



**2009 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 It should be noted that these are general marking principles and may be superseded by decisions made at the Markers' Meeting.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 <sub>3</sub> COOH	1.65
CH <sub>2</sub> ClCOOH	1.27
CHCl <sub>2</sub> COOH	0.90
CCl <sub>3</sub> 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 Cl<sub>2</sub>, 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.

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Credit Level**

**Marking Instructions**

**Part 1 – 20 marks**

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

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

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**Part 2**

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
<p><b>9 (a)</b></p>	<p>10 10 10 11 10 12</p>	<p><b>1</b></p>		
<p><b>(b)</b></p>	<p>Isotopes</p>	<p><b>1</b></p>		
<p><b>(c)</b></p>	<p>20 or <sup>20</sup>Ne  Deduct ½ mark if wrong units given eg amu/g</p>	<p><b>1</b></p>		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
10 (a)	Electrolysis	1		
(b)	$(\text{Al}^{3+})_2(\text{O}^{2-})_3$ $\text{Al}^{3+}_2$ $\text{O}^{2-}_3$	1		
(c)	Ions can move/free ions Ionic lattice broken up	1	Electrons can flow/free moving electrons	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
11 (a)	Hydrogen or H or H <sub>2</sub> (½) Carbon or C (½)	1		
(b)	Test tube A – colourless liquid or water or H <sub>2</sub> O – condensation (½)  Test tube B – lime water did not turn milky or no change (½)	1		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
12 (a)	Covalent	1		
(b)	Diagram must show 1 P and 3 H atoms 3 pairs of shared electrons and 2 non-bonded electrons	1		



Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
13 (a)	Neutralisation	1		
(b) (i)	Gas given off/CO <sub>2</sub> given off	1	Any other named gas	
(ii)	Both scales correct (½) Both labels correct including units (½) Plots correct (½) Joining points (½)  Allow ½ box tolerance Allow 1 plotting error  Deduct maximum ½ mark if less than half paper used in either direction Bar graph – maximum 1 mark  Axes can be reversed	2		
(c)	Greater than 0.8 No higher than 0.86	1		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
14 (a) (i)	Ostwald	1		
	(ii) Reaction is exothermic/gives out heat It is exothermic	1	Catalyst gives out heat	
	(iii) Water/H <sub>2</sub> O	1		
(b)	FM = 80 (1 mark) $\% = \frac{28 \times 100}{80} = 35$ (1 mark) 35 with no working (2 marks)  Arithmetic error deduct ½ mark Chemical error deduct 1 mark Atomic numbers used maximum 1 mark	2		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
15 (a)	Y X W Z	1		
(b)	Hydrogen/H <sub>2</sub>	1	H alone	
(c)	Y = K/Na/Li/Ca/Mg (½ mark) Z = Hg/Ag/Au/Pt (½ mark) Name or correct symbol	1		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
16 (a)	Hydrolysis	1		
(b)	$\text{C}_6\text{H}_{12}\text{O}_6 \longrightarrow 2 \text{C}_2\text{H}_5\text{OH} + 2 \text{CO}_2$ <p>Or correct multiples</p>	1		
(c)	distillation evaporation <b>and</b> condensation	1	fractional/evaporation/condensation	
(d)	FM = 46 (1 mark)  $\frac{230}{46} = 5$ (1 mark) 5 on its own (2 marks)  Arithmetic error deduct ½ mark Chemical error deduct 1 mark Atomic numbers used deduct 1 mark	2		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
17 (a)	Oxidation	1		
(b)	Right to left (Y to X) On or very close to wire Not nearer to ion bridge	1		
(c)	Add starch (½) Blue-black (½)  Must have starch for any marks to be given	1		
(d)	$\text{Br}_2 + 2\text{e} \longrightarrow 2\text{Br}^-$  Ignore state symbols  No charge needed on electrons	1		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
18 (a)	$  \begin{array}{c}  \text{H} \quad \text{CN} \\    \quad   \\  \text{---C---C---} \\    \quad   \\  \text{H} \quad \text{COOCH}_3  \end{array}  $ <p>Ignore one missing end bond If both missing (½)</p>	1		
(b)	Carbon = 8 hydrogen = 17	1		
(c)	Carbon monoxide or CO Hydrogen cyanide or HCN Cyanide or cyanide gas (½)	1	CN or CN <sup>-</sup>	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
19 (a)	216 – 221 inclusive	1		
(b)	Homologous	1		
(c)	<p>1 mol    <math>\longrightarrow</math>    10 mol (½ mark)</p> <p>128       <math>\longrightarrow</math>    180 (½ mark)</p> <p>6.4       <math>\longrightarrow</math>    <math>\frac{6.4 \times 180}{128}</math>       = 9 (1 mark)</p> <p>9 g on its own = 2 marks</p> <p>-----</p> <p>6.4 / 128 =       0.05 (1 mark)</p> <p>0.05 x 10 =       0.5 (½ mark)</p> <p>0.5 x 18 =       9 (½ mark)</p>	2		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
19 (d)	Correct structural formula for butane  Allow one missing H or one missing C to H bond	1		

[END OF MARKING INSTRUCTIONS]