



2012 Chemistry

Standard Grade - Credit

Finalised Marking Instructions

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Standard Grade Chemistry Credit

General information for markers

The general comments given below should be considered during all marking. It should be noted that these are general marking principles and may be superseded by decisions made at the Markers' Meeting.

1. Markers are reminded to read candidate responses **in their entirety**. If the candidate shows a clear understanding of the chemistry but does not use the exact words of the Marking Instructions they should still be given credit.
2. Markers are reminded that **no** comments are to be written on scripts. Comments such as 'ARITH', 'ERROR' and 'BOD' (Benefit of doubt) are **not** acceptable.
3. 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.

4. 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 "hydrolic acid" (for "hydrochloric acid") and "it gets hotter" (for "the temperature rises") should be accepted.

However the example below would not be acceptable, as an incorrect chemical term, which the candidate should know, has been given.

Example: If the correct answer is "ethene", and the candidate's answer is "ethane", this should not be accepted.

5. 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.

6. 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.

7. Full marks should be awarded for the correct answer to a calculation on its own; the part marks shown in the Marking Instructions are for use when working is given.
8. A half mark should be deducted in a calculation for each arithmetic slip.
9. A half mark should be deducted for incorrect or missing units **only when stated in the Marking Instructions**.
10. A half mark should be deducted for a transcription error.
11. 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.
12. Ignore the omission of one H atom from a full structural formula provided the bond is shown.
13. A symbol or correct formula should be accepted in place of a name.
14. If an answer comes directly from the text of the question, no marks should be given.

Example: Why do ionic compounds, like copper chloride, conduct electricity when in solution?

No marks for "because they are ionic" since the word "ionic" appears in the text.

15. 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.

16. When formulae of ionic compounds are given as answers it will only be necessary to show ion charges if these have been specifically asked for. However, if ion charges are shown, they must be correct. If incorrect charges are shown, no marks should be awarded.
17. When it is very difficult to make a decision about a partially correct answer, a half mark can be awarded.
18. When marks have been totalled, a half mark should be rounded up.

**2012 Standard Grade Chemistry
Credit Level**

Marking Instructions

Part 1 □ 20 marks

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

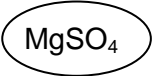

Please note that **NO HALF MARKS** are awarded in Part 1.

Marking Instructions**Chemistry Standard Grade – Credit****Part 2**

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
10 (a)	Stop air, oxygen and/or water, moisture, rain	1	Iron can no longer lose electrons	Barrier provides sacrificial protection / provides electrons
(b) (i)	A / Zinc	1		
(ii)	D / Silver	1		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
11 (a)	2	1		
(b) (i)	Larger particle size, smaller surface area. Large lumps.	1	Use lumps Particle size Surface area Catalyst removed	Particle size with wrong answer
(ii)	0.5g zinc	1		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
12 (a)	<p>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/spike graph drawn Deduct max ½ mark if less than half of graph area is used</p> <p>If both scales have numbers taken directly from the table maximum 1 mark</p> <p>If extended down to axis – class as an error (plotting)</p> <p>If scale written between bold lines but plots on bold lines deduct ½ mark</p>	2		
(b)	<p>If graph drawn answer must be from graph (½ box tolerance) If no graph drawn accept 25.5 ±1</p>	1		
(c)	Speed up reaction, too slow at 200°C	1	Any mention of decomposition Cost	Faster & produces more ammonia

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
13 (a)	Any suitable diagram showing two hydrogen atoms with two electrons in the overlapped area $\text{H} \begin{array}{c} \times \\ \times \end{array} \text{H} \qquad \text{H} \begin{array}{c} \circ \\ \circ \end{array} \text{H}$	1 1	Petal/tetrahedral orbital diagram	
(b) (i)		1		
(ii)	1.5 on its own 1 mark if working shown (deduct ½ mark for arithmetic error)	1	Wrong values selected from table	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
14 (a)	Hydrolysis	1	Digestion (with hydrolysis does <u>not</u> negate)	
(b)	Less/no activity Wouldn't not work Less efficient	1	ON THEIR OWN Enzyme killed/denatured/destroyed Reaction will be slower Reactivity will be less No reaction	Killed Reaction would be quicker
(c)	Fructose, galactose	1		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
15 (a)	$2\text{KOH} + \text{H}_2\text{SO}_4 \rightarrow \text{K}_2\text{SO}_4 + 2\text{H}_2\text{O}$ Or correct multiples	1		
(b)	neutralisation	1		
(c)	$\text{FM} = 174\text{g}$ (1 mark) $78/174 \times 100 = 44.8$ (1 mark) 44.8 or 45 on its own 2 marks Deduct $\frac{1}{2}$ mark for arithmetic error Using atomic numbers 44% (max 1 mark) 44 must have working If use mass of one potassium max 1 mark If use S or O max 1 mark	2	44 on its own zero If use element not in potassium sulphate – zero marks	
(d)	$(\text{NH}_4^+)_3\text{PO}_4^{3-}$	1	$(\text{NH}_4)_3\text{PO}_4$	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
16 (a)	displacement redox	1	Oxidation/reduction	
(b) (i)	B/negative	1		
(ii)	$2\text{Cl}^- \longrightarrow \text{Cl}_2 + 2\text{e}$ As per data booklet, ignore state symbols $2\text{Cl}^- - 2\text{e} \longrightarrow \text{Cl}_2$ $\text{Cl}^- \rightarrow \frac{1}{2} \text{Cl}_2 + \text{e}$	1	$\text{Cl}^- \longrightarrow \text{Cl} + \text{e}$	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
17 (a) (i)	Red, pink, orange, yellow	1		
(ii)	Line must be increasing } Line stops at pH7 or below } or 0	1 or 0		
(b)	$n = c \times v$ $n = 0.1 \times 0.05$ (½) $n = 0.005$ moles (½) 0.005 on its own 1 mark Deduct ½ if 50cm ³ not in litres (0.05)	1	$n = c \times v$ on its own 0 marks 5 on its own	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
18 (a)	Ionic Ionic lattice Ionic network	1 or 0	Ionic molecular Lattice on its own Network on its own Sodium to chlorine bonds	
(b)	As concentration increases/decreases freezing point decreases/increases The freezing point decreases/increases as concentration increases/decreases As concentration increases freezing point gets colder	1	Wrong cause & effect eg: As freezing point decreases concentration increases.	
(c)	-1.8 to -2.0 inclusive	1	Statement Less than -1.5	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
19 (a)	oxidation	1 or 0		
(b)	Left to right indicated on or near the wire	1	if line goes into cell 0 marks	
(c)	C, graphite, carbon	1		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
20 (a)	Diagram must show three monomer units linked together One end bond missing no penalty Two end bonds missing deduct ½ mark	1 or 0	If molecule closed at both ends zero marks	
(b)	thermosetting thermoset thermal setting	1		
(c)	$ \begin{array}{c} \text{H} \quad \text{COOCH}_3 \\ \quad \\ \text{Br} - \text{C} - \text{C} - \text{Br} \\ \quad \\ \text{H} \quad \text{CN} \end{array} $	1		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
21 (a)	by electrolysis	1 or 0		
(b)	alloy	1	compound	compound
(c) (i)	25g	1		
(ii)	(allow follow through from (c)(i)) (25/27 =) $\frac{1}{2}$ 0.926 / 0.93 $\frac{1}{2}$ 0.926, 0.93 or 0.9 on its own (1 mark) if atomic numbers used (1.9) maximum $\frac{1}{2}$ mark	1		

[END OF MARKING INSTRUCTIONS]