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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Science B 4462 / Chemistry 4421

CHY1F Unit Chemistry 1

Mark Scheme

2009 examination – January 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: January 2009

question	answers	extra information	mark
1(a)	atoms		1
1(b)	mixture		1
	metal		1
	structure		1
	smart		1
1(c)(i)	any **two** from: • saves raw materials / iron ore • saves energy / fuels • make new / useful items • make money / it is economic • <u>reduces</u> pollution • decreases cost of steel cans • reduces carbon dioxide emissions • decreases waste materials / use of landfill	accept cheaper / saves money allow less harmful for the environment	2
1(c)(ii)	any **one** from: • provide information / education of the need to recycle • legislate against / charge for waste • reward / pay people to recycle • put labels on the cans • provide recycling bags / bins / areas	accept fine people for not recycling	1
Total			**8**

COMPONENT NUMBER: CHY1F

COMPONENT NAME: Science B / Chemistry

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question	answers	extra information	mark
2(a)(i)	1 3		1 1
2(a)(ii)	nucleus electron		1 1
2(b)(i)	methane / CH_4	accept natural gas ignore air do **not** allow other gases	1
2(b)(ii)	carbon dioxide		1
2(c)(i)	any **two** from: • medical risks • asthma • cancer • dirt • causes global warming / global dimming / greenhouse effect / acid rain	ignore death accept effect on health accept difficulty breathing/ lung disease allow smoke particles allow harmful for the environment	2
2(c)(ii)	any **two** from: • have a test done / scientific evidence • independent (evidence) • comparison of smoke particles / when different fuels used • medical evidence **or** more / less asthma attacks **or** cancer **or** dirt on cars		2
Total			**10**

COMPONENT NUMBER: CHY1F

COMPONENT NAME: Science B / Chemistry

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
3(a)(i)	pressing		1
3(a)(ii)	dissolve		1
3(b)	bromine		1
3(c)	temperature needs to be high / above 100°C **or** (sunflower oil has a) high(er) boiling point **or** boiling point of water is not high enough any **one** from: • remove water / make potato crisp(er) • adds / gives flavour	allow melting point accept water makes potato soft / soggy	1 1
3(d)(i)	any **one** from • to look attractive / redder / brighter • to attract buyers / make more profit / sell more		1
3(d)(ii)	any **one** from: • could cause cancer • unsafe / health risk	ignore death	1
3(e)(i)	chromatography		1

Question 3 continued on next page…

COMPONENT NUMBER: CHY1F

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DATE: January 2009

Question 3 continued…

question	answers	extra information	mark
3(e)(ii)	any **two** from: • not safe / may contain Sudan 1 • <u>one</u> (colour / dye) is safe • <u>one</u> (colour / dye) is / could be unsafe • <u>two</u> (colours / dyes) **or** B and C do not match • it contains two colours / dyes	accept <u>one</u> (colour / dye) **or** A does match	2
Total			**10**

COMPONENT NUMBER: CHY1F

COMPONENT NAME: Science B / Chemistry

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
4(a)	core		1
4(b)(i)	3 or below / low on the Richter scale	accept vibrations not felt / causes no damage ignore references to injuries	1
4(b)(ii)	4		1
4(b)(iii)	movement of (Earth's / tectonic) plates	allow plates collide	1
4(b)(iv)	(earthquakes) cannot be predicted / sudden / without warning / random	ignore under / in the sea	1
Total			**5**

COMPONENT NUMBER: CHY1F

COMPONENT NAME: Science B / Chemistry

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DATE: January 2009

question	answers	extra information	mark
5(a)(i)	polyethene / poly(ethene)	accept polythene / polyethylene	1
5(a)(ii)	needs heat / energy / high temperature / fuel (for cracking)	ignore other processes	1
	produces carbon dioxide / CO_2	ignore use of CO_2 **or** 'produces carbon'	1
5(b)	any **three** from: • use water from local sources **or** water from close to home • recycle bottles in the UK / close to home • (reduction in distance travelled) would reduce CO_2 emitted by transport • use tap water • use glass bottles / waxed cartons / metal bottles • do not put in landfill **or** recycle <u>more</u> • reuse / refill plastic bottles • <u>tax</u> imported water / plastic bottles (to offset carbon cost) • make more / all plastic bottles in UK	answers must be about the reduction of carbon cost accept do not recycle in other countries / Asia accept use of transport with low / no carbon dioxide emissions do **not** accept 'do not use plastic bottles' without an alternative material	3
Total			**6**

COMPONENT NUMBER: CHY1F

COMPONENT NAME: Science B / Chemistry

STATUS: Final

DATE: January 2009

question	answers	extra information	mark
6(a)(i)	the greater the number (of carbon atoms), the higher its boiling point	do **not** accept hydrocarbons for carbon atoms allow converse allow melting point	1
6(a)(ii)	accept answers in the range 344 to 350		1
6(a)(iii)	216		1
6(b)(i)	**EITHER** shortage of petrol **or** demand for petrol is higher than supply diesel is in excess **or** supply of diesel is higher than demand **OR** petrol low supply **and** diesel high supply (1) petrol high demand **and** diesel low demand (1)	petrol / diesel not specified = max **1** mark	1 1
6(b)(ii)	any **one** from: • <u>use diesel</u> to make petrol • make diesel cheap(er) (than petrol) **or** make petrol more expensive • mix ethanol with petrol	accept crack diesel **or** description of cracking accept lobby the government to reduce the tax on diesel / increase tax on petrol ignore biodiesel	1
Total			**6**