CAMBRIDGE
International Education

Cambridge International AS & A Level

CHEMISTRY **9701/52**

Paper 5 Planning, Analysis and Evaluation **May/June 2026**

MARK SCHEME

Maximum Mark: 30

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.

This document consists of **22** printed pages.

[Turn over

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.

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.

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
	Unclear
	Information missing or insufficient for credit
	Benefit of the doubt given
	Contradiction in response otherwise markworthy, mark not given
	Part of the correct answer has been seen. Full credit has not been awarded.
	Error carried forward applied
	Incorrect or insufficient point ignored while marking the rest of the response
	Rounding error

Annotation	Meaning
POT	Power of ten error
REP	Repeat error
SEEN	Blank page **or** part of script seen
SF	Error in number of significant figures
TE	Transcription error

Mark scheme abbreviations

R	reject the response
A	accept the response
I	ignore the response
ecf	error carried forward
BOD	benefit of doubt given
ora	or reverse argument
owtte	or words to that extent
underline	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 that can be given
M	marking point

Question	Answer	Marks	Guidance
1(a)(i)	7.61 g	**1**	0.300 × 100/1000 × 253.8 **A** 7.614 **R** 7.62 or 127 or 254 used in working **A** 7.6 but only if there is no evidence of 7.62 / 127 / 254

Question	Answer	Marks	Guidance
1(a)(ii)	**M1** dissolve the solid / I_2 (s) (in the beaker) (using a small volume of) methanol	3	**M1** is the dissolving mark **M2** is the transfer with rinsing mark into a flask **M3** is volumetric apparatus and inversion mark (we need 100 cm^3 **AND** volumetric flask seen somewhere) **M1** and **M2** could still be awarded if another type of flask (e.g. conical) is used – but must be a flask not a beaker / measuring cylinder **M1 I** 'weigh the solid' **I** mass / mol I_2 if seen **I** 'place in a beaker' (assume they are repeating the question) but if they transfer the solid to a second container, evidence of rinsing is needed to allow **M1** **M1 R** if it is assumed I_2 is aqueous/in methanol **M1 R** if suggestion is to add more than 50 cm^3 of methanol or to fill the beaker to dissolve solid in the beaker. Any volume quoted must be 50 cm^3 or less. **A** prepare / make a solution for dissolve. If dissolve not seen here, **A** 'transfer the solution' in **M2** to be equivalent to 'dissolve' in **M1** ie they must have dissolved in **M1** if they are transferring a solution in **M2**.
	M2 transfer/add to a (100 cm^3 volumetric) flask **AND** rinse (with methanol)		**M2 A** graduated flask for volumetric flask **A** extra transfers as long as the exact number of moles of solid end up in the vol flask via rinsing. Assume 'rinse' / 'wash' is into flask unless stated **I** lack of rinsing the funnel **M2 R** if transfer of solution from **M1** is via burette/pipette assume 'rinse the residue' refers to residual solution in the beaker
	M3 top the 100 cm^3 volumetric flask up to mark (with methanol) **AND** invert the (stoppered) flask		**M3 A** make up to 100 cm^3 with methanol. **I** 'top up' without reference to 100 **A** 'fill the flask to 100 cm^3 / mark' but **R** 'fill the flask' (alone) for 'invert the flask' **A** 'shake', 'swirl' etc **I** Homogenise (alone) **I** 'mix' (alone) /'mix the flask' (we need to know how they mix/homogenise) **R** stir in the flask

Question	Answer	Marks	Guidance
1(a)(ii)			**A** max 2 marks if solid is added directly into the volumetric flask **M1** is not awarded **M2** rinsing of beaker is still needed to ensure all the solid is put into the vol flask **M3** OK If they fill volumetric flask to the mark / add 100 cm^3 of methanol and then add solid **A** max 1 mark: **M1** is not awarded **M2** is not awarded (because they cannot rinse into a full flask) **M3** still possible for 100 cm^3 volumetric flask **AND** methanol **AND** invert to gain credit '100 cm^3 volumetric flask' needs to be seen in **M2** or **M3** for **M3** to be awarded Methanol needs to be seen at least once in **M1**, **M2** or **M3** without methanol 3 marks = 2 marks, 2 marks = 1 and 1 mark = 0 marks. methanol must be seen once to award **M1** if not directly used in **M1** max 2 marks if (distilled) water is used as the solvent

Question	Answer	Marks	Guidance
1(b)(i)	methanol is flammable	1	**A** inflammable for flammable **R** non-flammable **A** other comments implying the flammability of methanol e.g. methanol vapours ignite **A** solution / I_2(meth) / substance is flammable **A** solvent is flammable **I** I_2 (alone) is flammable **A** tetramethylammonium iodide / $(CH_3)_4NI$ is flammable **A** reactants are flammable **A** contents are flammable **A** polyiodide salt / $(CH_3)_4NI_{2n+1}$ is flammable **A** product(s) are flammable **I** '(it is) flammable' alone (not specifying whether it is the contents or the flask which is flammable) **I** references to explosions **I** to reduce evaporation of methanol / prevent methanol boiling **I** $(CH_3)_4NI$ / reactant will (thermally) decompose **I** to avoid spitting **I** flask shattering / flask breaking
1(b)(ii)	to remove any soluble impurities	1	**A** to remove impurites / to remove reactants / I_2 / I_2(meth) / $(CH_3)_4NI$ **A** to remove solute(s) / **A** to remove solution(s) **A** to remove (methanol-)soluble substances (no need to tell us what the substances are) **I** to remove substances (alone) **I** to remove filtrate **R** to remove product / residue / solid impurities **R** to remove methanol / solvent / water

Question	Answer	Marks	Guidance
1(b)(iii)	leave (to dry) **AND** until constant mass	1	**A** description of leaving until constant mass e.g. keep on weighing until constant mass e.g. weigh every 5 minutes until constant mass e.g. dry to constant mass e.g. repeat drying and weighing until a constant mass is obtained e.g. wait until constant mass **R** heating or methods which do not reflect step 6 (where heating does not occur) e.g. heat to constant mass / place in an oven until constant mass / leave in a warm place **I** use of cobalt chloride paper / desiccator **R** leave until constant volume **R** constant weight for constant mass

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>1(b)(iv)</td><td>M1 suitable results table showing rows which include:
• mass of (evaporating) basin
• mass of (evaporating) basin + crystals
• mass of crystals
• with column to enter values
• units i.e. ‘g’

e.g.<table><tr><td>mass of (evaporating) basin / g</td><td></td></tr><tr><td>mass of (evaporating) basin + crystals / g</td><td></td></tr><tr><td>mass of crystals / g</td><td></td></tr></table></td><td>2</td><td>mark table first
the table may be vertical as well as horizontal
A ‘weight’ for ‘mass’ in this question only
‘mass’ must be seen in table

A dish for basin

A any table that has:
mass of dish / weighing boat / any container + crystals
mass of dish / weighing boat / any container (ignore ‘+ residue’)
mass of crystals / product / $(CH_3)_4NI_{2n+1}$ / solid
units i.e. ‘g’
A rows 1 and 2 in any order
I other rows
R tables which do not have a container
R tables which do not measure mass of crystals (e.g. tables which only measure mass change due to methanol/water loss e.g. ‘wet crystals to dry crystals)
I mass change due to solvent loss as extra row(s)
R tables which measure mass of stated substance other than crystal/product e.g. I_2

allow units in value box (as shown)<table><tr><td></td><td>mass</td></tr><tr><td>Mass of evaporating basin</td><td>g</td></tr></table></td></tr>
</table>

Question	Answer	Marks	Guidance
1(b)(iv)	**M2** description of correct method used in obtaining mass of dry crystals • Weigh an evaporating basin • (Transfer the dry crystals from the filter paper to the evaporating basin and) reweigh the evaporating basin + crystals.		**A** as an alternative description of correct method for **M2**: • weigh an evaporating basin + crystals • rinse and dry the evaporating basin and reweigh **I** descriptions of maths involved in determining mass of crystals other methods which involve transfer of crystal from the original basin into another container (might be a basin) will not score **M2** e.g. • weigh a weighing boat (or other container) • transfer the crystals from the evaporating basin to the weighing boat / container and reweigh weighing boat/container
1(c)(i)	0.0200 mol dm^{-3} $Na_2S_2O_3$(aq)	**1**	**A** $Na_2S_2O_3$(aq) / aqueous sodium thiosulfate / 0.02 mol dm^{-3} $Na_2S_2O_3$ **A** sodium thiosulfate / $Na_2S_2O_3$ alone without aqueous **A** rinse with solution to be used in the burette **I** slips in concentration e.g. 0.2 mol dm^{-3} **I** rinsing with distilled water or organic drying solvent e.g. propanone before rinsing with $Na_2S_2O_3$(aq). **R** rinsing with anything else after $Na_2S_2O_3$(aq). **R** incorrect formulae **R** 'rinse with water/ $Na_2S_2O_3$(aq)' (too vague)

Question	Answer	Marks	Guidance
1(c)(ii)	Working must be shown. $= \frac{2\times0.05}{13.35} \times 100 = 0.749\%$	**1**	(0.05×2) may be seen separate or as $(0.1 / 2 \times 2)$ **I** 0.1 as numerator without evidence of 0.05 **A** Any correct answer that rounds to 0.7 i.e. **A** 0.7 / 0.74 / 0.749 **A** 0.75 / 0.750 **I** missing 'x 100' in calculation if correct answer seen **I** Rounding errors beyond 1st SF **R** 0.0749 this must mean 0.005 was used in the working **R** incorrect answers with correct working Titre used must be 13.35
1(c)(iii)	13.30 cm^3	**1**	**I** 13.3

Question	Answer	Marks	Guidance
1(c)(iv)	**M1** mol of $Na_2S_2O_3$ in mean titre = 13.30 cm^3 × 0.02 / 1000 = 2.66×10^{-4} mol **M2** mol of I_2 in 10 cm^3 of solution A = 2.66×10^{-4} / 2=1.33×10^{-4} mol and mol of I_2 in 100 cm^3 of solution A =1.33×10^{-4} mol × 100 / 10 =1.33×10^{-3} mol **M3** mass of I_2 in 100 cm^3 of solution A = $1.33 \times 10^{-3} \times 253.8$ =0.338 g	**3**	**A** 3 marks for 0.338 if no evidence of incorrect working. **I** minor transcription errors **A** 0.338 up to calculator value (0.337554) **I RE** after 3rd SF **A** 2SF as final answer if 3SF or more correct answer seen in working Otherwise mark by step. **M2** subsumes **M1** **A** ecf for mean titre from 1(c)(iii) **A M2** for ecf of **M1** **A M3** for ecf of **M2** **A** Use of 254 **A** ecf for use of 126.9 / 127 for M_r I_2 if used in 1(a)(i) Scaling up by 100 / 10 appears in step 2, but can appear in any step. **A** mole ratio methods involving concentration × volume of solutions $\frac{C_1 \times V_1}{C_2 \times V_2}$ C_1 = $[I_2(aq)]$ in solution A V_1 = volume solution A C_2 = $[Na_2S_2O_3(aq)]$ V_2 = volume $Na_2S_2O_3(aq)$ concentration of I_2 (in soln A) × volume I_2 (soln A) = 1 concentration of $Na_2S_2O_3$ × volume $Na_2S_2O_3$ 2 $\frac{\text{concentration of } I_2 \times 10.00}{0.0200 \times \text{volume } Na_2S_2O_3\ 2} = 1$ This leads to $[I_2(aq)]$ in solution A = 0.0133 mol dm^{-3} **M1** ✓ Moles of I_2 in 100 cm^3 of solution A = 0.0133 100 / 1000 = 1.33×10^{-3} **M2** ✓ (**M2** subsumes **M1**) $1.33 \times 10^{-3} \times 253.8$ = 0.338 g **M3** ✓ Other methods may be used.

Question	Answer	Marks	Guidance
1(c)(v)	Working must be shown. mol I_2 = 0.338 / 253.8 = 0.00133 mol I_2 mass $(CH_3)_4NI$ = 0.472 – 0.338 = 0.134 g mol $(CH_3)_4NI$ = 0.134/200.9 = 0.000667 mol ratio = $\frac{0.00133}{0.000667}$ = 1.99… (= 2) **AND** *n* = 2	**1**	The mass (or substitute value) of I_2 from 1(c)(iv) must be used or a derived number of moles from this value must be seen (moles may be seen in **M2** of 1(c)(iv)) **A** ecf from 1(c)(iv) for 0.338 (mass of I_2) **A** ecf for M_r I_2 = 126.9 / 127 if 126.9 / 127 was used in 1(a)(i) Apply the following formulas to help If 253.8 is used as M_r I_2 $n = \frac{0.7916 \times a}{(0.472–a)}$ where a = answer to (c)(iv) If 126.9 is used as M_r I_2 $n = \frac{1.583 \times a}{(0.472–a)}$ where a = answer to (c)(iv) **A** as minimum seen for working: 0.338 / 253.8 and (0.472 – 0.338) / 200.9 or 0.134 / 200.9 or 0.00133 mol I_2 and 0.000667 mol of $(CH_3)_4NI$ or 1.99… **A** mol of I_2 = 0.00133 or mol of I_2 derived from incorrect mass of I_2 in 1(c)(iv) and **A** mol of $(CH_3)_4NI$ = 0.000667 or mol of $(CH_3)_4NI$ derived from incorrect mass of I_2 in 1(c)(iv) Using given 0.374 g as the mass of I_2 gives *n* = 3. Other methods may be used.

Question	Answer	Marks	Guidance
2(a)	**M1** labelled gas syringe **M2** sealed apparatus using a bung / cork / stopper	**2**	**M1** gas syringe must be attached (directly to) side arm **R** M1if delivery to gas syringe goes through extra apparatus eg condenser etc **A** 'syringe' / 'glass syringe' as label **A** for displacement of non-aqueous named liquid (instead of water) into an inverted labelled measuring cylinder **M2** **A** for any apparatus that is sealed and is capable of collecting a measured volume of gas e.g. displacement of water using a measuring cylinder e.g. gas syringe coming from hole in bung and side arm sealed **A** 'lid' as label for a clearly drawn bung. **A** 'bung' as label for what looks like a lid **R** lid as a label if it looks like a lid **R** if 'sealed' apparatus includes addition of solution that would push air into the gas syringe e.g. burette delivering a solution through the bung. **I** attempts at mixing solutions within sealed apparatus e.g. test-tube dangling on a string **I** lines across delivery tubes **A** for loose diagrams - if it looks like a bung at the top of the flask assume it to be sealed **A** non-tight connection of delivery tubes to side arm **A** loose piston in the gas syringe **R** sealed apparatus that would pop apart due to increased pressure

Question	Answer	Marks	Guidance
2(a)			If **M2** (or **M1**) is given for a displacement of water apparatus be lenient with position of delivery tube at the bottom of the measuring cylinder. But it should not 'enter' the measuring cylinder above the water line or go through the wall of the water trough **R M1** and **M2** if a syringe being used to deliver reactants
2(b)	time	**1**	**I** units **R** 'time intervals'
2(c)	the volume (of CO_2) was measured / recorded too early / before 1000 s	**1**	**A** (recorded) time is greater than actual time for actual time **A** true time / real time for recorded time **A** time read / the time (seen) in the results table **A** reading was taken / recorded / measured at (880 – 920) s / (120 – 80) s early **R** timer was started / stopped too early / late **I** comments on volume error assume 'the time was recorded' means 'the recorded time' i.e. 'time was recorded too late' is correct i.e. 'time was recorded too early' is incorrect
2(d)	a smooth curve that: • starts at the origin • is to the left of the original curve • flattens at 10 cm^3 and before 1300 s • ends at 1600 s	**1**	**I** points drawn on curve **A** curve to start within first four small squares of *y*-axis and at 0 on the x-axis **R** curves which cross original graph **R** curves which clearly stray outside *y*-axis **A** curves to stray up to a ¼ of a square above 10 cm^3 as a 'hump **AND** return to 10 cm^3 **R** curves (with humps) that go too high above 10 cm^3 **R** curves where horizontal part stops before 1400 s

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>2(e)(i)</td><td>
<table>
<tr><th>$[Na_2S_2O_8]$ / mol dm^{-3}</th><th>rate / mol dm^{-3} s^{-1}</th><th>log $[Na_2S_2O_8]$</th><th>log (rate)</th></tr>
<tr><td>1.00 x 10^{-2}</td><td>0.02760</td><td>–2.00</td><td>–1.56</td></tr>
<tr><td>5.74 x 10^{-3}</td><td>0.01160</td><td>–2.24</td><td>–1.94</td></tr>
<tr><td>3.67 x 10^{-3}</td><td>0.00549</td><td>–2.44</td><td>–2.26</td></tr>
<tr><td>2.88 x 10^{-3}</td><td>0.00398</td><td>–2.54</td><td>–2.40</td></tr>
<tr><td>2.08 x 10^{-3}</td><td>0.00250</td><td>–2.68</td><td>–2.60</td></tr>
<tr><td>1.57 x 10^{-3}</td><td>0.00169</td><td>–2.80</td><td>–2.77</td></tr>
<tr><td></td><td></td><td>✓</td><td>✓</td></tr>
</table>
M1 column 3
M2 column 4
</td><td>**2**</td><td>all values must be to 2 DP
A ecf for **M2** if all –ve signs are missing in both columns
A ecf for -1.93 in column 4 if –2.43 is seen in column 3
A ecf for both –2.4 **AND** –2.6 seen in column 4 if –2.(0) **AND** –2.8 is seen in column 3</td></tr>
</table>

Question	Answer	Marks	Guidance
2(e)(ii)	**M1** all 6 points correctly plotted **M2** line of best fit correctly drawn	**2**	If a point should be on a line, it must be on a line. If a point should not be on a line, it must not be on a line. If not supposed to be on the line, points must be within half a small square of the correct position and in the correct small square. Blobs/thick crosses should be less than ½ a square across and be correctly centred. **A** ecf for acceptable line of best fit for incorrectly plotted points **I** remnants of lines that have been rubbed out place tick for **M1** on graph place tick for **M2** to the left-hand side of graph Indicate any incorrect plots with colour tool once line of best fit must cover all the points line of best fit guidance: • line should meet right-hand side of grid above –1.6 • point at (–2.24, –1.94) should not be significantly above the line.
2(e)(iii)	**M1** co-ordinates correctly recorded from line of best fit **M2** gradient calculated and correctly rounded to <u>three</u> significant figures	**2**	range at least 0.4 units on *x*-axis table points may be used but must be on line of best fit (beware (–2.00, –1.56)) Co-ordinates should be read to nearest ½ square **I** any (lack of) trailing zeroes on co-ordinates e.g. A -2.00 as -2 If *x*, *y* values are reversed, **R** ecf of *x* / *y* but **A M2** for a correct gradient (*y* / *x)* **I** units

Question	Answer	Marks	Guidance
2(e)(iv)	correct values of y, m and x for use in $y = mx + c$ where y and x are coordinates of a point of the line m is gradient calculated in **2(e)(iii)** **AND** determination of log k **AND** determination of k	**1**	**A** ecf of incorrect x and y values from co-ordinates in 2(e)(iii) E.g. $-1.94 = [2(e)(iii) \times -2.24] + \log k$ $\text{Log k} = -1.94 - [2(e)(iii) \times -2.24]$ $k = 10^{-1.94 - [\mathbf{2(e)(iii)} \times -2.24]}$ **A** 1.55 to be used in place of 2(e)(iii) **A** gradient from 2(e)(iii) expressed as a fraction or calculator value **A** correct answer to 2 or more SF **I RE** after 2nd SF
2(e)(v)	Method 1: $\frac{[2(e)(iii) - 1.5]}{1.5} \times 100$ **OR** $\frac{[1.5 - 2(e)(iii)]}{1.5} = Q\%$ **AND** (if Q% less than 4.5) **AND** (measurement) error **OR** (if Q% greater than 4.5) **AND** other factors Method 2: 4.5 % of 1.5 = 0.0675 **AND** 1.5 + 0.0675 = 1.5675 **AND** / **OR** 1.5 – 0.0675 = 1.4325 **AND** 2(e)(iii) between 1.4325 and 1.5 **AND** / **OR** between 1.5 **AND** 1.5675 **AND** measurement error **OR** 2(e)(iii) is outside this range **AND** other factors	**1**	**A** other suitable methods **A** use of 3/2 instead of 1.5 for true gradient **A** 1.55 for their value of 2(e)(iii) If their gradient in 2(e)(iii) is 1.50 **A** 0% to be called 'an error' **A** statement 'there is no error' But a qualifying statement about 'measurement' error is required.

Question	Answer	Marks	Guidance
2(e)(vi)	it is reliable **AND** no anomalous results/points **OR** it is not reliable **AND** there is an anomalous point	**1**	<u>The answer must match the graph</u> **A** '(all) the points are on or (very) near to line (of best fit)' **A** 'outliers' for 'anomalous points' **A** '(straight) line passing through / touching all points' but **I** 'straight line passing all points' **I** 'line fits the data' **A** there is (only) one anomalous point, which must be identified, which can be ignored (and all the other points are on (or very near) line of best fit) **I** *most* of the points are on the line of best fit Not reliable lines of best fit will come from incorrect data plotting causing an anomalous point. Points near but not on the line are not anomalous unless the candidate has indicated this by a circle etc or by identifying the point using co-ordinates.