



**General Certificate of Secondary Education
January 2012**

Additional Applied Science 4863

AASC/2H Science at Work

Unit 2

Mark Scheme

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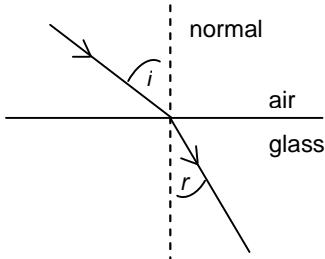
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AASC/2H

Question 1

question	answers	extra information	mark
1(a)(i) E	<p>use plasticine</p> <p>press / pour into markings or make a mould / cast</p>	<p>allow putty / plaster of paris / moulding clay / silicone rubber</p> <p>do not allow blue-tac</p> <p>if no other marks gained allow photograph for 1 mark</p>	<p>1</p> <p>1</p>
1(a)(ii) A	C		1
1(a)(iii) E	only proves the shoe was at the scene at some time, not the suspect	<p>owtte</p> <p>allow other people have the same shoes</p>	1
1(b) E	<p>$RI = \sin i / \sin r$</p> <p>then:</p>  <p>if only diagram given any two from:</p> <ul style="list-style-type: none"> some indication of direction of travel of light normal line marked angle of incidence and angle of refraction marked <p>if written description given any two from:</p> <ul style="list-style-type: none"> send a ray of light into the glass draw the normal measure the angle of incidence and the angle of refraction 	<p>eg arrows on ray or air/glass interface labelled or glass block given with ray going all way through</p> <p>normal must be drawn so both angles can be measured</p> <p>accept through ignore beam</p> <p>if written description contradicts diagram, use list principle</p>	<p>1</p> <p>max 2</p> <p>max 2</p>

AASC/2H**Question 1 continued**

question	answers	extra information	mark
1(c) E	not the same glass or the glass did not come from the crime scene / <i>window</i>		1
	glass on the suspect was from a television		1
Total			9

AASC/2H

Question 2

question	answers	extra information	mark
2(a)(i) E	aspartame - improve flavour / sweetener tartrazine - improve appearance / colour	<i>apply list principle</i> <i>if no other marks, allow 1 mark for both additives correctly named</i>	1 1
2(a)(ii) E	may cause hyperactivity	<i>allow hyper</i> <i>allow reference to allergy</i>	1
2(a)(iii) G	650(mg)		1
2(b)(i) E	preservative	<i>allow to make it last longer or increase shelf life</i>	1
2(b)(ii) E	<i>any two from:</i> <ul style="list-style-type: none"> • <i>implication of loss of reputation</i> • <i>implication of loss of direct over the counter sales</i> • <i>implication of other costs to company</i> 	<i>eg bad press</i> <i>eg lose customers</i>	2
2(b)(iii) E	<i>any two from:</i> <ul style="list-style-type: none"> • <i>loss of faith / trust in the company</i> • <i>worry about people drinking the contaminated product</i> • <i>increased awareness of ingredients</i> 	<i>eg won't buy it again</i> <i>accept converse if reason given</i> <i>eg would read the labels more carefully</i>	2
Total			9

AASC/2H

Question 3

question	answers	extra information	mark
3(a)(i) E	30 000/310 96.77 / 96.8 / 97	do not accept 96 or 96.7 (<i>incorrect rounding</i>) correct answer <i>with or without working</i> = 2 marks	1 1
3(a)(ii) G	average		1
3(a)(iii) E	any two from: <ul style="list-style-type: none"> • same amount of time • same height of step or same bench • same rate of steps • same time of day 	allow same number of steps ignore reference to diet	2
3(a)(iv) E	(count number of) beats <u>per minute</u>	accept bpm ignore details of method	1
3(a)(v) E	how long or how quickly the pulse takes to get back to normal	allow heart rate do not accept breathing rate	1
3(a)(vi) E	any two from: <ul style="list-style-type: none"> • reddening (of the skin) • sweat • deep(er) breathing or heavy / heavier breathing or tidal volume increases • increased breathing rate 	accept panting	2
3(b)(i) E	has more <u>muscular</u> tissue in wall because it carries blood under pressure or needs to withstand pressure	allow because A is an artery	1 1
3(b)(ii) E	oxygen / carbon dioxide / glucose able to pass through	do not accept food / nutrients / chemicals accept correct reference to gas exchange	1

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Question 4

question	answers	extra information	mark
4(a) E	nitrates phosphates potassium	allow magnesium / nitrogen / phosphorus / <i>calcium</i> / zinc / iron / <i>sulfur</i>	1 1 1
4(b) E	any two from: <ul style="list-style-type: none"> • <i>pesticides or pest control</i> • fungicides • herbicides or <i>weed control</i> • <u>more light</u> • <u>more heat</u> • <i>increased carbon dioxide</i> 	<p><i>allow using artificial light unqualified do not allow more sunlight</i></p> <p><i>allow grow in greenhouse / poly tunnel as an alternative to any of these three but only for 1 mark</i></p> <p><i>allow selective breeding / GM crops cloning / growth hormones / growth enhancer</i></p>	2
Total			5

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Question 5

question	answers	extra information	mark
5(a) E	<i>(if the level is too high / low / incorrect) the microorganisms could die or not work or would stop fermentation or enzymes wouldn't work</i>	<i>allow reference to killing off unwanted microorganisms do not allow enzymes killed ignore references to taste of wine</i>	1
5(b) E	<i>put known volume of sodium hydroxide into flask / beaker plus (a few drops of) indicator put wine into burette plus one from:</i> <ul style="list-style-type: none"> <i>• add wine drop by drop / slowly (to the sodium hydroxide)</i> <i>• until end point reached or until the indicator changes (from pink) to colourless</i> 	<i>allow converse accept suitable container allow converse allow converse allow converse converse must be applied consistently</i>	1 1 1
Total			5

AASC/2H

Question 6

question	answers	extra information	mark
6(a) G	male	<i>accept men</i>	1
	<i>white European</i>	<i>accept white / European</i>	1
	age 21–30		1
6(b) E	$38647/5\ 532\ 847 \times 100$	correct answer with or without working gains 2 marks	1
	$= 0.699/0.70/0.7$	<i>do not accept 0.6 or 0.69</i>	1
6(c)(i) E	unique to an individual (OWTTE)		1
6(c)(ii) E	<i>DNA placed (in a well) on a gel plate</i>		1
	<i>electric current / field causes fragments to move</i>		1
	<i>towards the positive terminal / anode</i>		1
	<i>smaller fragments move through the gel further / quicker / easier (accept converse)</i>		1
Total			10

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Question 7

question	answers	extra information	mark
7(a)(i)	tried because they were strong		1
E	not successful because they were too heavy or corroded	<i>allow not flexible <u>enough</u></i>	1
7(a)(ii)	two (or more) materials		1
E	<i>each with different properties</i>	<i>allow combined / bonded / mixed</i>	1
7(a)(iii)	<i>combines the (best) properties of each material</i>		1
E		<i>if no other marks given allow 1 mark for 2 or more properties of poles (eg strong and light)</i>	1
7(b)	any two from:		max 4
E	<ul style="list-style-type: none"> the maximum amount of air that can be taken in, in one breath (1), which is called the vital (lung) capacity (1) the amount of air taken in on one <u>normal</u> breath (1) which is called the tidal volume (1) how many breaths per minute (1), which is called the rate of breathing (1) the difference between a normal breath in and maximum breath in (1), which is the inspiratory reserve volume (1) the difference between a normal breath out and maximum breath out (1), which is the expiratory reserve volume (1) 	<i>do not accept total lung capacity</i>	
Total			10

Overall mark = 60