



General Certificate of Secondary Education

Additional Science 4463 / Biology 4411

BLY2H

Unit Biology 2

Mark Scheme

2010 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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Marking Guidance for Examiners

GCSE Science Papers

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 / ; 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.

BLY 2H**Question 1**

question	answers	extra information	mark
1(a)	the starch is stored for later use.		1
1(b)(i)	any two from: <ul style="list-style-type: none"> • carbon dioxide (concentration) • light intensity • light colour / wavelength • pH • size / amount plant • same / species / type plant • amount of water <u>in the tube</u> 	do not accept temperature – apply list principle ignore reference to time allow one mark for light if neither intensity or colour are awarded allow 'the plant' ignore amount of water alone	2
1(b)(ii)	number / amount of bubbles or amount of gas / oxygen (relevant reference to) time / named time interval	allow volume of bubbles (together) ignore 'the bubbles' unqualified allow how long it bubbles for do not accept time bubbles start / stop ignore speed / rate bubbles ignore instruments do not accept other factors eg temperature accept how many bubbles per minute for 2 marks	1 1
1(c)(i)	temperature	allow heat / °C / cold	1
1(c)(ii)	carbon dioxide / CO ₂	allow CO ₂ / CO ² / Co ₂ / Co ² / co ₂ / co ² do not accept CO / 2CO	1
Total			7

BLY 2H**Question 2**

question	answers	extra information	mark
2(a)(i)	20		1
2(a)(ii)	one tenth / 0.1 / 10% / 1:9 / 1 in 10 / 1 out of 10 / $\frac{1}{10}$	for correct answer irrespective of working ignore any units accept equivalent fractions eg $\frac{4}{40}$ / $\frac{2}{20}$ do not allow eg 1:10 / 1 to 10 if answer is incorrect clear selection of 2 and 20, or equivalent or 1:4:5 / 1:5:4 gains 1 mark	2
2(b)	any two from: <ul style="list-style-type: none"> • (body) heat / maintaining body temperature • movement (max 2) • growth / cell division / repair / reproduction / building molecules • accept active transport 	do not accept sweating / cooling / excretion allow keep warm allow 2 different examples of movement, internally and / or externally eg breathing / exercise / eating / circulation allow muscle contraction if no other muscle action is credited movement + breathing = 1 mark allow examples eg making proteins (from amino acids) ignore 'chemical reactions' / digestion	2

Question 2 continues on the next page

BLY 2H**Question 2 continued**

question	answers	extra information	mark
2(c)	more movement / have to hunt / catch food	allow converse if stated for herbivore eg herbivores food is all around ignore reference to size or predator unqualified	1
2(d)	any two from <ul style="list-style-type: none"> • less movement • less heat loss • less respiration 	ignore reference to food allow no movement allow less space to move ignore less space unqualified allow no heat loss or they are kept warm	2
Total			8

BLY 2H

Question 3

question	answers	extra information	mark
3(a)	B and D	both required in any order	1
3(b)	<p>any two from:</p> <ul style="list-style-type: none"> • carbohydrate / named example • protein / enzyme • amino acid • hormone / named plant hormone • lipid / fat / oil / wax • chlorophyll • DNA • vitamin(s) 	<p>do not accept compounds restricted to animals</p> <p>allow 2 marks for 2 named examples</p> <p>do not allow a general name and a named example for 2 marks (eg award 1 mark only for carbohydrate and starch)</p> <p>allow 2 marks for 2 named examples</p>	2
3(c)	<p>contains minerals / salts / ions / nutrients / named</p> <p>(needed by plants) for health / better growth</p>	<p>ignore 'food'</p> <p>do not allow vitamins / glucose / energy etc</p> <p>for / help plant growth is insufficient</p> <p>ignore moisture retention / soil structure</p> <p>ignore more plants</p> <p>allow examples linked to mineral eg contains magnesium to make chlorophyll for 2 marks</p>	<p>1</p> <p>1</p>
Total			5

BLY 2H**Question 4**

question	answers	extra information	mark
4(a)	B large(r) surface / area or large(r) membrane	no mark for “B”, alone accept reference to microvilli accept reasonable descriptions of the surface do not accept wall / cell wall ignore villi / hairs / cilia	1
4(b)(i)	any one from: • insulin / hormone • enzyme / named enzyme	if named hormone / enzyme must be correct for pancreas	1
4(b)(ii)	<u>many</u> ribosomes (ribosomes) produce protein or allow <u>many</u> mitochondria (1) provide energy to build protein or to make protein (1)	accept insulin / hormone / enzyme named is (made of) protein accept ATP for energy	1 1
Total			4

BLY 2H**Question 5**

question	answers	extra information	mark
5(a)(i)	liver		1
5(a)(ii)	kidney	allow urethra / bladder ignore ureter	1
5(a)(iii)	(excess) protein / named / amino acids	accept amino / ammonia	1
5(b)	less / no sweating less heat lost / evaporation	allow ideas of how sweat glands change in order to reduce sweating	1 1
5(c)(i)	become narrower / constrict	allow contract / get smaller etc allow less blood flows through vessels do not allow capillaries become narrower or reference to movement of vessels	1
5(c)(ii)	reduced / no heat loss	allow heat gained from room	1
Total			7

BLY 2H

Question 6

question	answers	extra information	mark
6(a)	stomach is acidic / has low pH	allow any pH below 7 ignore stomach is not alkaline	1
	lactase works best / well in alkali / high pH / neutral / non-acidic conditions	allow any pH of 7 and above accept works slowly in acid conditions allow figures from table with a comparison ignore reference to temperature	1
6(b)	<p>any three from</p> <ul style="list-style-type: none"> • (below 45(°C)) increase in temperature increases rate / <i>speed</i> of reaction • reference to molecules moving faster / colliding faster / harder / more collisions • optimum / best at 45(°C) • high temps / above 45(°C) (rate slows due to) denaturation of enzyme / lactase 	<p>allow value(s) in range 41 – 49</p> <p>allow synonyms of denaturation but not killed denaturation at high and low temperature does not gain this mark</p> <p>ignore body temperature</p> <p>ignore references to time / pH</p>	3

Question 6 continues on the next page

BLY 2H**Question 6 continued**

question	answers	extra information	mark
6(c)	any two from <ul style="list-style-type: none">• acid neutralised or conditions made neutral / alkali• (allow) emulsification / greater surface area of fat / lipid• enzymes (in small intestine) work (more effectively / better)	accept bile is alkaline allow description of emulsification eg fat is broken down / broken up into <u>droplets</u> allow better for enzymes	2
Total			7

BLY 2H

Question 7

question	answers	extra information	mark
7(a)	any one from <ul style="list-style-type: none"> chromosomes in pairs inherited one of each pair from each parent one of each pair in egg and one of each pair in sperm so sex cells / gametes can have half the number 	allow need to pair during cell division / meiosis	1
7(b)	any two from: <ul style="list-style-type: none"> <u>code</u> combination / sequence of amino acids forming specific / particular proteins / examples 	If no other mark gained allow reference to controlling characteristics / appearance for 1 mark	2
7(c)(i)	C		1
7(c)(ii)	30		1
7(d)(i)	for growth / repair / replacement / asexual reproduction	do not accept incorrect qualification, eg growth <i>of</i> cells or repair of cells they equals cells therefore do not accept they grow etc	1
7(d)(ii)	44 or 22 pairs		1
Total			7