OCR
Oxford Cambridge and RSA

GCSE

Chemistry A

Unit **A171/01**: Modules C1, C2, C3 (Foundation Tier)

General Certificate of Secondary Education

Mark Scheme for June 2015

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

Annotations

Used in the detailed Mark Scheme:

Annotation	Meaning
/	alternative and acceptable answers for the same marking point
(1)	separates marking points
not/reject	answers which are not worthy of credit
ignore	statements which are irrelevant - applies to neutral answers
allow/accept	answers that can be accepted
(words)	words which are not essential to gain credit
words	underlined words must be present in answer to score a mark
ecf	error carried forward
AW/owtte	credit alternative wording / or words to that effect
ORA	or reverse argument

Available in scoris to annotate scripts:

BP	Blank Page – this annotation must be used on all blank pages within an answer booklet (structured or unstructured) and on each page of an additional object where there is no candidate response.
	correct response
	incorrect response
BOD	benefit of doubt
NBOD	no benefit of doubt
ECF	error carried forward
0 , L1 , L2 , L3	indicate level awarded for a question marked by level of response
^	information omitted
CON	contradiction

R	reject
	indicate uncertainty or ambiguity
	draw attention to particular part of candidate's response

1. **ADDITIONAL OBJECTS:** You **must** assess and annotate the additional objects for each script you mark. Where credit is awarded, appropriate annotation must be used. If no credit is to be awarded for the additional object, please use annotation as agreed at the SSU.

Subject-specific Marking Instructions

a. Accept any clear, unambiguous response (including mis-spellings of scientific terms if they are *phonetically* correct, but always check the guidance column for exclusions).

b. Crossed out answers should be considered only if no other response has been made. When marking crossed out responses, accept correct answers which are clear and unambiguous.

e.g. for a one-mark question where ticks in the third <u>and</u> fourth boxes are required for the mark:

This would be worth 1 mark.

This would be worth 0 marks.

This would be worth 1 mark.

c. Marking method for tick-box questions:

If there is a set of boxes, some of which should be ticked and others left empty, then judge the entire set of boxes.
If there is at least one tick, ignore crosses and other markings. If there are no ticks, accept clear, unambiguous indications, e.g. shading or crosses. Credit should be given according to the instructions given in the guidance column for the question. If more boxes are ticked than there are correct answers, then deduct one mark for each additional tick. Candidates cannot score less than zero marks.

e.g. if a question requires candidates to identify cities in England:

Edinburgh	
Manchester	
Paris	
Southampton	

the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third <u>should be blank</u> (or have indication of choice crossed out).

Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	×	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	×		✓		✓	✓		✓	
Score:	**2**	**2**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**NR**

d. For answers marked by levels of response:
   i. **Read through the whole answer from start to finish**
   ii. **Decide the level** that **best fits** the answer – match the quality of the answer to the closest level descriptor
   iii. **To determine the mark within the level**, consider the following:

Descriptor	Award mark
A good match to the level descriptor	The higher mark in the level
Just matches the level descriptor	The lower mark in the level

   iv. Use the **L1**, **L2**, **L3** annotations in Scoris to show your decision; do not use ticks.

Quality of Written Communication skills assessed in 6-mark extended writing questions include:

- appropriate use of correct scientific terms
- spelling, punctuation and grammar
- developing a structured, persuasive argument
- selecting and using evidence to support an argument
- considering different sides of a debate in a balanced way
- logical sequencing.

Question			Answer	Mark	Guidance
1	a		cotton; (1) paper; (1)	2	
	b		2	1	
	c		<table><tr><td>√</td><td></td></tr><tr><td></td><td>√</td></tr><tr><td>√</td><td></td></tr></table>	2	All correct = 2 marks 2 correct = 1 mark
			Total	5	

Question			Answer	Mark	Guidance
2	a	i		1	
		ii	carbon monoxide	1	
	b		Data shows a correlation; Increasing the amount of coal burned increases amount of pollution; Example of another source e.g. transport/factories;	3	**Allow** does not show a causal link (1)
	c	i	<table><tr><th>true</th><th>false</th></tr><tr><td>√</td><td></td></tr><tr><td>√</td><td></td></tr><tr><td></td><td>√</td></tr><tr><td></td><td>√</td></tr></table>	3	All four correct = 3marks 3 correct = 2 marks 2 correct = 1 mark
		ii	Mean is calculated as 300;	1	
		iii	Mean is drawn at 300;(1) Maximum is drawn at 500; (1)	2	**Allow ecf** from ii)
			Total	11	

Question			Answer	Mark	Guidance
3	a		<table><tr><td>Nitrogen (1)</td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td>1% (1)</td></tr></table>	2	
	b		**[Level 3]** Comments on data for CO_2 and water vapour on both planets **and** gives reasons for changes in CO_2 and water vapour on Earth. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **[Level 2]** Comments on data for one gas on both planets and gives a reason for change on Earth **OR** comments on data for CO_2 and water vapour on one planet and gives a reason for change on Earth **OR** comments on data for CO_2 and water vapour on both planets Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **[Level 1]** Comments on data for one gas on both planets **OR** comments on data for CO_2 and water vapour on one planet **OR** gives a reason for the change of one gas on Earth. Quality of written communication impedes communication of the science at this level. (1 – 2 marks) **[Level 0]** Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	This question is targeted at grades up to D **Indicative scientific points may include:** **Comments on data** • percentage carbon dioxide in atmosphere on Earth has decreased • percentage water vapour in atmosphere on Earth has decreased • percentage carbon dioxide in atmosphere on Mars has increased • percentage water vapour in atmosphere on Mars has decreased **Reasons for changes to Earth's atmosphere** • Earth cooled and water vapour condensed to form oceans • Carbon dioxide dissolved in the oceans. • Carbon dioxide was locked in the formation of sedimentary rocks • Carbon dioxide locked in the formation of fossil fuels • Evolution of (photosynthesising) plants lowered percentage of carbon dioxide. **Ignore** reasons for change on Mars **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
			Total	8	

Question			Answer	Mark	Guidance
4	a		<table><tr><td></td><td></td></tr><tr><td>Changing the surface affects the outcome.</td><td>√</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table> (1)	1	
	b	i	40	1	
		ii	120 x 50/40 =(1) 150 (1)	2	Correct answer with no working = 2 marks. **Allow** ecf from (i) **Allow** substitution of numbers into the equation given for 1 mark
		iii	First measurement could be an outlier / reliability / repeatability / checking; (1)	1	**Allow** accuracy **Allow** to calculate a mean **Allow** idea of variation of results problems with controls eg wind, height etc **Ignore** fair test
	c		polymerisation	1	
	d	i	A	1	
		ii	harder; (1) more flexible; (1)	2	
			Total	**9**	

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Mark</th><th>Guidance</th></tr>
<tr><td>5</td><td>a</td><td></td><td>[Level 3]
Chooses polypropene and uses properties to justify that choice and gives a reason why another material is not chosen.
Quality of written communication does not impede communication of the science at this level.
(5 – 6 marks)
[Level 2]
Chooses polypropene and uses properties to justify that choice.
Quality of written communication partly impedes communication of the science at this level.
(3 – 4 marks)
[Level 1]
Chooses polypropene
OR
chooses any other material and justifies choice of that other material with a correct property.
Quality of written communication impedes communication of the science at this level.
(1 – 2 marks)
[Level 0]
Insufficient or irrelevant science. Answer not worthy of credit.
(0 marks)</td><td>6</td><td>This question is targeted at grades up to C

Indicative scientific points may include:

Properties of polypropene:
• low stiffness
• low density
• floats
• low water absorbency

Why another material is not chosen:
• Kevlar is dense/sinks/stiff/absorbs water
• Nylon is dense/sinks/absorbs water
• Polyester is dense/sinks

ignore: flexible and light (in the stem of question)

Use the L1, L2, L3 annotations in Scoris; do not use ticks.</td></tr>
<tr><td></td><td>b</td><td></td><td><table><tr><td></td><td></td><td></td></tr><tr><td>Buying rope from other countries is expensive.</td><td>√</td><td>(1)</td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td>Making rope from plants uses local materials.</td><td>√</td><td>(1)</td></tr></table></td><td>2</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>8</td><td></td></tr>
</table>

Question			Answer	Mark	Guidance
6	a	i	30; (1) 10; (1)	2	
		ii	Any **two** from Number of deaths goes down (over time); Fluctuations from year to year; Large drop after 1910; Deaths drop to zero in 1950;	2	**Allow** negative correlation
	b		**[Level 3]** Chooses Zac and justifies this choice by making a comment about the graph after 1910 AND explains an effect of adding chlorine to water. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **[Level 2]** Chooses Zac and justifies this choice by making a comment about the graph after 1910 **OR** chooses Zac and explains an effect of adding chlorine to water **OR** chooses both Zac and Beth and comments on the graph before and after 1910 Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **[Level 1]** Makes a comment about the graph OR explains an effect of adding chlorine to water. Quality of written communication impedes communication of the science at this level. (1 – 2 marks) **[Level 0]** Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	**6**	**This question is targeted at grades up to E** **Indicative scientific points may include:** **Explanation of the effects of chlorine** • chlorine kills microorganisms/bacteria/typhoid • Sterilisation of water supply • adding chlorine to water made a major contribution to public health **Comments about the graph** • Decrease of cases of typhoid greater after 1910/chlorine is added • Fluctuations in the graph • Slight/gradual decrease in deaths before 1910/chlorine is added • Deaths drop to zero after chlorine is added **Ignore** germs **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
			Total	**10**	

Question			Answer	Mark	Guidance
7	a	i	D	1	
		ii	C	1	
	b	i	Carlos	1	
		ii	Ben	1	
	c		……safe levels of chemicals in food ✓ (1)	1	
			Total	**5**	
8	a		Any **two** from: persists in the environment / is a long term / future problem; enters water / air / soil; enters human tissue; enters food chain; idea of accumulation/building up;	2	**ignore** named health problems eg gets into blood stream / lungs / cells etc
	b		Any **two** from: toxicity not taken seriously; no alternatives available / only way of making certain chemicals/goods at that time; people wanted the profit from selling chemicals; people needed to work to earn a living;	2	**allow** benefits outweigh risks
			Total	**4**	

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