



**General Certificate of Secondary
Education**

**Additional Science 4463 /
Biology 4411**

BLY2F

Unit Biology 2

Mark Scheme

2011 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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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.

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Question 1

| question | answers | extra information | mark |
|--------------|---|--|----------|
| 1(a)(i) | tissue | extra box ticked cancels the mark | 1 |
| 1(a)(ii) | organ | extra ring drawn cancels the mark | 1 |
| 1(b)(i) | Layer B Layer C | each extra box ticked cancels 1 mark | 1 1 |
| 1(b)(ii) | (contain) chloroplasts / chlorophyll | other parts disqualify | 1 |
| 1(c) | <p>The diagram shows a plant cell with three labels and their descriptions:</p> <ul style="list-style-type: none"> Vacuole: Controls the passage of substances into the cell Nucleus: Controls the activities of the whole cell Contains the cell sap: (This description is connected to the vacuole label) | two correct = 2 marks one correct = 1 mark extra line from a part of a cell cancels the mark | 2 |
| Total | | | 7 |

BLY2F**Question 2**

| question | answers | extra information | mark |
|-----------------|--|--|-------------|
| 2(a) | add mineral ions to the soil | extra box ticked cancels the mark | 1 |
| 2(b) | increasing the temperature turning lights on at night | each extra box ticked cancels 1 mark | 1 1 |
| Total | | | 3 |

BLY2F**Question 3**

| question | answers | extra information | mark |
|-----------------|----------------|-----------------------------------|-------------|
| 3(a) | insulin | extra ring drawn cancels the mark | 1 |
| 3(b) | pancreas | extra ring drawn cancels the mark | 1 |
| 3(c) | diabetes | extra ring drawn cancels the mark | 1 |
| Total | | | 3 |

BLY2F**Question 4**

| question | answers | extra information | mark |
|-----------------|---|--|-------------|
| 4(a)(i) | carbohydrase | extra ring drawn cancels the mark | 1 |
| 4(a)(ii) | fructose is sweeter than glucose so can be used in smaller amounts | extra box ticked cancels the mark | 1 |
| 4(b)(i) | (enzymes) work at <u>low</u> temperatures | ignore references to specific temperatures | 1 |
| | (enzymes) can be re-used / used many times | ignore correct answers which are unrelated to the information | 1 |
| 4(b)(ii) | any two from: <ul style="list-style-type: none"> • workers have to use face masks when working with enzymes • (enzymes) work in a narrow range of pH values • (enzymes) are easily broken down by <u>high</u> temperature • (enzymes) are expensive (to buy) | it is not necessary for the complete statement to be written out in each case ignore effects on the body ignore correct answers which are unrelated to the information. ignore reference to specific pHs ignore reference to specific temperatures | 2 |
| Total | | | 6 |

BLY2F**Question 5**

| question | answers | extra information | mark |
|-----------------|---------------------|-----------------------------------|-------------|
| 5(a)(i) | dominant | allow clear indication | 1 |
| 5(a)(ii) | recessive | allow clear indication | 1 |
| 5(b)(i) | aa | extra ring drawn cancels the mark | 1 |
| 5(b)(ii) | Aa | extra ring drawn cancels the mark | 1 |
| 5(c) | 3 purple : 1 yellow | extra box ticked cancels the mark | 1 |
| Total | | | 5 |

BLY2F**Question 6**

| question | answers | extra information | mark |
|-----------------|---|---|-------------|
| 6(a) | 1800 | allow – / minus 1800 | 1 |
| 6(b) | 3200 | award both marks for correct answer irrespective of working allow – / minus 3200 award 2 marks for 200 or –200 irrespective of working allow ecf from part (a) for both routes to 2 marks if no answer or incorrect answer then indication of addition of 1800 or their (a), 1000 and 400 gains 1 mark | 2 |
| 6(c) | drink <u>more</u> / take in <u>more</u> from food & drink 200 (cm ³) | allow ecf from (b), ie if answer to (b) is less than 3000 then accept drink less if answer to (b) is exactly 3000 accept do nothing accept ecf from (b) answer should be difference between (b) and 3000 if answer to (b) is 3000 accept they are the same NB drink / take in 3200 (cm ³) of water = 1 mark drink / take in 200 (cm ³) of water = 2 marks ignore references to exercise / sweat | 1 1 |
| Total | | | 5 |

BLY2F**Question 7**

| question | answers | extra information | mark |
|-----------------|---|--|-------------|
| 7(a) | bottom / third pyramid ticked | extra box ticked cancels the mark | 1 |
| 7(b) | the sun | extra ring drawn cancels the mark | 1 |
| 7(c) | any two from: <ul style="list-style-type: none"> • heat • movement / named example internal or external • respiration • faeces / not all digested • excretion/ urine • not all of animal / all parts eaten | ignore keeping warm ignore digestion do not allow <u>for</u> respiration allow waste for 1 mark if neither faeces nor excretion given (ie waste + movement = 2 marks waste + faeces = 1 mark do not accept growth / reproduction | 2 |
| Total | | | 4 |

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Question 8

| question | answers | extra information | mark |
|----------|--|---|------|
| 8(a) | any one from: <ul style="list-style-type: none"> (same) volume / amount / 1 cm³ lipase (same) volume / amount / 5 cm³ lipid mixed after 3 minutes / same time before mixing | ignore reference to recording results every 5 minutes or concentrations of lipid / lipase allow amount of solution allow keep same volumes in the test tubes do not accept temperature | 1 |
| 8(b) | so that the lipase and the lipid reached the right temperature | | 1 |
| 8(c) | any two from <ul style="list-style-type: none"> decrease in time or faster (breakdown) <u>then</u> increase in time or <u>then</u> slower (breakdown) fastest / least time / optimum at 35°C | ignore explanations | 2 |
| 8(d) | any two from: <ul style="list-style-type: none"> test more regularly eg test every minute test at smaller temperature intervals test between 50 (°C) and 95 (°C) repeat at same temperatures or repeat the investigation or compare results with others | ignore 'test at more temperatures' unqualified any interval < 5min any value <15°C allow test more temperatures in the range any value in range, eg test at 70 allow do it again | 2 |

Question 8 continues on the next page

Question 8 continued

| question | answers | extra information | mark |
|-----------------|---|---|-------------|
| 8(e)(i) | (lipase / it) denatured / destroyed / changed shape | allow damaged / deformed do not accept killed ignore broken (down) | 1 |
| 8(e)(ii) | fatty acids and glycerol | | 1 |
| Total | | | 8 |

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Question 9

| question | answers | extra information | mark |
|--------------|---|--|----------|
| 9(a) E | because water enters (the cell / it / named cell) | do not accept salt / sugar / solution entering | 1 |
| | by osmosis / diffusion | if osmosis / diffusion not given accept concentration inside cell greater than outside cell assume concentration refers to solute concentration unless answer indicates otherwise allow water goes <u>up</u> the concentration gradient allow water goes <u>down its</u> concentration gradient do not accept if diffusion of salt / sugar | 1 |
| | through a partially permeable membrane | allow semi / selectively permeable membrane or description | 1 |
| 9(b) E | (plant cells) have (cell) <u>wall</u> | accept animal cells have no (cell) <u>wall</u> ignore reference to cell membrane do not accept reference to other organelles or any implication that animal cells have a cell wall eg plant cells have a thicker cell wall | 1 |
| Total | | | 4 |

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