



**General Certificate of Secondary Education**

**Science B 4462 / Biology 4411**

**BLY1H      Unit Biology 1**

**Mark Scheme**

*2007 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 / ; e.g. 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.

### 3.8 Unexpected Correct Answers not in the Mark Scheme

The Examiner should use professional judgement to award credit where a candidate has given an unexpected correct answer which is not covered by the mark scheme. The Examiner should consult with the Team Leader to confirm the judgement. The Team Leader should pass this answer on to the Principal Examiner with a view to informing all examiners.

**Question 1**

	<b>answers</b>	<b>extra information</b>	<b>mark</b>
(a)(i)	20		1
(ii)	12000		1
(b)	area of strips <b>or</b> length / width / size of transect <b>or</b> number of transects		1
(c)(i)	since squirrels mobile <b>or</b> squirrels could be counted twice <b>or</b> squirrels hide		1
(ii)	any <b>two</b> from:  <ul style="list-style-type: none"> <li>• numbers of larders observed likely to be lower than actual</li> <li>• since unlikely that all could be spotted if 5 m away</li> <li>• old larder</li> <li>• squirrels moved on / died</li> <li>• young squirrels</li> <li>• haven't made a larder</li> </ul>	do <b>not</b> accept squirrels share larders or squirrels have more than one larder	2

**Continued on next page**

	<b>answers</b>	<b>extra information</b>	<b>mark</b>
(d)(i)	0 to 6.8 / 6.8 to 0		1
(ii)	<p>any <b>one</b> from:</p> <ul style="list-style-type: none"> <li>• squirrels prefer blue spruce cones / seeds / nuts as food</li> <li>• <u>more</u> cones / food</li> <li>• <u>more</u> nesting sites</li> <li>• <u>fewer</u> predators / competitors</li> </ul>	do <b>not</b> accept squirrels prefer blue spruce	1
total			8

**Question 2**

	<b>answers</b>	<b>extra information</b>	<b>mark</b>
(a)	any <b>two</b> from: <ul style="list-style-type: none"> <li>• burning</li> <li>• activity of microbes / microbial respiration</li> <li>• <u>less</u> photosynthesis</li> <li><b>or</b></li> <li>trees take in CO<sub>2</sub></li> <li><b>or</b></li> <li><u>less</u> CO<sub>2</sub> locked up in wood</li> <li>• CO<sub>2</sub> given off by clearing machinery</li> </ul>	ignore CO <sub>2</sub> release unqualified  do <b>not</b> accept CO <sub>2</sub> taken in for respiration	2
(b)(i)	range of different species	accept idea of variety of organisms or plants or animals	1
(ii)	any <b>one</b> from: <ul style="list-style-type: none"> <li>• organisms may produce substances useful to humans</li> <li>• duty to preserve for future generations</li> <li>• effect on other organisms e.g. food chain effects</li> <li>• loss of environmental indicators</li> </ul>	do <b>not</b> accept if food is only example  ignore effect on human food supply	1
total			4

**Question 3**

	answers	extra information	mark
(a)	any <b>two</b> from: <ul style="list-style-type: none"> <li>• birth mass / growth reduced</li> <li>• smoke contains carbon monoxide</li> <li>• blood carries less oxygen / fetus receives less oxygen</li> </ul>	ignore references to poison  do <b>not</b> accept harder for fetus to breathe	2
(b)(i)	it may cause mental illness  it may be a 'gateway' drug to more harmful substances	three answers max 1 four answers max 0	1  1
(ii)	it is less addictive than amphetamines, tobacco or alcohol  it is not associated with major sociological problems	three answers max 1 four answers max 0	1  1
total			6



**Question 4**

	<b>answers</b>	<b>extra information</b>	<b>mark</b>
(a)(i)	liver		1
(ii)	heart	accept brain / blood vessels	1
(iii)	heredity / genes / exercise / metabolism / HDL LDL balance / ratio	stress is neutral	1
(b)	any <b>two</b> from: <ul style="list-style-type: none"> <li>• increases metabolic rate or increased respiration</li> <li>• decreases blood pressure</li> <li>• decreases obesity / decreased cholesterol / burns off fat</li> <li>• lowers risk of heart disease</li> <li>• lowers risk of arthritis or worn joints</li> <li>• lowers risk of diabetes</li> </ul>	references to stress are neutral    allow keeps heart healthy	2
total			5

**Question 5**

	<b>answers</b>	<b>extra information</b>	<b>mark</b>
(a)	any <b>two</b> from: <ul style="list-style-type: none"> <li>• resistant to (most) antibiotics</li> <li>• contagious <b>or</b> easily passed on <b>or</b> reference to open wounds</li> <li>• patients ill therefore less able to combat disease</li> </ul>	virus is neutral	2
(b)(i)	chloride of lime / hand washing killed bacteria (picked up from corpses)	allow disease / germs / infection / disinfectants	1
(ii)	people to wash hands after contact with patient		1
	so <u>bacteria</u> / <u>pathogen</u> / <u>MRSA</u> not transferred to other patient		1
total			5

**Question 6**

	answers	extra information	mark
(a)	wing pattern similar to <i>Amauris</i>		1
	birds assume it will have foul taste		1
(b)	mutation / variation produced wing pattern similar to <i>Amauris</i>	do <b>not</b> accept breeds with <i>Amauris</i>	1
	these butterflies survived	do <b>not</b> accept idea of intentional adaptation	1
	breed / genes passed to next generation		1
total			5

**Question 7**

	answers	extra information	mark
(a)	have identical genes / chromosomes / genetic material		1
	since asexual reproduction	accept mitosis	1
(b)	mixture of genes / chromosomes / genetic material from two parents	accept meiosis	1
	sexual reproduction / fusion of gametes		1
(c)	public misunderstand technique as cloning <b>or</b> worried about large numbers of clones <b>or</b> moral / ethical / religious issues <b>or</b> unnatural process <b>or</b> scientists must not play god <b>or</b> technique may lead to embryo death	do <b>not</b> allow mark for embryos lost	1
total			5

**Question 8**

	answers	extra information	mark
(a)	inhibits FSH (production / secretion)		1
	(therefore) no eggs <u>mature</u> / <u>released</u> <b>or</b>	if no other marks gained allow 1 mark for no eggs produced	1
	effect of FSH on ovary described	references to LH are neutral	
(b)		maximum 4 marks if no conclusion	
	Pros max 2marks from 4 marks e.g. <ul style="list-style-type: none"> <li>large scale trial gave better results</li> </ul>		max 2 from 4
	<ul style="list-style-type: none"> <li>chose uneducated women so that if these women could use it correctly, women elsewhere would be able to</li> </ul>		
	cons max 3 marks from 4 marks e.g. <ul style="list-style-type: none"> <li>used pill with high dose of hormone – <b>either</b> so results not valid for general use of hormone <b>or</b> dangerous</li> <li>side effects ignored</li> <li>women not told pill was experimental / pill might have side effects</li> <li>no placebo</li> <li>should have tried a range of doses</li> <li>should have done pre-trial to check for side effects</li> </ul>		max 3 from 4
	conclusion 1 mark e.g. trials flawed therefore cons outweigh pros  accept reverse e.g. trials flawed but pros outweigh cons		1
total			7