



**General Certificate of Secondary Education
June 2012**

Additional Applied Science 4863

AASC2H 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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Question 1

question	answers	extra information	mark
1(a)(i)	any two from: <ul style="list-style-type: none"> obesity / become overweight heart disease / strokes / heart attack / <i>blocked arteries</i> / high blood pressure diabetes <i>increased</i> cholesterol 	ignore get fat allow heart failure ignore heart problems / cancer / veins / other medical conditions / ignore blood clot allow arthritis	2
1(a)(ii)	sugar / glucose / sucrose / fructose salt	ignore carbohydrates allow sodium	1 1
1(b)	any one from: <ul style="list-style-type: none"> advertisements / promotions / TV / radio / newspapers / 'happy meals' / gift / toys cheap food open all hours / widespread availability / free delivery tasty food (because of the high fat, salt , sugar content) 	accept instant availability allow quick and easy allow (additives used) to improve the appearance / flavour	1
1(c)	different sex different amount of exercise / work / activities done different BMR / rate of growth	allow different lifestyles allow reasonable suggestion that affects BMR eg more muscle / illness / pregnancy not asthma / diabetes / disorder ignore BMI / different height / builds ignore smoking	1 1 1
1(d)(i)	contains a lot of vitamin (C / B)	allow vitamin C is over 100% of daily allowance	1
1(d)(ii)	3.6		1
Total			10

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Question 2

question	answers	extra information	mark
2(a)		<i>plaster of Paris given with incorrect procedure = 1 mark</i>	
	place a frame / border around the print	<i>procedure in wrong order = max 2 marks</i>	1
	pour / add <u>plaster of Paris</u> (liquid)	<i>ignore cordon off</i>	1
	leave to dry / set / harden	<i>ignore times</i>	1
2(b)	<u>unique</u> to the shoe		1
2(c)(i)	pH range 4 – 6.99	any number between and including 4 and 6.99 <i>ignore units</i>	1
2(c)(ii)	<i>mass of water in soil = 0.53g</i>		1
	<i>mass of soil = 4.21g</i>		1
	<i>12.589 / 12.59 / 12.6</i>	correct answer = 3 marks <i>ignore subsequent rounding</i> <i>answers of 14.4.. gains 2 marks</i> <i>allow ecf from clear working shown</i>	1
Total			8

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Question 3

question	answers	extra information	mark																		
3(a)(i)	36		1																		
3(a)(ii)	<table border="1"> <thead> <tr> <th></th> <th>Material</th> <th>Suitability (put a tick or cross)</th> <th>Reason</th> </tr> </thead> <tbody> <tr> <td>Natural</td> <td>cotton</td> <td>cross</td> <td>let a lot / 36cm^3 of water through</td> </tr> <tr> <td rowspan="3">Synthetic</td> <td>nylon or</td> <td>tick</td> <td>waterproof / does not allow water through or doesn't allow the sweat to evaporate / not breathable</td> </tr> <tr> <td>polyester or</td> <td>cross</td> <td>lets more / most / 44cm^3 water through</td> </tr> <tr> <td>polyester fleece</td> <td>cross</td> <td>lets some / 10cm^3 water through</td> </tr> </tbody> </table> <p>correct choice of a natural and synthetic material = 1 mark correct suitability for each material = 1 mark correct reason for each material = 1 mark each</p> <p><i>allow cross for nylon if sweating given as reason</i> <i>ignore references to absorption</i></p>		Material	Suitability (put a tick or cross)	Reason	Natural	cotton	cross	let a lot / 36cm^3 of water through	Synthetic	nylon or	tick	waterproof / does not allow water through or doesn't allow the sweat to evaporate / not breathable	polyester or	cross	lets more / most / 44cm^3 water through	polyester fleece	cross	lets some / 10cm^3 water through		Max 4
	Material	Suitability (put a tick or cross)	Reason																		
Natural	cotton	cross	let a lot / 36cm^3 of water through																		
Synthetic	nylon or	tick	waterproof / does not allow water through or doesn't allow the sweat to evaporate / not breathable																		
	polyester or	cross	lets more / most / 44cm^3 water through																		
	polyester fleece	cross	lets some / 10cm^3 water through																		
3(b)	<p>sweating / sweat (as sweat) evaporates vasodilation <i>blood vessels will carry more blood nearer to the surface of the skin or more heat is radiated from the skin</i></p>	<p><i>do not accept veins dilating</i></p>	<p>1 1 1 1</p>																		

Question 3 continues on the next page

AASC2H**Question 3 continued**

question	answers	extra information	mark
3(c)	<i>replace glucose used (for energy)</i>	<i>ignore carbohydrates / sugar</i>	1
	<i>(water) to replace water / fluid that will be lost / (re)hydrate / prevent dehydration</i>		1
	<i>replace lost / contains electrolytes / ions / minerals / salts</i>		1
Total			12

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Question 4

question	answers	extra information	mark
4(a)	sodium copper		2
4(b)	add <i>acidified</i> potassium dichromate turns (<i>from orange to</i>) green (if ethanol present)	<i>accept add acid and potassium dichromate</i> <i>do not accept other colours to green</i>	1 1
4(c)	fizzes / bubbles silver nitrate (solution) white precipitate	<i>ignore nitric acid</i> <i>allow cloudy</i>	1 1 1
4(d)	<i>giant lattice</i> <i>held</i> together by strong forces of attraction / strong bonds between positively and negatively charged ions / oppositely charged or <i>made of metal and non-metal ions</i>	do not allow mark for bonds if single / double / hydrogen bonds mentioned or inter-molecular bonds accept particles for ions but not atoms or molecules	1 1 1
Total			10

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Question 5

question	answers	extra information	mark
5(a)(i)	$C_6H_{12}O_6$ and CO_2 correctly balanced	<i>in the correct order</i>	1 1
5(a)(ii)	fungus / fungi	<i>ignore mould</i>	1
5(a)(iii)	anaerobic		1
5(b)	preservative	<i>allow benzoic acid / sorbic acid / ascorbic acid</i> <i>accept sulfur dioxide / sulfites / antibacterial agent / sterilising agent / antioxidants</i> <i>ignore E numbers</i>	1
5(c)	any five from: <ul style="list-style-type: none"> • use aseptic techniques / example of aseptic technique • <i>collect sample using an inoculating loop / cotton bud / swab</i> • <i>streak the agar (jelly) with the sample</i> • streak the plate in the opposite direction • leave to grow in an incubator / warm place / $25^{\circ}C$ - $30^{\circ}C$ • identify the bacteria by the type of colony / colour / shape 	<i>ignore rub unless qualified</i> <i>allow idea of separating colonies</i> <i>do not allow $37^{\circ}C$ / hot place</i> accept use a microscope or reference to staining or compare to other known bacteria	5

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question	answers	extra information	mark
5(d)	any two from: <ul style="list-style-type: none">• salting• drying• smoking• vacuum packing• <i>freeze drying</i>• <i>pickling</i>• <i>canning</i>	<i>ignore airtight</i>	2
Total			12

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Question 6

question	answers	extra information	mark
6(a)	13		1
6(b)	1440 to 1450		1
6(c)	<p>the breathing rate increases</p> <p>the volume (of each breath) increases (as the speed increases)</p> <p>to increase oxygen intake</p> <p>oxygen needed for respiration or oxygen needed to convert glucose to energy</p> <p>because more energy being used</p> <p>and to remove extra CO₂ produced or prevent oxygen debt or to prevent build up of lactic acid</p>		<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>
Total			8
Overall mark = 60			