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General Certificate of Secondary Education

Science B 4462 / Chemistry 4421

CHY1F   Unit 1 Chemistry

Mark Scheme

2009 examination – June series

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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MARK SCHEME

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example:
where consequential marking needs to be considered in a calculation;
or the answer may be on the diagram or at a different place on the script.

In general the right hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

2.1 In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following lines is a potential mark.

2.2 A bold **and** is used to indicate that both parts of the answer are required to award the mark.

2.3 Alternative answers acceptable for a mark are indicated by the use of **or**. (Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.)

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which candidates have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

Example 1: What is the pH of an acidic solution? (1 mark)

Candidate	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Candidate	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.2   Use of chemical symbols / formulae

If a candidate writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3   Marking procedure for calculations

Full marks can be given for a correct numerical answer, as shown in the column 'answers', without any working shown.

However if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column;

3.4   Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5   Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6   Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7   Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

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Question 1

question	answers	extra information	mark
1(a)	conducts (electricity) **or** allows electrons / current to flow	accept flexible ignore conducts heat	1
1(b)	electron		1
1(c)(i)	lithium>copper>tungsten **or** Li>Cu>W	all correct allow **1** mark for one metal in the correct position	2
1(c)(ii)	has high / highest melting point **or** can withstand the highest temperature	accept has high / highest boiling point	1
1(d)	unreactive		1
Total			**6**

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Question 2

question	answers	extra information	mark
2(a)(i)	wood		1
2(a)(ii)	30 (kJ)		1
2(a)(iii)	carbon / C **or** hydrogen / H **or** sulfur / S **or** oxygen / O		1
2(a)(iv)	3 / three (g)		1
2(b)(i)	releases most energy	accept releases a lot of energy / burns rapidly ignore references to cost	1
	no harmful gases / no or less pollution formed / no global warming / no climate change / no greenhouse gas	accept produces water (only) /steam accept does **not** produce sulfur dioxide / carbon dioxide / carbon monoxide / particles / smoke	1

Question 2 continues on the next page…

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Question 2 Continued

question	answers	extra information	mark
2(b)(ii)	any **one** from: • expensive • difficult to produce • not available in large quantities • explosive / dangerous • not a natural fuel / resource • made from fossil fuels • difficult to store	accept large volume needed allow will run out / non-renewable	1
Total			**8**

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Question 3

question	answers	extra information	mark
3(a)(i)	any **one** from: • does not contain much saturated fat **or** low in saturated fat • contains a lot of unsaturated fat **or** high in unsaturated fat	accept correct use of figures to compare the amount of fat to the total amount of fat	1
3(a)(ii)	bromine		1
3(b)(i)	an emulsifier		1
3(b)(ii)	texture		1
3(c)(i)	any **two** from: • **A** has four colours • **B** has three colours • **A / B** have two colours the same • **B** has one different colour	if first two bullets not stated accept **A** has more colours (than **B**) **or** **B** has less colours (than **A**) for **1** mark only	2
3(c)(ii)	chromatography		1
Total			**7**

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Question 4

question	answers	extra information	mark
4(a)(i)	nitrogen / N_2		1
4(a)(ii)	carbon dioxide / CO_2		1
4(b)(i)	humans / scientists had not evolved	accept it was billions / millions of years ago allow too long ago	1
4(b)(ii)	temperature is above 100°C **or** any water would evaporate / boil	accept Venus is too hot	1
4(c)	any **three** from: • used by <u>plants</u> • used for <u>photosynthesis</u> • <u>dissolves</u> in oceans / seas • used to form the shells / skeletons of marine organisms • <u>locked up</u> as limestone / carbonates • <u>locked up</u> as fossil fuels / oil / coal	accept <u>plants take in carbon dioxide and give out oxygen</u> for the first two bullet points ie **2** marks allow absorbs into oceans / seas	3
Total			**7**

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Question 5

question	answers	extra information	mark
5(a)(i)	C_2H_4		1
5(a)(ii)	poly(ethene)		1
5(b)(i)	is not biodegradable		1
5(b)(ii)	not enough landfill sites / space	accept landfill sites are filling up **or** plastics remain for <u>years</u> **or** plastics not broken down ignore cost / waste of resources / not biodegradable / wildlife	1
5(b)(iii)	less (crude) oil / fuels / energy used	accept (crude) <u>oil</u> is a non-renewable resource	1
Total			**5**

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Question 6

question	answers	extra information	mark
6(a)(i)	3 / three		1
6(a)(ii)	5 / five		1
6(b)	any **one** from: • less / no transport • less / no (fossil) fuel used	accept less / no distance ignore references to carbon dioxide / carbon emissions	1
6(c)(i)	carbon dioxide / CO_2 (causes) global warming / climate change / greenhouse gas **or** (cement) particles / smoke　　(1) (causes) asthma / dust / (global) dimming　　(1) **or** sulfur dioxide / SO_2 / nitrogen oxides / NO_x　　(1) (causes) acid rain　　(1)	for a correct emission explanation must be correct for named emission ignore ozone layer accept breathing problems do **not** accept nitrogen or water vapour for emissions do **not** accept no named emission	1 1

Question 6 continues on the next page…

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Question 6 Continued

question	answers	extra information	mark
6(c)(ii)	absorb / trap / capture / filter / pass through water / scrub / electrostatic attraction	ignore condense / off setting / different fuel	1
Total			**6**

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Question 7

question	answers	extra information	mark
7(a)(i)	calcium oxide / quicklime	allow calcium monoxide do **not** accept calcium dioxide ignore chemical formulae	1
7(a)(ii)	any **three** from: • carbon dioxide / CO_2 • (carbon dioxide) reacts (with the calcium hydroxide / slaked lime / plaster) • limestone / calcium carbonate / $CaCO_3$ forms • water is lost / evaporates	it = plaster allow reaction 3 identified do **not** allow incorrect reaction ignore mixes, unless they state the correct product allow marble / chalk allow moisture ignore dries	3
7(b)(i)	as the amount / volume of sand decreases the strength of the mortar increases	accept as sand decreases the mortar is stronger / harder to crack allow as sand decreases the mortar increases allow converse ignore references to height of metal ball	1

Question 7 continues on the next page…

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Question 7 Continued

question	answers	extra information	mark
7(b)(ii)	any **two** from: • 400 / 5th result is anomalous • the interval between the others is similar or the interval is about 6/7 • he has only one set of results	 accept two results (36 and 37 / 400 and 500 / 4th and 5th) are almost the same accept result at 400 should be 42 allow the other results fit a pattern / are on a straight line allow he has only done it once ignore reliable	2
Total			**7**