OCR
RECOGNISING ACHIEVEMENT

GCSE

Chemistry A

General Certificate of Secondary Education

Unit **A322/01:** Modules C4, C5, C6 (Foundation Tier)

Mark Scheme for June 2012

Oxford Cambridge and RSA Examinations

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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	credit alternative wording / or words to that effect
ORA	or reverse argument

Available in scoris to annotate scripts:

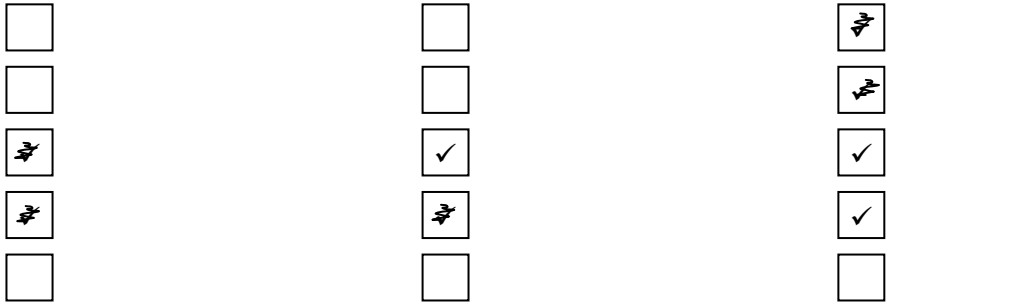
	indicate uncertainty or ambiguity
BOD	benefit of doubt
CON	contradiction
	incorrect response
ECF	error carried forward
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
NBOD	no benefit of doubt
R	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. 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:



This would be worth 1 mark.

This would be worth 0 marks.

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	
Manchester	
Paris	
Southampton	

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

Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	×	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	×		✓		✓	✓		✓	
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:

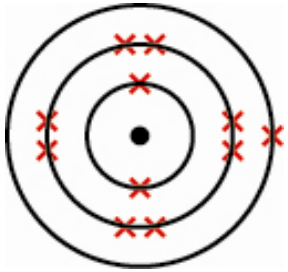
Descriptor	Award mark
A good match to the level descriptor	The higher mark in the level
Just matches the level descriptor	The lower mark in the level

iv. Use the **L1**, **L2**, **L3** annotations in Scoris to show your decision; do not use ticks.

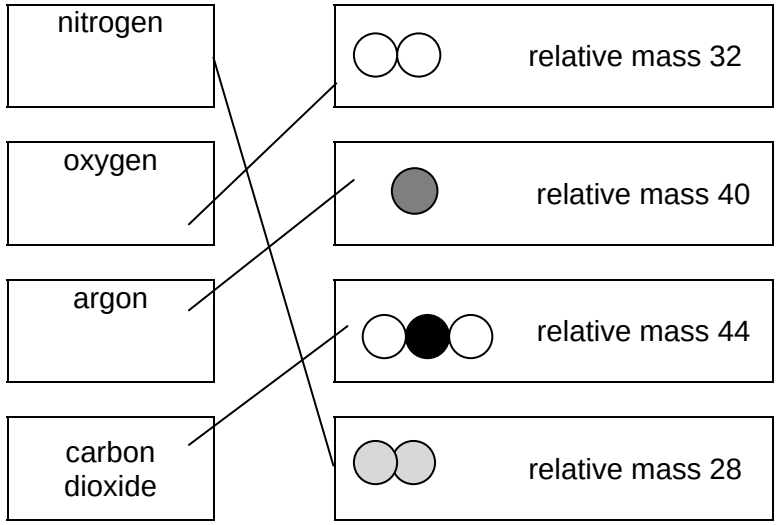
Quality of Written Communication skills assessed in 6-mark extended writing questions include:

- 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)	*any three from:* trends: melting points decrease down the group / table; (1) boiling points decrease down the group / table ; (1) melting point decreases as boiling point decreases; (1) similarities: formulae of the hydroxides; (1) melting points are all low (for metals); (1) boiling points are all low (for metals); (1) densities are all low (for metals); (1)	3	**accept** ... increase up .... instead of ... decrease down ... **ignore** comments about density **ignore** references to similar m.p, b.p or density
		(ii)	density; sodium is too high / potassium too low ;	2	**accept** no trend in formulae (all the same) for [1] **not** just goes up then down as you go down the group **look for** evidence related to density from table for the second mark
	(b)		KCl	1	correctly capitalised
			Total	**6**	

Question			Answer	Marks	Guidance
2	(a)		2.7	1	
	(b)			1	
	(c)		protons and neutrons	1	either order
			Total	**3**	

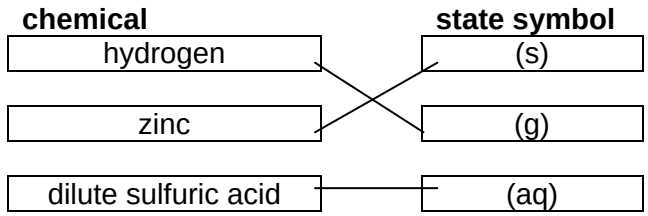
Question			Answer	Marks	Guidance
3	(a)		chlorine – green gas bromine – red-brown liquid iodine – grey solid	2	1 or 2 correct = 1 3 correct = 2
	(b)	(i)	sodium + chlorine → sodium chloride	1	if symbols used, formulae must be correct & balanced
		(ii)		1	
			Total	**4**	

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>4</td><td>(a)</td><td></td><td>name arrangement of atoms and relative mass
 
</td><td>2</td><td>all four correct = 2
2 or 3 correct = 1
1 correct = 0</td></tr>
<tr><td></td><td>(b)</td><td></td><td><table>
<tr><td>All the gases in the air are elements.</td><td></td></tr>
<tr><td>Air contains only non-metal elements.</td><td>✓</td></tr>
<tr><td>There are weak attractions between molecules in the air.</td><td>✓</td></tr>
<tr><td>All the gases have high melting points and boiling points.</td><td></td></tr>
<tr><td>The gases are good conductors of electricity.</td><td></td></tr>
</table></td><td>2</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>4</td><td></td></tr>
</table>

Question			Answer	Marks	Guidance
5	(a)		(burning) wood releases carbon dioxide; trees take in carbon dioxide / trees use carbon dioxide (for photosynthesis) / need carbon dioxide to grow; same amount taken in as given out / no carbon (dioxide) is added to the air;	3	**ignore** references to oxygen **reject** 'plants breathe in carbon dioxide'
	(b)		hydrogen, oxygen and nitrogen ✓ oxygen, nitrogen and chlorine silicon, oxygen and nitrogen iron, hydrogen and oxygen	1	
			Total	**4**	

Question			Answer	Marks	Guidance
6	(a)		The aluminium oxide loses oxygen. ✓ The density of the aluminium oxide decreases. The aluminium oxide loses energy. The volume of the aluminium oxide decreases.	1	
	(b)	(i)	ionic; liquid	2	
		(ii)	aluminium at the negative; oxygen at the positive	2	aluminium and oxygen identified uniquely as products = 1 mark
	(c)		**use** / **most important property** aircraft – low density... power cables – shiny... drinks and food cans – surface is non-toxic... jewellery – very good electrical conductivity ...	2	all four correct = 2 2 or 3 correct = 1 1 correct = 0
			Total	**7**	

Question			Answer	Marks	Guidance
7	(a)		hydrochloric acid; water and H_2O;	2	**not** hydrogen chloride, **accept** phonetic spelling **accept** (di)hydrogen oxide for water look for correct capitals and subscripts for H_2O subscript is at most half height of capital
	(b)		copper hydroxide, copper oxide	1	both needed
	(c)		separate / remove the copper carbonate (in excess); by filtering; through the filter paper/ filter paper goes into funnel; heat the solution (in the basin); to evaporate (the water); stop heating when some solution remains; leave to crystallise over a period of time	4	4 marks can only be awarded if items are in the correct sequence **reject** references to heating the solid for 4th marking point
			Total	**7**	

Question			Answer	Marks	Guidance
8	(a)			2	all 3 correct = 2 1 or 2 correct = 1
	(b)		zinc sulfate	1	
	(c)		Use the same mass of zinc but in larger pieces. ; Use a higher concentration of acid. ✓ Do the experiment at a lower temperature. ; Use a lower mass of zinc. ; Increase the surface area of the zinc. ✓ Use a larger gas syringe. ;	2	
	(d)	(i)	no reaction is happening ; reaction rate is at its fastest ✓ the reaction is slow but getting faster ; the reaction is happening at a constant rate ;	1	
		(ii)	reaction has stopped ✓ reaction rate is at its fastest ; reaction is increasing in rate ; gas is being given off at a constant rate ;	1	
			Total	**7**	

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