

2005 Chemistry

Standard Grade – Credit

Finalised Marking Instructions

These Marking Instructions have been prepared by Examination Teams for use by SQA Appointed Markers when marking External Course Assessments.

Standard Grade Chemistry

General information for markers

The general comments given below should be considered during all marking.

1. Marks should **not** be deducted for incorrect spelling or loose language as long as the meaning of the word(s) is conveyed.

Example: Answers like 'distiling' (for 'distillation') and 'it gets hotter' (for 'the temperature rises') should be accepted.

2. A right answer followed by a wrong answer should be treated as a cancelling error and no marks should be given.

Example: What is the colour of universal indicator in acid solution?

The answer 'red, blue' gains no marks.

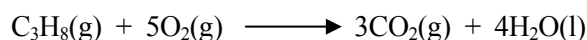
3. If a right answer is followed by additional information which does not conflict, the additional information should be ignored, whether correct or not.

Example: Why can the tube not be made of copper?

If the correct answer is 'It has a low melting point', and the candidate's answer is 'It has a low melting point and is coloured grey' this would **not** be treated as a cancelling error.

4. Full marks should be awarded for the correct answer to a calculation on its own; the part marks shown in the marking scheme are for use when working is given.
5. A half mark should be deducted in a calculation for each arithmetic slip.
6. A half mark should be deducted for incorrect or missing units **only when stated in the marking scheme.**
7. Where a wrong numerical answer (already penalised) is carried forward to another step, no further penalty is incurred provided the end result is used correctly.
8. Ignore the omission of one H atom from a full structural formula provided the bond is shown.
9. A symbol or correct formula should be accepted in place of a name.
10. When formulae of compounds are given as answers, if any charge is given which is correct, the charge can be ignored. However, if the charge is incorrect, no mark should be awarded.
11. If an answer comes directly from the text of the question, no marks should be given.

Example: A student found that 0.05 mol of propane, C₃H₈ burned to give 82.4 kJ of energy.



Name the kind of enthalpy change which the student measured.

No marks should be given for 'burning' since the word 'burned' appears in the text.

12. A guiding principle in marking is to give credit for (partially) correct chemistry rather than to look for reasons not to give marks.

Example: A student measured the pH of four carboxylic acids to find out how the strength is related to the number of chlorine atoms in the molecule. The results are shown.

Structural Formula	pH
CH ₃ COOH	1.65
CH ₂ ClCOOH	1.27
CHCl ₂ COOH	0.90
CCl ₃ COOH	0.51

How is the strength of the acids related to the number of chlorine atoms in the molecule?

Although not completely correct, an answer such as 'the more Cl₂, the stronger the acid' should gain the full mark.

13. Unless the question is clearly about a non-chemistry issue, eg costs in industrial chemistry, a non-chemical answer gains no marks.

Example: Why does the (catalytic) converter have a honeycomb structure?

A response such as 'to make it work' may be correct but it is not a chemical answer and the mark should not be given.

14. When it is very difficult to make a decision about a partially correct answer, a half mark can be awarded.
15. When marks have been totalled, a half mark should be rounded up.

**2005 Standard Grade Chemistry
Credit Level**

Marking Instructions

Part 1 – 20 marks

1	(a)	B	1 or 0	
	(b)	A	1 or 0	
	(c)	E and F	1 or 0	CLOSED
2	(a)	A	1 or 0	
	(b)	E	1 or 0	
3	(a)	E	1 or 0	
	(b)	C and D	1 or 0	CLOSED
4	(a)	E	1 or 0	
	(b)	A and E	1 or 0	CLOSED
5	(a)	F	1 or 0	
	(b)	B and E	1 or 0	CLOSED
	(c)	D and E	2 or 1 or 0	OPEN
6		F	1 or 0	
7		B and E	2 or 1 or 0	OPEN
8		A and D	2 or 1 or 0	OPEN
9		C and F	2 or 1 or 0	OPEN

Please note that **NO HALF MARKS** are awarded in Part 1.

Marking Instructions

Chemistry Standard Grade - Credit

Part 2

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
10 (a) (i)	$\text{Zn} \longrightarrow \text{Zn}^{2+} + 2\text{e}^{-}$ $\text{Zn} - 2\text{e}^{-} \longrightarrow \text{Zn}^{2+}$	1		
(ii)	Sacrificial	1	Galvanising Chemical	
(b)	It/Cobalt is less reactive than iron It/Cobalt is lower in the reactivity/electrochemical series Iron is more reactive	1	Cobalt is unreactive	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
11 (a)	$ \begin{array}{cccccc} \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} \\ & & & & & \\ -\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{C}- \\ & & & & & \\ \text{H} & \text{C}_6\text{H}_5 & \text{H} & \text{C}_6\text{H}_5 & \text{H} & \text{C}_6\text{H}_5 \end{array} $ <p>Allow one end bond to be missing</p> <p>Both end bonds missing ½ mark</p>	1	Missing C — C bond in back bond An H on either end	
(b)	<p>Formula mass = 104 1 mark</p> <p>96/104 x 100 ½ mark</p> <p>92.3% ½ mark</p> <p>92.3% / 92% on its own 2 marks</p> <p>Use of atomic numbers max 1 mark</p>	2		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
12 (a)	C_nH_{2n+2}	1		
(b)	(i) Accept 150 – 160 (ii) To allow the cracking to be carried out at a lower temperature/less heat or energy required	1 1	Cheaper Does not get used up	
(c)	Iodomethane and iodopropane	1		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
13 (a) (i)	2	1		
(b)	proton 3 ½ mark neutron 4 ½ mark electron 2 1 mark	2	7 on its own with no working	
(ii)	6.9 on its own OR With working and rounded up to 7	1		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
14 (a)	To ensure all the acid had reacted To ensure the acid has reacted/neutralised	1	Copper carbonate has fully dissolved To ensure all the gas has been given off	
(b)	Step 4: Filtration or correct description Step 5: Evaporation/leave to dry/boil/heat/leave to crystallise	1 1	Remove excess solid Burn it	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
15 (a)	Diagram must show overlapping of three half filled electron clouds or 3 pairs of bonding electrons and both non-bonding electrons in each atom	1		
(b) (i)	Ostwald Process	1		
(ii)	The reaction is exothermic It gives out heat	1	Platinum gives out heat Catalyst or platinum stays hot	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
16 (a)	$2\text{HCl} + \text{Na}_2\text{S}_2\text{O}_3 \longrightarrow 2\text{NaCl} + \text{S} + \text{SO}_2 + \text{H}_2\text{O}$ Or correct multiples	1		
(b)	<p>(i) Both labels with units ½ mark Both scales ½ mark Plots correct (allow one error and ½ box tolerance) ½ mark Plots joined ½ mark</p> <p>Max 1 mark if bar graph/spike graph drawn Deduct ½ mark if less than half of graph area is used</p> <p>(ii) Correct answer from graph</p> <p>(iii) As temperature increases the speed increases</p>	2	Relationship between temperature and time	
(c)	Concentration/volume of any of the solutions used Intensity of the “X” Size of conical flask	1	Amount of solution Strength of solution Light intensity	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
17 (a)	$C_6H_{12}O_6 / C_6(H_2O)_6$	1		
(b) (i)	Hydrolysis	1		
	(ii) The enzyme is denatured/destroyed/loses its shape/does not work The temperature is too high It is not the optimum temperature	1	The enzyme is killed/dies Enzyme is not specific/would not react	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
18 (a)	$\text{CuO} + \text{H}_2 \longrightarrow \text{Cu} + \text{H}_2\text{O}$	1		
(b)	Goes brown/red/pink/bronze colour	1	black to copper colour	
(c)	It/Calcium is more/too/very/reactive/some reference to calcium higher in the ECS/bond between calcium and oxygen is stronger Calcium oxide is very/too stable Calcium is more reactive than hydrogen	1	Calcium is too reactive with hydrogen Calcium oxide is stable Electrolysis is needed It is too stable	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
19 (a)	Arrow must be on or near the wires and running from A to B	1	Arrow in electrolyte	
(b)	To complete the circuit/allow ions to flow Finish the circuit	1	Conducts electricity Carries the current Allows the electrons to flow	
(c)	Covalent/not ionic	1		
(d) (i)	Transition metals	1		
(ii)	Changes toxic/poisonous/harmful gases to harmless gases/a correct name change eg changes carbon monoxide to carbon dioxide	1	Makes them safer Removes poisonous gases Speeds up a reaction Reduces pollution	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
20 (a)	Circle $\text{Al}_2(\text{SO}_4)_3$	1		
(b)	<p>1 mole 1½ moles 2 moles 3 moles ½ mark 54 6 ½ mark 1.35 0.15 1 mark</p> <p>0.15 on its own 2 marks</p> <p>Use of atomic numbers – max 1 mark</p> <p>Deduct ½ for arithmetic error OR</p> <p>1 mole 1.5 moles } 2 moles 3 moles } ½ mark</p> <p>½ mark { $\frac{1.35}{27}$ = 0.05moles → 0.075 moles → ½ mark 0.075 x 2 } = 0.15 } ½ mark</p>	2		

[END OF MARKING INSTRUCTIONS]