GCSE 2004
June Series

ASSESSMENT and QUALIFICATIONS ALLIANCE

Mark Scheme

Biology (Modular) Specification A
(3413/H)

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.

Further copies of this Mark Scheme are available from:

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or

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GCSE BIOLOGY (MODULAR)

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 Quality of Written Communication

Where *Quality of written communication* appears in the mark scheme, one mark is to be awarded for either of the following points:

- Using correct scientific terms
- Correct sequencing or linking of ideas or points

The mark scheme will specify which of the points is to be awarded in a particular question. A QoWC mark can be awarded for a scientific answer, even if it is not accurate. It cannot be awarded for a nonsensical or non-scientific answer.
On the script, the QoWC tick should be identified by a 'q' written next to it.

3.2 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

3.3 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.

3.4 The marking of quantitative relationships

Full credit can be given for a correct quantitative relationship expressed in:

- named units;
- physical quantities;
- standard symbols;
- a combination of physical quantities and units.

No credit can be given for any quantitative relationship expressed in terms of:

- a combination of physical quantities, units and symbols;
- a diagram, e.g. the ohm's law triangle, unless the rest of the answer shows clearly that the candidate understands the relationships involved.

3.5 Marking procedure for calculations

3.5.1 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;
- if the answer is correct, but an incorrect relationship is written in the working, then no marks can be awarded (see 3.5.2).

3.5.2 Where calculations are based on incorrectly recalled relationships, neither the incorrectly recalled relationship, nor the resulting calculation based on the incorrect relationship, will be credited.

3.6 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.

3.7 Errors carried forward

There should be no error carried forward from a previous answer which has been based on wrong science. Any error in the answers to a structured question should be penalised once only.

Examples

(a) A candidate who calculates average speed using speed = time/distance **and** then proceeds to use this incorrect answer to calculate an acceleration based on the correct quantitative relationship should be given credit for the use of the correct acceleration relationship but none for either numerical answer.

(b) A candidate who incorrectly calculates average speed using speed = distance/time and then proceeds to use this incorrect value to calculate an acceleration based on the correct quantitative relationship, should be given credit for the use of both correct quantitative relationships **and** for the correct substitution and use of the incorrect value in the calculation of the rate of acceleration.

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.

3.8 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.9 Brackets

(…..) is 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.

3.10 Interpretation of marginal points

There will be times when the answer is almost, but not quite, correct. Some examiners would award a mark while others would not. In any one script, an attempt should be made to balance these nearly correct answers by giving the mark on some occasions but not on others. If this is not done, the marking would end up being too lenient or too harsh.

3.11 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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Biology (Modular) **3413/H**
Summer 2004

3413/H Q1

	answers	extra information	mark
(a)	• correct plotting • correct order	minimum 1 label	2
(b)	• $\frac{2}{15}$	accept $\frac{80}{600}$ etc.	1
(c) (i)	any **one** from • sugar used up • carbon dioxide lost • water lost		1
(ii)	any **two** from • muscle contraction/movement • to maintain body temperature • to synthesise large <u>molecules</u>	accept suitable example accept active transport	2
(d)	• not eaten • lost in waste/indigestible	accept leaf decomposition do not accept Excretion accept respiration in <u>leaf</u>	2
total			8

3413/H Q2

	answers	extra information	mark
	any **two** pairs • dig it over/aerate it • provides oxygen for microbes • water it • microbes need water • keep it warm • microbes more active/enzymes • add more soil/manure/decaying material • more microbes • introduce worms • increase aeration/breakdown material	accept other descriptions with suitable explanations	4
total			4

3413/H Q3

	answers	extra information	mark
(a)	any **three** from • as temperature increases activity increases (for either red or black) • little difference at 20˚C • activity of black higher (than red) at 5˚C/lower temperature • activity of red increases more than black • black is always more active than red		3
(b)	**Quality of written communication** *The answer to this question requires ideas in good English in a sensible order with correct use of scientific terms.* any **three** from • black increases/red decreases • black more active/black out compete red • more reproduction of black • pass on colour genes to offspring QoWC – correct linking of ideas	accept valid reason for differential survival	3 1
total			7

3413/H Q4

	answers	extra information	mark
(a)	• mesohippus has longer (outer) toes • mesohippus has more carpal bones	accept converse to both	2
(b)	• from fossils		1
(c)	• fossils of different ages at different depths	accept carbon dating	1
total			4

3413/H Q5

	answers	extra information	mark
(a)	• A		1
(b)	• antibiotic diffuses/moves through jelly/passes into • antibiotic kills/prevents the growth of bacteria		2
(c)	• viruses are inside cells • antibiotics do not destroy viruses/only work on bacteria		2
total			5

3413/H Q6

	answers	extra information	mark
(a)	any **two** from • worried about side effects • measles not a dangerous disease • measles not a common disease		2
(b)	e.g. • may be biased/incorrect OWTTE		1
(c)	any **two** from • use a large sample • compare children with MMR and those without • compare proportion/% in each group who develop autism		2
total			5

3413/H Q7

	answers	extra information	mark
(a)	• 15.00hrs/3pm		1
(b)	• changed to starch	accept other valid alternatives	1
(c)	• 09.00hrs – 12.00hrs		1
(d)	• greatest increase in light intensity • greatest increase in temperature	accept most light **or** highest temperature for one mark only	2
total			5

3413/H Q8

	answers	extra information	mark
(a)	• 597		1
(b)	• $\frac{30}{50} \times 100$ • 60%	60% with no working = 2	2
(c)	• liver		1
(d)	• more protein eaten • excess amino acids broken down to urea	(accept example)	2
total			6

3413/H Q9

	answers	extra information	mark
(a)	**Quality of written communication** *The answer to this question requires ideas in good English in a sensible order with correct use of scientific terms.*	a maximum of three advantages/disadvantages	
	any **five** from advantages • conservation of wild salmon stocks • food quality can be controlled • can be genetically engineered/selectively bred • easier to catch • predictable crop • easier transport from one place • fewer lost to predation • employment • restricted movement linked to idea of more efficient food → biomass conversion		5
	disadvantages • disease more likely • so more antibiotics used • high cost of food • expensive to set up • pollution of environment • effect of pollution on food chain		1
	QoWC – correct use of scientific terms (atleast 3)	e.g. predation, selective breeding genetic engineering, food chain	
(b)	any **five** from • (nitrogenous compounds) to ammonium • by (putrefying) bacteria • ammonium to nitrates • by nitrifying bacteria • uptake of nitrates by plants • nitrate + sugar → protein		5
total			11

3413/H Q10

	answers	extra information	mark
(a)	• genes on chromosomes • chromosomes copied (before cell division)	accept genes copied	2
(b)	any **three** from • interferes with nature/lack of choice • unknown side effects on humans • further selective breeding more difficult • reduced no. of alleles in population/they are all genetically identical		3
total			5

3413/H Q11

	answers	extra information	mark
(a)	• changes order of bases in DNA • different sequence of amino acids in protein/haemoglobin • **which** transports oxygen/in red blood cells	mark for link between haemoglobin and oxygen transport	3
(b)	• parents both Hh • gametes correct • offspring derived correctly • probability (HH) = $\frac{1}{4}$		4
total			7

3413/H Q12

	answers	extra information	mark
(a)	• red cells clump together	do not accept clotting	1
(b)	• AB		1
(c)	• A		1
(d)	• antigen A present • on (surface of) red blood cell • antibody and antigen bind		3
total			6

3413/H Q13

	answers	extra information	mark
(a)	• plant material/waste containing carbohydrate/sewage/manure		1
(b)	• methane		1
(c)	• e.g. maintains optimum temperature for microbial activity		1
(d)	any **two** from • no piped gas available • cheap labour available • cheap source of organic material available	accept no other fuel available/cheaper than buying imported fuel	2
total			5

3413/H Q14

	answers	extra information	mark
(a)	• tail fin – large surface area • to push on water pushing fish forward • body shape – streamlined • to reduce resistance • dorsal fin – increases vertical surface area • to prevent roll	separate mark points accept to keep upright	6
(b)	• increased density of fish/less buoyant • fish sinks		2
total			8

3413/H Q15

	answers	extra information	mark
	• folded cell membrane/microvilli • large surface area (for uptake of materials) • many mitochondria • provide energy (for active transport)	do not accept villi	4
total			4