



General Certificate of Secondary Education

Biology 4411

BLY3H Unit 3 Biology

Mark Scheme

2008 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.

COMPONENT NUMBER: BLY3H**COMPONENT NAME: Biology****STATUS: Final****DATE: June 2008**

question	answers	extra information	mark
1(a)	any two from: <ul style="list-style-type: none"> large surface / area or many villi or have microvilli thin surface or thin wall or surface 1-cell thick or capillaries near surface or permeable or partially permeable <u>many</u> blood vessels or <u>many</u> capillaries or capillary <u>network</u> or <u>good</u> blood supply have enzymes 	<p>accept big surface / area</p> <p>accept they are thin do not allow thin cell wall</p> <p>ignore ‘constant blood flow’ owtte ignore extras eg moist or reference to gases</p> <p>ignore release enzymes</p> <ul style="list-style-type: none"> accept reference to lacteal as 5th point allow reference to having mitochondria 	2
1(b)(i)	small(er) (surface area) / flat(ter) / short(er) or not as folded or fewer capillaries owtte	<p>allow small(er) lacteal</p> <p>ignore references to wide / thick / spread out etc</p>	1
1(b)(ii)	less absorption (of digested food) / less digestion / diffusion	<p>accept slower for less</p> <p>accept description of less digestion</p> <p>accept less food can get in</p> <p>do not allow zero absorption</p> <p>do not allow ‘collection’ of nutrients</p>	1
Total			4

COMPONENT NUMBER: BLY3H**COMPONENT NAME: Biology****STATUS: Final****DATE: June 2008**

question	answers	extra information	mark
2(a)	<p>B</p> <p>(B has) low(est) number of stomata or no stomata on upper surface or <u>only</u> 800 (on lower surface)</p> <p>less transpiration / evaporation / water loss owtte or water (vapour) is lost via stomata</p>	<p>only allow zero water loss if linked to no stomata on upper surface / linked to leaf B upper surface</p> <p>ignore references to leaf surface area</p>	<p>1</p> <p>1</p> <p>1</p>
2(b)	<p>reduce loss / amount of water (vapour) or reduced transpiration (from upper surface)</p> <p>warmer above leaf or wilted leaf folds over lower surface or lower leaf in shade or less light / heat / sun on lower side</p>	<p>accept converse</p> <p>do not allow <u>no</u> water is lost</p> <p>accept converse</p> <p>ignore reference to dust</p>	<p>1</p> <p>1</p>
Total		5	

COMPONENT NUMBER: BLY3H**COMPONENT NAME: Biology****STATUS: Final****DATE: June 2008**

question	answers	extra information	mark
3(a)	<p>increased speed or harder exercise / running → increased need / use / loss of energy</p> <p>increased mass / bigger → increased use of energy</p>	<p>allow further you run / walk the more energy you need</p>	<p>1</p> <p>1</p>
3(b)	<p>any three from:</p> <ul style="list-style-type: none"> • supply / using (more / enough) oxygen or get (more) oxygen in blood • remove (more) CO₂ • doing (more) work or using (more) energy allow produce energy • for <u>respiration</u> • prevent build up of lactic acid or prevent oxygen debt or prevent anaerobic (respiration) or allow aerobic (respiration) 	<p>} need reference to 'more' ONCE only for full marks</p>	3
Total		5	

COMPONENT NUMBER: BLY3H**COMPONENT NAME: Biology****STATUS: Final****DATE: June 2008**

question	answers	extra information	mark
4(a)	carbon dioxide / CO ₂		1
	alcohol / ethanol	ignore beer, wine, bread, energy, heat 3 rd wrong chemical cancels a mark	1
4(b)(i)	any two from: <ul style="list-style-type: none"> • volume / amount of sugar (solution) or volume / amount of solution • volume / amount of yeast (suspension) or volume / amount of suspension • temperature • amount of time 	} allow volumes / amounts of reactants for 1 mark do not allow ratio of reactants	2
4(b)(ii)	A and C	if A or C allow the 2 nd mark	1
	produced gas / carbon dioxide (CO ₂)	wrongly named gas loses the mark B given = 0 marks for part (b)(ii)	1
Total			6

COMPONENT NUMBER: BLY3H**COMPONENT NAME: Biology****STATUS: Final****DATE: June 2008**

question	answers	extra information	mark
5(a)(i)	protein is large (molecule) / too big to pass through filter		1
5(a)(ii)	glucose is present in the filtrate or 0.8 in filtrate	ignore units	1
	no glucose is present in the urine or 0 in urine		1
5(a)(iii)	active transport – up / against (concentration) gradient or from low to high (concentration)	it = active transport throughout	1
	uses energy / ATP	accept needs specific carrier / specific protein (in cell membrane) for 1 mark	1
5(b)	<u>water reabsorption</u> / taken out or water taken into blood / body	other substances cancel mark	1
Total			6

COMPONENT NUMBER: BLY3H**COMPONENT NAME: Biology****STATUS: Final****DATE: June 2008**

question	answers	extra information	mark
6(a)	<p>any five from:</p> <p><u>description:</u></p> <ul style="list-style-type: none"> • (at low protein conc / at first) increased protein gives increased growth / gives steep line • at <u>medium</u> protein conc rise is less steep • at high protein conc / later <u>increased protein</u> gives no change • appropriate use of number eg levels off at 16.4 (million bacteria per cm³) or levels off at 5 (g per dm³ protein) or 6 (million bacteria) at 0 protein conc. or 12-12.4 (million bacteria) or 0.8-1 protein conc. <p><u>explanation:</u></p> <ul style="list-style-type: none"> • protein is the limiting factor at low conc. / at first or not enough protein at low concentration • something else is limiting at high conc. / later or not enough named example at high concentration • growth rate equals death rate at high concentration / accept birth rate equals death rate • protein is used to make cell structures 	<p>if no reference to protein conc allow 1 mark for description of line in 2 or 3 stages eg goes up and levels off or goes up sharply, goes up less steeply and levels off</p> <p>allow between 16.3 and 16.5</p> <p>accept named example: temperature / glucose / mineral element / etc</p> <p>do not accept growth unqualified</p>	5

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Question 6 continued...

question	answers	extra information	mark
6(b)	0.5–5 (g per dm ³)	allow any number in range	1
	below this – lower growth rate	allow most / greatest amount of bacteria at 5	1
	above 5 – no improvement in growth rate / waste of resources / waste of money or above 0.5 < 5 slower improvement in growth rate / waste of resources / waste of money	do not allow just ‘graph levels off’	1
Total			8

COMPONENT NUMBER: BLY3H

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question	answers	extra information	mark
7(a)	circulation / mixing / described or temperature maintenance supply <u>oxygen</u> or for <u>aerobic</u> conditions or for <u>faster</u> respiration	 do not allow oxygen for anaerobic respiration	1 1
7(b)	any one from: <ul style="list-style-type: none">energy supply / fuel or use in respiration <u>material</u> for growth or to <u>make</u> mycoprotein	do not allow just food / growth ignore reference to aerobic / anaerobic	1
7(c)	(heat / energy) from <u>respiration</u>	allow <u>exothermic</u> reactions allow description eg <u>breakdown</u> of glucose / catabolism ignore metabolism ignore aerobic / anaerobic	1
7(d)(i)	any one from: <ul style="list-style-type: none">compete (with Fusarium) for food / oxygen or reduce yield of Fusarium make toxic waste products or they might cause disease / pathogenic or harmful to people / Fusarium	do not allow harmful unqualified	1

Question 7 continued on next page...

