



**General Certificate of Secondary Education  
June 2010**

**Additional Applied Science**

**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.

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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.

## AASC/2H

## Question 1

Question	Answers	Extra information	Mark
1(a)(i)	(aluminium) more flexible (than wood)	allow stiff <b>or</b> not flexible (for wood)	1
	(graphite carbon fibre) less flexible (than aluminium)		1
1(a)(ii)	composite	ignore synthetic ignore mixture ignore reinforced plastic	1
1(a)(iii)	any <b>three</b> from: <ul style="list-style-type: none"> <li>• durable / lasts longer</li> <li>• does not dry out / crack with age</li> <li>• strong</li> <li>• light / low density</li> <li>• does not warp / distort</li> <li>• less flexible <b>or</b> more ball control</li> </ul>	do <b>not</b> accept not brittle ignore hard to break / rigid ignore does not add weight do <b>not</b> accept high density  allow easy to mould  ignore suits all players ignore cost  do <b>not</b> accept biodegradable	3
1(b)	(loss in weight =) 80		1
	$\frac{(80)}{380} \times 100$	ecf from their 80	1
	21 <b>or</b> 21.05 <b>or</b> 21.1	correct answer = <b>3</b> marks with or without working	1
<b>Total</b>			<b>9</b>

## AASC/2H

## Question 2

Question	Answers	Extra information	Mark
2(a)(i)	3	allow 2.5–3.5	1
2(a)(ii)	chips / potatoes cooked in oil		1
2(b)(i)	baked (in their skin) and <u>served with (butter) substitute</u>		1
2(b)(ii)	any <b>two</b> from: <ul style="list-style-type: none"> <li>• less fat</li> <li>• less / no cholesterol</li> <li>• less salt / sodium <u>than chips</u></li> </ul>	ignore reference to fibre and protein if baked in skin <b>or</b> served with butter only allow: <ul style="list-style-type: none"> <li>• less fat <u>than chips</u></li> <li>• less salt</li> </ul>	2
2(b)(iii)	any <b>one</b> from: <ul style="list-style-type: none"> <li>• (too much salt) high blood pressure / heart attack / stroke / heart disease</li> <li>• (too much fat) obesity / diabetes / heart disease / clog arteries / heart attack / stroke / liver disease / CHD</li> </ul>	allow kidney disease / failure allow heart failure allow overweight / heart failure ignore heart problems ignore cancer ignore any other medical conditions ignore any reference to cholesterol	1

AASC/2H

Question 2

Question	Answers	Extra information	Mark
2(c)	<p>any <b>three</b> from:</p> <ul style="list-style-type: none"> <li>• wear protective clothing</li> <li>• wear gloves when handling food</li> <li>• cover cuts</li> <li>• do not sneeze / cough over food</li> <li>• wash hands</li> <li>• wear hat / cover hair / tie hair back / remove jewellery</li> <li>• clean utensils / equipment / surfaces</li> <li>• keep raw and cooked foods separate <b>or</b> separate equipment when preparing food</li> <li>• removal of waste from canteen area</li> <li>• control pests</li> <li>• cover food</li> <li>• store (food) in fridge</li> </ul>	<p>allow cut nails / no nail varnish</p> <p>allow store in cold places ignore freeze ignore storing food at correct temperature</p> <p>allow do not smoke ignore use by date ignore reference to heating food</p>	3
<b>Total</b>			<b>9</b>

## AASC/2H

## Question 3

Question	Answers	Extra information	Mark
3(a)	wear protective clothing / masks / gloves / overshoes / body paper suits	allow overall / coverall ignore special suit / apron / goggles	1
	restrict access <b>or</b> tape off the scene	allow make a route through crime scene	1
3(b)(i)	any <b>one</b> from: <ul style="list-style-type: none"> <li>• tweezers / forceps</li> <li>• <u>sticky</u> tape / sellotape</li> <li>• vacuum</li> </ul>	do <b>not</b> accept UV light  do <b>not</b> accept pliers  ignore sterilised	1
3(b)(ii)	<u>comparison</u> microscope	allow comparative	1
3(b)(iii)	any <b>three</b> from: <ul style="list-style-type: none"> <li>• colour</li> <li>• pattern</li> <li>• texture</li> <li>• thickness / diameter / width</li> <li>• shape (of cross section)</li> <li>• amount of twist</li> </ul>	allow stripes for pattern  allow smoothness / roughness  ignore size  ignore properties of fibres eg density, strength, water retention, flexibility	3
3(b)(iv)	cotton		1
	polyester		1



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## Question 3

Question	Answers	Extra information	Mark
3(b)(v)	<p>No</p> <p>any <b>one</b> from:</p> <ul style="list-style-type: none"> <li>• similar rug / material from somewhere else could have the same fibres</li> <li>• could have been there before the crime was committed</li> <li>• someone else could have worn / stolen his jacket</li> </ul>	ignore comments about fibre	<p>1</p> <p>1</p>
3(c)	<p>any <b>one</b> from:</p> <ul style="list-style-type: none"> <li>• fingerprints / handprints</li> <li>• footprints / shoe prints</li> <li>• weapon / gun</li> <li>• DNA</li> <li>• saliva</li> <li>• blood</li> <li>• soil</li> </ul>	<p>allow urine / hair / skin / semen / sweat</p> <p>ignore reference to wine glass / bottle</p> <p>do <b>not</b> accept any other named weapon</p> <p>do <b>not</b> accept ink</p>	1
<b>Total</b>			<b>12</b>

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## Question 4

Question	Answers	Extra information	Mark
4(a)(i)	1.6		1
4(a)(ii)	dried the filter paper (before re-weighing) <b>or</b> evaporation		1
4(b)	<p>any <b>one</b> from:</p> <ul style="list-style-type: none"> <li>• prevent scurvy</li> <li>• healthy skin and gums</li> <li>• absorption of iron</li> <li>• (maintain) immune system</li> <li>• (maintain) lining of digestive system</li> <li>• repairs tissues / cells</li> <li>• prevent disease</li> </ul>	<p>ignore teeth</p> <p>do <b>not</b> accept (maintain) teeth and bones</p> <p>allow fights infection</p> <p>do <b>not</b> accept references to sight do <b>not</b> accept (maintain) nervous system</p> <p>ignore antioxidant</p>	1

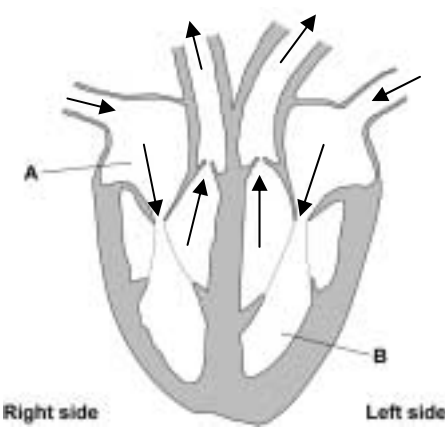
## AASC/2H

## Question 4

Question	Answers	Extra information	Mark
4(c)(i)	preservative helps prevent the loss of vitamin C / (36 %) vitamin C lost if no preservative used		1
	sorbic acid reduces the loss of vitamin C <b>or</b> less vitamin C lost if sorbic acid is added	answers for second two statements must be comparative to gain marks  allow sorbic acid is the worst preservative	1
	the best preservative is benzoic acid / sulfur dioxide <b>or</b> benzoic acid / sulfur dioxide prevents vitamin C loss	allow strongest for best accept benzoic acid / sulfur dioxide are better at preserving vitamin C than sorbic acid for <b>2</b> marks	1
4(c)(ii)	place juice in a burette	allow DCPIP into burette and orange juice into flask	1
	put known amount of DCPIP / indicator into flask / beaker	allow using beaker and pipette instead of flask and burette	1
	titrate / drip orange juice into DCPIP		1
	plus any <b>one</b> from:		1
	<ul style="list-style-type: none"> <li>• record volume used / number of drops</li> <li>• shake flask</li> <li>• until colourless</li> </ul>	accept swirl / stir flask  accept loses (blue) colour  if DCPIP is in burette colour change is colourless (orange) to blue  ignore changes colour	
<b>Total</b>			<b>10</b>

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Question 5

Question	Answers	Extra information	Mark
5(a)(i)		<p>right side correct</p> <p>left side correct</p> <p>arrows must show entry and exit</p>	<p>1</p> <p>1</p>
5(a)(ii)	<p>A = <u>right</u> atrium / atria</p> <p>B = <u>left</u> ventricle</p>	<p>allow phonetic spelling</p> <p>if no marks awarded then atrium / atria <u>and</u> ventricle = 1 mark <b>or</b> left atrium and right ventricle = 1 mark</p>	<p>1</p> <p>1</p>
5(b)(i)	<p>any <b>one</b> from:</p> <ul style="list-style-type: none"> <li>• to get <u>more</u> oxygen (to the muscles) / gets oxygen (to the muscles) quicker</li> <li>• to get <u>more</u> glucose (into muscles)</li> <li>• remove <u>more</u> carbon dioxide</li> </ul>	<p>ignore sending more blood around the body</p>	<p>1</p>

## AASC/2H

## Question 5

Question	Answers	Extra information	Mark
5(b)(ii)	(B) (resting) pulse / heart rate is <u>lower</u>	no mark for A or B	1
	pulse / heart rate does not increase as much (during exercise)	accept maximum increase in heart rate is not as great <b>or</b> lower maximum pulse rate	1
	recovery rate is quicker	allow pulse rate slows down / goes back to normal quicker (after exercise) allow heart rate drops quicker (after exercise)	1
5(c)	<p>any <b>two</b> from:</p> <ul style="list-style-type: none"> <li>• energy intake</li> <li>• effectiveness of clothing / equipment</li> <li>• skill / ability / experience / training / reaction time</li> <li>• ability to concentrate <b>or</b> level of determination</li> </ul>	<p>allow <u>sports</u> drink allow enough energy</p> <p>ignore general references to diet</p> <p>clothing / equipment must be qualified eg the right clothing / equipment</p> <p>accept agility</p> <p>ignore weight / height / somatotype / speed / weather / power</p>	2
<b>Total</b>			<b>10</b>

## AASC/2H

## Question 6

Question	Answers	Extra information	Mark
6(a)(i)	any <b>four</b> from: <ul style="list-style-type: none"> <li>• place glass in a drop of oil</li> <li>• on microscope</li> <li>• heat oil</li> <li>• when the glass disappears</li> <li>• take temperature</li> <li>• RI glass = RI oil at a specific temperature <b>or</b> RI glass = RI oil when the glass disappears</li> <li>• compare with data <b>or</b> look up RI tables</li> </ul>	ignore calculate the index	4
6(a)(ii)	repeat / get another person to do the test	accept anything that implies repeat	1
6(b)(i)	iron II / $\text{Fe}^{2+}$ / $\text{Fe}^{+2}$	allow iron 2 / iron two / $\text{iron}^{2+}$  do <b>not</b> accept just iron <b>or</b> ion	1
6(b)(ii)	lead <b>or</b> aluminium <b>or</b> zinc	accept Pb <b>or</b> Al <b>or</b> Zn	1
6(c)(i)	glucose	allow fructose / galactose	1

## AASC/2H

## Question 6

Question	Answers	Extra information	Mark
6(c)(ii)	forces of attraction between molecules / particles / compounds are weak	accept intermolecular forces are weak	1
	not much energy needed to break the force of attraction / intermolecular forces <b>or</b> forces are easily broken	do <b>not</b> accept atoms do <b>not</b> accept bonds for forces	1
<b>Total</b>			<b>10</b>
			<b>Overall mark = 60</b>