AQA Level 1/2 Certificate in Science: Double Award

CHEMISTRY PAPER 1H

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 5b 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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COMPONENT NAME: Chemistry Paper 1H

STATUS: Accredited

question	answers	extra information	mark
1(a)	so no acid left **or** to neutralise acid		1
1(b)	copper oxide / hydroxide		1
1(c)	crystals forming (round edge)	accept description of testing with glass rod	1
1(d)	any **one** from: • because rinsing gets rid of impurities, which dissolve in the water • using a small amount of cold water makes sure that not too much Cu(II) sulfate is dissolved		1
1(e)	$CuCO_3 + H_2SO_4 \rightarrow CuSO_4 + CO_2 + H_2O$	accept correct formulae with incorrect balancing for **1** mark	2
1(f)(i)	anhydrous copper sulfate	do not accept 'dehydrated'	1
1(f)(ii)	it (turns) blue because (dilute sulfuric acid) contains water **or** because (dilute sulfuric acid) rehydrates the crystals or because hydrated copper sulfate is formed	owtte ignore references to forming a solution / dissolving	1 1
Total			**9**

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question	answers	extra information	mark
2(a)	**advantages** ethanol is renewable because it comes from plants and more plants can be grown **or** ethanol is carbon neutral (1) because the carbon dioxide produced when ethanol is burned is equivalent to / matches the carbon dioxide removed by photosynthesis when the plants were growing (1) **disadvantages** it uses land to produce plant material for the fuel which could cause deforestation **or** which reduces land available for food production **or** it is expensive to produce (1) because fermentation produces a dilute solution, which needs further processing (1)	explanation must match stated advantage / disadvantage to gain the mark	1 1 1 1
2(b)(i)	20.9	reject any other answer	1
2(b)(ii)	carbon particles incomplete combustion **or** insufficient oxygen / air		1 1
Total			**7**

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question	answers	extra information	mark
3(a)	(contains) carbon and hydrogen		1
	only		1
	no double bonds **or** only single bonds		1
3(b)	the heated crude oil vaporises / evaporates	'heating' alone is not sufficient: vaporisation / evaporation must be mentioned	1
	the vapour cools as it rises up the tower / column **or** tower / column cooler at the top		1
	the (different) fractions have different boiling points / condensation points	accept the larger the molecules, the higher the boiling point / condensation point	1
	so they will condense at different levels in the tower		1
3(c)(i)	$2C_8H_{18} + 25\ O_2 \rightarrow 16\ CO_2 + 18\ H_2O$		
	correct products		1
	balancing	allow halves and multiples ignore state symbols mark for balancing dependent on correct products	1
3(c)(ii)	$N_2 + 2O_2 \rightarrow 2NO_2$		
	correct formulae		1
	balancing	allow halves and multiples ignore state symbols mark for balancing dependent on correct products	1
Total			**11**

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STATUS: Accredited

question	answers	extra information	mark
4(a)	both ions having correct numbers of electrons		1
	correct use of dots / crosses as per provided diagram	accept chloride with all dots or with one cross in outer shell and the remainder dots ignore brackets and charges	1
4(b)	+2		1
4(c)(i)	because there are strong forces of attraction	accept strong bonds	1
	between oppositely charged ions	accept positive and negative ions	1
	that need lots of energy to overcome / break		1
4(c)(ii)	because the current is carried by <u>ions</u>		1
	which cannot move when solid	ignore reference to electrons not being able to move	1
	but can move when molten	do not accept references to electrons moving	1
Total			**9**

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COMPONENT NAME: Chemistry Paper 1H

STATUS: Accredited

question	answers	extra information	mark
5(a)	$SO_2(g) + H_2O(l) \longrightarrow H_2SO_3(aq)$	accept reversible arrow	1

5(b)

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(c)(i)	Ag^+ gain of electrons		1 1
5(c)(ii)	$Cu^{2+} + Fe \rightarrow Cu + Fe^{2+}$		1
5(d)(i)	there are delocalised electrons / free electrons / electrons that move within the copper / metallic structure which are able to carry the current / charge		1 1

Question 5 continues on the next page

Question 5 continued

question	answers	extra information	mark
5(d)(ii)	because the atoms / ions in alloys are different sizes which prevents the layers sliding	first mark can be given for diagram	1 1
Total			**14**

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question	answers	extra information	mark
6(a)	three shared pairs rest correct		1 1
6(b)(i)	add hydrochloric acid / nitric acid then add barium chloride / nitrate (solution) white precipitate forms if sulfate is present	if no barium salt added, no marks accept insoluble barium sulfate forms	1 1 1
6(b)(ii)	flame test yellow / orange	accept description of flame test	1 1
6(b)(iii)	the rate of reaction decreases because the concentration is lower **or** because fewer particles (of reagent) per unit volume so there are fewer collisions per second	accept the reaction slows down	1 1 1
Total			**10**