



General Certificate of Secondary Education

Science B 4462 / Chemistry 4421

CHY1F Unit Chemistry 1

Mark Scheme

2007 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.

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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.

3.8 Unexpected Correct Answers not in the Mark Scheme

The Examiner should use professional judgement to award credit where a candidate has given an unexpected correct answer which is not covered by the mark scheme. The Examiner should consult with the Team Leader to confirm the judgement. The Team Leader should pass this answer on to the Principal Examiner with a view to informing all examiners.

CHY1F Question 1

	answers	extra information	mark
(a)	low density		1
	unreactive		1
(b)	a polymer		1
(c)	any one from: <ul style="list-style-type: none"> not broken down by (microorganisms) does not decay (naturally) 	ignore cannot recycle / degrade / disintegrate	1
total			4

CHY1F Question 2

	answers	extra information	mark
(a)(i)	additive		1
(b)	any three from: <ul style="list-style-type: none"> colour 1 is made up of only one colour / dye colour 2 is made up of only one colour / dye colour 3 is made up of two colours / dyes or more colours (than colours 1 and 2) <ul style="list-style-type: none"> colours 1, 2 and 3 are all different colour 1 is less dark than colour 2 	accept colour 3 is a mixture of colours 1 and 2 for 3 marks accept E-number or additive instead of colour ignore comments about height / level	3
total			4

CHY1F Question 3

	answers	extra information	mark
(a)	hydrogen	ignore formulae	1
(b)	any two from: <ul style="list-style-type: none"> different sized molecules / more or less (carbon) atoms (in molecules) fuels have <u>different</u> boiling points fuels condense at <u>different</u> temperatures 	ignore different densities	2
(c)		all three correct = 3 marks two correct = 2 marks one correct = 1 mark	3
total			6

CHY1F Question 4

	answers	extra information	mark
(a)(i)	any one from: <ul style="list-style-type: none"> • iron ore is a limited resource / non-renewable • iron is in high demand • provide jobs • economic advantage 		1
(ii)	any two from: <ul style="list-style-type: none"> • would damage (wildlife) habitats / countryside / greenfield sites • extra traffic • visual (pollution) / eyesore • noise (pollution) / sound (pollution) • dust (pollution) • river (pollution) • carbon dioxide (from traffic) / adds to greenhouse effect / global warming • damage roads / buildings by <u>vibrations</u> / <u>shockwaves</u> 		2
(b)(i)	carbon monoxide / carbon	accept formulae CO / C	1
(ii)	atoms	accept (particles) are all the same (size) / type for one mark	1
	are all the same (size) / type		1

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Question 4 continued

	answers	extra information	mark
(iii)	any two from: <ul style="list-style-type: none">• impurities / carbon / different (sized) atoms or elements or metals• changes the structure / disrupts the pattern or layers• prevents layers sliding over each other• it is an alloy		2
total			8

CHY1F Question 5

	answers	extra information	mark
(a)	core	ignore outer or inner	1
	mantle		1
(b)(i)	carbon dioxide	accept formula CO ₂	1
	oxygen	accept formulae O ₂ / O	1
(ii)	4%		1
(iii)	carbon dioxide has <u>decreased</u> / from 95% to 0%		1
	oxygen has <u>increased</u> / from 0% to 21%		1
	any one from: (carbon dioxide decrease) <ul style="list-style-type: none"> • carbon dioxide used during photosynthesis / by plants • carbon dioxide dissolves in oceans • carbon dioxide is locked up in rocks / carbonates / fossil fuels (oxygen increase) <ul style="list-style-type: none"> • oxygen released during photosynthesis / by plants 		1
total			8

CHY1F Question 6

	answers	extra information	mark
(a)	any two from: <ul style="list-style-type: none"> nitrogen carbon dioxide water (vapour) / steam 	accept formulae N / N ₂ accept formula CO ₂ ignore CO accept formula H ₂ O	2
(b)	any three from: <p><u>limestone</u></p> <ul style="list-style-type: none"> abundant / local natural material or no 'processing' needed relatively easy to cut appearance better <p><u>concrete</u></p> <ul style="list-style-type: none"> <u>raw materials</u> are abundant can be reinforced (by steel rods) / strong(er) / supported (by steel rods) concrete mixture can be poured / moulded / constructed on site less reactive with acid rain / weathering / erosion 	no mark for 'limestone' or 'concrete' on first line – mark advantages only ignore ideas of speed of production or easier to use accept 'can build higher' ignore density / extraction / quarrying / pollution / cost	3
total			5

CHY1F Question 7

	answers	extra information	mark
(a)(i)	$\text{Cu}_2\text{S} + 2\text{O}_2 \rightarrow 2\text{CuO} + \text{SO}_2$	accept fractions and multiples	1
(ii)	any two from: <ul style="list-style-type: none"> • sulfur dioxide • causes acid rain • consequence of acid rain eg kills fish / plants 	accept sulphur dioxide / sulphur oxide / SO_2 ignore other comments eg global warming / ozone / global dimming / greenhouse effect	2
(b)	any two from: <ul style="list-style-type: none"> • heat (copper oxide with carbon) • oxygen is removed by carbon or carbon monoxide / carbon dioxide is produced or carbon displaces copper • because carbon is more reactive than copper 	accept copper (oxide) loses oxygen or carbon gains oxygen accept carbon oxide accept a correct word or balanced symbol equation allow a correct comparison of reactivity	2
(c)(i)	electrolysis	accept electroplating	1
(ii)	(electrical) wiring / appliances / coins / pipes / cladding for buildings / jewellery / <u>making</u> alloys or named alloys		1

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Question 7 continued

	answers	extra information	mark
(d)	<p>any three explanations from:</p> <p><u>for recycling</u></p> <ul style="list-style-type: none"> • less acid rain (pollution) • copper reserves last longer / conserved or do not run out • energy for extraction (saved) or less energy required • less mining / quarrying • less waste (copper) / electrical appliances dumped or less landfill <p><u>against recycling</u></p> <ul style="list-style-type: none"> • collection problems • transport problems • difficult to separate copper from appliances • energy used to melt the collected copper 	<p>ignore electrolysis / pollution</p> <p>ignore ideas about less machinery / plant</p> <p>ignore idea of cost</p>	3
total			10