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General Certificate of Secondary Education
June 2011

Additional Applied Science 4863

AASC/2F 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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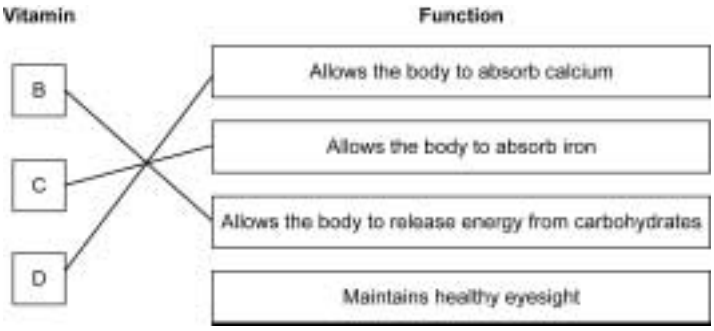
Question 1

question	answers	extra information	mark
1(a)(i)			3
1(a)(ii)	bleeding gums		1
1(b)(i)	burette orange juice blue		1 1 1
1(b)(ii)	By using the same amount of orange juice each time.		1
1(c)	25 %		1
Total			**9**

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Question 2

question	answers	extra information	mark
2(a)(i)	**A**  Whorl **B**  Arch **C**  Loop	all 3 correct for **2** marks 1 or 2 correct for **1** mark	2
2(a)(ii)	any **one** from: • because no two people have the same fingerprint • fingerprints are unique • can match to a database / suspect	can identify a person ignore 'tell if someone was at the crime scene' ignore reference to DNA	1
2(a)(iii)	put them into a database compare the suspects prints <u>to find a match</u>	ignore computer / programme / system **not** DNA database ignore DNA	1 1
2(b)(i)	(yes) because his fingerprint matches (fingerprint) A / one of the fingerprints	no mark for yes ignore 'similar'	1
2(b)(ii)	no this only proves that he was at the crime scene (when the crime was committed)	no mark for no ignore could have been planted by someone **or** not enough evidence	1
2(c)(i)	colour layers		1 1
2(c)(ii)	a microscope		1

Question 2 continues on the next page

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Question 2 continued

question	answers	extra information	mark
2(d)	make an identikit or artist impression of face	allow e-fit	1
2(e)	any **three** from: • make a (cardboard) support around the print • mix plaster (of Paris) with <u>water</u> • put / pour (mix) over the print • leave to dry / set / harden (and remove)	allow box / frame around the print do **not** allow ring if using wrong substance max **2** marks	3
Total			**14**

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Question 3

question	answers	extra information	mark
3(a)(i)	diet diary / diet log / diet journal or 24 hour dietary recall	allow intake diary accept food diary / food log / food journal ignore record	1
3(a)(ii)	how much was eaten **or** what / how much was drunk	allow amount eaten ignore time / calories / exercise / energy ignore nutrient types	1
3(a)(iii)	more carbohydrates / protein / fats / food	allow larger amounts ignore vitamins and minerals / energy	1
3(a)(iv)	any **two** from: • tuna • steak • egg • bacon	ignore muesli bar / nuts yoghurt / beans / peas	2
3(a)(v)	to build / grow / repair <u>muscle</u>	ignore growth and repair other than muscle ignore reference to bones / energy / strong	1
3(a)(vi)	athlete B's diet provides more energy / carbohydrate because swimming uses a lot of energy	accept converse explanation eg athlete **A** must be a weightlifter because of high protein intake weight lifting needs strength / muscle	1 1
3(b)(i)	drink B - glucose, water, electrolytes		1
3(b)(ii)	water / fluid is lost through sweat	**or** to keep body hydrated ignore body fluids without reference to sweat	1
Total			**10**

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Question 4

question	answers	extra information	mark
4(a)	organic glucose covalent		1 1 1
4(b)(i)	ethanol **or** water		1
4(b)(ii)	magnesium oxide		1
4(b)(iii)	bonds / force between molecules are weak **or** weak intermolecular bonds / forces	do **not** accept weak bonds / atoms	1
4(c)(i)	test it with iodine if it turns black it is starch	mark independently allow dark blue **or** blue black ignore purple	1 1
4(c)(ii)	$C_6H_{12}O_6$		1
Total			**9**

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Question 5

question	answers	extra information	mark
5(a)(i)	any **one** from: • E.coli • campylobacter • salmonella	**not** staphylococcus allow phonetic spelling allow listeria / botulinum	1
5(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
5(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
5(b)(ii)	any **one** from: • to protect technician from (harmful) bacteria / germs • to prevent contamination (of the experiment)		1
5(c)	any **one** from: • cheese • yoghurt • sauerkraut	ignore brand names allow <u>sour</u> dough / bread	1
Total			**9**

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Question 6

question	answers	extra information	mark
6(a)	natural any **one** from: • leather • silk • cotton synthetic any **one** from: • polyester • lycra / elastane / spandex • acrylic • nylon • rayon	 ignore rubber allow latex / wool / linen must be suitable for clothing ignore plastic / polythene / pvc ignore other brand names allow Kevlar / Teflon / neoprene ignore sportswool	1 1
6(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
6(b)(ii)	have air (trapped) in the material **or** provides cushioning	allow bubbles / holes ignore padded ignore absorbs shock allow spongy / bouncy	1
6(c)(i)	6.5		1

Question 6 continues on the next page

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Question 6 continued

question	answers	extra information	mark
6(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 6(c)(i) allow max **1** mark for correct explanation if wrong shoe is chosen or no shoe chosen at all	 1 1
Total			**9**
			Overall mark = 60

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