



# **General Certificate of Secondary Education**

## **Additional Science 4463 / Biology 4411**

**BLY2F**

**Unit Biology 2**

# **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

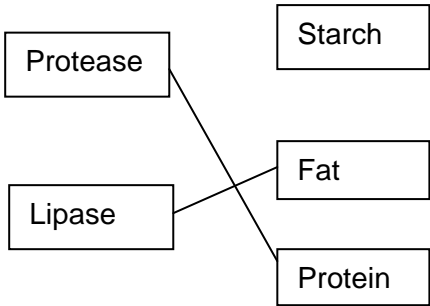
(.....) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

**BLY2F****Question 1**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>1(a)(i)</b>	many nuclei		1
<b>1(a)(ii)</b>	any <b>one</b> from: (all have) <ul style="list-style-type: none"> <li>• (cell) wall</li> <li>• (cell) membrane</li> <li>• vacuole</li> <li>• cytoplasm</li> </ul>		1
<b>1(b)(i)</b>	Warm  Moist	if more than two boxes are ticked deduct <b>1</b> mark for each incorrect tick	1  1
<b>1(b)(ii)</b>	they are digested		1
<b>Total</b>			<b>5</b>

**BLY2F**

**Question 2**

question	answers	extra information	mark
2(a)(i)	129		1
2(a)(ii)	9	accept calculated difference between answer to (a)(i) and 120	1
2(b)	less energy / power used	allow less fuel / named fuel used ignore cost	1
	less pollution / carbon dioxide or less hot water / less heat released	allow less global warming / carbon emissions or reduced carbon footprints  do <b>not</b> accept secondary effects alone, eg less melting of ice caps	1
2(c)(i)	 <pre> graph LR     Protease --- Starch     Lipase --- Fat     Lipase --- Protein             </pre>	1 mark for each correct line  do <b>not</b> accept two lines from an enzyme	2
2(c)(ii)	denatured	if no answer on the line accept a clear indication of correct answer in the box	1
<b>Total</b>			<b>7</b>

**BLY2F****Question 3**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>3(a)</b>	any <b>one</b> from: <ul style="list-style-type: none"> <li>(in) food / named</li> <li>(from) respiration</li> </ul>	allow eating do <b>not</b> allow breathing	1
<b>3(b)(i)</b>	the greater / heavier the body mass the more water (should be drunk)	ignore references to hot / cold day accept positive (relationship) ignore figures unqualified	1
<b>3(b)(ii)</b>	2200		1
<b>3(b)(iii)</b>	400	award <b>2</b> marks for correct answer, irrespective of working allow ecf from b(ii) for <b>2</b> marks  if no answer or incorrect answer: 2200 – 1800 <b>or</b> b(ii) – 1800 gains <b>1</b> mark	2
<b>3(c)</b>	need to replace water lost / prevent dehydration / keep hydrated  from / by (more) sweat	idea of balancing input and output  ignore other losses	1  1
<b>3(d)</b>	kidney		1
<b>Total</b>			<b>8</b>

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**BLY2F****Question 4**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>4(a)</b>	asexual		<b>1</b>
<b>4(b)</b>	mitosis		<b>1</b>
<b>4(c)</b>	genes		<b>1</b>
<b>Total</b>			<b>3</b>



**BLY2F****Question 5**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>5(a)(i)</b>	any <b>two</b> from: <ul style="list-style-type: none"> <li>• more milk</li> <li>• electricity produced</li> <li>• farmers can keep more cows in the space</li> </ul>	(about) 50 litres milk compared to (up to) 20 litres / 30 litres more ignore costs / profit  answers must refer to number of cows <u>and</u> space	2
<b>5(a)(ii)</b>	any <b>two</b> from: <ul style="list-style-type: none"> <li>• less stress for cow <b>or</b> not cruel to cow <b>or</b> cows have freedom to move around</li> <li>• crops fertilised</li> <li>• less disease <b>or</b> disease not as easily spread</li> </ul>	ignore references to ethical / unnatural without qualification	2
<b>5(b)</b>	more	in this order	1
	less		1
<b>Total</b>			<b>6</b>

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**BLY2F****Question 6**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>6(a)</b>	chromosomes		1
<b>6(b)(i)</b>	has XY / Y	allow female would be XX / has no Y	1
<b>6(b)(ii)</b>	The strands are in pairs		1
<b>6(b)(iii)</b>	nucleus		1
<b>Total</b>			<b>4</b>

**BLY2F****Question 7**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>7(a)</b>	photosynthesis	do <b>not</b> accept other additional processes	1
<b>7(b)(i)</b>	any <b>three</b> from, eg: <ul style="list-style-type: none"> <li>• mass of pondweed</li> <li>• volume of water</li> <li>• other reasonable features of the water</li> <li>• light intensity</li> <li>• light colour</li> <li>• carbon dioxide</li> <li>• temperature</li> <li>• pH</li> </ul>	ignore time / apparatus <u>type</u> of pondweed = max <b>2</b> accept amount / volume / length / size ignore number / surface area of leaves / pondweed unqualified accept amount accept distance between light source and tube / pondweed accept light if neither colour nor intensity is given	3

**Question 7 continues on the next page ....**

**BLY2F****Question 7 continued**

question	answers	extra information	mark
<b>7(b)(ii)</b>	any <b>one</b> idea from, eg: <ul style="list-style-type: none"> <li>• how much oxygen they give off</li> <li>• is pondweed poisonous to fish</li> <li>• will fish eat pondweed</li> <li>• is pondweed harmful to environment</li> <li>• how long the pondweed lives</li> <li>• growth rate / size of pondweed</li> <li>• reference to appearance / aesthetics</li> <li>• availability</li> </ul>	ignore reference to cost	1
<b>7(c)</b>	magnesium / Mg	accept iron / Fe ignore ion and <sup>+</sup> or <sup>-</sup> ignore nitrate	1
<b>Total</b>			<b>6</b>

**BLY2F****Question 8**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>8(a)(i)</b>	insulin	accept glucagon (correct spelling only)	1
<b>8(a)(ii)</b>	pancreas	accept phonetic spelling allow pancrease	1
<b>8(b)(i)</b>	11(.0)	accept in range 10.5–11 (.0)	1
<b>8(b)(ii)</b>	any <b>two</b> from: <ul style="list-style-type: none"> <li>high(er) concentration (of blood glucose) (anywhere / any time)</li> <li>large(r) increase (in concentration after the drink)</li> <li>fast(er) / steep(er) rise</li> <li>slow(er) fall</li> </ul>	ignore numbers unless comparative accept 115 <u>not</u> 88 139 <u>not</u> 99  accept increase by 24 <u>not</u> 11 / their b(i)  accept it takes 3 hours <u>not</u> 1 ¼ hours to get back to original level accept it takes a long time to get back to normal	2
<b>8(b)(iii)</b>	any <b>one</b> from: <ul style="list-style-type: none"> <li>insulin present / produced</li> <li>(used in) respiration</li> <li>taken into cells</li> </ul>	accept glucagon not produced allow exercise allow converted to glycogen allow taken into liver (cells) / muscle (cells) allow produce / make energy	1
<b>Total</b>			<b>6</b>

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