

# **Additional Applied Science A**

General Certificate of Secondary Education

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

## **Mark Scheme for January 2013**

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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.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

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## Annotations

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

**Subject-specific Marking Instructions**

- a. Accept any clear, unambiguous response (including mis-spellings of scientific terms if they are *phonetically* correct, but always check the guidance column for exclusions).
- b. If a candidate alters his/her response, examiners should accept the alteration.
- c. Crossed out answers should be considered only if no other response has been made. When marking crossed out responses, accept correct answers which are clear and unambiguous.

*eg for a one-mark question where ticks in the third and fourth boxes are required for the mark:*

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

*This would be worth  
1 mark.*

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

*This would be worth  
0 marks.*

<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

*This would be worth  
1 mark.*

d. The list principle:

If a list of responses greater than the number requested is given, work through the list from the beginning. Award one mark for each correct response, ignore any neutral response, and deduct one mark for any incorrect response, eg one which has an error of science. If the number of incorrect responses is equal to or greater than the number of correct responses, no marks are awarded. A neutral response is correct but irrelevant to the question.

e. Marking method for tick-box questions:

If there is a set of boxes, some of which should be ticked and others left empty, then judge the entire set of boxes. If there is at least one tick, ignore crosses and other markings. If there are no ticks, accept clear, unambiguous indications, eg shading or crosses. Credit should be given according to the instructions given in the guidance column for the question. If more boxes are ticked than there are correct answers, then deduct one mark for each additional tick. Candidates cannot score less than zero marks.

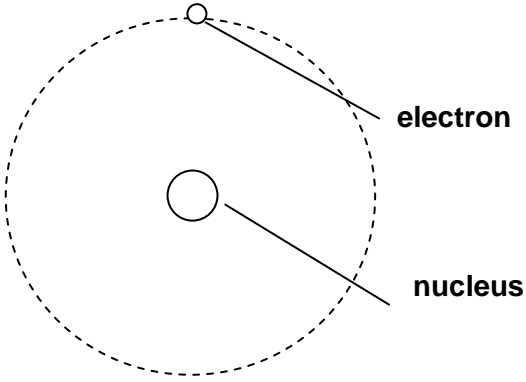
eg if a question requires candidates to identify cities in England:

Edinburgh	<input type="checkbox"/>
Manchester	<input type="checkbox"/>
Paris	<input type="checkbox"/>
Southampton	<input type="checkbox"/>

the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third should be blank (or have indication of choice crossed out).

Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	x	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	x		✓		✓	✓		✓	
<b>Score:</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>NR</b>

Question		Answer	Marks	Guidance
1	(a)	2 <sup>th</sup> box.. are analysed by the agency ..; 5 <sup>nd</sup> box.. used to accredit a laboratory ;	2	
	(b)	<b>2 from:</b> health & safety; checking / cleaning equipment; training;	2	<b>ignore</b> reasons why good laboratory practice is required eg to avoid contamination, for accurate / reliable results
		<b>Total</b>	<b>4</b>	


Question		Answer	Marks	Guidance										
2	(a)		1	2 correct = 1 1 correct = 0  <b>accept</b> protons or neutrons for nucleus										
	(b)	<table border="1"> <tr> <td>magnify thousands of times</td> <td><input type="checkbox"/></td> </tr> <tr> <td>produces images in colour</td> <td><input type="checkbox"/></td> </tr> <tr> <td>resolve problems by identifying specimens</td> <td><input type="checkbox"/></td> </tr> <tr> <td>produce a very focused image</td> <td><input type="checkbox"/></td> </tr> <tr> <td>produce separate images of closely spaced details</td> <td><input checked="" type="checkbox"/></td> </tr> </table>	magnify thousands of times	<input type="checkbox"/>	produces images in colour	<input type="checkbox"/>	resolve problems by identifying specimens	<input type="checkbox"/>	produce a very focused image	<input type="checkbox"/>	produce separate images of closely spaced details	<input checked="" type="checkbox"/>	1	if more than one box is ticked then box scores zero <b>allow</b> any other clearly identified correct response eg shading in the box
magnify thousands of times	<input type="checkbox"/>													
produces images in colour	<input type="checkbox"/>													
resolve problems by identifying specimens	<input type="checkbox"/>													
produce a very focused image	<input type="checkbox"/>													
produce separate images of closely spaced details	<input checked="" type="checkbox"/>													
	(c)	<table border="1"> <tr> <td>images of fields</td> <td><input type="checkbox"/></td> </tr> <tr> <td>sharp focus across the width of the specimen</td> <td><input type="checkbox"/></td> </tr> <tr> <td>sharp three dimensional images</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>both close and far parts of the specimen in focus</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>images deep within a substance</td> <td><input type="checkbox"/></td> </tr> </table>	images of fields	<input type="checkbox"/>	sharp focus across the width of the specimen	<input type="checkbox"/>	sharp three dimensional images	<input checked="" type="checkbox"/>	both close and far parts of the specimen in focus	<input checked="" type="checkbox"/>	images deep within a substance	<input type="checkbox"/>	2	if more than two boxes are ticked then each incorrect box loses one mark from the total for the question the candidate cannot score less than zero
images of fields	<input type="checkbox"/>													
sharp focus across the width of the specimen	<input type="checkbox"/>													
sharp three dimensional images	<input checked="" type="checkbox"/>													
both close and far parts of the specimen in focus	<input checked="" type="checkbox"/>													
images deep within a substance	<input type="checkbox"/>													
<b>Total</b>			<b>4</b>											

Question			Answer	Marks	Guidance
3	(a)	(i)	to get a closer match;	1	
		(ii)	mix the solution;	1	
		(iii)	same every time / can be replicated;	1	
	(b)	(i)	any two from: accurate; more precise; more reliable / repeated; check results;	2	
		(ii)	quantitative;	1	
<b>Total</b>				<b>6</b>	

Question			Answer	Marks	Guidance
4	(a)		spot drawn above banned dye AND level with 8cm;	1	
	(b)	(i)	solvent;	1	<b>accept</b> water
		(ii)	dyes;	1	
		(iii)	paper;	1	
	(c)		the greater the attraction between medium and sample; slower sample moves;	2	<b>accept</b> reverse argument OR correct reference to sample and solvent.
	(d)		0.3;	1	<b>allow</b> 0.29-0.31
<b>Total</b>				<b>7</b>	



Question			Answer	Marks	Guidance
5	(a)	(i)	<b>B</b> ; shows most detail OWTTE;	2	eg biggest clear picture explanation mark dependent on choosing correct image
		(ii)	<b>B</b> ; in focus from front to back OWTTE;	2	explanation mark dependent on choosing correct image
		(iii)	<b>C</b> ; largest size of image;	2	explanation mark dependent on choosing correct image
	(b)		only original image was x70000; photo may be larger or smaller;	2	
	(c)		x900;	1	
<b>Total</b>				<b>9</b>	

Question		Answer	Marks	Guidance
6	(a)		2	
	(b)	27.2 cm;	2	unit mark dependent on correct value
	(c)	sketch; written description;	2	
		<b>Total</b>	<b>6</b>	
		<b>Paper Total</b>	<b>36</b>	

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