



General Certificate of Secondary Education

Biology 4411

BLY3F

Unit Biology 3

Mark Scheme

2011 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. 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.

BLY3F**Question 1**

| question | answers | extra information | mark |
|-----------------|----------------|--------------------------|-------------|
| 1(a)(i) | carbon dioxide | | 1 |
| 1(a)(ii) | fermentation | | 1 |
| 1(b) | 25 | | 1 |
| Total | | | 3 |

BLY3F**Question 2**

| question | answers | extra information | mark |
|-----------------|--|--------------------------|-------------|
| 2(a)(i) | capillary | | 1 |
| 2(a)(ii) | diffusion | | 1 |
| 2(b)(i) | Z | ignore any names | 1 |
| 2(b)(ii) | large / increased surface / area / or to absorb <u>more</u> food or improved diffusion | allow all food absorbed | 1 |
| Total | | | 4 |

BLY3F**Question 3**

| question | answers | extra information | mark |
|--------------|-----------------|-------------------|----------|
| 3(a)(i) | 18 | | 1 |
| 3(a)(ii) | Z | | 1 |
| 3(b)(i) | red blood cells | | 1 |
| 3(b)(ii) | haemoglobin | | 1 |
| Total | | | 4 |

BLY3F**Question 4**

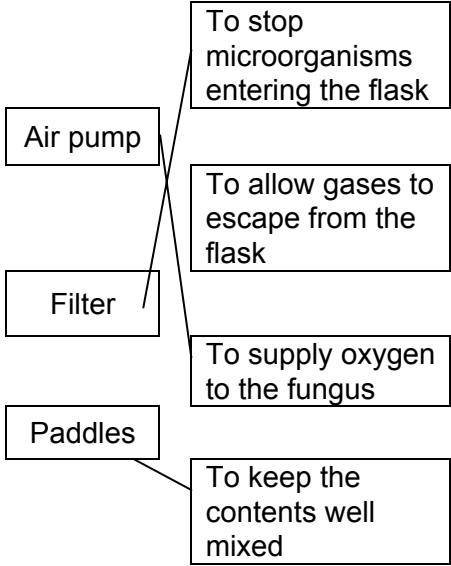
| question | answers | extra information | mark |
|--------------|---|--|----------|
| 4(a)(i) | wind | answers in either order | 1 |
| | temperature | ignore weather | 1 |
| 4(a)(ii) | different plants have different sizes / different numbers of leaves / different sizes of leaves / different plants take up different amounts of water | ignore reference to validity allow different plants need different amounts of water | 1 |
| 4(b) | in table, in sequence: C B A | all 3 correct = 2 marks 2 correct = 1 mark 0 or 1 correct = 0 mark | max 2 |
| 4(c) | transpiration | | 1 |
| Total | | | 6 |

BLY3F**Question 5**

| question | answers | extra information | mark |
|--|---|--|-------------|
| 5(a) | in table, in sequence: | allow descriptions for increase / decrease | |
| | decrease | | 1 |
| | increase | | 1 |
| 5(b) | No | allow figures | 1 |
| | older have lower % / less chance of rejection (than younger) | | |
| | older have higher % / more chance of still working (after 5 years than younger) | | |
| | or | | |
| Yes | allow max 1 mark if Yes | | |
| older have lower % / less chance of surviving (at least 10 years than younger) (1) | allow older people are more likely to die | | |
| Total | | | 4 |

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Question 6

| question | answers | extra information | mark |
|-----------------|--|--|--------------------------|
| 6(a) |  <p>The diagram shows three components of a flask with callout boxes:</p> <ul style="list-style-type: none"> Air pump: To stop microorganisms entering the flask Filter: To allow gases to escape from the flask Paddles: To supply oxygen to the fungus Paddles: To keep the contents well mixed | <p>all three correct = 3 marks</p> <p>two correct = 2 marks</p> <p>one correct = 1 mark</p> <p>extra line from a statement cancels the mark</p> | 3 |
| 6(b)(i) | <p>increased growth</p> <p>or</p> <p>increased (dry) mass</p> <p>correct use of numbers eg by 18 (grams) / by 46 times</p> | | 1 1 |
| 6(b)(ii) | <p>glucose supplies energy / materials (for growth)</p> <p>or</p> <p>glucose can be used in respiration</p> | ignore glucose provides food | 1 |
| 6(c) | magnesium | | 1 |
| 6(d) | mycoprotein | | 1 |
| Total | | | 8 |

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Question 7

| question | answers | extra information | mark |
|--------------|--|--|-------------------------|
| 7(a)(i) | brain | | 1 |
| 7(a)(ii) | skin | | 1 |
| 7(a)(iii) | 1/25 or 4% or 0.04 or 1 in 25 or 1:25 or 1 out of 25 | allow $\frac{1000}{25000}$ | 1 |
| 7(b) | any two from: <ul style="list-style-type: none"> increased / high heart rate / pulse rate dilation / widening of <u>arteries</u> / <u>arterioles</u> (to skeletal muscles) or less blood flow to other organs increased stroke volume / described | do not allow pumps more blood unqualified accept vasodilation unqualified do not accept reference to veins / capillaries | 2 |
| 7(c) | <u>more</u> respiration / description or <u>more</u> energy required or to provide <u>more</u> energy respiration / process described → CO ₂ CO ₂ <u>diffuses</u> into blood | ignore references to breathing do not accept anaerobic respiration | 1 1 1 |
| Total | | | 8 |

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Question 8

| question | answers | extra information | mark |
|--------------|--|--|------------|
| 8(a) | to kill (other) (micro) organisms (in the milk) / to sterilise | allow germs ignore viruses allow destroy ignore pasteurise | 1 |
| 8(b)(i) | 0.015 | award 2 marks for correct answer irrespective of working allow answer or use of 1.5 for 1 mark allow 1 mark for $\frac{(y_1 - y_2)}{100}$ but incorrect answer y-values may be incorrect or use of 6.0 and 4.5 but incorrect answer | 2 |
| 8(b)(ii) | running out of substrate / sugar / food or (acid / low pH) denatures enzymes / proteins / kills bacteria | accept stops / slows enzymes / metabolism allow (acid / low pH) stops / slows bacteria working / growing | 1 |
| 8(c) | lactic acid | if incorrect acid allow 1 mark | 1 1 |
| 8(d)(i) | 25 | | 1 |
| 8(d)(ii) | pathogens / harmful bacteria (might) grow (at 35 °C) | do not accept viruses | 1 |
| Total | | | 8 |