

Additional Applied Science A

General Certificate of Secondary Education

Unit **A325/02**: Scientific Detection (Higher Tier)

Mark Scheme for June 2012

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

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
e cf	error carried forward
AW/owtte	alternative wording
ORA	or reverse argument

Available in scoris to annotate scripts

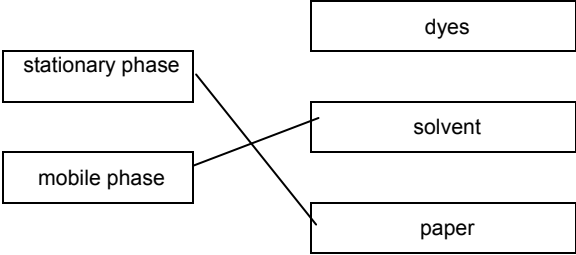
	indicate uncertainty or ambiguity
	benefit of doubt
	contradiction
	incorrect response
	error carried forward
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	no benefit of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

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

Question		Answer	Mark	Guidance														
1	(a)	<p>FSS any good answer eg match finger prints; analyse crime scene samples</p> <p>EA any good answer eg monitor river water samples; check air quality; flood control</p> <p>FSA any good answer eg investigate food poisoning; food labelling; check safety of food; setting standards for food</p>	3	<p>allow collecting evidence / searching crime scene not paternity testing ignore crime scene investigation</p> <p>allow testing / analysing of air/water/soil ignore decreasing pollution / protecting the environment</p> <p>allow educating about food safety etc. ignore checking standard / quality of food</p>														
	(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>use the samples to train colleagues</td> <td></td> </tr> <tr> <td>avoid contamination of samples</td> <td>✓</td> </tr> <tr> <td>avoid interfering with samples</td> <td>✓</td> </tr> <tr> <td>prevent change or deterioration</td> <td>✓</td> </tr> </tbody> </table>	collect representative samples	✓	copy samples for multiple use		dispose of samples within a six week period		use the samples to train colleagues		avoid contamination of samples	✓	avoid interfering with samples	✓	prevent change or deterioration	✓	2	<p>7 correct = 2 marks 6 or 5 correct = 1 mark</p> <p>accept any indication of correct response</p>
collect representative samples	✓																	
copy samples for multiple use																		
dispose of samples within a six week period																		
use the samples to train colleagues																		
avoid contamination of samples	✓																	
avoid interfering with samples	✓																	
prevent change or deterioration	✓																	
	(c)	<p>H&S any good answer eg keep work surfaces clean; have phone number for first aid</p> <p>maintenance any good answer eg keep glassware clean; calibrate equipment; qualified safety testing</p> <p>training any good answer eg help colleague; go on courses</p>	3	<p>allow wearing appropriate safety equipment</p> <p>allow examples of the subject of the training eg tell staff the correct procedures</p>														

Question		Answer	Mark	Guidance
2	(a)	<p>eye piece objective (lens) stage</p> <p>clip focussing knob lamp</p>	3	<p>6 correct responses for 3 marks 5 or 4 correct response for 2 marks 3 or 2 correct responses for 1 mark 1 or 0 correct responses is 0</p> <p>allow eye lens for eye piece not lens alone for either eyepiece or objective not magnifying lens allow idea of clip e.g. grip/clamp/clasp/slide holder allow focus not knob / zoom allow light or mirror for lamp</p>
	(b)	<p>any two from:</p> <p>quick / easy to use; can look at living materials; cheap; colour; portable</p> <p>any two from:</p> <p>low magnification; not 3D / limited depth of field; low resolution</p>	4	<p>accept any good answers ignore used for moving objects / it is simple</p> <p>allow instant results</p> <p>allow does not need electricity / doesn't take up much room</p> <p>ignore references to clarity alone / zoom / quality of image</p> <p>allow less detail</p>
3	(a)	Jane	1	
	(b)	idea of estimation	1	allow value was between 2 lines / average of 2 readings
	(c)	$3.50 \times 8.40 = 29.4$;(1) m ² (1)	2	<p>correct answer and unit = 2 marks correct answer only = 1 mark</p>
	(d)	<p>errors / uncertainties in length and width / measurements; multiplication increases overall error</p>	2	allow area may not be square / perfect shape

Question		Answer	Mark	Guidance
4	(a)	electrons only	<input checked="" type="checkbox"/>	1 if more than one box is ticked then candidate scores zero. accept any indication of correct response.
		light only	<input type="checkbox"/>	
		both electrons and light	<input type="checkbox"/>	
		neither electrons or light	<input type="checkbox"/>	
	(b)	negative nucleus surrounded by positive electrons	<input type="checkbox"/>	1 if more than one box is ticked then candidate scores zero. accept any indication of correct response
		positive nucleus surrounded by positive electrons	<input type="checkbox"/>	
		negative nucleus surrounded by negative electrons	<input type="checkbox"/>	
		positive nucleus surrounded by negative electrons	<input checked="" type="checkbox"/>	
	(c)	find the pH of different substances	<input type="checkbox"/>	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
		produce quantitative results	<input checked="" type="checkbox"/>	
		discriminate between different colours	<input type="checkbox"/>	
		identify different substances	<input type="checkbox"/>	
		measure the intensity of a colour	<input checked="" type="checkbox"/>	
	(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	
		(v)	10 ÷ 20; 0.5	2	0.5 without working = 2 marks
	(b)		 <p>The diagram consists of five rectangular boxes. On the left, there are two boxes: 'stationary phase' (top) and 'mobile phase' (bottom). On the right, there are three boxes: 'dyes' (top), 'solvent' (middle), and 'paper' (bottom). A line connects 'stationary phase' to 'solvent'. A line connects 'mobile phase' to 'dyes'. A line connects 'mobile phase' to 'paper'.</p>	1	both lines correct = 1 mark multiple lines going to more than one box does not score for that connection
	(c)		any two from: quantitative data; from very small samples; can separate gases, volatile solids; can collect the samples	2	ignore faster / more accurate / better / greater separation ORA
			Total	36	

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