

Markscheme

May 2026

Chemistry

Standard level

Paper 1B

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Subject Details: Chemistry Standard Level Paper 1B Markscheme

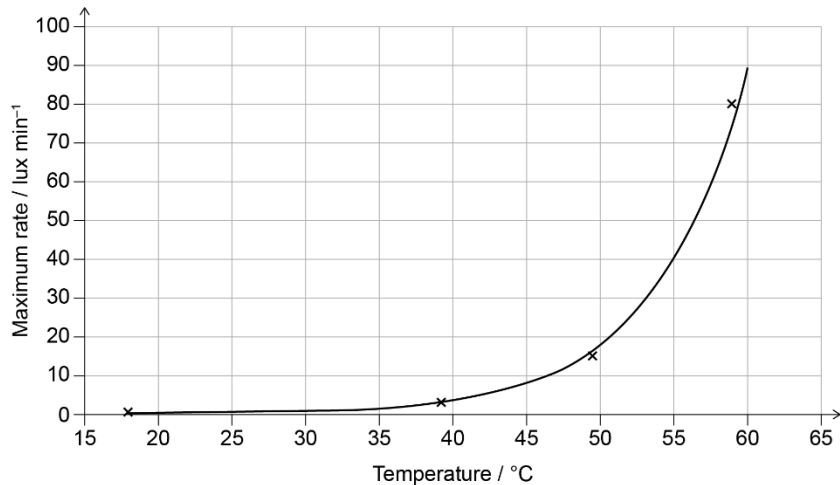
Candidates are required to answer **ALL** questions. Maximum total = **[25 marks]**.

1. Each row in the “Question” column relates to the smallest subpart of the question.
2. The maximum mark for each question subpart is indicated in the “Total” column.
3. Each marking point in the “Answers” column is shown by means of a tick (✓) at the end of the marking point.
4. A question subpart may have more marking points than the total allows. This will be indicated by “**max**” written after the mark in the “Total” column. The related rubric, if necessary, will be outlined in the “Notes” column.
5. An alternative word is indicated in the “Answers” column by a slash (/). Either word can be accepted.
6. An alternative answer is indicated in the “Answers” column by “**OR**”. Either answer can be accepted.
7. An alternative markscheme is indicated in the “Answers” column under heading **ALTERNATIVE 1** etc. Either alternative can be accepted.
8. Words inside chevrons « » in the “Answers” column are not necessary to gain the mark.
9. Words that are underlined are essential for the mark.
10. The order of marking points does not have to be as in the “Answers” column, unless stated otherwise in the “Notes” column.
11. If the candidate’s answer has the same “meaning” or can be clearly interpreted as being of equivalent significance, detail and validity as that in the “Answers” column then award the mark. Where this point is considered to be particularly relevant in a question it is emphasized by **OWTTE** (or words to that effect) in the “Notes” column.
12. Remember that many candidates are writing in a second language. Effective communication is more important than grammatical accuracy.
13. Occasionally, a part of a question may require an answer that is required for subsequent marking points. If an error is made in the first marking point then it should be penalized. However, if the incorrect answer is used correctly in subsequent marking points then **follow through** marks should be awarded. When marking, indicate this by adding **ECF** (error carried forward) on the script.
14. Do **not** penalize candidates for errors in units or significant figures, **unless** it is specifically referred to in the “Notes” column.
15. If a question specifically asks for the name of a substance, do not award a mark for a correct formula unless directed otherwise in the “Notes” column. Similarly, if the formula is specifically asked for, do not award a mark for a correct name unless directed otherwise in the “Notes” column.
16. If a question asks for an equation for a reaction, a balanced symbol equation is usually expected, do not award a mark for a word equation or an unbalanced equation unless directed otherwise in the “Notes” column.

Ignore missing or incorrect state symbols in an equation unless directed otherwise in the “Notes” column.

Question			Answers	Notes	Total
1.	(a)		<i>Dependent:</i> light intensity AND <i>Independent:</i> temperature ✓		1
1.	(b)		<i>Any two of:</i> maintain water bath at target temperature/insulate water bath ✓ «same» surrounding light/darkness ✓ «glow sticks are the» same type/colour/size/brand ✓ «same» method/duration of shaking ✓ «same» distance to light sensor ✓ «same» time to mount glowstick «in water bath»/«same» starting time «after snapping vial» ✓ «same» stick position/orientation/percent submerged ✓ «same» volume/mass/depth of water in bath ✓ «glow sticks» from same batch/expiry date ✓ «same» light sensor/calibration/data logger settings ✓ «same» container/beaker ✓ «same» storage conditions before use ✓ «same» method to break/bend/snap glow stick ✓	<i>Apply List Principle.</i>	2 max

Question			Answers	Notes	Total
1.	(c)		<i>Range:</i> reasonable range of temperatures OR temperatures not evenly spaced OR should include lower/room/higher temperature OR data collected until light intensity reaches baseline OR data collected for sufficient time OR wide range of lux data ✓ <i>Quantity:</i> should have more than one trial per temperature OR data collected for sufficient time ✓		2
1.	(d)		adjusting to water bath temperature OR reactants insufficiently mixed ✓		1
1.	(e)		area under curve ✓	<i>Do not accept height of peak.</i> <i>Accept “triangulation of peak/equation.”</i> <i>Accept “integral of curve.”</i>	1

Question			Answers	Notes	Total
1.	(f)		«draw» tangent to curve «at time of interest» ✓ determine «tangent» gradient/slope ✓	<i>Award [2] marks if the student correctly refers to taking the derivative/differentiating the curve/function</i> <i>Accept “$\Delta y/\Delta x$” for M2.</i>	2
1.	(g)	(i)	 similar to trend line shown ✓		1

Question			Answers	Notes	Total
1.	(g)	(ii)	Any two of: light intensity increases with temperature OR higher temperatures produce higher maximum light intensities ✓ light intensity/maximum rate AND temperature relationship is positive correlation/non-linear ✓ light duration decreases with temperature OR higher temperatures decrease light intensity more rapidly/give shorter duration OR «maximum» rate of reaction increases with temperature ✓ light duration AND temperature relationship exponential/negative correlation ✓	Apply List Principle.	2 max

Question		Answers	Notes	Total
1.	(h)	Any two of: - more/multiple trials ✓ - shake longer ✓ - pre-heat glow stick in water bath ✓ - submerge glow stick completely ✓ - more/evenly spaced temperatures ✓ - extend measurements until intensity approaches zero ✓ - stirred/circulating water bath ✓ - larger water bath ✓ - calibrate/zero the sensor before each run/higher-precision light sensor ✓ - position sensor parallel to glow stick ✓ - same surrounding light/darkness ✓ - glow sticks same type/colour/size/brand ✓ - glow sticks from same batch/expiry date ✓ - same distance to light sensor ✓ - same time to mount glowstick/same starting time ✓ - same glow stick position/orientation/percent submerged ✓ - same light sensor/calibration/data logger settings ✓ - same container/beaker ✓ - same storage conditions before use ✓ - same method to break/bend/snap glow stick ✓	Apply List Principle.	2 max
2.	(a)	<i>Temperature change:</i> $\ll 35.50 - 26.00 = \gg 9.50 \text{ } ^\circ\text{C} \gg$ ✓ <i>Uncertainty:</i> $\ll 0.05 + 0.05 = \pm 0.1/0.10 \text{ } ^\circ\text{C} \gg$ OR $\ll \sqrt{(0.05^2 + 0.05^2)} = \pm 0.07 \text{ } ^\circ\text{C} \gg$ ✓		2

Question			Answers	Notes	Total
2.	(b)		Percentage uncertainty in mass: $\llcorner 100(0.002/0.601) = \pm \llcorner 0.3 \llcorner \%$ AND Percentage uncertainty in temperature: $\llcorner 100(0.1/9.50) = \pm \llcorner 1/1.1 \llcorner \%$ OR $0.7 \llcorner \%$ ✓ Validity of student's decision: uncertainty in mass significant/should not be ignored OR final uncertainty $\llcorner \pm \llcorner 1.4/1.3\%$ ✓		2
2.	(c)		$\llcorner Q = 95.5 \times 4.18 \times 9.50 = \llcorner 3792 \llcorner \text{J} \llcorner$ ✓ $\llcorner 3792/0.601 = \llcorner 6310/6.31 \times 10^3 \llcorner \text{J g}^{-1} \llcorner$ ✓	Award [2] for correct final answer. Accept "$6300\text{--}6323 \llcorner \text{J g}^{-1} \llcorner$" due to differences in significant figures in student calculations and ECF.	2
2.	(d)		ignore trial 3 « because it is an » outlier/anomaly ✓ $\llcorner (6113 + 6684 + 6306 + 6310)/4 = \llcorner 6350/6353 \llcorner \text{J g}^{-1} \llcorner$ ✓	Accept "$\llcorner (6113 + 6684 + 6306 + 6500)/4 = \llcorner 6400/6401 \llcorner \text{J g}^{-1} \llcorner$" when 6500 is used for M2. Award [1 max] for "$5700/5701/5739/5740 \llcorner \text{J g}^{-1} \llcorner$" for not ignoring outlier.	2

Question			Answers	Notes	Total
2.	(e)		$\ll 100(21500-6350 /21500) = \gg 70.5/71 \ll \% \gg \checkmark$	<i>Accept “73-74 «%»” if outlier not ignored and final value from 2d is 5700 «J g⁻¹».</i> <i>Accept “70.2/70 «%»” from 6400 «J g⁻¹».</i>	1

Question			Answers	Notes	Total
2.	(f)		Any two of: - insulate calorimeter ✓ - draft shield ✓ - same initial water temperature ✓ - similar/same surrounding temperature ✓ - use clamp to maintain consistent flame position ✓ - remove soot between trials ✓ - stir water ✓ - use temperature probe/data logger/ thermometer with smaller uncertainty ✓ - measuring heat capacity of calorimeter «and including it in Q »✓ - weigh fuel with lid ✓ - improve air/oxygen flow ✓ - increase mass of fuel ✓ - use cooling/extrapolation correction ✓	Apply List Principle.	2 max