OCR
Oxford Cambridge and RSA

F

…day June 20XX – Morning/Afternoon

GCSE (9–1) Chemistry B (Twenty First Century Science)

J258/01 Breadth in chemistry (Foundation Tier)

SAMPLE MARK SCHEME

Duration: 1 hour 45 minutes

MAXIMUM MARK 90

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. **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

11. **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 B:

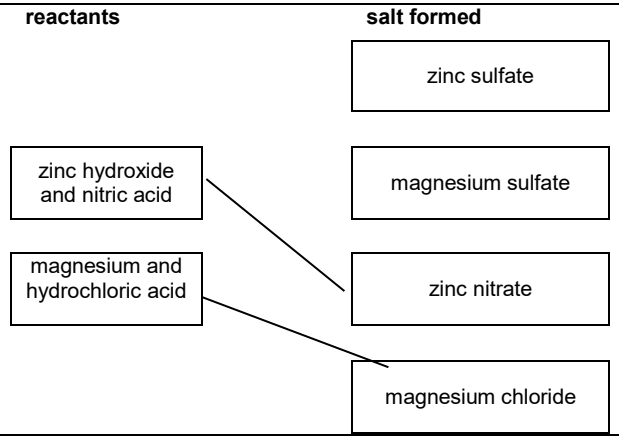
	Assessment Objective
AO1	**Demonstrate knowledge and understanding of scientific ideas and scientific techniques and procedures.**
AO1.1	Demonstrate knowledge and understanding of scientific ideas.
AO1.2	Demonstrate knowledge and understanding of scientific techniques and procedures.
AO2	**Apply knowledge 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.

Question			Answer	Marks	AO element	Guidance
1	(a)		Dalton ✓	1	1.1	
	(b)		Thomson ✓	1	1.1	
2	(a)		**D** ✓ the more electrons, the larger the radius / both increase idea ✓ does not go through the origin / data for radius starts at 150 / data for number of electrons starts at 3 ✓	3	2.1 2.1 3.1b	
	(b)		they all have one electron in their outer shell ✓ they all have different numbers of shells / down the group have more shells ✓ the number of electrons in the inner shells is different / some have full shells of 8 electrons / gives numbers of shells ✓	3	2.1	
	(c)		potassium > sodium > lithium ✓	1	1.2	
3	(a)		$C_2H_4O_2$ shows correct number of each atom ✓ shows molecular formula ✓	2	2.1	**ALLOW** CH_3COOH / C_2H_4OO for marking point 1 only
	(b)		both contain the same functional group ✓	1	1.1	
	(c)	(i)	H+ ✓	1	1.1	
		(ii)	idea that strong acid has a lower pH than a weak acid / gives values for both with strong acid below weak acid ✓ both are below 7 / gives both pH values below 7 ✓	2	2.2	

Question			Answer	Marks	AO element	Guidance
4	(a)	(i)	**FIRST CHECK THE ANSWER ON THE ANSWER LINE** **If answer = 76 (%) award 2 marks** 1.9/2.5 ✓ (x 100) = 76 (%) ✓	**2**	**2.2**	
		(ii)	18 ✓	**1**	**2.2**	**ALLOW ECF** from **(a)(i)**
	(b)		19 ÷ 28 x 100 = 68 % less than 92 % ✓ only one other type of atom shown/gold contains two other types of atom ✓	**2**	**2.2** **3.1a**	
	(c)		B ✓	**1**	**1.1**	
5	**(a)**		C_4H_{10}	**1**	1.1	**DO NOT ALLOW** C4H10 / C^4H^{10} **ALLOW** $H_{10}C_4$
	(b)		propane and butane contain carbon and hydrogen (atoms) ✓ only ✓ has (carbon to carbon) single bonds only / contains single (covalent) bonds only ✓	**3**	1.1	**DO NOT ALLOW** is a mixture of carbon and hydrogen (only) **DO NOT ALLOW** contains carbon and hydrogen molecules 'only' must be linked to first marking point and is not independent **ALLOW** has no (carbon to carbon) double bonds (1) **ALLOW** they are saturated compounds (1) **ALLOW** has general formula $C_nH_{(2n+2)}$ (1) **IGNORE** has the maximum amount of hydrogen atoms

Question			Answer	Marks	AO element	Guidance
6	(a)		F T T ✓✓✓	3	2.2	
	(b)		(no because) the energy involved in manufacture is greater than 120 MJ ✓ energy involved in manufacture is more than 400 MJ / quotes a value 420-480 MJ ✓	2	3.1a	
7	(a)		yield would be lower ✓ because reactants/products would escape / reaction is reversible ✓	2	1.1	
	(b)	(i)	**FIRST CHECK THE ANSWER ON THE ANSWER LINE** **If answer = 17 (g) award 3 marks** ratio of N_2 : NH_3 = 1:2 ✓ $\frac{\text{amount of ammonia}}{17.0}$ = 2 x 14/28 ✓ amount of ammonia = 2 x 14/28 x 17 = 17 (g) ✓	3	2.2 1.2 2.2	
		(ii)	correct substitution. 8.5 ÷ 17.0 (ECF) x 100 ✓ correct computation: 50 % ✓	2	2.2	**ALLOW ECF** from **(b)(i)**

Question			Answer	Marks	AO element	Guidance
	(c)	(i)	A catalyst lowers the activation energy. ✓ Catalysts are used up quickly. A catalyst changes the reaction temperature. A catalyst increases the time taken for the reaction. The same catalyst can be used in more than one reaction. ✓	2	1.1	
		(ii)	increase in pressure ✓ increase in temperature ✓	2	1.1	
	(d)		potassium ✓ phosphorus ✓	2	1.1	

Question			Answer	Marks	AO element	Guidance
8	(a)			2	1.1	
	(b)		hydrogen ✓	1	1.1	
	(c)		filtration ✓	1	1.2	
9	(a)		copper → dilute sodium hydroxide gives a blue precipitate ✓ chloride → dilute silver nitrate gives a white precipitate ✓	2	1.1	
	(b)	(i)	fizzing / bubbles ✓	1	1.2	
		(ii)	lime water ✓	1	1.2	

Question			Answer	Marks	AO element	Guidance
10	(a)	(i)	**A** ✓	1	1.2	
		(ii)	**D** ✓	1	1.2	
	(b)		changes colour/shows end point ✓ at the end point / when neutralisation happens / when enough NaOH has been added ✓	2	1.2 2.2	
	(c)		sample every batch ✓ take samples from throughout the batch / lots of samples of each batch / random choice of bottles from each batch ✓	2	1.2	
	(d)	(i)	$2NaOH + H_2SO_4 \longrightarrow Na_2SO_4 + 2H_2O$ ✓✓	2	1.2	one mark for correct symbols one mark for correct balancing
		(ii)	**FIRST CHECK THE ANSWER ON THE ANSWER LINE** **If answer = 50 (cm^3) award 2 marks** ratio of NaOH to H_2SO_4 = 2:1 ✓ therefore volume of NaOH = 2 x 25 = 50 (cm^3) ✓	2	2.2	**ALLOW ECF** from **(d)(i)**
11	(a)		hydrogen is an element / only contains hydrogen atoms/ contains all the same type of element / contains 2 atoms per molecule whereas methane is a compound / contains carbon and hydrogen atoms/ contains two types of atoms / contains 5 atoms per molecule / contains more atoms per molecule ✓ both contain hydrogen atoms / both are simple molecules / both covalently bonded ✓	2	2.2	
	(b)	(i)	(g) ✓	1	1.1	
		(ii)	-253° C ✓	1	2.1	
	(c)		methane contains single covalent bonds ✓ methane is in the same family ….. ✓	2	1.1	

Question			Answer	Marks	AO element	Guidance
12	(a)		hydrogen needs a high temperature to produce/ uses energy in production / methane is a finite fossil fuel / will run out idea ✓ hydrogen only produces water which is not a pollutant / does not produce carbon dioxide / methane produces carbon dioxide which is a pollutant ✓ methane gives out more energy (per mole) ✓	3	2.1 3.1b 3.1b	
	(b)		both give out energy /exothermic ✓ 890 ÷ 286 = approx. 3 therefore 3x more energy is given out by methane therefore energy gap 3x larger ✓	2	2.2	
13	(a)		(blue) Litmus paper ✓ goes red then white / red then bleaches ✓	2	1.1	
	(b)		water evaporates (from sea water) by the heat from the sun ✓ water condenses (on the sides of the dome) and collects in the trough ✓	2	1.1	
14	(a)		water vapour condensed/turned into a liquid/became oceans ✓ because the Earth cooled/surface temperature fell ✓	2	2.1	
	(b)		carbon dioxide percentage decreases ✓ plants use carbon dioxide for photosynthesis/to make glucose ✓	2	2.1 1.1	

Question			Answer	Marks	AO element	Guidance
15	(a)		zinc is recovered at the end of the process/ a way of making zinc from waste ✓	1	3.2a	
	(b)		zinc ions are toxic if they enter drinking water/water supplies ✓ risk is reduced if zinc ions are stored in plants ✓	2	3.2a	
	(c)		any **TWO** from: larger plants therefore take up more zinc ✓ more plants grow per m^2 therefore absorb more zinc per m^2 ✓ plants grow more quickly therefore more zinc can be removed in a shorter time ✓	2	3.1b	
	(d)		find out amount/ concentration of zinc ions in Alpine Penny-cress ✓ find out tolerance of sheep for zinc ions / whether zinc ions get into wool/meat ✓	2	3.3a	
	(e)		**A** contains zinc (ions) ✓ **B** contains copper (ions) ✓ **C** does not contain any (identifyable) metal ions ✓	3	3.2b	