



**General Certificate of Secondary  
Education**

**Science B 4462 / Biology 4411**

**BLY1H**

**Unit Biology 1**

**Mark Scheme**

*2012 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 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	Pluto, Mars, Moon	1
2	Pluto, 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.

**BLY1H****Question 1**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>1(a)</b>	(soft) body parts / other parts / named parts	accept flesh	1
	decayed / decomposed / rotted / eaten  <b>or</b> bones do not decay / decompose / rot / get eaten	ignore disintegrated / dissolved ignore microorganisms	1
<b>1(b)</b>	any <b>one</b> aquatic feature from: eg <ul style="list-style-type: none"> <li>• streamlined body shape</li> <li>• long tail</li> <li>• eyes on top of head</li> <li>• scales</li> <li>• fins / paddles / flippers / webbed feet</li> </ul>	ignore gills	1
	any <b>one</b> terrestrial feature from: <ul style="list-style-type: none"> <li>• (front) legs / limbs / hands</li> <li>• could lift front end upwards</li> </ul>	ignore feet  accept for <b>2</b> marks eg fin / flipper can be used for walking <b>or</b> fins like legs	1
<b>Total</b>			<b>4</b>

**BLY1H****Question 2**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>2(a)</b>	(reduced) competition	ignore fighting	1
	for any <b>one</b> from: <ul style="list-style-type: none"> <li>• light</li> <li>• water</li> <li>• nutrients / ions / salts / minerals</li> <li>• space</li> <li>• colonise new areas</li> </ul>	ignore Sun  ignore food  allow less overcrowding	1
<b>2(b)</b>	hooks	allow spines	1
	attach to animals / human clothing / animals carry fruits long distances	ignore wind dispersal	1
<b>Total</b>			<b>4</b>

**BLY1H****Question 3**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>3(a)</b>	Y – spinal cord / central nervous system / CNS	do <b>not</b> accept spine  ignore nerve / nervous system / coordinator  ignore grey / white matter	1
	W – receptor / nerve ending	ignore sensory / neurone / stimulus	1
	X – effector / muscle	allow gland	1
<b>3(b)</b>	any <b>two</b> from: eg <ul style="list-style-type: none"> <li>• reflex action quicker</li> <li>• effect of reflex action over shorter period</li> <li>• hormone involves blood system <u>and</u> reflex involves neurones / nerve cells</li> <li>• reflex involves impulses <u>and</u> hormone involves chemicals</li> <li>• reflex action affects only one part of the body</li> </ul>	accept reverse argument for each marking point  ignore nervous system / nerves  ignore involves brain  ignore outside / inside stimuli	2
<b>Total</b>			<b>5</b>

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## Question 4

question	answers	extra information	mark
4(a)	hearsay		1
4(b)	(volunteers with feet in) <u>empty</u> bowls	accept bowl with no (iced) water do <b>not</b> accept mention of bowl with iced water	1
4(c)	any <b>three</b> from: <ul style="list-style-type: none"> <li>• only some of those whose feet were in cold water caught colds</li> <li>• some controls caught colds</li> <li>• only feet were cold in experimental group</li> <li>• only kept feet in cold water for 20 minutes</li> <li>• insufficient evidence for ‘proof’ / only showed increased risk</li> <li>• don’t know activities of individuals before / after the investigation (eg exposure to cold virus) / reference to immune system</li> </ul>	ignore control variables, eg age, gender  allow (control) not wrapped up warm  allow small sample size  allow investigation done in ‘cold season’	3
<b>Total</b>			<b>5</b>



**BLY1H****Question 5**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>5(a)</b>	any <b>two</b> from: <ul style="list-style-type: none"> <li>• diet</li>   <li>• heredity / genes / genetic makeup</li>   <li>• reference to cholesterol production by liver</li> </ul>	ignore exercise  accept any reasonable reference to diet  do <b>not</b> accept salt / blood pressure  ignore age / gender / HDL / LDL	<b>2</b>
<b>5(b)(i)</b>	Blood cholesterol concentration is only one of several factors affecting death from all causes		<b>1</b>
<b>5(b)(ii)</b>	170 – 210	accept 210 - 170	<b>1</b>
<b>Total</b>			<b>4</b>

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## Question 6

question	answers	extra information	mark
6(a)(i)	kills / gets rid of / reduces methane bacteria	allow kills / gets rid of / reduces bad bacteria ignore acts like antibiotic	1
6(a)(ii)	less food converted to methane	allow can keep more cattle without further environmental damage ignore energy	1
	more growth / meat / muscle / milk produced / more profit / fatter animals	ignore references to bacteria and disease	1
6(b)	absorbs energy / heat radiated by Earth	allow absorbs / traps energy / heat / from Earth do <b>not</b> allow absorbs energy / heat from Sun	1
	some energy / heat reradiated	ignore reflected do <b>not</b> allow reradiates energy / heat from Sun	1
	leading to global warming / enhanced greenhouse effect	accept effects of global warming eg melting ice caps accept methane is a greenhouse gas ignore references to ozone	1
<b>Total</b>			<b>6</b>

**BLY1H****Question 7**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>7(a)</b>	fusion of gametes / named gametes	allow meet / join / fertilise	1
	results in mixing of genetic information / DNA / chromosomes	accept genetic information / DNA / chromosomes from two parents	1
<b>7(b)(i)</b>	use enzyme		1
	to cut gene from pout <u>chromosome / DNA</u>		1
	insert <u>gene</u> into salmon chromosome / DNA / egg / embryo / nucleus	accept use of plasmid as carrier ignore salmon / cell	1
<b>7(b)(ii)</b>	eg fear of gene transfer to wild salmon / extinction of wild salmon / fear of harmful effect on consumers / unsure of long term effects	ignore cruel / ethics / morals / religion / unnatural / economics	1
<b>Total</b>			<b>6</b>

**BLY1H****Question 8**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>8(a)</b>	dead or inactive or weak form of pathogen / bacterium / virus / microorganism introduced	ignore disease / germ	1
	(stimulates) white cells / lymphocytes / leucocytes	accept B and T cells ignore phagocytes	1
	to produce antibodies	ignore antitoxins / antigens	1
	antibodies made quickly on re-infection / idea of memory cells	ignore already has antibodies ignore 'body remembers'	1
<b>8(b)(i)</b>	alters / causes <u>chemical processes</u> / body chemistry	ignore craving / withdrawal symptoms	1
<b>8(b)(ii)</b>	any <b>two</b> from: <ul style="list-style-type: none"> <li>combined molecule / vaccine stimulates antibody production</li> <li>if nicotine taken, antibodies bind to nicotine molecules</li> <li>making them too large to get to brain / making them ineffective</li> </ul>	ignore destroys nicotine  allow prevents nicotine entering brain	2
<b>Total</b>			<b>7</b>

## Question 9

question	answers	extra information	mark
9	<p>any <b>three</b> from:</p> <p><b>advantages of IUCD over pill eg</b></p> <ul style="list-style-type: none"> <li>• can't forget to take it / have to take pill every day</li> <li>• effect much longer than pill</li> <li>• more effective in preventing pregnancy</li> <li>• stops sperm entering uterus</li> </ul> <p><b>disadvantages of IUCD over pill eg</b></p> <ul style="list-style-type: none"> <li>• pain / uncomfortable / risk of infection / may damage uterus</li> <li>• prevents fertilised egg developing / 'embryo rights'</li> <li>• needs replacement by doctor / nurse / professional <b>or</b> access to IUCD is more difficult than pill <b>or</b> IUCD is harder to come off than pill</li> </ul> <p>argued conclusion</p>	<p>max <b>2</b> if only advantages <b>or</b> only disadvantages discussed</p> <p>ignore 'side effects' unqualified</p> <p>ignore side effects produced by hormones</p> <p>do <b>not</b> allow last 5 years unless qualified</p> <p>do <b>not</b> allow reference to figures unless qualified</p> <p>allow kills embryo</p> <p>must include a preference and a reference to <b>both</b> advantages and disadvantages <b>or</b> one is better in a given situation but the other is better in a different situation</p>	<p>3</p> <p>1</p>
<b>Total</b>			<b>4</b>

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