



ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Mark scheme

June 2003

GCSE

Biology (Modular)

3413

Foundation

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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. Boldening

- 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 boldened. 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 $\text{speed} = \text{time}/\text{distance}$ **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 $\text{speed} = \text{distance}/\text{time}$ 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.

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GCSE BIOLOGY (MODULAR) 3413F
MARK SCHEME – FOUNDATION TIER (TERMINAL PAPER)
SUMMER 2003

Question 1

	answers	extra information	mark
(a)	<ul style="list-style-type: none"> • nucleus • gene 		2
(b)	<ul style="list-style-type: none"> • sex chromosomes different / (X and) Y chromosome present 		1
(c)	<ul style="list-style-type: none"> • half the number of chromosomes present 	accept only 23 chromosomes accept only 1 sex chromosome accept 1 set of chromosomes	1
total			4

Question 2

	answers	extra information	mark
(a)	<ul style="list-style-type: none"> • rock • hard • soft • water • oxygen 	} either order	5
(b)(i)	<ul style="list-style-type: none"> • 400 		1
(ii)	<ul style="list-style-type: none"> • 200 		1
(iii)	<ul style="list-style-type: none"> • fish and amphibians 	both must be given, in either order	1
(c)	any two from <ul style="list-style-type: none"> • change in environment • <u>new</u> predators • <u>new</u> disease • <u>new</u> competitors 	allow 2 examples e.g. less food and water = 2 marks	2
total			10

Question 3

	answers	extra information	mark
(a) (i)	any one from <ul style="list-style-type: none"> • heron • fish • diving beetle • frog 		1
(ii)	answer dependent on (a) (i) (heron) - fish (fish) - fly larvae or water fly (diving beetle) - water flea (frog) - waterboatmen	accept fly/larvae/flea accept flea	1
(b)	<ul style="list-style-type: none"> • frog 		1
(c) (i)	<ul style="list-style-type: none"> • more are eaten 		1
(ii)	<ul style="list-style-type: none"> • more waterfleas/food 		1
(d)	biomass decreasing at each tropic level AND all labels correct	both points needed	1
(e)	<ul style="list-style-type: none"> • light/sunlight 	allow the sun	1
total			7

Question 4

	answers	extra information	mark
(a)	<ul style="list-style-type: none">70		1
(b)	<ul style="list-style-type: none">combustion/burningof fossil fuels	accept named example	2
(c)	any two from <ul style="list-style-type: none">SO₂ <u>dissolves</u> to form an aciddamage to treesorganisms cannot survive in acidic water	do not credit makes acid rain do not credit effects on limestone	2
total			5

Question 5

	answers	extra information	mark																				
(a)	<table border="1"> <thead> <tr> <th>Type of Microbe</th> <th>Cell Wall</th> <th>Protein Coat</th> <th>Cytoplasm</th> <th>Nucleus</th> </tr> </thead> <tbody> <tr> <td>Yeast</td> <td>(√)</td> <td></td> <td>√</td> <td>√</td> </tr> <tr> <td>Virus</td> <td></td> <td>√</td> <td></td> <td></td> </tr> <tr> <td>Bacteria</td> <td>(√)</td> <td></td> <td>√</td> <td></td> </tr> </tbody> </table>	Type of Microbe	Cell Wall	Protein Coat	Cytoplasm	Nucleus	Yeast	(√)		√	√	Virus		√			Bacteria	(√)		√		each line should be completely correct for one mark	3
Type of Microbe	Cell Wall	Protein Coat	Cytoplasm	Nucleus																			
Yeast	(√)		√	√																			
Virus		√																					
Bacteria	(√)		√																				
(b) (i)	<ul style="list-style-type: none"> yeast 	do not allow mould	1																				
(ii)	<p>Quality of written communication <i>The answer to this question requires ideas in good English in a sensible order with correct use of scientific terms.</i> <i>Quality of written communications should be considered in crediting points in the mark scheme</i></p> <p>any four from</p> <ul style="list-style-type: none"> carbon dioxide (produced) in respiration gas trapped in dough gas expands when bread is cooked/on heating 	maximum of 3 if ideas not well expressed	4																				
total			8																				

Question 6

	answers	extra information	mark
(a)	<ul style="list-style-type: none">source of energy	allow for respiration food neutral	1
(b) (i)	<ul style="list-style-type: none">microbes enter (from the air)microbes present in brothmicrobes reproduce		3
(ii)	any two from <ul style="list-style-type: none">boiling the broth kills microbesmicrobes cannot enter (from the air)sterile air has no microbes		2
total			6

Question 7

	answers	extra information	mark
(a)	<ul style="list-style-type: none">• large/insoluble• so can pass into blood	accept so can leave (small) intestine/be absorbed	2
(b)	<ul style="list-style-type: none">• E• F		2
total			4

Question 8

	answers	extra information	mark
(a) (i)	A		1
(ii)	D		1
(b)	<ul style="list-style-type: none">• glucose• oxygen	accept sugar answers in either order	2
total			4

Question 9

	answers	extra information	mark
(a) (i)	<ul style="list-style-type: none"> 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)	<ul style="list-style-type: none"> U/V light/x-rays 	allow 'certain chemicals' not just radiation	1
(b)	<ul style="list-style-type: none"> cut out gene using enzyme transfer gene to bacterial cell then culture bacteria 	allow then bacteria reproduce/multiply	4
total			6

Question 10

	answers	extra information	mark
(a)	<ul style="list-style-type: none">ovarypituitary	answers in either order	2
(b) (i)	<ul style="list-style-type: none">prevent egg release/production/maturation	allow inhibit FSH	1
(b) (ii)	<ul style="list-style-type: none">side effects or example or STDs can still be transmitted	e.g. weight gain, circulatory problems, headaches	1
total			4

Question 11

	answers	extra information	mark
(a)	<p>Quality of written communication <i>The answer to this question requires ideas in good English in a sensible order with correct use of scientific terms.</i> <i>Quality of written communications should be considered in crediting points in the mark scheme</i></p> <ul style="list-style-type: none"> • large size • small surface area to volume ratio • thick layer of body fat • feathers trap air 	<p>maximum of 3 if ideas not well expressed</p> <p>do not credit has body fat accept insulating coat not fur</p>	4
total			4

Question 12

	answers	extra information	mark
(a)	<ul style="list-style-type: none">• 2350	allow 2340-2360	1
(b)	any one from <ul style="list-style-type: none">• abundant food• little competition for food		1
(c)	<ul style="list-style-type: none">• shortage of food• disease	accept correct reference to inbreeding accept new predators not just increased competition	2
total			4

Question 13

	answers	extra information	mark
(a)	<ul style="list-style-type: none">starch		1
(b)	<ul style="list-style-type: none">enzymes work well/optimum temperature for enzymes		1
(c)	<ul style="list-style-type: none">for flavour/taste		1
(d)	<ul style="list-style-type: none">ethanol/alcoholcarbon dioxide	in either order	2
total			5

Question 14

	answers	extra information	mark
(a)	<ul style="list-style-type: none">• vaccination results in antibody production• (antibody production) takes time/is slow• virus replicates/causes symptoms before antibody can be produced		3
(b) (i)	<ul style="list-style-type: none">• antibodies		1
(ii)	<ul style="list-style-type: none">• antibody reacts with/binds to virus• prevents viral replication/virus destroyed		2
total			6

Question 15

	answers	extra information	mark
(a) (i)	incisor tooth correctly labelled		1
(ii)	canine tooth correctly labelled		1
(b)	<ul style="list-style-type: none"> • 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 16

	answers	extra information	mark
(a)	<ul style="list-style-type: none">• 3 bars correctly plotted• all <u>bars</u> plotted correctly	mark bars for height only	1 1
(b)	<ul style="list-style-type: none">• $500/2500 \times 100$• 20	award 2 marks for correct answer with no working	2
(c)	<ul style="list-style-type: none">• <u>more</u> sweating• to cool body		2
(d)	<ul style="list-style-type: none">• Urea/salts		1
total			7