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General Certificate of Secondary Education
June 2011

Additional Applied Science 4863

AASC/2H Science at Work

Unit 2

Mark Scheme

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)	any **one** from: • E.coli • campylobacter • salmonella	 **not** staphylococcus allow phonetic spelling allow listeria / botulinum	1
1(a)(ii)	any **two** from: • sickness / vomiting / nausea / loss of apetite • diarrhoea • stomach pains • fever / high temperature **or** sweating	ignore headache **or** going to the toilet a lot allow upset stomach ignore dizziness	2
1(b)(i)	any **four** from: • example of sterile technique • swab / streak the plate with the sample • streak the plate in the opposite direction • leave in a <u>warm</u> temperature or incubate • (identify bacteria) grown by observing colonies / colour / shape	 allow recognition of a sterile method not 'dip in hydrochloric acid' alone ignore rub unless qualified allow zig-zag across plate – if using a serial dilution can get this mark allow 15 - 50°C ignore oven ignore time allow look at plate / bacteria <u>under microscope</u>	4
1(b)(ii)	any **one** from: • to protect technician from (harmful) bacteria / germs • to prevent contamination (of the experiment)		1
1(c)	any **one** from: • cheese • yoghurt • sauerkraut	ignore brand names allow <u>sour</u> dough / bread	1
Total			**9**

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Question 2

question	answers	extra information	mark
2(a)	<u>natural</u> any **one** from: • leather • silk • cotton	 ignore rubber allow latex / wool / linen	1
	<u>synthetic</u> any **one** from: • polyester • lycra / elastane / spandex • acrylic • nylon • rayon	must be suitable for clothing ignore plastic / polythene / pvc ignore other brand names allow Kevlar / Teflon / neoprene	1
2(b)(i)	any **three** from: • strong • low density / light(weight) • flexible • waterproof • durable / hard wearing / long lasting / sturdy / tough • dries quickly / wicking / lets sweat out • can be dyed bright colours / colourfast	 ignore hard ignore cost or easy to wash ignore elastic / comfortable / soft or keeps shape allow doesn't get heavy when wet allow 'feet to breathe' / air movement ignore weatherproof ignore shock absorbent	3
2(b)(ii)	have air (trapped) in the material **or** provides cushioning	allow bubbles / holes ignore padded ignore absorbs shock allow spongy / bouncy	1
2(c)(i)	6.5		1

Question 2 continues on the next page

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Question 2 continued

question	answers	extra information	mark
2(c)(ii)	sports shoe **A** provides more / most friction / grip **or** highest force so will not slip so much **OR** sports shoe **B** has the lowest / less force or least / less friction (1) so it allows easiest movement on artificial grass (1)	ecf from part 2(c)(i) allow max **1** mark for correct explanation if wrong shoe is chosen or no shoe chosen at all	 1 1
Total			**9**

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Question 3

question	answers	extra information	mark
3(a)(i)	**A**  Whorl **B**  Arch **C**  Loop	allow phonetic spelling ignore other words in front	3
3(a)(ii)	so (the evidence is) not contaminated **or** no new fingerprints		1
3(a)(iii)	unique to the individual (relatively) easy to compare to find a match **or** easy to store on database	allow each print is different	1 1
3(a)(iv)	could have been there before / after the crime could have been there but did not commit the crime	allow evidence on a moveable object	1 1
3(b)	any **one** from: • make a case / mould / impression • photographs	allow plaster of (Paris) allow plasticine / putty / moulding clay / silicon rubber	1
3(c)(i)	microscope	ignore types of microscope **or** collection equipment ignore chromotography	1
3(c)(ii)	any **one** from: • (number of) layers • colour • type of paint / texture	accept composition of layers accept combination of colours ignore manufacturer	1
Total			**11**

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Question 4

question	answers	extra information	mark
4(a)	59		1
4(b)(i)	25.2 – 11.3 = 13.9 their $\frac{13.9}{11.3} \times 100$ **or** their $\frac{13.9}{.113}$ 123 %	allow all 3 marks for correct answer with or without working if answer is incorrect $\frac{11.3}{100} = \frac{25.2}{x}$ = **1** mark **or** $x = \frac{25.2}{11.3} \times 100$ **or** 2.23 **or** 223% = **2** marks	1 1 1
4(b)(ii)	less pig producers but more pigs produced		1
4(c)(i)	promote growth less space needed less labour needed	 ignore costs unless qualified	1 1 1
4(c)(ii)	any **three** from: • reference to cost eg housing / machinery / food • welfare of pigs issue eg less space to move • spread of disease (in the shed) • consumer resistance	ignore poor meat quality ignore pollution	3
Total			**11**

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Question 5

question	answers	extra information	mark
5(a)(i)	take a sample of blood and put on dipstick / test strip / test card		1
	(put dipstick) into a meter and read meter	allow monitor / machine if qualified allow alternative method of observing a colour change	1
5(a)(ii)	respiration	ignore anaerobic / aerobic	1
5(a)(iii)	because it needs to be transported to the cells / muscles / organs	ignore just to body	1
5(b)(i)	59 to 60		1
5(b)(ii)	food C		1
	causes the least rise in blood glucose **or** not so much glucose produced **or** not so much glucose in the food		1
5(b)(iii)	insulin / (it) lowers blood glucose level **or** insulin produced when glucose level is high **or** increased absorption by body cells		1
	glucose turned to glycogen		1
	glycogen stored in the liver / muscles		1
Total			**10**

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Question 6

question	answers	extra information	mark
6(a)(i)	to make it more concentrated		1
6(a)(ii)	dip loop / wire / splint in sample **or** spray sample place in hot / blue / roaring flame record / identify colour of flame	allow see what colour the flame is if no other marks awarded allow clean wire loop / dip in HCl and put in flame for **1** mark	1 1 1
6(a)(iii)	copper sulfate	award **one** mark for identifying copper and **one** mark for identifying sulfate allow copper II sulfate do **not** accept sulfur	2
6(b)(i)	electrophoresis	allow gel electrophoresis allow phonetic spelling do **not** allow electrolysis	1
6(b)(ii)	DNA negatively charged attracted to positive terminal / anode different sized molecules move through gel at different rates **or** smaller fragments move faster		1 1 1
Total			**10**
			Overall mark = 60

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www.aqa.org.uk/umsconversion