digestion</li> <li>• fermentation / anaerobic respiration</li> <li>• distillation</li> <li>• mixing with petrol</li> </ul>	<p>accept correct named example eg amylase / maltase / sucrase. If protease / lipase also given only accept carbohydrase if linked to correct substrate / product</p> <p>but max 2 if methane production</p> <p>apply list principle</p> <p>accept hydrolysis</p> <p>ignore fermenter</p>	<p>1</p> <p>3</p>
<b>Total</b>			<b>4</b>

**BLY 3H****Question 6**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>6(a)(i)</b>	movement of atoms / molecules / ions	accept particles allow dissolved substances ignore reference to membranes	1
	(substance) moves from high to low concentration	allow down the gradient ignore across / along / with a gradient	1
<b>6(a)(ii)</b>	any <b>two</b> from: <ul style="list-style-type: none"> <li>• movement of molecules / ions</li> <li>• from low to high concentration</li> <li>• requires energy / respiration</li> </ul>	accept particles allow dissolved substances this point <u>once</u> only in (a)(i) and (a)(ii)  allow up / against the gradient ignore across / along / with a gradient  accept requires ATP	2

**Question 6 continues on the next page**

