ASSESSMENT and QUALIFICATIONS ALLIANCE

Mark scheme June 2003

GCSE

Biology (Modular)

3413

Higher

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ADDITIONAL INFORMATION FOR EXAMINERS

Mark Scheme

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

Examiners are reminded of the need to assess QoWC by the following statement appearing in the appropriate parts of the mark scheme:

The answer to this question requires ideas in good English in a sensible order with correct use of scientific terms. Quality of written communication should be considered in crediting points in the mark scheme.

The maximum marks available to a candidate whose answer is not well expressed will be (the number of marks available –1).

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.

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 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.

GCSE BIOLOGY (MODULAR) 3413H
MARK SCHEME – HIGHER TIER (TERMINAL PAPER)
SUMMER 2003

Question 1

	answers	extra information	mark
(a) (i)	• change in a gene/genetic information/DNA	allow change in base sequence allow change in chromosome number allow a change in a chromosome	1
(ii)	• U/V light/x-rays	allow 'certain chemicals' not just radiation	1
(b)	• cut out gene • using enzyme • transfer gene to bacterial cell • then culture bacteria	allow then bacteria reproduce/multiply	4
total			6

Question 2

	answers	extra information	mark
(a)	• ovary • pituitary	answers in either order	2
(b) (i)	• prevent egg release/production/maturation	allow inhibit FSH	1
(b) (ii)	• side effects or example **or** STDs can still be transmitted	e.g. weight gain, circulatory problems, headaches	1
total			4

Question 3

	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.* *Quality of written communications should be considered in crediting points in the mark scheme* • large size • small surface area to volume ratio • thick layer of body fat • feathers trap air	maximum of 3 if ideas not well expressed do not credit has body fat accept insulating coat **not** fur	4
total			4

Question 4

	answers	extra information	mark
(a)	• 2350	allow 2340-2360	1
(b)	any **one** from • abundant food • little competition for food		1
(c)	• shortage of food • disease	accept correct reference to inbreeding accept new predators not just increased competition	2
total			4

Question 5

	answers	extra information	mark
(a)	• starch		1
(b)	• enzymes work well/optimum temperature for enzymes		1
(c)	• for flavour/taste		1
(d)	• ethanol/alcohol • carbon dioxide	in either order	2
total			5

Question 6

	answers	extra information	mark
(a)	• vaccination results in antibody production • (antibody production) takes time/is slow • virus replicates/causes symptoms before antibody can be produced		3
(b) (i)	• antibodies		1
(ii)	• antibody reacts with/binds to virus • prevents viral replication/virus destroyed		2
total			6

Question 7

	answers	extra information	mark
(a) (i)	incisor tooth correctly labelled		1
(ii)	canine tooth correctly labelled		1
(b)	• canine teeth pointed/sharp • to pierce/kill/hold/tear prey • molars ridged/large surface area • to crush prey	do not credit large must link tooth to function	1 1 1 1
total			6

Question 8

	answers	extra information	mark
(a)	• 3 bars correctly plotted • all <u>bars</u> plotted correctly	mark bars for height only	1 1
(b)	• 500/2500 x 100 • 20	award 2 marks for correct answer with no working	2
(c)	• <u>more</u> sweating • to cool body		2
(d)	• Urea/salts		1
total			7

Question 9

	answers	extra information	mark
(a)	• nervous system		1
(b) (i)	• dominant		1
(ii)	• 50%		1
(iii)	• mother – Hh and father - hh • Richard – Hh **or** hh • correct derivation	accept other symbols with key	3
total			6

Question 10

	answers	extra information	mark
(a)	suggestion related to food shortages or fear of prison	e.g. there were food shortages so they wanted to believe him	1
(b)	• DNA/genes are not changed • environmental changes not <u>inherited</u>		2
(c)	**Quality of written communication** *The answer to this question requires ideas in good English in a sensible order with correct use of scientific terms.* *Quality of written communications should be considered in crediting points in the mark scheme.* • choose plants with the largest fruit • breed • select largest offspring • repeat over several generations	maximum of 3 if ideas not well expressed	4
total			7

Question 11

	answers	extra information	mark
(a)	1. burning of trees produces carbon dioxide 2. <u>less</u> photosynthesis to remove carbon dioxide 3. decomposition/respiration of microbes produces carbon dioxide	in any order	3
(b)	• carbon dioxide is a greenhouse gas • causes global warming	accept description of effect of CO_2	2
(c)	• temperature and carbon dioxide levels have been changing for thousands of years • human activities have only resulted in a rise in carbon dioxide levels for less than 200 years	accept – present day temperatures are similar to those c.125 thousand years ago human activity could not account for that	2
total			7

Question 12

	answers	extra information	mark
(a)	• 12/80 x 100 • 15	award 2 marks for correct answer with no working	2
(b)	any **two** from • (biomass) lost in faeces/waste • (biomass) used in respiration • (biomass) used in growth/repair		2
(c)	• less <u>biomass</u> used in respiration • as less movement • less energy needed to maintain body temperature	accept less used for repair for 1 mark	3
total			7

Question 13

	answers	extra information	mark
(a) (i)	glucose: • 0.1 • so no glucose is lost (from the blood)		5
(ii)	urea • less than 0.04 • so urea moves into the dialysis fluid/out of blood • by diffusion/along concentration gradient	allow correct reference to diffusion in a (i) if not awarded in a (ii)	
(b)	• similar genotype/antigens • less risk of rejection	accept similar tissue type	2
(c)	any **three** from • stops/reduces white (blood) cell production • white (blood) cells produce antibodies • antibodies destroy donor <u>cells</u>	• T cells involved • receptors to antigens on T cell membrane • white (blood) cells destroy <u>cells</u> with foreign antigen/donor cells	3
total			10

Question 14

	answers	extra information	mark
(a)	• shortage of sugar/food • yeast killed by high alcohol concentration	• allow build up of toxins	2
(b)	e.g. any **two** from • abundant/cheap supply of waste from sugar cane • sugar cane cannot grow in Britain • few oil reserves in Brazil		2
total			4

Question 15

	answers	extra information	mark
(a)	• transfer of oxygen to blood • transfer of carbon dioxide from blood to air	allow gas exchange for one mark only	2
(b)	• reduced surface area of alveoli • reduced number of blood vessels to carry away oxygen	accept oxygen uptake reduced as longer diffusion pathway	2
total			4

Question 16

	answers	extra information	mark
	• increased distance along upper surface/air flows faster along upper surface • therefore reduced air pressure above wing • resulting in lift		3
total			3