

Additional Applied Science A

General Certificate of Secondary Education

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

Mark Scheme for June 2011

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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

Question		Answer	Mark	Guidance
1	a	<p>accreditation / proficiency tests;</p> <p>common/standard practice and procedures;</p>	2	<p>allow idea of comparison of results with other labs</p> <p>allow idea of all doing it the same way</p> <p>allow descriptions of correct use of equipment e.g. calibration, maintenance, cleanliness, accuracy, working, good, checked, correct etc</p> <p>not just 'equipment' or 'cleanliness' or clean laboratory</p>
	b	<p>(adherence to H&)Safety;</p> <p>correct use of equipment;</p> <p>training;</p>	3	<p>ignore accreditation, proficiency testing, standard procedures</p> <p>allow examples eg. wear safety goggles</p> <p>allow just 'safety'</p> <p>allow examples such as calibration, maintenance, cleanliness, accuracy, working, good, checked, correct etc</p> <p>not just 'equipment' or 'cleanliness' or clean laboratory</p> <p>allow examples such as 'make sure staff know what they are doing', skilled workers</p> <p>not just 'staff'</p>

Question			Answer	Mark	Guidance
2	a		objective (lens); focus(sing adjuster); stage;	3	allow 'coarse or fine focus' not zoom
	b		reference to ability to discriminate between two points; reference to wavelength of light OR size of aperture;	2	allow references to amount or clarity of detail/definition accept references to how distinct image is ignore references to clearer focus, blurred images, magnification and depth of field
	c		arch and whorl;	1	accept either way round; both required
	d		power/magnification of a lens; power/magnification of a second lens;	2	not magnification of the microscope/its magnification allow 'how much the lens magnifies' accept objective, eyepiece etc for lens ignore strength ignore incorrect names of lenses as long as it is clear there are two if power/magnification is not given, allow 1 mark max for reference to 2 lenses.
3	a	i	qualitative;	1	
		ii	quantitative indicates how much / amount / gives a number / quantity;	1	assume 'it' refers to quantitative accept idea of numbers accept reverse argument candidates do not have to refer to qualitative
		iii	blue;	1	accept bluey / bluish and light or dark blue reject if any other colour is given
	b		4 because colour matches / same colour;	1	both needed accept same shade of grey
			clinistix	1	any other named medical colour testing procedure e.g. diabetes or Chlamydia or cancer etc. accept colour changing thermometers ignore colorimetry and chromatography accept ideas such as testing urine for glucose BUT not just testing urine

Question		Answer	Mark	Guidance										
4		<table border="1"> <tr> <td>A very thin slice is cut from the material.</td> <td>E</td> </tr> <tr> <td>The slice is dried and fixed.</td> <td>A</td> </tr> <tr> <td>The slice is placed in an electron microscope.</td> <td></td> </tr> <tr> <td>Air is sucked out of the electron microscope.</td> <td>D</td> </tr> <tr> <td>The image of the slice is viewed on a screen.</td> <td>B</td> </tr> </table>	A very thin slice is cut from the material.	E	The slice is dried and fixed.	A	The slice is placed in an electron microscope.		Air is sucked out of the electron microscope.	D	The image of the slice is viewed on a screen.	B	4	ignore if candidates creates and fills in centre box
A very thin slice is cut from the material.	E													
The slice is dried and fixed.	A													
The slice is placed in an electron microscope.														
Air is sucked out of the electron microscope.	D													
The image of the slice is viewed on a screen.	B													
5	a	because they are invisible / to be able to see them;	1	allow remain visible not to enable identification e.g. 'to see what they are'										
5	b	8; (1) 10; (1) 0.8;	3	0.8 with or without working = 3 marks if candidate has measured distances instead of using the scale: accept 5.6-5.8(cm) for X and 6.9-7.1(cm) for solvent front and 0.789-0.841 for Rf value										
	c	<table border="1"> <tr> <td>... sample molecules and solvent molecules.</td> <td>✓</td> </tr> <tr> <td>... all the solvent molecules.</td> <td></td> </tr> <tr> <td>... the sample molecules and the molecules of the medium.</td> <td>✓</td> </tr> <tr> <td>... all the molecules of the medium.</td> <td></td> </tr> <tr> <td>... all the molecules of the solute..</td> <td></td> </tr> </table>	... sample molecules and solvent molecules.	✓	... all the solvent molecules.		... the sample molecules and the molecules of the medium.	✓	... all the molecules of the medium.		... all the molecules of the solute..		2	more than two boxes ticked then lose 1 mark for each additional response.
... sample molecules and solvent molecules.	✓													
... all the solvent molecules.														
... the sample molecules and the molecules of the medium.	✓													
... all the molecules of the medium.														
... all the molecules of the solute..														
	d	i	C /paper chromatography;	1										
		ii	B /gas chromatography;	1										
		iii	D /electrophoresis;	1										

Question			Answer	Mark	Guidance
6	a	i	40;	1	accept 4cm and + or – 1 mm
		ii	40 / 10000; (1) 0.004;	2	accept 1/250mm or 1/2500cm 4×10^{-3} 0.004 scores 2 marks. If answer correct ignore calculation. ecf
	b		idea of foreground and background; idea of difference in focus(at different levels);	2	allow idea of near and far e.g. 3D effect, image and background ignore depth (of image) alone allow idea of clarity/sharpness of image ignore detail not 'focus' etc if response does not imply different levels
			Total	36	

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