Cambridge IGCSE™

CO-ORDINATED SCIENCES **0654/63**

Paper 6 Alternative to Practical **October/November 2024**

MARK SCHEME

Maximum Mark: 60

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2024 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

This document consists of **10** printed pages.

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Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptions for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5: Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).	

GENERIC MARKING PRINCIPLE 6: Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.	

Science-Specific Marking Principles

1	Examiners should consider the context and scientific use of any keywords when awarding marks. Although keywords may be present, marks should not be awarded if the keywords are used incorrectly.
2	The examiner should not choose between contradictory statements given in the same question part, and credit should not be awarded for any correct statement that is contradicted within the same question part. Wrong science that is irrelevant to the question should be ignored.
3	Although spellings do not have to be correct, spellings of syllabus terms must allow for clear and unambiguous separation from other syllabus terms with which they may be confused (e.g. ethane / ethene, glucagon / glycogen, refraction / reflection).
4	The error carried forward (ecf) principle should be applied, where appropriate. If an incorrect answer is subsequently used in a scientifically correct way, the candidate should be awarded these subsequent marking points. Further guidance will be included in the mark scheme where necessary and any exceptions to this general principle will be noted.
5	‘List rule’ guidance For questions that require **n** responses (e.g. State **two** reasons …): • The response should be read as continuous prose, even when numbered answer spaces are provided. • Any response marked *ignore* in the mark scheme should not count towards **n**. • Incorrect responses should not be awarded credit but will still count towards **n**. • Read the entire response to check for any responses that contradict those that would otherwise be credited. Credit should **not** be awarded for any responses that are contradicted within the rest of the response. Where two responses contradict one another, this should be treated as a single incorrect response. • Non-contradictory responses after the first **n** responses may be ignored even if they include incorrect science.

6	Calculation specific guidance
	Correct answers to calculations should be given full credit even if there is no working or incorrect working, **unless** the question states 'show your working'.
	For questions in which the number of significant figures required is not stated, credit should be awarded for correct answers when rounded by the examiner to the number of significant figures given in the mark scheme. This may not apply to measured values.
	For answers given in standard form (e.g. $a \times 10^n$) in which the convention of restricting the value of the coefficient (a) to a value between 1 and 10 is not followed, credit may still be awarded if the answer can be converted to the answer given in the mark scheme.
	Unless a separate mark is given for a unit, a missing or incorrect unit will normally mean that the final calculation mark is not awarded. Exceptions to this general principle will be noted in the mark scheme.
7	Guidance for chemical equations
	Multiples / fractions of coefficients used in chemical equations are acceptable unless stated otherwise in the mark scheme.
	State symbols given in an equation should be ignored unless asked for in the question or stated otherwise in the mark scheme.

Question	Answer	Marks
1(a)(i)	38 ; 37 ;	**2**
1(a)(ii)	(–)2 and (–)3 ; – sign against both ;	**2**
1(a)(iii)	to keep the same surface area;	**1**
1(a)(iv)	water / sugar solution on outside will increase **mass** / also measuring **mass** of solution on outside AW ;	**1**
1(a)(v)	(mass of the cylinder has increased because) **water** has entered the potato ;	**1**
1(b)(i)	axes right way round and labelled with quantity and units ; sensible linear scale and plots cover more than half the grid ; plots correct ± half small square ;	**3**
1(b)(ii)	best-fit curve ;	**1**
1(c)(i)	reading off graph ; line from 0 to x axis ;	**2**
1(c)(ii)	no net overall movement of water ;	**1**

Question	Answer	Marks
2(a)(i)	<table><tr><td></td><td colspan="3">final colour student observes</td></tr><tr><td>type of food</td><td>Benedict's solution</td><td>biuret solution</td><td>iodine solution</td></tr><tr><td>potato</td><td>**blue**</td><td>**blue**</td><td>**blue-black**</td></tr><tr><td>apple</td><td>**red / orange / yellow / green**</td><td>**blue**</td><td>**brown**</td></tr></table> one mark each positive ;; one mark all negatives ;	3
2(a)(ii)	potato contains starch ; apple contains <u>reducing</u> sugar ; ref neither contain protein ;	3

Question	Answer	Marks
3(a)(i)	initial volume was taken at room temperature / volume changes with temperature ;	1
3(a)(ii)	78.5 ; 65.<u>0</u> ;	2
3(a)(iii)	13.5 ;	1
3(a)(iv)	17 / 17.2;	1
3(b)	heat for longer / use more iron ;	1

Question	Answer	Marks
3(c)	goes out **and** because no oxygen ;	1
3(d)	(aqueous) sodium hydroxide / aqueous ammonia **AND** red / brown ppt ;	1
3(e)	too little CO_2 to see the difference ;	1
3(f)	white to blue ;	1
3(g)	**1**, **2** and **4** ; Any two from: **1** no air / oxygen **2** no water **4** no water **AND** air / oxygen;;	3

Question	Answer	Marks
4	one mark from each section and any two others **apparatus** balance and its use ; stop-clock / timer and its use ; gloves to protect skin / self / hands from (poisonous) X ; **method** iron and water and salt and indicator X and time (to rust / go blue) for 2 masses of salt ; **measurements** mass of salt ; time to go blue ; repeat each mass at least once to identify / exclude anomalies ; 5 different masses of salt ; **control** mass / size / surface area / amount of iron ; volume / amount of water ; volume / amount / number of drops / concentration / amount of indicator X ; temperature ; **process and conclusion** plot graph of mass of salt against time (for X to go blue) ; what shape of graph indicates e.g. positive gradient means positive relationship / straight line through origin means proportional etc. ; as mass increases does time increase / decrease / stay the same ;	7

Question	Answer	Marks
5(a)(i)	10.3 ;	1
5(a)(ii)	61.8 ;	1
5(a)(iii)	move the screen slowly / backwards and forwards ;	1
5(b)	15(.1) ;	1
5(c)	15(.035) ;	1
5(d)	15(.1) ; 15.1 (3 sf) ;	2
5(e)	image drawn inverted ; image smaller than the object ;	2
5(f)	easier to see when the image has a sharp edge ;	1

Question	Answer	Marks
6(a)(i)	82.5 (°C) ;	1
6(a)(ii)	to allow the thermometer to reach the temperature of the hot water / to allow the liquid (in the thermometer) to expand ;	2
6(a)(iii)	read scale at right angles / at eye level / stir the water (before measuring the temperature) ;	1
6(b)(i)	10.5;	1
6(b)(ii)	5.25 / 5.3 ;	1

Question	Answer	Marks
6(c)	$\Delta\theta$ = 8.5 ; 4.25 / 4.3 ;	**1**
6(d)	water cools more quickly when it is hotter / water cools more quickly when there is a greater difference between hot water and ambient temperature ;	**1**
6(e)(i)	24(.0) °C ;	**1**
6(e)(ii)	> 45 °C and < 55 °C ;	**1**