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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Science B 4462 / Chemistry 4421

CHY1F Unit 1 Chemistry

Mark Scheme

2008 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.

COMPONENT NUMBER: CHY1F

COMPONENT NAME: Science B / Chemistry

STATUS: Final

DATE: June 2008

question	answers	extra information	mark
1(a)	electron nucleus	words must be in correct position	1 1
1(b)(i)	oxygen / O_2	ignore air	1
1(b)(ii)	any **one** from: • (water) does not pollute • (only) water is produced • no carbon dioxide (is produced) • no sulfur dioxide (is produced) • no nitrogen oxides (are produced) • no carbon / no particles (are produced)	 accept no harmful gas(es) accept no greenhouse gas(es) / effect accept no acid rain	1
Total			**4**

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question	answers	extra information	mark
2(a)(i)	sulfur dioxide / SO_2		1
2(a)(ii)	global dimming		1
2(a)(iii)	carbon dioxide / CO_2	ignore ozone	1
	increases the levels (of carbon dioxide)	accept it is a greenhouse gas **or** causes global warming / greenhouse effect	1
2(b)	gas / oil bar correct length		1
	coal bar correct length		1
Total			**6**

COMPONENT NUMBER: CHY1F

COMPONENT NAME: Science B / Chemistry

STATUS: Final

DATE: June 2008

question	answers	extra information	mark
3(a)	tectonic radioactive	words must be in correct places	1 1
3(b)(i)	any **two** from: • records not available / made / accurate • bodies not found • affected many islands / large area		2
3(b)(ii)	any **two** from: • cannot predict earthquakes / plate movement • (cannot) accurately (predict earthquakes) • (earthquakes / tsunamis) are random / not regular / sudden • do not know what is happening below / in the Earth's crust / in the mantle • very slow / thousands of years build up of pressure	ignore references to technology / equipment	2
Total			**6**

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COMPONENT NAME: Science B / Chemistry

STATUS: Final

DATE: June 2008

question	answers	extra information	mark
4(a)(i)	crushed	if line blank allow crushed circled in the box	1
4(a)(ii)	any **one** from: • 'costs' less / cheaper • easier / faster • less complicated equipment • does not need heating / energy • distilling could decompose the oil		1
4(b)(i)	any **one** from: • do not mix / dissolve • (stay) separate • form layers • are immiscible		1
4(b)(ii)	mix emulsion	words must be in correct places	1 1
Total			**5**

COMPONENT NUMBER: CHY1F

COMPONENT NAME: Science B / Chemistry

STATUS: Final

DATE: June 2008

question	answers	extra information	mark
5(a)(i)	hydrogen	must be name	1
5(a)(ii)	a line of four or more ethene molecules joined to the original two with single bonds	at least two other ethene molecules joined to the original two in a chain gains **1** mark	2
5(b)(i)	any **two** from: • non-biodegradable • landfill sites are filling up / limited • waste of a resource / could be recycled / reused	accept remains a long time accept land / space used up ignore references to tablets / animals	2
5(b)(ii)	any **one** from: • (two) different polymers / plastics / materials • need to be separated • limited collection points / many need to be collected • tablets may still be present		1
Total			**6**

COMPONENT NUMBER: CHY1F

COMPONENT NAME: Science B / Chemistry

STATUS: Final

DATE: June 2008

question	answers	extra information	mark
6(a)	(an alloy) that can return to its original shape (after being deformed / bent / twisted)	accept (on heating / cooling) it returns to its shape	1
6(b)	any **two** from: • brass / it is a <u>mixture</u> • zinc changes structure / disrupts patterns or layers • copper metal atoms / layers able to slide over each other	 accept brass / it is <u>not pure</u> accept zinc prevents atoms / layers sliding over each other	2
6(c)(i)	oxygen / O_2 / O		1
6(c)(ii)	lead remains (in furnace) because of its high boiling point zinc boils / evaporates (out of furnace) because of its low boiling point	 if neither mark awarded then allow **1** mark for different boiling points ignore references to melting points	1 1
Total			**6**

COMPONENT NUMBER: CHY1F

COMPONENT NAME: Science B / Chemistry

STATUS: Final

DATE: June 2008

question	answers	extra information	mark
7(a)(i)	calcium oxide / CaO	products can be in either order ignore chemical names other than calcium oxide **or** carbon dioxide	1
	carbon dioxide / CO_2		1
7(a)(ii)	(thermal) decomposition	accept endothermic	1
7(b)(i)	(chemical) reaction / react	accept calcium hydroxide / slaked lime produced ignore incorrect products	1
	energy / heat released / exothermic	ignore gets hot / heats up if neither mark awarded then allow 'mixing the chemicals heats up the coffee' for **1** mark	1
7(b)(ii)	any **two** from: • foil has been broken • ring pull used	if neither mark awarded accept 'cannot / difficult to repair' for **1** mark ignore button pushed	2
	• quicklime and / or water mixed / reacted	accept reaction not reversible accept cannot / difficult to replace quicklime / water / chemicals	
Total			**7**

COMPONENT NUMBER: CHY1F

COMPONENT NAME: Science B / Chemistry

STATUS: Final

DATE: June 2008

question	answers	extra information	mark
8(a)	any **one** from:		1
	• gasoline / petrol / it contains short(er) chains / hydrocarbons **or** small(er) molecules **or** contains few(er) carbons	accept fuel oil contains long(er) chain length / large(r) molecules **or** contains many carbons ignore particles	
	• gasoline / petrol / it has weak(er) / small(er) intermolecular forces	accept fuel oil has strong(er) / great(er) intermolecular forces	
8(b)	any **two** from:	only accept figures if used in a comparative statement	2
	• gasoline / petrol / it is in high demand	accept fuel oil is in low demand	
	• gasoline / petrol / it is in short supply	accept fuel oil is plentiful accept answers such as 'gasoline / petrol / its supply is less than demand for **2** marks **or** gasoline / petrol / its percentage in crude oil is less than demand for **2** marks	
	• (high) tax / duty		
	• cracking costs in terms of money / energy	accept cracking expensive	
8(c)	any **two** from:	ignore particles	2
	• (fuel oil / it) heated / vaporised		
	• with catalyst	accept a named catalyst if first two bullet points are not awarded 'cracking' gains **1** mark	
	• (to give / form / produce) short(er) chains / hydrocarbons **or** small(er) molecules **or** contains few(er) carbons	if wrong process named max **1** mark	
Total			**5**