AQA Level 1/2 Certificate in Science: Double Award

CHEMISTRY PAPER 1F

SPECIMEN MARK SCHEME

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.

4. Quality of communication and levels marking

In Question 5a candidates are required to produce extended written material in English, and will be assessed on the quality of their written communication as well as the standard of the scientific response.

Candidates will be required to:

- use good English
- organise information clearly
- use specialist vocabulary where appropriate.

The following general criteria should be used to assign marks to a level:

Level 1: basic

- Knowledge of basic information
- Simple understanding
- The answer is poorly organised, with almost no specialist terms and their use demonstrating a general lack of understanding of their meaning, little or no detail
- The spelling, punctuation and grammar are very weak.

Level 2: clear

- Knowledge of accurate information
- Clear understanding
- The answer has some structure and organisation, use of specialist terms has been attempted but not always accurately, some detail is given
- There is reasonable accuracy in spelling, punctuation and grammar, although there may still be some errors.

Level 3: detailed

- Knowledge of accurate information appropriately contextualised
- Detailed understanding, supported by relevant evidence and examples
- Answer is coherent and in an organised, logical sequence, containing a wide range of appropriate or relevant specialist terms used accurately.
- The answer shows almost faultless spelling, punctuation and grammar.

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STATUS: Accredited

question	answers	extra information	mark
1(a)(i)	it melted quickly	allow melts in contact with water	1
1(a)(ii)	it is easily cut		1
1(a)(iii)	it fizzed	allow bubbled/effervescence ignore named gas	1
1(a)(iv)	it floats (on the water)	allow moves on the surface of the water	1
1(b)	sodium + chlorine ⟶ sodium chloride		1
1(c)(i)	element		1
1(c)(ii)	compound		1
1(d)	loses one electron from outer shell		1 1
1(e)(i)	8 electrons drawn on outer energy level / shell		1
1(e)(ii)	because oppositely charged ions attract each other **or** because chloride ions are negative and sodium ions are positive		1
Total			**11**

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question	answers	extra information	mark
2(a)	sulfuric water	accept H_2SO_4 accept H_2O	1 1
2(b)(i)	to increase the rate of reaction	accept to speed up the reaction	1
2(b)(ii)	no more solid dissolves **or** solid remains at bottom of beaker	do **not** allow no more reacts	1
2(b)(iii)	**A** (filter) funnel **B** filter paper		1 1
2(b)(iv)	crystallisation		1
2(b)(v)	this is because excess copper oxide is added to make sure that all the acid is neutralised / reacted the filtration step removes any excess copper oxide	 accept is removed in Stage **3**	1 1 1
Total			**10**

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question	answers	extra information	mark
3(a)	fractional distillation	'distillation' alone is not sufficient	1
3(b)	carbon and hydrogen single	must have both for mark, but can be either way round	1 1
3(c)(i)	**F**		1
3(c)(ii)	**F**		1
3(d)(i)	decreases up the tower	accept hotter at bottom than at top	1
3(d)(ii)	boiling points / temperatures	do not accept melting temperatures	1
3(e)(i)	acid rain → sulfur dioxide climate change → carbon dioxide global dimming → carbon particles		1 1 1
3(e)(ii)	oxygen carbon monoxide		1 1
Total			**12**

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question	answers	extra information	mark
4(a)	red	accept red-orange or brick red	1
4(b)(i)	calcium hydroxide	accept slaked lime	1
4(b)(ii)	blue alkali(ne)	 accept 'a source of hydroxide ions'	1 1
4(b)(iii)	11		1
4(c)(i)	exothermic		1
4(c)(ii)	because (heat) energy is given out (to the surroundings)	 2nd mark is dependent on the 1st	1 1
4(d)	oxygen will relight a glowing splint		1
Total			**9**

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question	answers	extra information	mark

5(a)

Marks awarded for this answer will be determined by the quality of communication as well as the standard of the scientific response. Examiners should also refer to the information on page 4 and apply a best-fit approach to the marking.

0 marks	Level 1 (1-2 marks)	Level 2 (3-4 marks)	Level 3 (5-6 marks)
No relevant content	There is a basic description of how copper is purified by electrolysis.	There is a clear description of how copper is purified by electrolysis.	There is a clear and detailed description of how copper is purified by electrolysis.

examples of chemistry points made in the response	extra information
• impure copper is made the positive electrode • at the positive electrode, (impure) copper loses electrons **or** forms positive ions **or** copper is oxidised • copper ions go into the solution • negative electrode is made of pure copper • the ions are attracted to / move to the negative electrode • where they gain electrons and are deposited as copper • impurities are not attracted to the negative electrode • so collect at the bottom	accept explanations in terms of half equations

5(b)(i)	the atoms are arranged in layers / rows which can slide over each other		1 1
5(b)(ii)	because it is a <u>mixture</u> of copper and zinc	accept because it is a mixture of two metals / atoms **or** because it contains two different metals / atoms	1
5(b)(iii)	because the zinc atoms are bigger than the copper atoms which stops the layers from sliding over each other	allow because the atoms are different sizes	1 1
Total			**11**

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question	answers	extra information	mark
6(a)	*Advantage* any **one** from: • the ethanol is renewable • the ethanol is carbon neutral. *Disadvantage:* any **one** from: • a lot of land is needed to grow the plant material to use • uses land that could be used for growing crops for food • slow process **or** produces carbon dioxide **or** batch process • distillation of ethanol uses energy		1 1
6(b)(i)	20.9		1
6(b)(ii)	start temp <u>and</u> end temp of water start mass <u>and</u> end mass of burner	 if just 'temp of water and mass of burner' award 1	1 1
6(b)(iii)	any **one** from: • to improve quality of results • to check repeatability • to make it easier to spot an anomalous measurement • to be able to calculate an average mean value.		1
6(b)(iv)	use a lid / cover over the calorimeter	accept any mention of how the calorimeter could be safely enclosed / insulated	1
Total			**7**