



Cambridge IGCSE™

CO-ORDINATED SCIENCES

0654/06

Paper 6 Alternative to Practical

For examination from 2025

MARK SCHEME

Maximum Mark: 60

Specimen

This document has **10** pages.

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 descriptions for the question
- the specific skills defined in the mark scheme or in the generic level descriptions 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 descriptions.

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 descriptions 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	<p><u>'List rule' guidance</u></p> <p>For questions that require n responses (e.g. State two reasons ...):</p> <ul style="list-style-type: none"> • The response should be read as continuous prose, even when numbered answer spaces are provided. • Any response marked <i>ignore</i> 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.

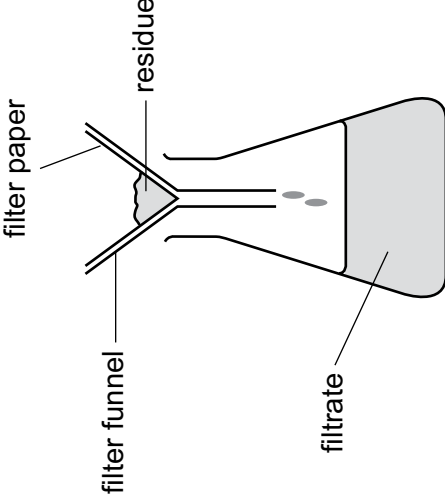
State symbols given in an equation should be ignored unless asked for in the question or stated otherwise in the mark scheme.

Mark scheme abbreviations

;	separates marking points
/	alternative responses for the same marking point
R	reject the response
A	accept (a less than ideal answer which should be marked correct)
I	ignore (mark as if this material was not present)
ecf	error carried forward
MP	mark point
AVP	alternative valid point
ORA	or reverse argument
owtte	or words to that effect
AW	alternative wording (where responses vary more than usual)
AND	both responses required for the mark
OR	alternative responses for the same marking point
<u>underline</u>	actual word given must be used by candidate (grammatical variants excepted)
()	the word / phrase in brackets is not required but sets the context
max	indicates the maximum number of marks

Question	Answer	Marks	Guidance
1(a)(i)	measuring cylinder / syringe ;	1	A graduated pipette
1(a)(ii)	time AND minutes ;	1	A min
1(a)(iii)	6.0 ; 8.8 ;	2	5.9–6.1 8.6–9.0
1(b)(i)	axes correctly orientated and labelled with units ; sensible linear scale using at least half the grid ; all plots correct \pm half a small square ;	3	ecf from (a)(iii) A 6 plots correct ecf (a)(iii)
1(b)(ii)	appropriate best-fit curve ;	1	
1(b)(iii)	correct reading \pm half a small square from graph ;	1	
1(b)(iv)	height increases with time ; no change in height with time ;	2	
1(c)	identify anomalies ;	1	I calculate mean / average A to see the variability of the results
1(d)	any one from: top of foam not level / top of foam moving / bottom of test-tube rounded so ruler not next to bottom / ruler scale does not start at end of ruler / test-tube rack obstructs test-tube / AVP ;	1	
Question	Answer	Marks	Guidance
2(a)(i)	Benedict's – <u>reducing</u> sugar ; biuret – protein ; iodine – starch ;	3	A glucose
2(a)(ii)	Benedict's – orange ; biuret – blue ; iodine – brown ;	3	A yellow / green / red A variations of brown, e.g. orange-brown and yellow-brown
2(b)	contains <u>reducing</u> sugar ;	1	A glucose

Question	Answer	Marks	Guidance
3(a)	42.5 ; 33.0 ;	2	
3(b)	19.0 AND 10.5 ;	1	ecf from (a)
3(c)	801.8 AND 443.1 ; both values to three significant figures ;	2	802 AND 443 in the table – award both marks
3(d)	value between 444 and 801 ; Al less reactive than Mg and more reactive than Zn ;	2	ecf from (c)
3(e)	any two from: repeat ; insulate ; lid ; draft excluder ; measure mass of powder ; use a burette / graduated pipette / volumetric pipette to measure the hydrochloric acid ;	2	1 syringe 1 same starting temperatures of the hydrochloric acid
3(f)(i)	prediction 1 (Effervescence will be observed in all three experiments.) AND copper does not react with (dilute) acids ;	1	
3(f)(ii)	hydrogen ;	1	

Question	Answer	Marks	Guidance
4(a)(i)	aqueous barium nitrate ; blue solution (no change) ; aqueous silver nitrate ; white ppt. ;	4	
4(a)(ii)	Cu^{2+} AND Cl^- ;	1	A copper (II) AND chloride note oxidation state must be correct
4(b)	(salt) on a (nichrome / platinum) wire / loop ; into a roaring / blue Bunsen flame ;	2	A on a wooden splint I tongs / tweezers / spoons / squirting solution into flame
4(c)	filter paper in filter funnel and both labelled correctly with a receiving vessel ; residue and filtrate labelled correctly ;	2	filter paper must have V at the base and not be a dotted line 

Question	Answer	Marks	Guidance
5(a)(i)	correct distance marked ;	1	
5(a)(ii)	8.0 (cm) ;	1	ecf from candidate's line
5(b)	40.0 (cm) / candidate's (a)(ii) \times 5 ;	1	
5(c)(i)	25.6 (s) / correct value to 3 significant figures or more ;	1	correct answer only
5(c)(ii)	25.5 (s) / correct value to 3 significant figures or more ;	1	ecf candidate's (c)(i)
5(c)(iii)	to identify any anomalous result / to increase confidence in the results / to reduce the effect of random errors ;	1	
5(d)(i)	1.28 (s) / candidate's (c)(ii) \div 20 ;	1	A 1.275
5(d)(ii)	1.64 / candidate's (d)(i) ² ;	1	A 1.63
5(e)	9.63 (m / s ²) / correct evaluation of candidate's values ;	1	
5(f)	9.69 (m / s ²) / average of candidate's (e) and (f) ;	1	
5(g)	Yes / No – statement to match results ; values used to justify statement ;	2	
5(h)	reaction time errors less significant / measurement errors less significant in larger length ;	1	

Question	Answer	Marks	Guidance
6	<p>MP1 additional apparatus: stop-watch and thermometer ;</p> <p>MP2 method: time hot water (in beaker) cooling ;</p> <p>MP3 control variables: volume / mass of water ;</p> <p>MP4 results table: columns for (initial) temperature and time / temperature drop AND all units present and correct ;</p> <p>MP5 conclusion: any one from: compare the temperature drops in equal times – largest drop gives the greatest rate ; compare the times for the same temperature drops – shortest time gives the greatest rate ; calculate the rate of temperature fall each time and compare ; plot graphs of temperature against time and compare the gradients ;</p> <p>MP6 additional points: any two from: repeat experiment at each temperature (at least) three times to identify anomalous results ; repeat experiment using water at different (initial) temperatures ; same temperature of the surroundings / room temperature ; same size / shape / initial temperature of the beaker ; same time of cooling / same temperature decrease ;</p>	7	<p>A amount</p> <p>depends on the method used</p> <p>symbols or words</p>