Version 1: 0109

ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Biology 4411

BLY3H Unit Biology 3

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.

Set and published by the Assessment and Qualifications Alliance.

The Assessment and Qualifications Alliance (AQA) is a company limited by guarantee registered in England and Wales (company number 3644723) and a registered charity (registered charity number 1073334).
Registered address: AQA, Devas Street, Manchester M15 6EX *Dr Michael Cresswell Director General*

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: January 2009

question	answers	extra information	mark
1(a)(i)	19 800	for correct answer ignore working or lack of working 165 × 120 but no answer / wrong answer = **1** mark (ignore extras)	2
1(a)(ii)	any **two** from: • for respiration • energy released • prevents anaerobic respiration • prevents build-up of lactic acid	 ignore oxygen debt allow energy produced	2
1(b)	any **two** from: • increased breathing rate • increased depth of breathing **or** deep breathing • dilation of arteries / vasodilation • blood diverted from elsewhere	 } more breathing is max **1** mark ignore increase in heart rate allow heavier breathing do **not** allow harder breathing allow blood vessels dilate do **not** allow veins / capillaries dilate ignore name of organ	2
Total			**6**

COMPONENT NUMBER: BLY3H

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
2(a)	transpiration / evaporation / diffusion	ignore osmosis	1
2(b)(i)	D		1
2(b)(ii)	any **two** from: • more / faster diffusion **or** evaporation **or** transpiration • molecules move faster • maintains concentration gradient **or** keeps water concentration low in the air **or** brings in more dry air **or** removes damp air / water		2
Total			**4**

COMPONENT NUMBER: BLY3H

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
3(a)	prevents denaturation / change / damage of proteins / enzymes **or** prevents bacteria being killed / destroyed	allow protein is 'destroyed' do **not** allow 'bacteria denatured' **or** 'protein killed'	1
3(b)(i)	any **two** from: • anaerobic respiration • lactic (production) • acid (produced)	 do **not** allow 'bacteria are acidic' allow max **1** mark if incorrect named acid	2
3(b)(ii)	any **one** from: • thickens / clots / solidifies (milk) • kills other microorganisms **or** prevents other microbes growing • preserves yoghurt **or** prevents yoghurt going off **or** makes yoghurt last longer **or** keeps it fresh • reference to (improved) flavour	 allow reference to germs	1
3(c)	reduce / prevent growth / reproduction of microorganisms **or** to prevent decay **or** to preserve it **or** to keep it fresh **or** to prevent it becoming <u>too</u> sour	allow reference to germs ignore curdling	1
Total			**5**

COMPONENT NUMBER: BLY3H

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
4(a)	any **two** from: • sterilise / kill microorganisms • method of sterilisation eg apparatus / media sterilised in oven / autoclave • pass flask mouth / pipette tip / loop / test tube mouth through flame • work near a flame • minimise opening of flask / test tube **or** hold non-vertical	 ignore 'cleaning' / 'disinfect' ignore 'germs' allow pressure cooker / boiling water allow idea of sealing / covering **or** prevent entry of air	2
4(b)	any **two** from: • temperature • concentration / amount of nutrients / ions • type of nutrient • volume / amount of solution • amount of bacteria added • agitation **or** amount of oxygen	 ignore references to time / type of bacterium	2
4(c)(i)	7.5	accept in range 7.4 – 7.6	1
4(c)(ii)	use more pH values around / close to pH 7.5 / between 7 and 8		1
Total			**6**

COMPONENT NUMBER: BLY3H

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
5(a)(i)	glucose **and** galactose		1
5(a)(ii)	any **three** from: Evidence: • absorption reduced by cyanide • absorb faster (than other sugars) Explanation: • active transport needs <u>energy</u> • less / no <u>energy</u> available / released if cyanide is there **or** less / no <u>energy</u> if no / less respiration	 allow converse allow <u>energy</u> produced ignore cyanide prevents respiration	3
5(b)	all / the sugars / they can be absorbed <u>when gut poisoned</u> / <u>with cyanide</u> **or** <u>when no respiration</u> (diffusion) does not need an <u>energy</u> supply		1 1
Total			**6**

COMPONENT NUMBER: BLY3H

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
6(a)	carbon dioxide **and** water vapour	either order	1
6(b)	less methane		1
	because less anaerobic respiration		1
	more CO_2	ignore water	1
	because (more) aerobic respiration		1
Total			**5**

COMPONENT NUMBER: BLY3H

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
7(a)(i)	**A**		1
7(a)(ii)	(protein) molecule is large cannot pass through filter	ignore letters (protein is) too big to get through the filter = **2** marks	1 1
7(b)	**B** is taken back into the blood **or B** is reabsorbed reabsorbed completely **or** reabsorbed after filtration		1 1
7(c)	RBC is too big to pass through filter Haemoglobin is inside red blood cells **or** haemoglobin released when red blood cell bursts Haemoglobin is small enough to pass through filter **or** haemoglobin diameter < pore diameter		1 1 1
Total			**8**

COMPONENT NUMBER: BLY3H

COMPONENT NAME: Biology

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
8	any **four** from: Points for Ethanol: • renewable fuel **or** carbon neutral **or** uses plant <u>waste</u> • less CO / hydrocarbons / SO_2 / NOx emissions • details of what emissions do eg CO is toxic / hydrocarbons cause smog / SO_2 / NO_x causes acid rain Points against Ethanol: • releases less energy • so need to burn more • more fuel loss due to evaporation • need to burn fuel to grow and process crop plants • reduces (land use for) food crops / causes deforestation Debatable points: • claimed to increase NO_x emissions – but this not <u>observed</u> by air quality monitoring • takes more energy to produce than it releases – but sugar cane yields 8:1 / maize yields 1.34:1 Conclusion: sensible conclusion for **or** against ethanol substantiated by information from passage	 max **3** marks allow petrol is non renewable less <u>named</u> emission max **3** marks **must** reach conclusion using information from the passage	4 1
Total			**5**