General Certificate of Education

Chemistry

AS Investigative Skills Assignment

CHM3T/Q11/MG

Final Marking Guidelines

2011 examination – June series

Marking Guidelines are prepared by the Principal Moderator and considered, together with the relevant questions, by a panel of subject teachers.

It must be stressed that Marking Guidelines are a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future Marking Guidelines on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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Guidance for teachers marking Chemistry ISAs

Final Marking Guidelines must be used to mark candidates' work.

General principles

In general, you are looking for evidence that the candidate knows and understands the key idea required by the Marking Guidelines.

It is important to mark what the candidate has written, not to assume what may have been intended. It is also important to make sure that a valid point is in the correct context. Individual words or phrases where the overall answer does not apply to the question asked should not be credited.

Conventions

The following conventions are used in the Marking Guidelines.

- An oblique stroke (/) separates alternatives within a marking point.
- Underlining of a word or phrase means that the term must be used.
- Brackets are used to indicate contexts for which a marking point is valid. This context may be implied by a candidate's answer.
- 'Accept' shows answers that have been allowed.
- 'Max' refers to the maximum mark that can be awarded for a particular question.

The Marking Guidelines show the minimum acceptable answer(s) for each marking point. A better, more detailed, or more advanced answer should always be accepted, provided that it covers the same key ideas.

Marking Guidelines cannot give every possible alternative wording - equivalent phrasing of answers should be accepted. It is, however, important to be sure that the minimum requirement of the guidelines is met and that the point is made unambiguously.

Converse answers are normally acceptable, unless the wording of the question rules this out. For example, 'an increase in pressure favours the forward reaction' or 'a decrease in pressure favours the backward reaction'.

Occasionally, a candidate will give a chemically correct answer that is not present in the Marking Guidelines. If it is equivalent in standard to the Marking Guideline answers, it should be credited. In this case, write the word 'valid'.

All marking points are awarded independently, unless a link between points is specified in the Marking Guidelines.

The mechanics of marking

Always mark in red ink. Make sure that some red ink appears on every page on which the candidate has written.

For each mark awarded, put a tick close to the word or phrase. In all cases, a tick should equal one mark and the total number of ticks should match the mark given for that question. The teacher should write the total mark in the margin.

Put a cross against incorrect points. It is helpful to indicate omissions of key words or incomplete answers with a Λ symbol, and to highlight irrelevancies or contradictions etc. by underlining. It may also be helpful to write brief comments to explain the reason for awarding or withholding a mark when the answer does not obviously match the Marking Guidelines.

When marking answers with many marking points, the points do not have to appear in the order in the Marking Guidelines.

Disqualifiers A correct point should be disqualified when the candidate contradicts it in the same answer. Indicate by 'dq'. If a tick has already been placed against a valid point, ensure that it is clearly deleted. Note that there is no penalty for incorrect points which are not contradictory, nor for surplus or neutral information.

The list rule When a question asks for a specific number of points, and the candidate gives more, the general rule is that any wrong answer cancels a correct answer. For example, if a question asks for two points and three answers are given, two correct and one clearly wrong, the mark awarded is one, whatever the order of the answers. This prevents candidates from gaining full marks from a list of right and wrong answers.

'Neutral' points, ie ones which are not creditworthy but not actually incorrect, should not negate a correct answer. For example, in answer to 'Name **two** physical properties of metals' a candidate may give:

'Good conductor of electricity, solid high density.'

In this case one mark would be awarded for 'good conductor of electricity' and one for 'high density'. 'Solid' is a neutral point and should be ignored.

Two correct points on the same answer line should be credited.

Spelling Reasonably close phonetic spellings should be credited.

Task Assessment

Q	Marking Guidelines	Mark	Additional Guidance
	Candidate reads the thermometer correctly to 1 d.p.	(**T**)1	If the candidate does not read the thermometer correctly, tell the candidate the correct reading.
	Results recorded clearly and in full in a table	(**R**)1	'Full' means completes the temperature row correctly, with no entry for the 4th minute if a 4th minute space has been included in the table. Lose this mark if reading missing at 0 minutes. The table does not have to have gridlines. Allow a clear answer that is outside a table box. Do not penalise lack of units.
	All temperatures to 1 decimal place	(**P**)1	
	The **accuracy** of the temperature rise, measured against a teacher value Temperature rise is within 3% of teacher value Temperature rise is within 5% of teacher value Temperature rise is within 8% of teacher value Temperature rise is within 10% of teacher value Temperature rise is within 12% of teacher value Enter your mark for thermometer reading (T), recording (R), precision (P) and accuracy (A) in the table at the bottom of each Candidate Results Sheet.	(**A**)5 4 3 2 1	It is **essential** that the teacher **checks** that the candidate has plotted and extrapolated the graph correctly. The teacher must check that answers to Section A Questions **2**, **3** and **4** are correct deductions from the candidate's results **before** allocating marks for accuracy. If an answer is incorrect, underline the wrong answer and write the correct value beside it. If the candidate's answer to Section A Question **4** is wrong, use the correct answer to Q4 (deduced by correct interpretation of the candidate's results) to assess accuracy.
	Total	**8**	

Section A **Ignore absence of units unless units are required in the Marking Guidelines. Incorrect units lose the mark.**

Q	Part	Marking Guidelines	Mark	Additional Guidance
1		Temperature on *y*-axis	1	Do not penalise missing axes labels. If axes unlabelled use data to decide if temperature is on *y*-axis. Lose this mark if axes mis-labelled.
		Sensible scales	1	Lose this mark if the **plotted points** do not cover at least half of the paper. Lose this mark if the temperature axis starts at 0 °C.
		Plots all points correctly +/–one square	1	Lose this mark if the graph plot goes off the squared paper.
		Draws two best fit lines	1	Candidate must draw **two** correct lines to the 4th minute. Lose this mark if the candidate's line is doubled or kinked. Allow a curve if appropriate.
		Both extrapolations are correct	1	Award this mark if the candidate's extrapolations are natural extensions of the best fit lines as drawn.
2		Correct value for temperature before mixing from their graph	1	Do not penalise precision of answer.
3		Correct value for temperature after mixing from their graph	1	Do not penalise precision of answer.
4		Q3 – Q2	1	Only award this mark if temperature rise is recorded to **1 d.p.**
5		Uses mcΔT equation	1	Allow use of this equation with symbols or values (even if the value of m is wrong).
		Correct answer (= 50 $\times$ 4.18 $\times$ Q4)	1	Correct answer without working scores both marks. Do not penalise precision of answer. Do not accept 54 $\times$ 4.18 $\times$ Q4
6		0.02(00) (mol)	1	Do not penalise precision of answer.

Q	Part	Marking Guidelines	Mark	Additional Guidance
7		0.0717 (mol)	1	Answer must be given to at least 2 sig.fig. eg allow 0.072 but do not allow 0.07
8		Uses 0.02(00) (mol) Correct answer (= Q5 / 0.02(00)) Includes '–' sign to indicate exothermic enthalpy change	1 1 1	Allow smaller of answers from Q6 and Q7. Allow Q5 / smaller of Q6 and Q7 Allow 1 mark (M2 only) for use of Q5/(larger answer from Q6 and Q7). Do not penalise precision of answer.
9		Measuring cylinder = 1.0 × 100 / 50 = 2.0%. Thermometer = 0.2 × 100 / Q4	2	Do not penalise precision of answer. Two correct answers without working scores one mark only.
10		Iron added in excess	1	If answer to Q7 is less than answer to Q6 then allow error from balance is very small if sensible estimate is provided eg +/– 0.01 g or +/ – 0.25%
11		Calculates difference between 184 kJ mol^{-1} and answer from Q8 Difference × 100 / 184	1 1	Do not penalise precision of answer. Allow without working. (Using 170 kJ mol^{-1} gives difference of 14 and a % difference of 7.6%). Allow without working.
		Total	**20**	

Section B **Ignore absence of units unless units are required in the Marking Guidelines. Incorrect units lose the mark.**

Q	Part	Marking Guidelines	Mark	Additional Guidance
12	a	Hydrochloric acid = **C** Barium chloride = **A**	1 1	
12	b	Barium sulfate is insoluble $CuSO_4 + BaCl_2 \rightarrow BaSO_4 + CuCl_2$	1 1	 Accept multiples. Accept ionic equation. Do not penalise lack of state symbols, but if used they must be correct.
12	c	CO_2 / Carbon dioxide	1	
12	d	Reagent 1 silver nitrate (solution) Observation 1 White precipitate Reagent 2 (dilute) ammonia solution/ aqueous ammonia Observation 2 (Colourless) solution	1 1 1 1	Ignore lack of reference to acidifying prior to addition of silver nitrate solution. Do not accept addition of **ammonia** only. Allow ppt dissolves. Do not allow 'goes colourless' or 'goes clear'. Chlorine and no visible change or solution does not become orange scores M3 and M4.
12	e	Gloves/ wash hands after use	1	Ignore 'eye protection'. Do not accept 'do not ingest the chemicals', 'wipe up spillages', 'use a fume cupboard', 'wear a lab coat' (list principle).
		Total	**10**	