

Additional Applied Science A

General Certificate of Secondary Education

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

Mark Scheme for January 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.

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

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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

Subject-specific Marking Instructions

- If a candidate alters his/her response, examiners should accept the alteration.
- 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 boxes 3 and 4 are required for the mark:

Put ticks (✓) in the two correct boxes.

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

This would be worth 1 mark.

Put ticks (✓) in the two correct boxes.

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

This would be worth 0 marks.

Put ticks (✓) in the two correct boxes.

<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.

c. 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.

d. Marking method for tick boxes:

Always check the additional guidance.

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. If there are no ticks, accept clear, unambiguous indications, eg shading or crosses.

Credit should be given for each box correctly ticked. 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.

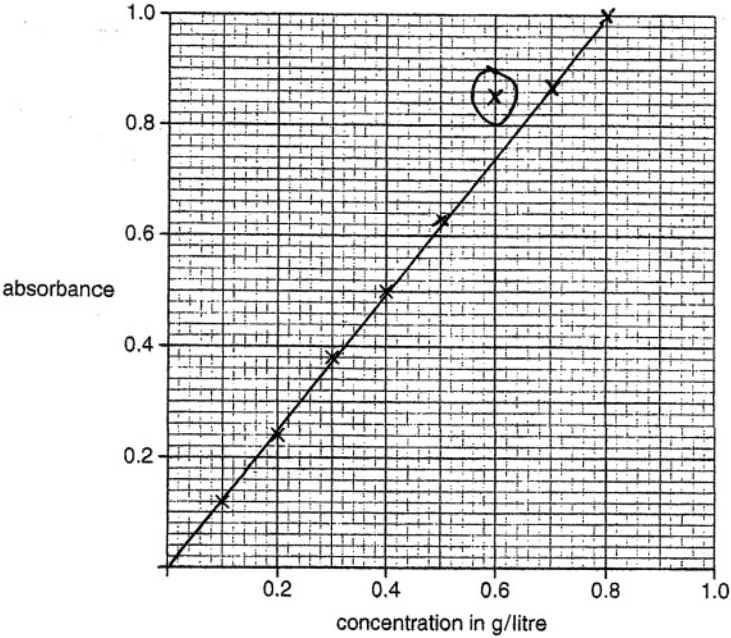
Eg If a question requires candidates to identify a city in England, then in the boxes

Edinburgh	
Manchester	
Paris	
Southampton	

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		✓		✓	✓		✓	
Score:	2	2	1	1	1	1	0	0	0	NR

Question		Answer	Mark	Guidance
1	(a)	C	1	
	(b)	0.3	1	reject 3
	(c)	D	1	
	(d)	idea that they have moved different distances	1	accept correct answer re Rf values ignore they are different colours ignore took longer to rise up accept not in line / different place on scale reject solvent moves by different amounts
	(e)	idea of comparison / match; to identify unknown	2	accept to check whether it contains that substance / to find out what it is
	(f)	solvent; mobile; stationary; quantitative	2	4 correct = 2 marks 3 correct = 1 mark
2	(a)		2	plotting mark 1 mark for all plots correct plots must be within half a square of correct position ignore 00 plot line of best fit 1 mark for line of best fit that goes through or within one square of the first and fourth given plots, and within 1 square of origin (must touch bottom left-hand square) reject multiple lines MUST BE STRAIGHT LINES

Question	Answer	Mark	Guidance
(b)		1	accept any point that they have plotted that is furthest away from their line of best fit
(c)	0.24	1	ecf if answer is not 0.24 then error carried forward from the candidates line of best fit reject all answers if line of best fit is not drawn
(d)	intensity of a colour	1	if more than 1 box is ticked then no mark accept any indication of correct result
3 (a)	to ensure the test is always carried out in the same way	1	accept reliable ignore accurate/can be repeated
(b)	to check that the sample could not have been contaminated	1	accept prevent tampering/ stop (bacteria/anything) getting in ignore spillage
(c)	to ensure the clinistick has not deteriorated	1	ignore to check it's not been used
(d)	to check for colour change (indicating the presence of glucose in the urine)	1	accept match colour with chart / to compare with chart / to see if glucose present

Question			Answer	Mark	Guidance
4	(a)	(i)	D because image is larger than others	1	accept more zoomed in / more up close / closer in ignore more magnified / closer alone reject more detail / more clarity
		(ii)	C because it is the largest and sharpest image	1	accept more detailed
		(iii)	A because it is sharp from front to back	1	accept ideas of 3D
	(b)		light microscope has less resolution	1	accept correct references to depth of field accept correct descriptions of resolution
	(c)		not portable; cost; longer setting up time; not for live samples; not coloured	2	3 correct = 2 mark 2 correct = 1 mark 0 or 1 correct = 0 marks accept needs power supply / heavy as alternatives to portable accept needs training to use / harder to use for longer setting up time ignore longer procedure
	(d)	(i)	980-1000 and 200-250; 1000 x 250 = 250000; square km	3	allow 250000 with no working for 2 marks
		(ii)	idea that area does not have straight lines; idea that calculated area has greater uncertainty than measured lengths	2	accept area may be different at different height (1) accept idea of uncertainty in measurements ignore incorrect multiplication / human error
5	(a)	(i)	it starts at 4 and not 0	1	accept left side of scale missing / it (only) starts at 4 reject scale doesn't start at 1 / scale finishes at 14
		(ii)	C	1	
		(iii)	D idea of greatest area under peak	2	accept widest / most spread out / range of retention time ignore biggest / retention time alone

Question		Answer	Mark	Guidance
	(b) (i)	any 2 from; (scene of) crime identification (of suspect / victim); paternity testing; pedigree testing food testing qualified eg pork in beef burgers	2	
	(ii)	any 2 from; size / shape / mass of particle; magnitude of charge on particle; voltage applied; time run for; temperature / pH / type of gel	2	accept fragment / molecule / atom for particle not sample / specimen for particle ignore temperature / pH unless clearly referring to the gel
Total			36	

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