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General Certificate of Secondary Education

Additional Science 4463 / Biology 4411

BLY2F Unit Biology 2

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.

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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 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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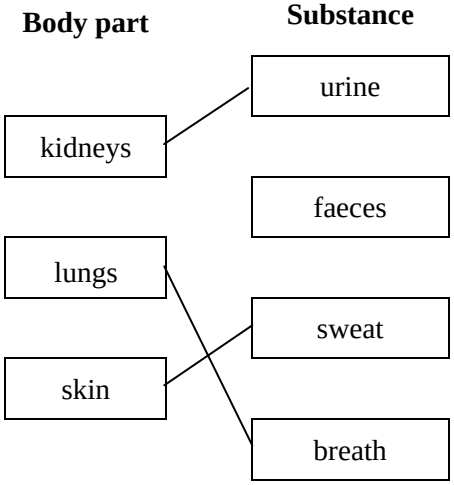
Question 1

question	answers	extra information	mark
1(a)		**1** mark per correct line extra line from a body part cancels the mark	3
1(b)(i)	1800 cm^3		1
1(b)(ii)	decreases		1
1(b)(iii)	any **one** from: • less / no sweat • less / no cooling *(*needed*)* • less / reduce / no heat loss / keep warm		1
1(c)	increases		1
Total			**7**

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Question 2

question	answers	extra information	mark
2(a)(i)	sex cells		1
2(a)(ii)	chromosomes		1
2(b)(i)	two		1
2(b)(ii)	recessive		1
2(c)(i)	cell membrane	allow membrane	1
2(c)(ii)	cytoplasm		1
2(d)(i)	A		1
2(d)(ii)	B		1
Total			**8**

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Question 3

question	answers	extra information	mark
3(a)	pancreas		1
3(b)	the diabetic should get more energy from fat the diabetic should get less energy from carbohydrate		1 1
3(c)	(use) insulin	allow pancreas / stem cell transplant do **not** allow injection / transplant / stem cells / tablets alone ignore exercise	1
Total			**4**

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Question 4

question	answers	extra information	mark
4(a)	root		1
4(b)(i)	chlorophyll		1
4(b)(ii)	absorbs / traps / takes in light (for) photosynthesis	do **not** accept attracts / solar energy / sunshine / sun accept to make food / glucose / sugar / biomass	1 1
4(c)	**Mineral ion** / **Effect of its shortage** Magnesium – Yellow leaves Nitrate – Stunted growth White flowers	**1** mark per correct line extra line from a mineral ion cancels the mark	2
Total			**6**

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Question 5

question	answers	extra information	mark
5(a)	fatty acids glycerol		1 1
5(b)(i)	any **one** from: • (same) amount / 1cm^3 fat • (same) amount / 10cm^3 lipase / enzyme • (kept for) 24 hours **or** (same length of) time		1
5(b)(ii)	temperature	allow heat / warmth	1
5(c)	(carry out experiments) using more temperatures / smaller intervals between 20 and 60 ºC / around 40 ºC	ignore repeat unqualified do not accept longer time accept extra single temperature in range 20 ºC – 60 ºC but cannot be 20 ºC, 40 ºC or 60 ºC	1 1
5(d)(i)	'strong' acid		1
5(d)(ii)	enzyme works / not destroyed / not denatured / not damaged	do **not** accept enzyme not killed accept any indication that the fat is digested accept same as tube 3 / tube at 40 ºC accept optimum temperature / at or near body temperature	1
Total			**8**

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Question 6

question	answers	extra information	mark
6(a)	three layer triangular pyramid	either way up (as blocks or triangle)	1
	soya / beans / food – trout / fish – people / human (in sequence)	ignore reference to producers / herbivores / consumers award **1** mark only for a correct food chain with 2 correct arrows showing energy flow	1
6(b)	the trout release energy when they respire		1
	some energy will be lost in waste from the trout		1
6(c)	any **one** from eg • easy / easier to catch / more caught • easy / easier to feed • no / less predation • less energy loss • less movement	 allow easy / easier to monitor allow control food allow less fishing / poaching allow grow faster ignore less space to move do **not** allow easier to farm	1
6(d)	any **two** from: • microorganisms / bacteria / decomposers / microbes / fungi / detritus feeders • decay / rot / decompose / digest / break down • (microorganisms) respire • turned into fossil fuels / named fossil fuels • carbon dioxide / CO_2 released	 ignore biodegrade do **not** award this mark if response implies the trout respire	2
Total			**7**

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Question 7

question	answers	extra information	mark
7(a)	5		1
7(b)	any **one** from: • more light • warm(er) / hot • more water / lot of rain	allow in either section allow more sun / sunnier	1
	increased / more photosynthesis	allow in either section allow more biomass / carbohydrate / named (made) do **not** allow food allow enzymes / metabolism faster **NB** for **2** marks this must be linked to heat to gain **2** marks more / increased must be mentioned at least once	1
7(c)	less pollution / named pollutant eg carbon dioxide / 'fumes' / emissions	allow examples of effect of less pollution eg less global warming / less acid rain allow any relevant environmental effect eg imported diseases	1
	less fuel used / less transport / named transport	ignore 'less distance' / importing allow 'less distance travelled' / 'less travel' allow smaller carbon footprint once only for either mark	1
Total			**5**