



AQA Level 1/2 Certificate in Chemistry

PAPER 1

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 ecf 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 3a 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.

COMPONENT NUMBER: AQA Level 1/2 Certificate in Chemistry**COMPONENT NAME: Paper 1****STATUS: Specimen V5**

question	answers	extra information	mark
1(a)	fractional distillation	'distillation' alone is not sufficient	1
1(b)	carbon and hydrogen	must have both for mark, but can be either way round	1
	single		1
1(c)(i)	F		1
1(c)(ii)	F		1
1(d)	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
1(e)(i)	$2\text{C}_8\text{H}_{18} + 25 \text{O}_2 \rightarrow 16 \text{CO}_2 + 18 \text{H}_2\text{O}$ correct products	allow halves and multiples ignore state symbols mark for balancing dependent on correct products	1
	balancing		1
1(e)(ii)	global dimming or lung disease		1

Question 1 continues on the next page . . .

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COMPONENT NAME: Paper 1

STATUS: Specimen V5

Question 1 continued . . .

question	answers	extra information	mark
1(f)(i)	because the car engine / it is hot		1
1(f)(ii)	acid rain		1
Total			14

COMPONENT NUMBER: AQA Level 1/2 Certificate in Chemistry**COMPONENT NAME: Paper 1****STATUS: Specimen V5**

question	answers	extra information	mark
2(a)(i)	chlorine > bromine > iodine	accept symbols in place of names (Cl ₂ or Cl, etc)	1
2(a)(ii)	any two suitable comparisons about the extent to which the iron wool glowed eg chlorine is more reactive than bromine because iron glowed more brightly with chlorine than bromine eg bromine is more reactive than iodine because iron glowed with bromine but not with iodine eg iodine is the least reactive because it is the only one that did not glow eg chlorine is the most reactive as it was the only one that glowed brightly or glowed most brightly		max. 2
2(a)(iii)	NO (no marks)	accept YES (no marks)	
	because the observations were made using the halogen vapours	because the observations were made using the halogen vapours	1
	so the fact that the three elements are naturally solid, liquid or gas is not relevant	so the iodine (and bromine) must have been heated	1
2(b)	division of masses by A _r values	if division inverted (A _r / mass) then award zero marks	1
	correct answers of division	if one slip in A _r values used, do not award first mark, but award remainder consequentially	1
	simplification by division by smallest		1
	correct formula (NaClO ₃)	accept elements in any order (such as ClNaO ₃) correct answer alone with or without working = 4 marks	1
Total			9

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3(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 method, which includes some of the apparatus, and there is some attempt at explaining some of the steps. The method does not necessarily allow the procedure to be completed successfully by another person. There may be an attempt at identifying safety precautions but these may be inappropriate or incomplete.	There is a clear description of the method, which includes most of the apparatus needed, and an explanation of the various steps in the procedure. The method could be followed by another person. There is some attempt at identifying some, but not necessarily all, of the safety precautions needed.	There is a clear, balanced and detailed description of the method, which correctly names the apparatus needed and explains the purpose of each step. This method could easily be followed by another person. There is a comprehensive list of appropriate safety precautions.
examples of chemistry points made in the response <ul style="list-style-type: none">• heat the sulfuric acid in a <u>beaker</u> and add the copper oxide with stirring• because heating and stirring speed up the reaction• until the copper oxide is in <u>excess</u>• which means that the reaction has gone to completion• <u>filter</u> the mixture• or• pour the mixture through a <u>funnel</u> and <u>filter paper</u>• or• leave the mixture to stand and decant / pour off the excess liquid• to remove the <u>excess</u> / <u>unreacted</u> copper oxide• put the solution in an <u>evaporating basin</u>• heat it gently so that (some of) the <u>water evaporates</u>• when a saturated solution is formed or when crystals start to form, stop heating• leave the solution to cool so that crystallisation can occur.		extra information <p>the underlined words are needed to gain each point</p>	

Question 3 continues on the next page . . .

COMPONENT NUMBER: AQA Level 1/2 Certificate in Chemistry**COMPONENT NAME: Paper 1****STATUS: Specimen V5****Question 3 continued . . .**

question	answers	extra information	mark
examples of the safety points made in the response <ul style="list-style-type: none">• wear safety goggles – to protect eyes because sulfuric acid is corrosive / an irritant / harmful• care when heating – to protect against burns• wash hands after the preparation – copper sulfate is harmful / a sensitiser• care when handling glass apparatus – to protect against cuts• do not add copper oxide to boiling acid as it may boil over			
3(b)(i)	anhydrous copper sulfate	do not accept 'dehydrated'	1
3(b)(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

COMPONENT NUMBER: AQA Level 1/2 Certificate in Chemistry**COMPONENT NAME: Paper 1****STATUS: Specimen V5**

question	answers	extra information	mark
4(a)(i)	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(a)(ii)	Na ⁺ and Cl ⁻	both required	1
4(b)(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(b)(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

COMPONENT NUMBER: AQA Level 1/2 Certificate in Chemistry

COMPONENT NAME: Paper 1

STATUS: Specimen V5

question	answers	extra information	mark
5(a)(i)	correct structure showing all bonds $\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}-\text{O}-\text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array}$	accept –OH	1
5(a)(ii)	hydrogen / H ₂		1
5(b)(i)	oxidised		1
5(b)(ii)	vinegar		1
5(b)(iii)	COOH / carboxylic acid		1
5(c)(i)	ester		1
5(c)(ii)	flavouring / perfume / solvent		1
Total			7

COMPONENT NUMBER: AQA Level 1/2 Certificate in Chemistry**COMPONENT NAME: Paper 1****STATUS: Specimen V5**

question	answers	extra information	mark
6(a)(i)	killing trees or acidification of lakes or damage to building or statues		1
6(a)(ii)	$\text{SO}_2 + \text{H}_2\text{O} \longrightarrow \text{H}_2\text{SO}_3$	accept reversible arrow	1
6(b)(i)	at the positive electrode, (impure) copper loses electrons or forms positive ions or copper is oxidised which go into the solution 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		1 1 1 1 1
6(b)(ii)	$\text{Cu} \longrightarrow \text{Cu}^{2+} + 2\text{e}^-$ on right or $- 2\text{e}^-$ on left		1 1
6(c)(i)	the atoms / ions are arranged in layers / rows which means that the layers / rows can slide over each other		1 1
6(c)(ii)	because all atoms are the same		1
6(d)	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

COMPONENT NUMBER: AQA Level 1/2 Certificate in Chemistry

COMPONENT NAME: Paper 1

STATUS: Specimen V5

question	answers	extra information	mark
7(a)(i)	sulfuric neutralisation		1
			1
7(a)(ii)	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	1
			1
		accept insoluble barium sulfate forms	1
7(b)	(gases) cooled or temperature reduced so the ammonia turns to liquid and separates from the other gases		1
			1
7(c)(i)	2252 2346 (2252 – 2346) = –94	allow ecf from first two parts of calculation answer of 94 gains 2 marks sign must be correct	1
			1
			1
7(c)(ii)	general shape correct with correct relative heights of reagents and products, with reagents and products labelled E_a correctly marked (may have double headed arrow) ΔH correctly marked (arrow must go correct way)	allow ecf from (c)(i)	1
			1
			1
7(d)	three shared pairs rest correct		1
			1
Total			15

COMPONENT NUMBER: AQA Level 1/2 Certificate in Chemistry**COMPONENT NAME: Paper 1****STATUS: Specimen V5**

question	answers	extra information	mark
8(a)(i)	calcium hydroxide	accept slaked lime	1
8(a)(ii)	alkali(ne)	accept 'a source of hydroxide ions'	1
	OH ⁻		1
8(a)(iii)	11		1
8(b)(i)	line starts at origin, increases and becomes level at about same time as printed line		1
	drawn line ends lower than printed line		1
	time marked approximately at point printed line becomes level		1
8(b)(ii)	the concentration / amount / moles of N ₂ O ₄ increases		1
	so there are more collisions per second or same fraction of molecules have sufficient energy to break bonds, so more molecules break bonds each second		1
8(b)(iii)	the paler colour shows that more dinitrogen tetroxide / N ₂ O ₄ is formed which means that the equilibrium has moved to the right to oppose the decrease in temperature this means that the forward reaction is exothermic		1
			1
			1
			1
Total			13