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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Additional Science 4463 / Biology 4411

BLY2H Unit 2 Biology

Mark Scheme

2009 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 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)(i)		answers must be in this order	
	water / H_2O	allow hydrogen oxide	1
	oxygen / O_2 / O	allow upper and lower case symbols and superscripts	1
1(a)(ii)	respiration in the plant	allow clear indication of correct response	1
1(b)	light (: no light) / light intensity	ignore references to the card / covered / uncovered	1
	chlorophyll (: no chlorophyll) / chloroplast	allow leaf colour **or** both green **and** white given	1
1(c)(i)	no light (received) **or** it's dark	allow no photosynthesis do **not** allow little light / photosynthesis ignore sun apply list principle for other factors	1
1(c)(ii)	no chlorophyll / chloroplasts (present)	allow no / little photosynthesis allow white **or** not green **or** little chlorophyll / few chloroplasts apply list principle for other factors	1
Total			**7**

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Question 2

question	answers	extra information	mark
2(a)(i)	increase / higher / faster / quicker		1
	numerical comparison eg from 30 to 60 / by 30 **or** it is 30 at 15°C and 60 at 25°C	award **2** marks for doubles / goes twice as fast or 30 units <u>more</u>	1
2(a)(ii)	any **two** from: • oxygen / air (in) • for microorganisms / bacteria / microbes / fungi / decomposers • (for aerobic) respiration • let heat out • heat kills microorganisms	 do **not** accept lets oxygen / air out ignore reference to other substances / light passing in or out ignore microorganisms passing in ignore worms / germs / bugs ignore heat in	2
2(b)	compost contains minerals / nutrients / elements / ions / named	allow improve moisture / drainage allow nitrogen ignore CO_2 / food / goodness / fertilisers do **not** accept vitamins / glucose etc	1
Total			**5**

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Question 3

question	answers	extra information	mark
3(a)	4	award **both** marks for correct answer, irrespective of working. allow 125/3125 (× 100) **or** 0.04 for **1** mark	2
3(b)	any **three** from: • excreted / urine / urea • not digested / faeces • methane • respiration • movement / named internal / external movement • heat / temperature control / sweating	} if neither of these marks is awarded then waste gains **1** mark do **not** allow **for** respiration allow sound allow milk production allow active transport	3
3(c)	any **two** from: • no / less biomass / energy lost (by intermediate) **or** examples of losses • shorter food chain • cheap(er) to feed herbivores	herbivores contain more energy is insufficient ignore reference to carnivores being dangerous	2
Total			**7**

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Question 4

question	answers	extra information	mark
4(a)(i)	B		1
4(a)(ii)	any **one** from: • largest area of / most digestion (of lipid) • largest clear area	allow agar / jelly / mixture broken down / digested do **not** allow digestion of bacteria / lipase ignore digestion **by** bacteria	1
4(b)	any **two** from: • effect of pH / pH described • effect of temperature • effect on different types of lipid / fat • cost **or** allergic reactions **or** effect on skin / fabrics / **or** environment **or** interaction with other chemicals in powder **or** shelf life		2
4(c)	enzymes / named enzyme denatured / destroyed	allow active site(of enzyme) altered	1
Total			**5**

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Question 5

question	answers	extra information	mark
5(a)(i)	(wholemeal bread) any **two** from: lower maximum / peak / less change slower rise / change need to take less insulin / less likely to hyper	no mark for identifying the type of bread but max **1** mark if not identified ignore references to rate of fall **or** first to peak	 1 1
5(a)(ii)	any **four** from: • amylase / carbohydrase • starch to sugar • (sugar) absorbed / diffused / passes into blood • correct reference to pancreas • insulin produced • glucose (from blood) into cells / tissue / organ **or** named tissue / organ • glucose used in respiration / for energy	max 3 for explaining rise max 3 for explaining fall allow starch to glucose allow once only as rise or fall allow glucose to glycogen	4

Question 5 continues on the next page…

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Question 5 Continued

question	answers	extra information	mark
5(b)	any **three** from: advantages (compared to insulin injections): • (may be) permanent / cure • no / less need for self monitoring • no / less need for insulin / injections • no / less need for dietary control disadvantages (compared to insulin injections): • low success rate • (may) still need insulin / dietary control • operation hazards • risk of infection from donor • rejection / need for drugs to prevent rejection	max **2** if only advantages **or** only disadvantages discussed can give converse if clear that it relates to insulin injections ignore reference to cost	3
Total			**9**

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Question 6

question	answers	extra information	mark
6(a)	(genotype / gametes from **T** / mother) h and h (accept h)	eg may be in punnett square	1
	(genotype / gametes from **U** / father) H and h	allow own upper and lower case symbols or allow any symbol correctly used with key	1
	offspring genotypes: correctly derived from correct gametes		1
	chance = 50% / ½ / 0 .5 / 1 : 1 / 1 out of 2	do **not** accept 1 : 2 allow irrespective of working	1
6(b)(i)	(cells from) embryo tested for particular allele / gene / (named) genetic condition / the disease / gender	ignore x-rays / ultra sound	1
6(b)(ii)	any **one** from: • possible harm to embryo **or** mother • sensible reference to abortion • hard to make moral / ethical decisions	ignore moral / ethical unqualified ignore not natural / playing God references to other ideas eg designer babies must be well argued	1
6(c)(i)	(cystic fibrosis is) recessive (allele / gene)	allow not dominant	1
	need two alleles / genes **or** need one allele / gene from each parent **or** both parents must have cystic fibrosis allele / gene		1

Question 6 continues on the next page…

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Question 6 Continued

question	answers	extra information	mark
6(c)(ii)	any **three** from: • osmosis / diffusion • more concentrated solution outside cells / in mucus • water moves from dilute to more concentrated solution • partially permeable membrane (of cell)	do **not** accept reference to movement of ions / solution by osmosis / diffusion assume concentration is concentration of solute unless they tell us otherwise allow correct references to movement of water in relation to concentration gradient	3
6(c)(iii)	ribosomes		1
Total			**12**