

Additional Applied Science A

General Certificate of Secondary Education

Unit **A325/01**: Scientific Detection (Foundation Tier)

Mark Scheme for June 2012

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All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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Annotations

Used in the detailed Mark Scheme:

Annotation	Meaning
/	alternative and acceptable answers for the same marking point
(1)	separates marking points
not/reject	answers which are not worthy of credit
ignore	statements which are irrelevant – applies to neutral answers
allow/accept	answers that can be accepted
(words)	words which are not essential to gain credit
words	underlined words must be present in answer to score a mark
ecf	error carried forward
AW/owtte	alternative wording
ORA	or reverse argument

Available in scoris to annotate scripts

	indicate uncertainty or ambiguity
	benefit of doubt
	contradiction
	incorrect response
	error carried forward
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	no benefit of doubt

	reject
	correct response
	draw attention to particular part of candidate's response
	information omitted

Question		Answer		Mark	Guidance														
1	(a)	<table border="1"> <thead> <tr> <th>type of scientific detection</th> <th>code letters</th> </tr> </thead> <tbody> <tr> <td>match and identify finger prints</td> <td>A</td> </tr> <tr> <td>monitor river water samples</td> <td>B</td> </tr> <tr> <td>check air quality</td> <td>B</td> </tr> <tr> <td>investigate outbreaks of food poisoning</td> <td>C</td> </tr> <tr> <td>check the safety of food packaging</td> <td>C</td> </tr> <tr> <td>analyse samples from a crime scene</td> <td>A</td> </tr> </tbody> </table>		type of scientific detection	code letters	match and identify finger prints	A	monitor river water samples	B	check air quality	B	investigate outbreaks of food poisoning	C	check the safety of food packaging	C	analyse samples from a crime scene	A	2	6 correct = 2 marks 5 corrects = 1 mark 4 or less correct = 0 marks accept any indication of correct response
		type of scientific detection	code letters																
		match and identify finger prints	A																
		monitor river water samples	B																
		check air quality	B																
		investigate outbreaks of food poisoning	C																
		check the safety of food packaging	C																
		analyse samples from a crime scene	A																
(b)	<table border="1"> <tbody> <tr> <td>collect representative samples</td> <td>✓</td> </tr> <tr> <td>copy samples for multiple use</td> <td></td> </tr> <tr> <td>dispose of samples within a six week period</td> <td></td> </tr> <tr> <td>avoid contamination of samples</td> <td>✓</td> </tr> <tr> <td>avoid interfering with samples</td> <td>✓</td> </tr> </tbody> </table>		collect representative samples	✓	copy samples for multiple use		dispose of samples within a six week period		avoid contamination of samples	✓	avoid interfering with samples	✓	2	3 correct = 2 marks 2 correct = 1 mark delete 1 mark for each additional incorrect response accept any indication of correct response					
	collect representative samples	✓																	
	copy samples for multiple use																		
	dispose of samples within a six week period																		
	avoid contamination of samples	✓																	
avoid interfering with samples	✓																		

Question		Answer				Mark	Guidance
	(c)	task	Health & Safety	Checking equipment	Staff training	2	5 correct = 2 marks 4 or 3 correct = 1 mark accept any indication of correct response
		clearing the work surface after completing an investigation	✓				
		showing a colleague how to operate new equipment			✓		
		calibrating a colorimeter		✓			
		attending courses on new techniques and methods			✓		
		having a first aiders telephone number on the wall	✓				

Question		Answer	Mark	Guidance										
2	(a)	eye piece slide clip focussing knob lamp	2	4 correct = 2 marks 3 correct = 1 mark 2 correct = 0 marks										
	(b)	15 x 50; 750	2	750 = 2 marks										
	(c)	<table border="1"> <tr> <td>electron microscopes have greater magnification</td> <td></td> </tr> <tr> <td>light microscopes are quicker to set up</td> <td>✓</td> </tr> <tr> <td>electron microscopes are more expensive</td> <td>✓</td> </tr> <tr> <td>light microscopes can examine living material</td> <td>✓</td> </tr> <tr> <td>electron microscopes have greater resolution</td> <td></td> </tr> </table>	electron microscopes have greater magnification		light microscopes are quicker to set up	✓	electron microscopes are more expensive	✓	light microscopes can examine living material	✓	electron microscopes have greater resolution		2	3 correct = 2 marks 2 correct = 1 mark delete 1 mark for each additional incorrect response accept any indication of correct response rule 5b does NOT apply in this case.
electron microscopes have greater magnification														
light microscopes are quicker to set up	✓													
electron microscopes are more expensive	✓													
light microscopes can examine living material	✓													
electron microscopes have greater resolution														

Question		Answer	Mark	Guidance
3	(a)	round / spherical / circular / ball; ridges / dents / holes / dimples / craters	2	Feature 1 = overall shape Feature 2 = example of type of 3D effect on surface ignore size / pattern / grooves / web / cells / honeycomb / colpus / bumps / dots accept two correct answers on any one question paper answer line
	(b)	(i) 44	1	accept 43 to 45
		(ii) $bi \div 100$; correct answer	2	accept error carried forward

Question		Answer	Mark	Guidance										
4	(a)	<table border="1"> <tr> <td>electrons only</td> <td>✓</td> </tr> <tr> <td>light only</td> <td></td> </tr> <tr> <td>both electrons and light</td> <td></td> </tr> <tr> <td>neither electrons or light</td> <td></td> </tr> </table>	electrons only	✓	light only		both electrons and light		neither electrons or light		1	if more than one box is ticked then candidate scores zero accept any indication of correct response		
electrons only	✓													
light only														
both electrons and light														
neither electrons or light														
	(b)	<table border="1"> <tr> <td>negative nucleus surrounded by positive electrons</td> <td></td> </tr> <tr> <td>positive nucleus surrounded by positive electrons</td> <td></td> </tr> <tr> <td>negative nucleus surrounded by negative electrons</td> <td></td> </tr> <tr> <td>positive nucleus surrounded by negative electrons</td> <td>✓</td> </tr> </table>	negative nucleus surrounded by positive electrons		positive nucleus surrounded by positive electrons		negative nucleus surrounded by negative electrons		positive nucleus surrounded by negative electrons	✓	1	if more than one box is ticked then candidate scores zero accept any indication of correct response		
negative nucleus surrounded by positive electrons														
positive nucleus surrounded by positive electrons														
negative nucleus surrounded by negative electrons														
positive nucleus surrounded by negative electrons	✓													
	(c)	<table border="1"> <tr> <td>Find the pH of different substances</td> <td></td> </tr> <tr> <td>Produce quantitative results</td> <td>✓</td> </tr> <tr> <td>Discriminate between different colours</td> <td></td> </tr> <tr> <td>Identify different substances</td> <td></td> </tr> <tr> <td>Measure the intensity of a colour</td> <td>✓</td> </tr> </table>	Find the pH of different substances		Produce quantitative results	✓	Discriminate between different colours		Identify different substances		Measure the intensity of a colour	✓	2	if more than two boxes are ticked then minus 1 mark for each incorrect response Candidates cannot score less than zero accept any indication of correct response
Find the pH of different substances														
Produce quantitative results	✓													
Discriminate between different colours														
Identify different substances														
Measure the intensity of a colour	✓													
	(d)	any 2 from: idea of inaccuracy in the human eye / subjective; colour blindness; cards have fixed colours so cannot judge colours between cards easily / semi-quantitative	2	ignore cards might be inaccurate / fade care - do not give marks for repeating the stem of the question unless words used correctly explain the answer ie tick the 'meaning' and not the 'words'										

Question			Answer	Mark	Guidance															
5	(a)	(i)	G	1																
		(ii)	2	1																
		(iii)	7	1																
		(iv)	A, B, D	1																
	(b)		<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td></td> <td>dyes</td> </tr> <tr> <td>stationary phase</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>solvent</td> </tr> <tr> <td>mobile phase</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>paper</td> </tr> </table>			dyes	stationary phase					solvent	mobile phase					paper	1	<p>both lines correct = 1 mark</p> <p>multiple lines going to more than one box does not score for that connection</p>
		dyes																		
stationary phase																				
		solvent																		
mobile phase																				
		paper																		
	(c)		<p>any two from:</p> <p>quantitative data; from very small samples; can separate gases, volatile solids; can collect the samples</p>	2	<p>ignore faster / more accurate / better / greater separation</p> <p>ORA</p>															

Question			Answer	Mark	Guidance
6	(a)	(i)	it is alkaline / pH greater than 7	1	do not give mark if both acid and alkali are stated
		(ii)	tells you its an alkali; but not its pH / value / number / amount; yes or no answer	2	it does not tell you how alkaline it is = 2
	(b)		universal indicator / clinistix	1	
	(c)		any 2 from: diabetes; pregnancy; colour blindness	2	accept Chlamydia ignore 'urine test' on its own or testing for any substance in urine / blood. ignore cancer / kidney / heart / liver / AIDS / brain etc
			Total	36	

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