



...day June 20XX – Morning/Afternoon

GCSE (9–1) Chemistry A (Gateway Science)

J248/01 Paper 1 (Foundation Tier)

SAMPLE MARK SCHEME

Duration: 1 hour 45 minutes

MAXIMUM MARK 90

DRAFT

This document consists of 20 pages

MARKING INSTRUCTIONS**PREPARATION FOR MARKING****SCORIS**

1. Make sure that you have accessed and completed the relevant training packages for on-screen marking: *scoris assessor Online Training*; *OCR Essential Guide to Marking*.
2. Make sure that you have read and understood the mark scheme and the question paper for this unit. These are posted on the RM Cambridge Assessment Support Portal <http://www.rm.com/support/ca>
3. Log-in to scoris and mark the **required number** of practice responses (“scripts”) and the **required number** of standardisation responses.

YOU MUST MARK 10 PRACTICE AND 10 STANDARDISATION RESPONSES BEFORE YOU CAN BE APPROVED TO MARK LIVE SCRIPTS.

MARKING

1. Mark strictly to the mark scheme.
2. Marks awarded must relate directly to the marking criteria.
3. The schedule of dates is very important. It is essential that you meet the scoris 50% and 100% (traditional 50% Batch 1 and 100% Batch 2) deadlines. If you experience problems, you must contact your Team Leader (Supervisor) without delay.
4. If you are in any doubt about applying the mark scheme, consult your Team Leader by telephone, email or via the scoris messaging system.

5. Work crossed out:
- where a candidate crosses out an answer and provides an alternative response, the crossed out response is not marked and gains no marks
 - if a candidate crosses out an answer to a whole question and makes no second attempt, and if the inclusion of the answer does not cause a rubric infringement, the assessor should attempt to mark the crossed out answer and award marks appropriately.
6. Always check the pages (and additional objects if present) at the end of the response in case any answers have been continued there. If the candidate has continued an answer there then add a tick to confirm that the work has been seen.
7. There is a NR (No Response) option. Award NR (No Response)
- if there is nothing written at all in the answer space
 - OR if there is a comment which does not in any way relate to the question (e.g. 'can't do', 'don't know')
 - OR if there is a mark (e.g. a dash, a question mark) which isn't an attempt at the question.
- Note: Award 0 marks – for an attempt that earns no credit (including copying out the question).
8. The scoris **comments box** is used by your Team Leader to explain the marking of the practice responses. Please refer to these comments when checking your practice responses. **Do not use the comments box for any other reason.**
- If you have any questions or comments for your Team Leader, use the phone, the scoris messaging system, or email.
9. Assistant Examiners will send a brief report on the performance of candidates to their Team Leader (Supervisor) via email by the end of the marking period. The report should contain notes on particular strengths displayed as well as common errors or weaknesses. Constructive criticism of the question paper/mark scheme is also appreciated.

10. For answers marked by levels of response:

Read through the whole answer from start to finish, using the Level descriptors to help you decide whether it is a strong or weak answer. The indicative scientific content in the Guidance column indicates the expected parameters for candidates' answers, but be prepared to recognise and credit unexpected approaches where they show relevance. Using a 'best-fit' approach based on the skills and science content evidenced within the answer, first decide which set of level descriptors, Level 1, Level 2 or Level 3, best describes the overall quality of the answer. Once the level is located, award the higher or lower mark:

The higher mark should be awarded where the level descriptor has been evidenced and all aspects of the communication statement (in italics) have been met.

The lower mark should be awarded where the level descriptor has been evidenced but aspects of the communication statement (in italics) are missing.

In summary:

The skills and science content determines the level.

The communication statement determines the mark within a level.

11. Annotations

Annotation	Meaning
DO NOT ALLOW	Answers which are not worthy of credit
IGNORE	Statements which are irrelevant
ALLOW	Answers that can be accepted
()	Words which are not essential to gain credit
—	Underlined words must be present in answer to score a mark
ECF	Error carried forward
AW	Alternative wording
ORA	Or reverse argument

12. Subject-specific Marking Instructions

INTRODUCTION

Your first task as an Examiner is to become thoroughly familiar with the material on which the examination depends. This material includes:

- the specification, especially the assessment objectives
- the question paper
- the mark scheme.

You should ensure that you have copies of these materials.

You should ensure also that you are familiar with the administrative procedures related to the marking process. These are set out in the OCR booklet **Instructions for Examiners**. If you are examining for the first time, please read carefully **Appendix 5 Introduction to Script Marking: Notes for New Examiners**.

Please ask for help or guidance whenever you need it. Your first point of contact is your Team Leader.

The breakdown of Assessment Objectives for GCSE (9–1) in Chemistry A:

	Assessment Objective
AO1	Demonstrate knowledge and understanding of scientific ideas and scientific techniques and procedures.
AO1.1	Demonstrate knowledge and understanding of scientific ideas.
AO1.2	Demonstrate knowledge and understanding of scientific techniques and procedures.
AO2	Apply knowledge and understanding of scientific ideas and scientific enquiry, techniques and procedures.
AO2.1	Apply knowledge and understanding of scientific ideas.
AO2.2	Apply knowledge and understanding of scientific enquiry, techniques and procedures.
AO3	Analyse information and ideas to interpret and evaluate, make judgements and draw conclusions and develop and improve experimental procedures.
AO3.1	Analyse information and ideas to interpret and evaluate.
AO3.1a	Analyse information and ideas to interpret.
AO3.1b	Analyse information and ideas to evaluate.
AO3.2	Analyse information and ideas to make judgements and draw conclusions.
AO3.2a	Analyse information and ideas to make judgements.
AO3.2b	Analyse information and ideas to draw conclusions.
AO3.3	Analyse information and ideas to develop and improve experimental procedures.
AO3.3a	Analyse information and ideas to develop experimental procedures.
AO3.3b	Analyse information and ideas to improve experimental procedures.

SECTION A

Question	Answer	Marks	AO element	Guidance
1	D	1	1.2	
2	D	1	1.2	
3	A	1	2.1	
4	C	1	1.1	
5	B	1	1.1	
6	B	1	1.1	
7	A	1	2.1	
8	B	1	2.2	
9	C	1	2.2	
10	A	1	1.1	
11	C	1	2.1	
12	C	1	1.1	
13	A	1	2.1	
14	B	1	1.2	
15	D	1	1.2	

SECTION B

Question		Answer	Marks	AO element	Guidance
16	(a)	<p>A is exothermic as the temperature increases (1)</p> <p>B is neither exothermic nor endothermic as the temperature stays the same (1)</p> <p>C is endothermic as the temperature drops (1)</p> <p>D is exothermic as the temperature increases (1)</p>	4	1.2 3 x 3.2b	ALLOW no energy change
	(b)	<p>Idea that thermometer should remain in reaction mixture for temperature at end (1)</p> <p>otherwise temperature at end will be inaccurate (1)</p>	2	3.3b	<p>ALLOW do not stir with thermometer (1) as it is fragile (1)</p> <p>ALLOW lag the beaker (1) to reduce energy loss (1)</p>
	(c)	<p>$(1 \times 40.1) + [(16.0 + 1.0) \times 2]$</p> <p>Correct use of number of atoms (1)</p> <p>Correct use of A_r (1)</p>	2	2.1	

Question		Answer				Marks	AO element	Guidance
17	(a)					2	2.2	DO NOT ALLOW bromide
		Molten electrolyte	Formula	Product at negative electrode (cathode)	Product at positive electrode (anode)			
		sodium chloride	NaCl	sodium (1)	chlorine			
		lead bromide	PbBr ₂	lead	bromine (1)			
	(b)	negative electrode / cathode – copper deposited (1) positive electrode / anode – anode dissolves / copper ions formed (1)				2	1.2	
	(c)		Positive ions (cations)	Negative ions (anions)	2	2.2		
		Na ⁺	Cl ⁻ (1)					
		H ⁺ (1)	OH ⁻					
	(d)	Volume = 0.564^3 (1) = 0.179406144 (1) to 3 significant figures = 0.179 (1)				3	1.2	ALLOW 3 marks for 0.179 without any working out

Question	Answer	Marks	AO element	Guidance
18*	<p><i>Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question.</i></p> <p>Level 3 (5–6 marks) Suggestion would enable pure dry samples of all three components to be obtained in the correct sequence with clear explanations of why the methods work. <i>There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.</i></p> <p>Level 2 (3–4 marks) Suggestion would enable pure dry samples of two of the components of the mixture to be obtained with an attempt at an explanation. <i>There is a line of reasoning presented with some structure. The information presented is relevant and supported by some evidence.</i></p> <p>Level 1(1–2 marks) Suggestion would enable a pure sample of one of the components to be obtained. <i>The information is basic and communicated in an unstructured way. The information is supported by limited evidence and the relationship to the evidence may not be clear.</i></p> <p>0 marks <i>No response or no response worthy of credit.</i></p>	6	4 x 3.3a 2 x 2.2	<p>AO3.3a: Analyse information in the table to develop experimental procedures</p> <ul style="list-style-type: none"> • Wash solid C with water and allow to dry. • Evaporate solution of B to obtain solid crystals. • Using a magnet will separate A from other two. • Add water to mixture of B and C. • Filter mixture of B and C. • Rinse and dry solid C. • Evaporate solution of B. <p>AO2.2: Apply knowledge of purification techniques</p> <ul style="list-style-type: none"> • A is magnetic or B and C are not magnetic. • A can be removed from the mixture as it will stick to the magnet. • B will dissolve but C will not. • Solid C will be left after filtering.

Question		Answer	Marks	AO element	Guidance
19	(a)	$2\text{Mg(s)} + \text{O}_2\text{(g)} \longrightarrow 2\text{MgO(s)}$	2	1.1	
	(b)	During this reaction, the oxidising agent is oxygen and the reducing agent is magnesium (1)	1	1.2	
	(c)	add universal indicator solution / pH paper (1) identify colour produced (1) match to colour chart to determine pH (1)	3	1.2	

Question		Answer	Marks	AO element	Guidance	
20	(a)	<p>Correct - Any two from: sulfuric acid reacts with zinc and/or zinc carbonate to make zinc sulfate (1) zinc reacts with acid to make hydrogen (1) zinc carbonate reacts with acid to make carbon dioxide (1)</p> <p>Incorrect - Any two from: Both reactions do not make hydrogen (1) zinc and/or zinc carbonate will not react with hydrochloric acid to make zinc sulfate (1) zinc carbonate does not make hydrogen when it reacts with acid (1)</p>	4	2 x 2.1 2 x 3.1a		
	(b)	(i)	<p>$\text{ZnO} + 2\text{HNO}_3 \rightarrow \text{Zn}(\text{NO}_3)_2 + \text{H}_2\text{O}$ correct formulae in correct position (1) balancing (1)</p>	2	2.1 2.2	<p>balancing mark is conditional on correct formulae ALLOW any correct multiple e.g. $2\text{ZnO} + 4\text{HNO}_3 \rightarrow 2\text{Zn}(\text{NO}_3)_2 + 2\text{H}_2\text{O}$ (2)</p> <p>ALLOW = or \rightleftharpoons or \rightleftharpoons for arrow DO NOT ALLOW 'and' or & for + ALLOW one mark for correct balanced equation with minor errors in case, subscript and superscript e.g. $\text{ZnO} + 2\text{HNO}_3 \rightarrow \text{Zn}(\text{NO}_3)_2 + \text{H}_2$</p>
		(ii)	<p>any four from: idea that an excess of zinc oxide must be added (1) so reaction is complete / all nitric acid is reacted (1) filter off excess zinc oxide (1) evaporate off some of the water (1) allow to crystallise (1)</p>	4	3.3b	

Question		Answer	Marks	AO element	Guidance
21	(a)	$C_4H_{10} / H_{10}C_4$ (1)	1	2.1	DO NOT ALLOW $C^4H^{10} / H^{10}C^4 / C4H10 / H10C4$
	(b)	(i)	2	2.1	
		(ii)	1	2.1	
		(iii)	2	1.1	
	(c)	$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$ (2) correct formulae (1) balancing (1)	2	2.1	balancing mark is conditional on correct formulae ALLOW any correct multiple e.g. $2C_3H_8 + 10O_2 \rightarrow 6CO_2 + 8H_2O$ (2) ALLOW = or \rightleftharpoons or \rightleftharpoons for arrow DO NOT ALLOW 'and' or & for + ALLOW one mark for correct balanced equation with minor errors in case, subscript and superscript e.g. $C^3H^8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$ (2)
	(d)	Mass of fuel needed to boil water (g) = energy needed to boil water (J) / energy per gram = 63000 / 50000 (1) = 1.2 g (1) Since 3 g in burner, this is enough propane / AW (1)	3	2.2 2.2 3.1b	

Question		Answer	Marks	AO element	Guidance
22	(a)	large surface area to volume ratio (2)	2	1.1	ALLOW large surface area (1)
	(b)	Number of particles = $80.0 \text{ mg} \div (5.0 \times 10^{-3} \text{ mg})$ (1) = 16 000 particles (1)	2	1.1	
23		idea that does not show arrangement in space / is 2-dimensional only (1) bond angles are incorrect (1)	2	1.1	

Question		Answer						Marks	AO element	Guidance	
24	(a)	Particle	Atomic number	Mass number	Number of protons	Number of neutrons	Number of electrons	Electronic structure	4	2 x 2.1 2 x 3.1b	one mark scored for each correct line
		A	11	23	11	12	11	2.8.1			
		B	9	19	9	10	9	2.7			
		C	17	37	17	20	17	2.8.7			
		D	13	27	13	14	10	2.8			
	(b)	particle A – one electron in outer shell or energy level (1) particle D – has more protons than electrons (1)						2	2.1		
	(c)	group 7 (1) as 7 electrons in outer shell (1) period 3 (1) as 3 shells occupied (1)						4	2.1		
	(d)		Charge	Mass in atomic mass units				2	1.1	one mark scored for each correct column (2)	
		proton	positive /+	1					ALLOW 1/1760 or 1/1836 or 1/2000		
		neutron	neutral / no charge	1							
		electron	negative	0.0005							
	(e)	idea of the nuclear atom (1)						1	1.2		

Question		Answer	Marks	AO element	Guidance
25	(a)	graphite – has a layered structure (1) electrons can move / electrons between layers or delocalised (1) diamond – no free electrons or ions (1)	3	1.1	
	(b)	it can bond to itself (and make chains and rings) (1)	1	1.1	
	(c)	liquid (1) liquid above -114°C and does not boil until 78°C (1)	2	2.1	

SPECIMEN