

OCR

Oxford Cambridge and RSA

...day June 20XX – Morning/Afternoon

AS Level Chemistry A

H032/01 Breadth in chemistry

PRACTICE MARK SCHEME

Duration: 1 hour 30 minutes

MAXIMUM MARK 70

This document consists of 13 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. 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.

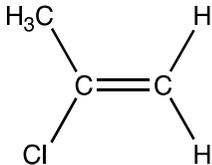
You should ensure also that you are familiar with the administrative procedures related to the marking process. These are set out in the OCR booklet **Instructions for Examiners**. If you are examining for the first time, please read carefully **Appendix 5 Introduction to Script Marking: Notes for New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

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

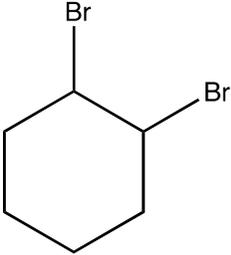
SECTION A

Question	Answer	Marks	Guidance
1	D	1	
2	A	1	
3	B	1	
4	B	1	
5	C	1	
6	B	1	
7	C	1	
8	A	1	
9	A	1	
10	B	1	
11	D	1	
12	D	1	
13	C	1	
14	A	1	
15	C	1	
16	B	1	
17	A	1	
18	D	1	
19	D	1	
20	D	1	
	Total	20	

SECTION B

Question			Answer	Marks	Guidance
21	(a)	(i)	Structure of 2-chloropropene ✓ 	1	ALLOW any unambiguous structure ALLOW CH ₃ CCl=CH ₂ (Double bond must be shown)
		(ii)	HCl gas is passed through alkali/carbonate ✓	1	
		(iii)	Reduces the dependency on finite resources OR Biodegradable OR Photodegradable ✓	1	ALLOW crude oil OR petroleum OR fossil fuels for 'finite resources' ALLOW 'rots naturally'
	(b)	(i)	Ag ⁺ + Cl ⁻ → AgCl OR Ag ⁺ + Br ⁻ → AgBr OR Ag ⁺ + I ⁻ → AgI ✓	1	
		(ii)	Bond enthalpy decreases C-Cl > C-Br > C-I ✓	1	ALLOW chlorine-carbon bonds are strongest.
		(iii)	Heat the test tubes in a water bath. ✓	1	
Total				6	

Question		Answer	Marks	Guidance
22	(a)	Aliphatic = E, H, I, J ✓ Alicyclic = E, H, J ✓ Aromatic = F, G ✓	3	
	(b)	C_nH_{2n+1} ✓	1	DO NOT ALLOW C_nH_{2n+1}
	(c) (i)	<i>Equation:</i> $C_6H_{12}O \rightarrow C_6H_{10} + H_2O$ ✓ <i>Calculation:</i> <u>FIRST CHECK THE ANSWER ON THE ANSWER LINE</u> IF answer = 32.7 (%) award 3 marks theoretical yield = $7.65 / 100 = 0.0765$ (mol) ✓ actual yield = $2.05 / 82 = 0.025$ (mol) ✓ % yield = $(0.025 / 0.0765) \times 100\% = 32.7(\%)$ ✓	4	IGNORE state symbols ALLOW $C_6H_{11}OH$ for $C_6H_{12}O$ <u>If there is an alternative answer, check to see if there is any ECF credit possible using working below</u> % yield must be to 1 dp ALLOW theoretical and actual yield calculated in mass theoretical yield = $0.0765 \times 82 = 6.273$ g ✓ % yield = $(2.05 / 6.273) = 32.7(\%)$ ✓ ALLOW ECF from calculated actual and theoretical yields
	(ii)	bromine water is decolourised ✓	2	ALLOW bromine water turns colourless IGNORE 'goes clear' ALLOW correct structural OR displayed OR skeletal formula OR mixture of the above

Question			Answer	Marks	Guidance
			 ✓		
			Total	10	

PRACTICE

Question		Answer	Marks	Guidance
23	(a)	63 p 90 n 60 e ✓	1	
	(b)	2 ✓ 2 ✓ 18 ✓	3	
	(c)	$n(\text{Eu}) = 0.0019 / 152.0 = 1.25 \times 10^{-5}$ ✓ Atoms of Eu = $1.25 \times 10^{-5} \times 6.02 \times 10^{23} = 7.5 \times 10^{18}$ ✓	2	ALLOW 0.0000125 Must be standard form AND two significant figures ALLOW ECF from incorrect amount ALLOW 2 marks for correct answer without working
	(d)	$n(\text{H}_2) = 144 / 24000 = 6(.00) \times 10^{-3}$ (mol) ✓ $n(\text{Eu}) = 0.608 / 152.0 = 4(.00) \times 10^{-3}$ (mol) AND ratio $n(\text{Eu}) : n(\text{H}_2) = 2 : 3$ ✓ $2\text{Eu} + 3\text{H}_2\text{SO}_4 \rightarrow \text{Eu}_2(\text{SO}_4)_3 + 3\text{H}_2$ ✓	3	Look for evidence of 2 : 3 anywhere. <i>Could be within an attempted equation.</i> IGNORE state symbols
		Total	9	

Question			Answer	Marks	Guidance
24	(a)	(i)	$K_c = \frac{[\text{CH}_3\text{OH}]}{[\text{CO}][\text{H}_2]^2}$ ✓	1	
		(ii)	$[\text{CH}_3\text{OH}] = 14.6 \times (3.10 \times 10^{-3}) \times (2.40 \times 10^{-3})^2$ ✓ $= 2.61 \times 10^{-7} \text{ (mol dm}^{-3}\text{)}$ ✓	2	
	(b)	(i)	Yield decreases AND Equilibrium (position) has moved to the left ✓	1	ALLOW moved towards reactants OR moved towards CO and H ₂
		(ii)	Oxidised Nitrogen AND -3 AND +2 ✓ Reduced Oxygen AND 0 AND -2 ✓	2	
			Total	6	

Question			Answer	Marks	Guidance									
25	(a)	(i)	$\text{H}_2\text{SO}_4 + 2\text{KOH} \rightarrow \text{K}_2\text{SO}_4 + 2\text{H}_2\text{O}$ ✓	1	ALLOW multiples									
		(ii)	<p><i>Energy (into water) mark</i> $70.0 \times 4.18 \times 16.5 = 4827.9$ (J) or 4.8279 (kJ) ✓</p> <p><i>amount of substance mark</i> $n(\text{H}_2\text{O}) = \frac{35.0}{1000} \times 2.40 = 0.084(0)$ (mol) ✓</p> <p><i>$\Delta_{\text{neut}}H$ mark</i> $(-4.8279 / 0.084(0)) =$ $(-57.475$ OR $(-57.48$ OR $(-57.5$ ✓</p> <p>Correctly rounded to at least 3 significant figures</p>	3	<p>ALLOW rounding to 4828 OR 4830</p> <p>ALLOW amount of substance mark to be based upon KOH, or H_2SO_4 with correct ratio</p> <p>ALLOW ECF for <u>Energy (into water) mark</u> Amount of substance mark</p>									
		(iii)	1 mole of water had been formed ✓	1										
		(iv)	$\frac{2 \times 0.5}{16.5} \times 100 = 6\%$ ✓	1										
	(b)	(i)	<p><i>Amount of each element mark</i></p> <table style="margin-left: 20px;"> <tr> <td style="text-align: center;">H</td> <td style="text-align: center;">O</td> <td style="text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"><u>0.025</u></td> <td style="text-align: center;"><u>0.300</u></td> <td style="text-align: center;"><u>0.175</u></td> </tr> <tr> <td style="text-align: center;">1.0</td> <td style="text-align: center;">16.0</td> <td style="text-align: center;">14.0</td> </tr> </table> <p>= 0.025 0.01875 0.0125 ✓</p> <p><i>Simplest whole number ratio empirical formula</i> $\frac{0.025}{0.0125} = 2$ $\frac{0.01875}{0.0125} = 1.5$ $\frac{0.0125}{0.0125} = 1$</p> <p>AND $\text{H}_4\text{O}_3\text{N}_2$ ✓</p>	H	O	N	<u>0.025</u>	<u>0.300</u>	<u>0.175</u>	1.0	16.0	14.0	2	
H	O	N												
<u>0.025</u>	<u>0.300</u>	<u>0.175</u>												
1.0	16.0	14.0												
		(ii)	acid: HNO_3 AND base: NH_3 ✓	1	ALLOW 2 marks for correct answer without working ALLOW atoms within HNO_3 and NH_3 in any order									
Total				9										

Question	Answer	Marks	Guidance
26 (a)	Initiation $\text{Cl}_2 \rightarrow 2\text{Cl}\cdot$ ✓ Propagation $\text{C}_2\text{H}_6 + \text{Cl}\cdot \rightarrow \text{C}_2\text{H}_5\cdot + \text{HCl}$ ✓ $\text{C}_2\text{H}_5\cdot + \text{Cl}_2 \rightarrow \text{C}_2\text{H}_5\text{Cl} + \text{Cl}\cdot$ ✓ Termination $\text{Cl}\cdot + \text{Cl}\cdot \rightarrow \text{Cl}_2$ OR $\text{C}_2\text{H}_5\cdot + \text{Cl}\cdot \rightarrow \text{C}_2\text{H}_5\text{Cl}$ OR $\text{C}_2\text{H}_5\cdot + \text{C}_2\text{H}_5\cdot \rightarrow \text{C}_4\text{H}_{10}$ ✓ Initiation, propagation, termination used in correct context ✓	5	If the structure of the ethyl radical is drawn, the lone electron must be attached to a C atom
(b)	I = $\text{C}_4\text{H}_{10}^+$ ✓ II = C_3H_7^+ ✓ III = C_2H_5^+ ✓ C_3H_7^+ could be $\text{CH}_3\text{CH}_2\text{CH}_2^+$ or $\text{CH}_3\text{CHCH}_3^+$ OR C_3H_7^+ could be from $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$ or $\text{CH}_3\text{CH}(\text{CH}_3)_2$ ✓ CH_3CH_2^+ could only be from $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$ ✓	5	THROUGHOUT: IF any charge is missing, DO NOT ALLOW 1st formula but allow subsequent formulae by ECF ALLOW + charge anywhere
	Total	10	