OCR
Oxford Cambridge and RSA

…day June 20XX – Morning/Afternoon

GCSE (9–1) Combined Science (Chemistry) A (Gateway Science)
J250/03 Paper 3 (Foundation Tier)

SAMPLE MARK SCHEME

Duration: 1 hour 10 minutes

MAXIMUM MARK 60

DRAFT

This document consists of 16 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:
   a. where a candidate crosses out an answer and provides an alternative response, the crossed out response is not marked and gains no marks
   b. 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 Combined Science A (Gateway Science):

	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	B	1	1.1	
2	C	1	2.2	
3	C	1	1.2	
4	A	1	1.1	
5	D	1	2.1	
6	D	1	1.2	
7	A	1	2.1	
8	A	1	2.1	
9	B	1	2.1	
10	A	1	2.2	

SECTION B

Question			Answer	Marks	AO element	Guidance
11	(a)		Sand remains in the filter paper (1) Salt is soluble/passes through the filter paper (1)	2	1.2 1.2	**ALLOW** because sand is insoluble so remains in the filter paper and salt is soluble so passes through the filter paper (2)
	(b)		**Any three from** Idea that compounds boil/vaporise (1) Idea that glass beads increase surface area (to improve separation) (1) Idea of temperature gradient in column/cooler at top of column (1) Idea of different boiling points (1) Idea of condensing of gas back to liquid in condenser (1)	3	1.2	
	(c)	(i)	Prevent spot being washed away/dissolving in solvent/spreading across whole of paper / AW (1)	1	2.1	
		(ii)	R_f = distance moved by substance = 38 (.0 mm) (1) distance moved by solvent 45.5 (mm) R_f = 0.84 (1)	2	1.1 2.1	**ALLOW** distance moved by substance 37 – 39 mm **ALLOW** distance moved by solvent 45 – 46 mm **ALLOW** R_f = 0.81 – 0.87

Question			Answer	Marks	AO element	Guidance
12	(a)	(i)	$2Al + 3CuO \longrightarrow Al_2O_3 + 3Cu$ Correct formulae (1) Balancing (1)	2	 2.1 2.2	
		(ii)	Oxidation is gain of oxygen and reduction is loss of oxygen (1)	1	1.1	**ALLOW** oxidation is loss of electrons and reduction is gain of electrons (1) Oxidation **and** reduction both needed for (1)
		(iii)	Copper oxide / CuO (1)	1	2.1	
		(iv)	Aluminium / Al (1)	1	2.1	
	(b)	(i)	Brown/salmon pink solid/deposit/copper appearing / AW (1)	1	1.2	
		(ii)	Chlorine (1)	1	2.1	**ALLOW** Cl_2

Question			Answer	Marks	AO element	Guidance
13	(a)		Salt (1) Water (1)	2	1.1 1.1	Either order
	(b)	(i)	(14 + 13 + 14) = 41 ÷ 3 (1) 13.7 (1)	2	1.2	
		(ii)	With appropriate scale so that the graph occupies at least ½ of grid provided (1) Correct plotting of all points to within ½ square (1)	2	2.2	
		(iii)	Result at $5cm^3$/ 9°C (1) because it does not fit the pattern/the temperature change is too high (1)	2	3.2a	
		(iv)	Line of best fit ignoring anomalous result (1)	1	2.2	
	(c)		Any improvement **AND** linked reason Insulate beaker/use polystyrene beaker/put a lid on the beaker (1) To reduce heat loss (1) Stir mixture (1) To ensure an even temperature (1) Make sure temperature reached is the maximum (1) To ensure reaction is complete/AW (1) Use a measuring cylinder/pipette/burette to measure the volume (1) To reduce error/uncertainty in measuring the volume (1)	2	3.3b	**ALLOW** make sure alkali and acid at same temperature (1) to ensure no heating or cooling effect at the start (1)

Question			Answer	Marks	AO element	Guidance
	(d)	(i)	Add universal indicator to acid then record colour change when mixed with alkali (1) **OR** Place pH probe into acid and record value then mix with alkali, place in pH probe and record new value (1)	1	2.2	**ALLOW** add universal indicator and note the colour change **ALLOW** place probe into mixture and read off value
		(ii)	(pH) 7 (1)	1	2.2	

Question			Answer	Marks	AO element	Guidance
14	(a)	(i)	15 (1)	1	1.1	
		(ii)	Nitrogen (1)	1	1.1	
	(b)		(2 x 12.0) + (6 x 1.0) + (1 x 16.0) Correct use of number of atoms (1) Correct use of A_r (1)	2	2.1	

Question			Answer	Marks	AO element	Guidance
15	(a)		Add limewater (1) Turns milky/white precipitate (1)	2	1.2	
	(b)		2 in front of HCl (1)	1	2.1	**DO NOT ALLOW** if any number in front of other formulae
	(c)		**1.** Suitable choice of equipment including gas syringe (1) **2.** Correct assembly of equipment to make it gas tight (1) Description includes **3.** Bung attached quickly to prevent gas loss/gas may escape at the start/ the need to add acid quickly (1)	3	2.2	MP1 and MP2 can be obtained from diagram and/or description

Question			Answer	Marks	AO element	Guidance
16	(a)*		*Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question.* **Level 3 (5–6 marks)** **Describes the bonding of both materials** **AND** **Makes a comparison** **AND** **Makes a choice with justified reasons.** *There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.* **Level 2 (3–4 marks)** **Describes the bonding of both materials** **OR** **Describes the structure of one material AND makes a choice with justified reasons.** *There is a line of reasoning presented with some structure. The information presented is relevant and supported by some evidence.* **Level 1(1–2 marks)** **Describes the bonding of one material** **OR** **makes a choice with justified reasons.** *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.*	6	1.1 x 3 3.2a x 3	**AO1.1: Knowledge of bonding in metals and polymers** Bonding in polymers: • Covalent bonds in molecule/Macromolecule. • Weak intermolecular forces. • Some have cross linkages. Bonding in metals: • Cationic lattice. • Free/mobile pool of electrons. Comparison • Polymers are weaker because intermolecular forces are weaker than metallic bonds. • Metals conduct electricity because of free electrons. **AO3.2a: Analyse information in the table to make judgements** • Not carbon-fibre-reinforced-polymer – too expensive. • Aluminium – strong, corrosion resistant, low density so easy to carry but quite expensive. • Steel – strong, cheap but higher density so heavy to carry, corrodes/rusts but can be painted to make look better and resist corrosion. • PVC – corrosion resistant, low density means cost per chair is low, easy to carry,

Question			Answer	Marks	AO element	Guidance
			0 marks *No response or no response worthy of credit.*			easy to shape, may not be strong enough. • Titanium - strong, corrosion resistant, fairly low density but very expensive.
	(b)		*Against* Carbon-fibre-reinforced-polymer very expensive (so only used in luxury cars) (1) *For* **Any two from** Carbon-fibre-reinforced-polymer stronger than steel/ORA (1) Carbon-fibre-reinforced-polymer lower density/ORA (1) Carbon-fibre-reinforced-polymer has better corrosion resistance/ORA (1)	**3**	**3.1b**	Must have an argument for and against for full marks. **ALLOW** carbon-fibre-reinforced-polymer would be no good for crumple zones **ALLOW** carbon-fibre-reinforced-polymer's lower density will result in better fuel economy
	(c)		Conduction of electricity (1) Low density/corrosion resistance (1)	**2**	**3.2b**	
	(d)		Mixture of a metal and other element(s)/mixture of two or more metals (1)	**1**	**1.1**	