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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Additional Science 4463 / Biology 4411

BLY2H Unit 2 Biology

Mark Scheme

2008 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.

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.

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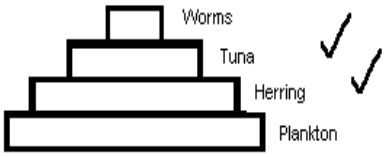
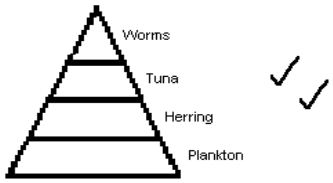
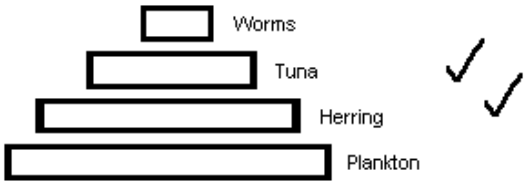
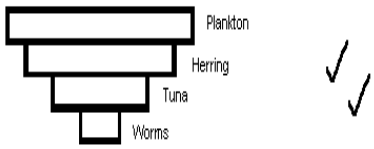
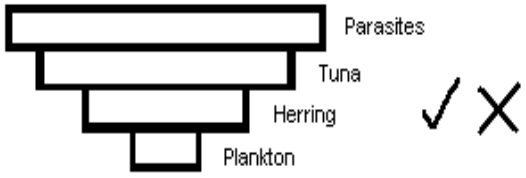
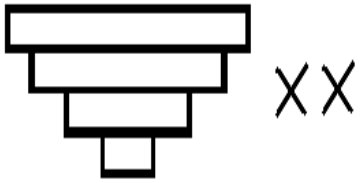
Question 1

	answers	extra information	mark
(a)(i)	a triangular-shaped pyramid, with 4 layers – widest at the bottom	either in blocks or as a triangle	1
	labels in food chain order (from widest part) ie plankton—herring— tuna — parasitic / worms	upside down labelled pyramid with producer at top gains **2** marks upside down labelled pyramid with producer at bottom gains **1** mark for labels unlabelled upside down pyramid = **0** marks accept separate boxes correct food chain with correct arrows if given gains **1** mark	1
	eg  	eg  	
	eg  	eg  	
	eg  	eg 	

continued…

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Question 1 continued…

	answers	extra information	mark
(a)(ii)	any **two** from: • waste / excreted / urine / faeces / CO_2 (from tuna) • respiration (of tuna) • movement (of tuna) / hunting • used for heat (production) (of tuna) • not digested / absorbed	from / of tuna not required but do not accept if of / from other organisms ignore used in reproduction if a mark is not awarded for respiration / movement / heat allow **1** mark for energy (unqualified)	2
(b)(i)	40	award **both** marks for correct answer, irrespective of working allow (290 – 50)/6 **or** 240/6 for **1** mark allow 48.3 / 48 ⅓ / 48 for **1** mark	2
(b)(ii)	cost of food / protein		1
(c)	any **one** from: • concern about animal welfare **or** examples **or** cruel to tuna **or** unethical **or** lack of space • poorer flavour / quality	allow immoral ignore not natural	1
total			8

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Question 2

	answers	extra information	mark
(a)(i)	**D**		1
(a)(ii)	**A**		1
(b)(i)	air / oxygen (can enter)	ignore other factors entering or leaving	1
	for (aerobic) respiration	do **not** accept anaerobic respiration	1
(b)(ii)	(more) minerals / nutrients /salt(s) / ions **or** named mineral / element available	ignore fertility / fertiliser allow symbols allow eg mulching / reducing weeds **or** retain water	1
total			5

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Question 3

	answers	extra information	mark
(a)	any **two** from: • other scientists not aware of his work • chromosomes / DNA / genes not seen / discovered / known • other theories accepted at the time • not considered to be a scientist / not eminent / respected	accept other logical / reasonable ideas do **not** accept there was no interest in genetics allow 'he was just / only a monk'	2
(b)(i)	random selection	accept a method of achieving random selection eg "take a handful" if number given, minimum 20	1
(b)(ii)	any **one** from: • 1:1 / one to one • 19:21	accept any ratio to give correct answer, eg "50:50" do **not** accept 21:19 unqualified	1

continued…

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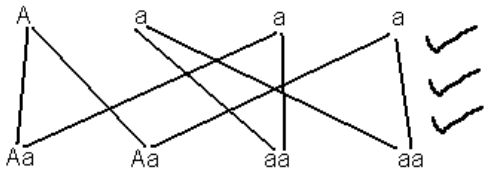
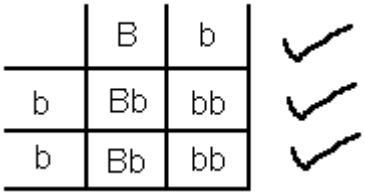
Question 3 continued…

	answers	extra information	mark
(b)(iii)	A + a as gametes from 1st parent		1
	a + a as gametes from 2nd parent	allow a alone	1
	(offspring / 2nd generation) Aa aa	offspring must be derived from correct gametes	1
	correct identification of yellow (Aa) **or** green (aa) (if both given, both must be correct)	other symbols correctly used can gain full marks ignore references to previous generations if no other marks awarded, both correct parental genotypes given gains **1** mark	1
	examples of award of first three marks		
			
			
			
total			8

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Question 4

	answers	extra information	mark
(a)	any **two** from: • amylase / carbohydrase • protease • lipase	 allow trypsin	2
(b)(i)	high / above normal blood sugar **or** cannot control blood sugar	allow other symptoms eg frequent / plentiful urination **or** sugar in urine **or** thirst **or** weight loss **or** coma ignore consequential effects eg blood pressure / circulation / glaucoma / tiredness	1
(b)(ii)	any **one** from: • small / regular meals • low sugar (meals) or low GI / GL **or** carbohydrates as starch	 allow high fibre ignore reference to low carbohydrate	1
(b)(iii)	any **one** from: • keep constant(blood) sugar **or** prevent high (blood) sugar **or** reduces surge / rush of sugar into blood • reduce the need for insulin		1
(b)(iv)	(take) insulin	allow pancreas transplant	1
(c)	protein / hormone / enzyme synthesis **or** synthesis of named example **or** combine amino acids		1
total			7

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Question 5

	answers	extra information	mark
(a)	any **two** from: • neutralises acid / makes conditions alkaline / raises pH • enzymes (in small intestine) work (more/most effectively) **or** stop/prevents enzymes being denatured • emulsifies fats/lipids **or** description of emulsification • larger surface area	do **not** accept breakdown unqualified	2
(b)(i)	bile / bilirubin / pigment / broken down haemoglobin / substance / cholesterol linked to movement **or** effect does **not** get to the intestine / food / faeces **or** cannot leave liver **or** effect not happening (in intestine)		1 1
(b)(ii)	bilirubin / pigment / broken down haemoglobin (deposited) in skin	not 'bile' alone only award if bilirubin / pigment / broken down haemoglobin given allow carried in the blood	1 1
total			6

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Question 6

	answers	extra information	mark
(a)(i)	thermoregulatory centre (in brain) (receptors sensitive to/measures) temperature of <u>blood</u>	accept hypothalamus	1 1
(a)(ii)	any **one** from: • receptors (in skin) • (skin) sends information / signals / impulses / messages to brain / thermoregulatory centre		1
(b)	any **three** from: (cold conditions) • muscle (X) contracts when cold • no / less blood through capillaries • no / less heat lost / radiated • no / less sweat produced (hot conditions) • muscle (X) relaxes/does not contract when hot • (more) blood through capillaries • more heat lost / radiated • more sweat produced	NB X contracts when cold and relaxes when hot = **2 marks** all other points must be clearly identified by correct conditions max **2** if idea of capillaries moving but ignore capillaries dilate	3
total			6

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Question 7

	answers	extra information	mark
(a)(i)	light (intensity)		1
(a)(ii)	any **one** from: • same mass/amount of grain produced when more (magnesium) provided • same mass / amount of grain at 0.1 and 0.15g		1
(a)(iii)	magnesium used for chlorophyll (production) for photosynthesis		1 1
(b)	extra cost (of fertiliser) not matched by (much) extra productivity	accept not cost effective or waste of money / fertiliser accept answers relating to effect of leaching	1
total			5