



General Certificate of Secondary Education

Additional Science 4463 /

Biology 4411

BLY2F Unit Biology 2

Mark Scheme

2009 examination – January 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. 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.

COMPONENT NUMBER: BLY2F**COMPONENT NAME: Additional Science / Biology****STATUS: Final****DATE: January 2009**

| question | answers | extra information | mark |
|-----------------|--|--|-------------|
| 1(a)(i) | A cytoplasm | accept clear indications | 1 |
| | B nucleus | | 1 |
| 1(a)(ii) | any two from: <ul style="list-style-type: none">• P• R• T | two required for 1 mark accept lower case letters | 1 |
| 1(b) | sperm cells need a lot of energy to swim | | 1 |
| Total | | | 4 |

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| question | answers | extra information | mark |
|-----------------|--|--|-------------|
| 2(a) | microorganisms | | 1 |
| 2(b)(i) | proteases | clear indications of correct answer | 1 |
| 2(b)(ii) | amino acids (both words) | clear indications of correct answer | 1 |
| 2(c)(i) | 14 | | 1 |
| 2(c)(ii) | enzyme Z | mark independently clear indication of correct answer | 1 |
| | takes least time (to pre-digest protein) / works fastest | allow <u>only</u> 7 minutes / less time / faster do not allow works best | 1 |
| 2(c)(iii) | temperature | | 1 |
| | pH | | 1 |
| Total | | | 8 |

COMPONENT NUMBER: BLY2F**COMPONENT NAME: Additional Science / Biology****STATUS: Final****DATE: January 2009**

| question | answers | extra information | mark |
|-----------------|--|---|-------------|
| 3(a) | 2 and 3 | | 1 |
| 3(b) | cell P has an X chromosome; cell R has a Y chromosome | | 1 |
| 3(c) | any two from: <ul style="list-style-type: none"> • (formed from) different egg / 2 eggs • (formed from) different sperm / 2 sperm • have different genes / alleles / chromosomes / DNA | allow genetics | 2 |
| 3(d)(i) | stem cells | | 1 |
| 3(d)(ii) | the cells divide | | 1 |
| | the cells differentiate | | 1 |
| 3(d)(iii) | (medical) research / named eg growing organs or medical / patient treatment | allow (embryo) cloning do not allow designer babies / more babies | 1 |

Question 3 continued on next page...

COMPONENT NUMBER: BLY2F**COMPONENT NAME: Additional Science / Biology****STATUS: Final****DATE: January 2009****Question 3 continued...**

| question | answers | extra information | mark |
|-----------------|--|---|-------------|
| 3(d)(iv) | any one from: <ul style="list-style-type: none">• ethical / moral / religious objections• potential harm to embryo | ignore cruel / not natural / playing God allow deformed ignore harm to mother | 1 |
| Total | | | 9 |

COMPONENT NUMBER: BLY2F**COMPONENT NAME: Additional Science / Biology****STATUS: Final****DATE: January 2009**

| question | answers | extra information | mark |
|-----------------|----------------|---|-------------|
| 4(a) | respiration | clear indication eg tick, underlining, others crossed out | 1 |
| 4(b) | lungs | | 1 |
| 4(c) | liver | | 1 |
| 4(d) | amino acids | | 1 |
| Total | | | 4 |

COMPONENT NUMBER: BLY2F**COMPONENT NAME: Additional Science / Biology****STATUS: Final****DATE: January 2009**

| question | answers | extra information | mark |
|-----------------|--|--|-------------|
| 5(a) | any one from: <ul style="list-style-type: none"> • (type of / amount of) soil / minerals / nutrients / pH • amount of water / time of watering • space between plants / plants and wall • time for growth | list principle ignore carbon dioxide / same number of plants / food do not allow temperature / light / exposure to wind | 1 |
| 5(b)(i) | North wall | | 1 |
| 5(b)(ii) | nugget | list principle | 1 |
| 5(c) | has not tested all varieties / nugget / champion against all walls | do not allow repeat experiment | 1 |
| Total | | | 4 |

COMPONENT NUMBER: BLY2F**COMPONENT NAME: Additional Science / Biology****STATUS: Final****DATE: January 2009**

| question | answers | extra information | mark |
|-----------------|---|--|-------------|
| 6(a) | the sun / light / sunshine / solar | allow radiation <u>from the sun</u> ignore photosynthesis / respiration apply list principle do not allow water / minerals / heat | 1 |
| 6(b) | 2.5 (:1) | correct answer with or without working ignore rounding with correct working do not allow other equivalent ratios for both marks evidence of selection of 10(insects) and 4(frogs) or 50 and 20 or 1 and 0.4 for 1 mark if no other working allow 1 mark for 0.4:(1) on answer line | 2 |
| 6(c) | any two from: <ul style="list-style-type: none"> • some parts indigestible / faeces • waste / examples of waste eg urea / nitrogenous compounds / urine / excretion • movement / eg of movement • heat • not all eaten / eg of not all eaten • respiration | allow for insects or frogs allow energy for biomass allow keeping warm do not accept energy for respiration | 2 |

Question 6 continued on next page...

COMPONENT NUMBER: BLY2F**COMPONENT NAME: Additional Science / Biology****STATUS: Final****DATE: January 2009****Question 6 continued...**

| question | answers | extra information | mark |
|--------------|--|---|----------|
| 6(d) | any four from: <ul style="list-style-type: none"> • (bodies) consumed by animals / named / scavengers / detritus feeders • microorganisms / bacteria / fungi / decomposers • reference to enzymes • decay / <u>breakdown</u> / decompose / rot • respiration • carbon dioxide produced • photosynthesis • sugar / glucose produced • fossilisation / fossil fuels / named • combustion / burning • (burning) produces carbon dioxide | ignore digest(ion) accept other organic molecules must be linked with fossilisation / fossil fuels allow carbon dioxide produced once only | 4 |
| Total | | | 9 |

COMPONENT NUMBER: BLY2F**COMPONENT NAME: Additional Science / Biology****STATUS: Final****DATE: January 2009**

| question | answers | extra information | mark |
|-----------------|--|---|-------------|
| 7(a)(i) | pancreas | allow phonetic spelling | 1 |
| 7(a)(ii) | glucose into cells / liver / muscles | allow any named organ / cell allow turned into / stored as glycogen but do not allow hybrid spellings for glycogen allow increases respiration allow stored as / turned into fat | 1 |
| 7(b)(i) | reference to “98.6% of all people who used Diacure reported an improvement in their condition.” | allow claim 1 / 1 / the first one | 1 |
| 7(b)(ii) | (only) 30 patients or not enough / not many patients | allow only one trial or only done once or not repeated ignore bias | 1 |
| 7(b)(iii) | little effect / difference suggest drug is not effective (in long term) | allow no effect allow only drops by 4 (± 1) allow wouldn't persuade people to take it | 1 1 |
| 7(b)(iv) | avoid bias / owtte | eg company could change / ignore results / might lie ignore fair / accurate / reliable / valid | 1 |
| Total | | | 7 |