

Chemistry A

General Certificate of Secondary Education

Unit **A321/01**: Modules C1, C2, C3 (Foundation 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

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
<u>words</u>	underlined words must be present in answer to score a mark
ecf	error carried forward
AW/owtte	credit alternative wording / or words to that effect
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

1. 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. 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.

e.g. 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.*

- 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, e.g. 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-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, e.g. 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.

e.g. 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		✓		✓	✓		✓	
Score:	2	2	1	1	1	1	0	0	0	NR

e. For answers marked by levels of response:

- i. **Read through the whole answer from start to finish**
- ii. **Decide the level that best fits** the answer – match the quality of the answer to the closest level descriptor
- iii. **To determine the mark within the level**, consider the following:

Descriptor	Award mark
A good match to the level descriptor	The higher mark in the level

Just matches the level descriptor	The lower mark in the level
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iv. Use the **L1**, **L2**, **L3** annotations in Scoris to show your decision; do not use ticks.

Quality of Written Communication skills assessed in 6-mark extended writing questions include:

- appropriate use of correct scientific terms
- spelling, punctuation and grammar
- developing a structured, persuasive argument
- selecting and using evidence to support an argument
- considering different sides of a debate in a balanced way
- logical sequencing.
















Question			Answer	Marks	Guidance
1	(a)	(i)	gases produced by plants <input type="checkbox"/> the decay of organic matter in the soil <input type="checkbox"/> The burning of fuels containing sulfur compounds <input checked="" type="checkbox"/>	1	
		(ii)	<div style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> oxygen <input checked="" type="checkbox"/> water <input checked="" type="checkbox"/> </div>	2	
		(iii)	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <input type="text"/> <input type="text" value="nitrogen dioxide"/> <input type="text"/> <input type="text"/> </div> <div style="width: 45%;"> <input type="text"/> <input type="text"/> <input type="text" value="NO<sub>2</sub>"/> <input type="text"/> </div> </div>	2	

Question		Answer	Marks	Guidance
1	(b)	<p>More cars and power stations changed to using low sulfur fuels.</p> <p style="text-align: right;"><input checked="" type="checkbox"/></p> <p style="text-align: right;"><input type="checkbox"/></p> <p style="text-align: right;"><input type="checkbox"/></p> <p>More power stations were fitted with devices to remove sulfur compounds from flue gases.</p> <p style="text-align: right;"><input checked="" type="checkbox"/></p> <p style="text-align: right;"><input type="checkbox"/></p> <p style="text-align: right;"><input type="checkbox"/></p>	2	
	(c)	<p style="text-align: right;"><input type="checkbox"/></p> <p style="text-align: right;"><input type="checkbox"/></p> <p style="text-align: right;"><input type="checkbox"/></p> <p>the Government <input checked="" type="checkbox"/></p>	1	
Total			8	

Question		Answer	Marks	Guidance
2	(a)	carbon (1) hydrogen (1)	2	
	(b)	<p style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> polymerisation <input checked="" type="checkbox"/> <input type="checkbox"/> </p>	1	
	(c) (i)	B	1	
	(ii)	A	1	
	(iii)	B	1	
	(iv)	plasticizer	1	
Total			7	

Question	Answer	Marks	Guidance
<p>3 (a)</p>	<p>Burning waste paper gives off carbon dioxide. <input checked="" type="checkbox"/></p> <p><input type="checkbox"/></p> <p>Paper in landfill slowly rots and gives off methane, which contributes to global warming. <input checked="" type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	<p>2</p>	
<p>(b)</p>	<p>first mark for idea that making new paper and making recycled paper involves a difference in energy used/pollution created/is more efficient</p> <p>plus any two differences between new and recycled paper shown in the diagram, from:</p> <p><i>1 transport</i> transporting/collecting waste paper for recycling may be for greater distance than transporting cut trees for new paper;</p> <p><i>2 de-inking and bleaching</i> recycled paper has to be de-inked/bleached but not new paper;</p> <p><i>3 screening and cleaning</i> contaminants are different for new and recycled paper (so screening and cleaning is different);</p> <p><i>4 replanting</i> trees can be replanted.</p>	<p>3</p>	<p>do not allow marks for answers that only refer to cutting trees being less sustainable because it reduces number of trees etc/recycled paper being more sustainable since it re-uses material rather than using up resources etc</p> <p>first marking point must refer to energy used or pollution created or environmental impact being less for new paper <u>or</u> replanting replaces raw material.</p> <p>examples of differences between new paper and recycled paper must be from the diagram to score marks and show a benefit for new paper.</p> <p>accept implied differences</p>

Question		Answer	Marks	Guidance
3	(c)	making sheets of paper (1) both involve spraying pulp onto wire screen/passing pulp through heated rollers (1)	2	
		Total	7	

Question	Answer	Marks	Guidance															
4 (a)	<p><i>any two from:</i> it enables an average/mean to be calculated; it allows outliers to be identified (and discarded); it allows for differences in samples/it allows for errors in equipment/it allows for errors in technique/one measurement may be in error;</p>	2	<p>do not allow to obtain a best estimate allow it increases the reliability/accuracy (of the best estimate)</p>															
(b)	0.178 (2)	2	<p>2 marks for correct answer allow 1 mark for addition of values to 0.89</p>															
(c)	<table style="width: 100%; text-align: center;"> <tr> <td><input type="checkbox"/></td> <td></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td></td> <td><input checked="" type="checkbox"/> (1)</td> </tr> <tr> <td><input type="checkbox"/></td> <td></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td></td> <td><input type="checkbox"/></td> </tr> </table>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		<input checked="" type="checkbox"/> (1)	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	2	
<input type="checkbox"/>		<input type="checkbox"/>																
<input type="checkbox"/>		<input checked="" type="checkbox"/> (1)																
<input type="checkbox"/>		<input type="checkbox"/>																
<input checked="" type="checkbox"/>		<input type="checkbox"/>																
<input type="checkbox"/>		<input type="checkbox"/>																
	Total	6																

Question		Answer			Marks	Guidance															
5	(a)	<table border="1"> <thead> <tr> <th>Farming Method</th> <th>Organic Farming</th> <th>Intensive Farming</th> </tr> </thead> <tbody> <tr> <td>use pesticides to kill pests</td> <td></td> <td>✓</td> </tr> <tr> <td>use predators to kill pests</td> <td>✓</td> <td></td> </tr> <tr> <td>use herbicides to kill weeds</td> <td></td> <td>✓</td> </tr> <tr> <td>pull out weeds by hand</td> <td>✓</td> <td></td> </tr> </tbody> </table>			Farming Method	Organic Farming	Intensive Farming	use pesticides to kill pests		✓	use predators to kill pests	✓		use herbicides to kill weeds		✓	pull out weeds by hand	✓		3	all four correct = 3 marks three correct = 2 marks two correct = 1 mark one correct = 0 marks
Farming Method	Organic Farming	Intensive Farming																			
use pesticides to kill pests		✓																			
use predators to kill pests	✓																				
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pull out weeds by hand	✓																				
	(b)	a plan for meeting people's needs (1) without spoiling the environment (for the future)/leaving resources (for future generations) (1)			2	allow without using up finite resources allow replacing what we use, so that it doesn't run out in the future for 2 marks allow managing what we use so that it does not run out in the future for 2 marks allow examples in place of resources eg trees															
	(c)	manure can be obtained from animals and so will not run out (1) synthetic fertiliser is made from crude oil that will run out (1)			2	allow supply of animal manure will not run out or fossil fuels used to make eg synthetic fertiliser/chemicals will run out															
Total					7																

Question		Answer	Marks	Guidance															
6	(a)	<p>It gives the drink a longer shelf life.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td> </td></tr> <tr><td>✓</td></tr> <tr><td> </td></tr> </table>		✓		1													
✓																			
	(b) (i)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td></td> <td style="text-align: center;">True</td> <td style="text-align: center;">False</td> </tr> <tr> <td>The FSA has been funded by major food manufacturers.</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td>The FSA was set up as an independent food safety watchdog.</td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>The FSA was set up by an Act of Parliament.</td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>The FSA was set up to protect the public's health in relation to food.</td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>		True	False	The FSA has been funded by major food manufacturers.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The FSA was set up as an independent food safety watchdog.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The FSA was set up by an Act of Parliament.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The FSA was set up to protect the public's health in relation to food.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2	<p>all four correct = 2 marks three correct = 1 marks two correct or one correct = 0 marks</p>
	True	False																	
The FSA has been funded by major food manufacturers.	<input type="checkbox"/>	<input checked="" type="checkbox"/>																	
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The FSA was set up to protect the public's health in relation to food.	<input checked="" type="checkbox"/>	<input type="checkbox"/>																	

Question			Answer	Marks	Guidance
6	(b)	(ii)	<input type="checkbox"/> Sorbic acid has been approved for use in the EU. <input checked="" type="checkbox"/> Sorbic acid has passed a safety test. <input type="checkbox"/> <input type="checkbox"/>	2	
	(c)		<input type="checkbox"/> Research has shown no link between sorbic acid and harmful effects <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> One person could not realistically consume enough litres of drinks containing sorbic acid to exceed the maximum daily dose of sorbic acid <input checked="" type="checkbox"/>	2	
			Total	7	

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