General Certificate of Secondary Education

Science B 4462 / Biology 4411

BLY1H   Unit Biology

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.

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.

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Question 1

question	answers		extra information	mark
1	**1** mark for each adaptation and **1** mark for its correct **linked** advantage			max 4
	fur / long hair / thick coat	(1)	allow keeps warm for insulation point	
	for insulation / reduces heat loss	(1)		
	large body / large mass / small SA:V ratio	(1)	ignore layer of fat	
	retains heat / loses less heat	(1)	ignore keeps warm	
	short legs	(1)	reject short (height) / small (height)	
	reduces surface area / heat loss	(1)	ignore keeps warm for this point	
	small ears	(1)		
	reduces surface area / heat loss	(1)	ignore keeps warm for this point	
	horns	(1)		
	defence	(1)		
	large shoulders	(1)		
	to move through snow	(1)		
Total				**4**

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Question 2

question	answers	extra information	mark
2(a)	any **two** from • survival of fittest • amplification of fittest ie has adaptations to survive • go on to breed **or** genes / characteristics passed on to next generation	allow examples allow examples NB best adapted organisms survive gains **2** marks	2
2(b)	any **two** from eg: • increased height • increased erectness ⁄ backbone or spine straighter • shorter arms • legs straighter • larger skull • larger pelvis **or** changing shape described • humans walk on two legs / feet	ignore unqualified change eg 'the skull changes shape' allow description of modern human characteristic eg 'modern humans stand up straight' allow description of ape-like characteristics eg ape-like ancestor walked on four legs	2
2(c)	any **two** from: • religious objections • insufficient evidence • mechanism of heredity not known did not know about genes / chromosomes / DNA / mutations • did not like the thought of being descended from apes	ignore **no** evidence accept could not prove	2

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Question 2 continued

question	answers	extra information	mark
2(d)	Darwin's theory depends on differences in genes at birth / inborn variation / mutation	allow Darwin's theory depends on genetics

ignore references to time | 1 |
| **Total** | | | **7** |

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Question 3

question	answers	extra information	mark
3(a)	any **one** from eg: • shorter distance between samples • sample to greater height • specify the size of each site	ignore repeat investigation / measurements ignore longer transect	1
3(b)(i)	Parmelia		1
3(b)(ii)	Evernia		1
3(c)	any **two** from: • Lecanora does not extend over whole range of transect / does not grow everywhere /does not grow in town centre / does not grow in countryside • Lecanora grows in a range of <u>sulfur dioxide</u> concentrations *or* Lecanora only grows in limited range of <u>sulfur dioxide</u> concentrations **or** Lecanora lives over large range of <u>sulfur dioxide</u> concentrations • other factors eg different pollutant might also influence growth of Lecanora • sulfur dioxide / pollutant concentration was not measured • amount of Lecanora not measured	ignore Lecanora does not give accurate measure of sulfur dioxide concentration	2
Total			**5**

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Question 4

question	answers	extra information	mark
4(a)	testing for toxicity / see if it is safe / see if it is dangerous / to see if it works	ignore side effects unqualified	1
4(b)(i)	testing for side effects / testing for reactions (to drug)	ignore to see if it works do **not** accept dosage	1
4(b)(ii)	any **one** from • dose too low to help patient • higher risk for patient • might conflict with patient's treatment / patient on other drug • effect might be masked by patient's symptoms / side effects clearer	ignore immune system	1
4(c)	to find optimum dose	allow testing on larger sample **or** it makes results more reliable allow to find out if drug is effective / find out if drug works on ill people (not just if drug works)	1
4(d)(i)	(tablet / drug / injection) that does not contain drug	allow control / fake / false allow tablet / injection that does not affect body do **not** accept drug that does not affect body	1
4(d)(ii)	neither patients nor doctors		1
Total			**6**

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Question 5

question	answers	extra information	mark
5(a)	rate of (chemical) reactions / rate of energy release / rate of respiration	ignore references to digestion	1
	in cells / tissues / organs		1
5(b)	any **three** from: • LDL 'bad' cholesterol **or** LDL causes heart / blood vessel disease • amplification eg reference to LDL depositing fat / lipid in blood vessels **or** LDL causes narrowness of arteries • HDL 'good' cholesterol / helps to prevent heart / blood vessel disease • amplification eg HDL lowers blood cholesterol • balance important (for good heart health) / high HDL and low LDL desirable	must have at least one LDL point and one HDL point for all **3** marks allow deposits of cholesterol in blood vessels	3
Total			**5**

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Question 6

question	answers	extra information	mark
6(a)	produces toxins / damage cells / reproduce rapidly **or** reproduce in cells	ignore invade cells	1
6(b)	any **three** from: • TV crew immune / Indians not immune / Indians have weak(er) immune system • TV crew had / produced antibodies / Indians had no antibodies **or** antibody production faster in TV crew • TV crew had previous exposure to flu / had been vaccinated **or** Indian tribe had no previous exposure to flu / had not been vaccinated • Indians caught disease from TV crew **or** TV crew were carriers *(of the virus)*	ignore resistant allow immunised	3
Total			**4**

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Question 7

question	answers	extra information	mark
7(a)(i)	pituitary		1
7(a)(ii)	ovary		1
7(b)(i)	$\frac{7}{28}$ **or** $\frac{1}{4}$ **or** 0.25 **or** 25%	allow 7 days <u>out of</u> 28 1 week <u>out of</u> 4 weeks	1
7(b)(ii)	any **two** from: • day 17 in fertile period / close(r) to day of egg release **or** day 9 far away from day of egg release • day 9 sperm die before egg released • day 17 sperm still alive when egg released • day of ovulation may vary / irregular cycle ideas • relevant reference to build up of womb lining	do **not** accept egg released on / by day 17 allow sperm only live for a few days	2
7(b)(iii)	any **two** from: • oestrogen concentration rises before LH / oestrogen and LH peak at different times • oestrogen stimulates LH production / woman will know that LH near peak • wider fertile period detected • reference to oestrogen stimulating build up of womb lining		2

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Question 7 continued

question	answers	extra information	mark
7(c)	curves show similar pattern / rise together	ignore peak together	1
	with oestrogen rising / peaking before LH		1
Total			**9**

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Question 7 continued

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Question 8

question	answers	extra information	mark
8(a)	chromosomes	ignore gene / DNA	1
8(b)	**pros eg** any **two** from: • overcomes shortage of human eggs / rabbits produce lots of egg*s* • ethical / religious issues with using human embryos • reduces tests on (adult) humans • may provide cure for / cause of disease • embryo not allowed to develop beyond 14 days • no harm to rabbit • 99.5 % human genetic information so very similar to human or will react in the same way **cons eg** any **two** from: • ethical / religious objections to mixture of human and rabbit genes • ethical issues with experimenting with rabbits • ethical / religious objections to killing embryos • 0.5% of rabbit genetic information might affect results • 14 days too short a time to get results	to obtain **3** marks candidates must give **one** reasonable pro **and one** reasonable con ignore all embryos identical allow some people object to using rabbits / cruel to rabbits	max 2 max 2

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Question 8b continued

	plus **conclusion eg** • possibility of cure does / does not outweigh ethical / religious objections • cure does not justify mixing human and animal genes / killing embryos	**Note:** the conclusion mark cannot be given unless both an advantage and a disadvantage have (already) been given do **not** award the mark if the conclusion only states that advantages outweigh disadvantages	1

Total			**5**

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