CAMBRIDGE
International Education

Cambridge IGCSE™

CO-ORDINATED SCIENCES **0654/62**

Paper 6 Alternative to Practical **May/June 2026**

MARK SCHEME

Maximum Mark: 60

Published

This mark scheme contains the instructions and marking guidance that our examiners used to mark candidate responses for this component.

Before they start marking, examiners complete a standardisation process. They review a range of candidate responses and discuss the mark scheme in detail to agree which answers can and cannot be accepted. Examiners award marks where it is clear that candidate responses have met the requirements of the mark scheme. These requirements may vary between different components or different versions of the same component, depending on the exact requirements of the question and the candidate responses seen during the standardisation process.

Sometimes, our mark schemes may allow marks to be awarded to responses which contain elements that are factually incorrect or for content not covered by the syllabus. We do this in response to the demands of a specific question to support candidates and make sure that our assessments are fair. However, these allowances should not be used as a guide for teaching and learning.

We cannot discuss the mark scheme with schools, and we recommend that schools read the mark scheme together with the assessment material and the Principal Examiner Report for Teachers.

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General marking principles

All examiners must apply these marking principles when marking candidate responses.

1	Examiners must award marks for each response in line with: • the specific **content** defined in the mark scheme • the specific **skills** defined in the mark scheme or in the level descriptions • the **standard of response** required as exemplified by the standardisation scripts.
2	Examiners must award **whole marks** (not half marks, or other fractions).
3	Examiners must award marks **positively**. This means that: • marks are not deducted for errors or omissions • marks are awarded for correct/valid answers as defined in the mark scheme and also for **other valid answers** which go beyond the scope of the syllabus and mark scheme referring to your team leader as appropriate • the quality of spelling, punctuation and grammar are judged **only** when the mark scheme indicates that these features are **specifically assessed** in the question. However, the meaning of all responses must be unambiguous.
4	Examiners must **consistently** apply the requirements of the mark scheme and any rules for what to do when candidates have not followed instructions correctly.
5	Examiners must use the **full range of marks** defined in the mark scheme, unless limited by the quality of the candidate responses seen.
6	Examiners must award marks according to the mark scheme and **must not** award marks with grade thresholds or grade descriptions in mind.

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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.

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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.

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Annotations guidance for centres

Examiners use a system of annotations as a shorthand for communicating their marking decisions to one another. Examiners are trained during the standardisation process on how and when to use annotations. The purpose of annotations is to inform the standardisation and monitoring processes and guide the supervising examiners when they are checking the work of examiners within their team. The meaning of annotations and how they are used is specific to each component and is understood by all examiners who mark the component.

We publish annotations in our mark schemes to help centres understand the annotations they may see on copies of scripts. Note that there may not be a direct correlation between the number of annotations on a script and the mark awarded. Similarly, the use of an annotation may not be an indication of the quality of the response.

The annotations listed below were available to examiners marking this component in this series.

Annotations

Annotation	Meaning
	correct point or mark awarded
	incorrect point or mark not awarded
BOD	benefit of the doubt given
FT	follow through
NBOD	benefit of doubt was considered, but the response was decided to not be sufficiently close for benefit of doubt to be applied.
TV	response is too vague or there is insufficient detail in response
ECF	error carried forward applied
^	information missing or insufficient for credit
	unclear response
I	incorrect or insufficient point ignored while marking the rest of the response

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Annotation	Meaning
R	incorrect point or mark not awarded
CON	contradiction in response, mark not awarded
LNK	two statements are linked
SEEN	point has been noted, but no credit has been given or blank page seen
	key point attempted / working towards marking point / incomplete answer / response seen but not credited / blank page seen
BP	blank page

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Mark Scheme Abbreviations

;	separates marking points
/	separates alternative responses for the same marking point
Allow	accept (a less-than-ideal answer which should be marked correct)
Ignore	ignore (mark as if this material was not present)
AND	indicates that two or more parts of a response are required for the mark
AVP	alternative valid point
AW	alternative wording (where responses vary more than usual)
NOT	indicates an incorrect response that would contradict another otherwise correct alternative
OR	alternative responses for the same marking point
owtte	or words to that effect
underline	actual word given must be used by candidate (grammatical variants excepted)
ecf	error carried forward
ORA	or reverse argument
( )	the word / phrase in brackets is not required but sets the context
max	indicates the maximum number of marks

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Question	Answer	Marks	Guidance
1(a)(i)	**M1** 5.0 ; **M2** 3.5 ; **M3** both to 1dp ;	**3**	**ALLOW ± 0.1 for both values** **ALLOW** 5 **ALLOW** ecf for M2 if M1 given in mm
1(a)(ii)	5.2 **AND** 3.4 ;	**1**	**ecf** on **1(a)(i)** The two values must be to the same number of significant figures **ALLOW** 5.15 and 3.35 **OR** 5.1 and 3.3
1(a)(iii)	as (enzyme / celery) volume increases height increases ORA ;	**1**	**NOTE** both variables need to be comparative **DO NOT ALLOW** proportional / negative **IGNORE** positive correlation / positive
1(a)(iv)	as volume increases rate increases ORA ;	**1**	**NOTE** both variables need to be comparative **ALLOW** as volume increases reaction is faster **IGNORE** (directly) proportional / positive / positive correlation **DO NOT ALLOW** negative

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Question	Answer	Marks	Guidance
1(a)(v)	low**er (**total) height ;	**1**	**NOTE** needs to be comparative **ALLOW** small**er** heights / height decreases **IGNORE** no increase in height **IGNORE** smaller results **IGNORE** slower
1(b)(i)	ensure celery cells are evenly distributed ;	**1**	**ALLOW** even distribution (of celery) / even spread of celery / enzyme **ALLOW** even enzyme distribution **ALLOW** hydrogen peroxide in contact with **all** celery / enzyme / **all** hydrogen peroxide in contact with enzyme / celery **ALLOW** the concentration (of celery / enzyme) is even **IGNORE** ensure celery cells have not settled (at the bottom of the tube) I**GNORE** evenly mix – mix is in the Question / evenly combined **IGNORE** to react / to get complete reaction / speed up the reaction / increase collision of particles **IGNORE** dissolving the enzyme / celery

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Question	Answer	Marks	Guidance
1(b)(ii)	to increase surface area (for enzyme action) / to release enzyme (from the cells) ;	**1**	**ALLOW** (to form a) large surface area **ALLOW** to break open the cells **IGNORE** mixing / increase rate of reaction / increase the surface area of a molecule

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Question	Answer	Marks	Guidance
1(b)(iii)	**M1** top of bubbles not level / flat / bubbles burst / **M2** (add no detergent and) measure volume of gas given off (with a syringe) / **OR** **M1** ruler doesn't start with 0 at the end / dead space at end of ruler ; **M2** just measure the foam **OR** **M1** boiling tube is curved (at the bottom) **M2** do experiment in a measuring cylinder / beaker / conical flask / (add no detergent and) measure volume of gas given off (with a gas syringe) / measure the height of the foam only ;	**2**	**IGNORE** foam starts to fall **IGNORE** irregular shape **ALLOW use a** light sensor / **use a** light gate **ALLOW** measure to the topmost part of the foam each time **ALLOW** measure mass / film it **IGNORE** measure to the lowest level of the foam **IGNORE** levelling the foam with a ruler / measure volume not height meniscus If no marks awarded **ALLOW 1 max** for parallax (or described) and the description of how to read the measurement correctly: at eye level to the reading / at 90 ° to the reading / perpendicular to the reading / eye level to the measurement / measure at eye level **IGNORE** eye level to the scale

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Question	Answer	Marks	Guidance
1(b)(iv)	measuring cylinder / syringe ;	**1**	**ALLOW** graduated pipette / volumetric pipette / burette **IGNORE** pipette unqualified **DO NOT ALLOW** dropping pipette / teat pipette / eye dropper
1(b)(v)	Benedict's **and** heat ;	**1**	

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Question	Answer	Marks	Guidance
2	**one** mark from each section and any **two other** marks **1 apparatus** timer / stop-watch and it's use in the method ; pulse meter and it's use in the method ; tape measure and it's use in the method ; **2 method** pulse rate at rest, exercise, time to return to resting pulse and at least 2 heights ; **3 measurements** pulse before (**and** immediately after exercise) ; height (of the people) ; time to return to normal / resting pulse ; repeats at same height to identify / exclude anomalies ; at least 5 different heights used ; **4 constant variables** (person) same gender / same age / (idea of) same fitness/health ; (exercise) same time for exercise / same type of (named) exercise ; **5 processing results/conclusion** plot graph of recovery time against height ; description of how to interpret the graph e.g. straight line through origin is proportional etc. ; look to see if increasing height increases or decreases (or doesn't affect) the recovery time ;	**7**	**ALLOW** ECG / smart watch / heart rate monitor / BPM tracker / BPM monitor / heart monitor / pulse rate counter **IGNORE** pulse rate detector / BPM machine **IGNORE** manual counting for apparatus **ALLOW** rule(r) **IGNORE** weight **IGNORE** exercise to same bpm **IGNORE** stated conclusion **ALLOW** just time provided they have explained earlier it is the recovery time

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Question	Answer	Marks	Guidance
3(a)(i)	tare / zero the balance ;	**1**	**ALLOW** reset the balance / start balance from 0 **IGNORE** clean the balance / make sure nothing is on the balance / restart the balance **IGNORE** reset the values
3(a)(ii)	doesn't leave soot on the bottom of the evaporating basin ;	**1**	**ALLOW** yellow flame sends bottom of basin black **IGNORE** faster reaction/evaporation **IGNORE** to see the colour change
3(a)(iii)	51.1 ; 45.7 ;	**2**	
3(b)(i)	5.4 / 5.45 ;	**1**	ecf on **3(a)(iii)** **IGNORE** 5.40
3(b)(ii)	0.30 ;	**1**	ecf, **ALLOW** 0.3 **ALLOW** 0.303 / 0.3027777777 any sf (using 5.45) rounded or truncated **IGNORE** 0.300

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Question	Answer	Marks	Guidance
3(b)(iii)	3.6 ;	**1**	ecf min 2sf, rounded or truncated **ALLOW** 3.57 (using balance readings) **ALLOW** 3.60
3(b)(iv)	0.034 ;	**1**	ecf 0.0339622641 min 2sf, rounded or truncated **ALLOW** 0.033679245 minimum 2sf **IGNORE** 0.0340
3(b)(v)	8.8 ; 9 ;	**2**	ecf 8.82352941 any sf rounded or truncated 1sf and correctly rounded **NOTE** 9 scores both marks
3(c)	water still there and heat to constant mass ;	**1**	**ALLOW** water still there **and** heat again / water still there **and** heat for longer

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Question	Answer	Marks	Guidance
3(d)	(heat) to evaporate half / some water / heat to saturate (solution) **and** leave to crystallise / cool ;	**1**	**ALLOW** (heat to) evaporate half / some water **and** leave solution somewhere warm **ALLOW** heat until crystals **just** form **and** leave to cool / crystalise **ALLOW** evaporate some of the water and leave **ALLOW** heat and leave the solution (to cool) **DO NOT ALLOW** heat to dryness **DO NOT ALLOW** leave to dryness **NOTE** crystallisation is insufficient
3(e)	**M1** anhydrous copper sulfate ; **M2** white to blue ; **OR** **M1** anhydrous cobalt chloride ; **M2** blue to pink ;	**2**	**M2** is dependent on **M1** unless **M1** is missing (or a near miss e.g. copper sulfite / cobalt chlorine) **ALLOW** white copper sulfate read anhydrous if starting colour is white **ALLOW** blue cobalt chloride read anhydrous if starting colour is blue

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Question	Answer	Marks	Guidance
3(f)	carbon dioxide also given off **AND** CO_2 has mass ;	**1**	**ALLOW** loses mass as carbon dioxide **ALLOW CO_2** has mass **ALLOW CO_2** leaves the evaporating basin / **CO_2** escapes / **CO_2** is given off / **CO_2** is released **IGNORE CO_2** evaporates / **CO_2** is made **DO NOT ALLOW** CO given off / CO^2 **IGNORE** the oxide is formed

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Question	Answer	Marks	Guidance
4(a)	zinc **and** iodide **and** sulfate / correct symbols ;	**1**	**ALLOW** Zn^{2+} , I^- , SO_4^{2-} **NOTE** If both names and formulae are given they must match **DO NOT ALLOW** iodine
4(b)	to breakdown any carbonate ;	**1**	**ALLOW** remove carbonate / so carbonate cannot give a precipitate
4(c)	HC*l* gives white ppt **and** would mask colour of iodide ppt ;	**1**	**ALLOW** HC*l* gives (also) a (white) precipitate **NOTE** HC*l* contains chloride ions is insufficient
4(d)	wire / splint into solution and into a flame ; blue/roaring (Bunsen) flame ;	**2**	**ALLOW** cotton bud / stick / rod / loop **IGNORE** spraying into flame **IGNORE** spoon / spatula **IGNORE** into Bunsen burner **ALLOW** non-luminous flame **IGNORE** into Bunsen burner

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Question	Answer	Marks	Guidance
5(a)(i)	5.6 ; 7.0 ;	**2**	
5(a)(ii)	0.56 **and** 0.70 ;	**1**	**ecf 5(a)(i)** ÷ 10 **ALLOW** 0.56 and 0.7
5(a)(iii)	0.31 **and** 0.49 ;	**1**	**DO NOT ALLOW** 0.50 from 0.7
5(b)(i)	axes labelled with quantity and unit ; sensible linear scales and plotted points cover ⩾ ½ grid and all must be able to be plotted ; points plotted correctly ± ½ small square ;	**3**	y axis T^2 **and** s^2 **and** x axis m / mass **and** g **ALLOW** 1 error
5(b)(ii)	straight line of best fit ;	**1**	points both sides of the line but ALLOW if they put through the origin and miss point at 200, OR the other points join a line and miss point at 100
5(b)(iii)	triangle using at least half of the line ; gradient correct ;	**2**	 quality mark expect 0.0013 – 0.0017 ecf on **3(b)(ii)**
5(b)(iv)	k correct ;	**1**	**ecf on 5(b)(iii)** min 2sf rounded or truncated

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Question	Answer	Marks	Guidance
5(b)(v)	yes **and** straight line passes through origin / $T^2 \div m$ OR $m \div T^2$= constant ;	**1**	correct statement **and** explanation **accept ecf** from **(b)(ii)** incorrect line of best fit If their line passes through the origin **ALLOW** yes and the (straight) line passes through the origin **OR** if their line doesn't pass through the origin **ALLOW** no as the (straight) line does not go through the origin **ALLOW** no and $T^2 \div m$ OR $m \div T^2$ is not constant **ALLOW** no and as m doubles T^2 doesn't double **IGNORE** as T^2 increases so m increases **IGNORE** straight line unqualified
5(c)	reaction time spread over more oscillations ;	**1**	**ALLOW** reduces / smaller random error / smaller % error / error has less effect (on 20 swings than 10 swings) / reaction time has less effect (on 20 swings than 10 swings) / reaction time is less significant **IGNORE** early oscillations are faster / slower **IGNORE** 20 swings takes longer unqualified **IGNORE** accuracy **IGNORE** 20 are easier to measure

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Question	Answer	Marks	Guidance
6(a)	68.0 ; 29.5 ;	**2**	ALLOW 68
6(b)	10.5 **and** 38.5 ;	**1**	**ecf** from **(a)**
6(c)	no **and** 10.5 × 2 = 21 (not 38.5 / not within 10%) / 38.5 ÷ 2 = 19.25 (not 10.5 not within 10%) ;	**1**	ecf from **6(b)** calculation needed **ALLOW** 38.5 ÷ 10.5 = 3.67 (not 2) / it is 3.67 times larger (allow value truncated or rounded)
6(d)	suitable hazard AND precaution ; e.g. hot water / hot beaker **and** hands / eyes / skin **and** use (heatproof) gloves / goggles	**1**	**ALLOW** hot beaker / hot water and hands and use tongs
6(e)	**bulb** not fully submerged AND thermometer (bulb) touching the beaker ;	**1**	**IGNORE** thermometer should be in the middle
6(f)	reading higher than 4 °C and less than 19 AND liquid level / thermometer has not stopped falling ;	**1**	 **ALLOW** thermometer hasn't reached lowest temperature **ALLOW** thermometer takes time to get to 4 °C

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