2009 Chemistry

Standard Grade − General

Finalised Marking Instructions

Standard Grade Chemistry General

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 It should be noted that these are general marking principles and may be superseded by decisions made at the Markers' Meeting.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_3COOH	1.65
$CH_2ClCOOH$	1.27
$CHCl_2COOH$	0.90
CCl_3COOH	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_2, 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 it is very difficult to make a decision about a partially correct answer, a half mark can be awarded.

17. When marks have been totalled, a half mark should be rounded up.

2009 Standard Grade Chemistry
General Level

Marking Instructions

Part 1 – 20 marks

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

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

Part 2

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
9 (a)	Exothermic	**1**	combustion burning	
(b)	Will run out/will not last forever limited amount non-renewable can't be replaced	**1**	short supply not a lot of can be used up	
(c)	Oil/gas/peat Natural gas/crude oil	**1**	Any named fraction Coke	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
10 (a)	**Atomic No.** **Metal or non-metal** Magnesium 12 metal Chlorine 17 non-metal	**1 or 0**		
(b) (i)	$MgCl_2$	**1**		
(ii)	Boiling point = 1418°C Melting point = 712°C	**1**		
(iii)	Liquid	**1**		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
11 (a)	Table drawn (½) Suitable headings (½) Correct entries (1) Deduct (½) mark for each missing/incorrect pair of entries up to a maximum of 1 mark.	**2**		
(b)	Rot/rot away/broken down by bacteria/disintegrate/ deteriorate	**1**	Erode/wear away/Degrade	
(c)	Thermoplastic	**1**		
(d)	Styrene	**1**		
(e)	Addition polymerisation/polymerisation Addition	**1**	condensation polymerization	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
12 (a)	Chlorine/chlorine gas/Cl_2	**1**	Chloride	
(b)	Electrons/e^-	**1**	negative	
(c)	Carbon/graphite/C	**1**		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
13 (a)	0.8 g/the same	**1**		
(b) (i)	Cracking	**1**		
(ii)	C_7H_{14}	**1**		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
14 (a)	Vertical scale (½) Correct bar labelling (½) Bars drawn correctly (1) (½ box tolerance) Deduct ½ mark for each incorrect bar up to maximum 1 If line graph drawn – maximum 1 mark Deduct maximum ½ mark if less than half of graph paper has been used on either axis	**2**		
(b)	Two atoms/two atoms joined/two oxygen atoms/go around in pairs	**1**	two molecules two elements two compounds two particles	
(c)	Alloy	**1**	compound	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
(d) (i)	Stops either or both air/oxygen/water/moisture	**1**	Physical protection	Provides electrons Sacrificial protection
(ii)	Magnesium/zinc/aluminium (or correct symbol)	**1**		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
15 (a)	Run out/expensive Chemicals run out/used up Limited supply of energy/power Need replaced	**1**	Leak Lower voltage Uses up finite resources	
(b) (i)	Voltage higher than 0.5 but lower than 2.7	**1**		
(ii)	Volume/type/concentration of electrolyte/solution Depth of immersion of rods Size of rods (electrodes) Separation of rods (electrodes) Temperature	**1**	amount of electrolyte volume of metal time	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
16 (a) (i)	Man-made/not natural	**1**	artificial made from chemicals	
(ii)	Phosphorus or P Potassium or K	**1**		
(b)	Ammonia/NH_3	**1**	Ammonium	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
17 (a)	Biological catalyst	**1**	Catalyst Natural catalyst	
(b)	$C_3H_6O_3$ (symbols in any order)	**1**	Shortened Structural formula Empirical formula	
(c)	So that alcohol is not produced So the sugar would not ferment Sugar would be used up/react/break down	**1**	Loses its sweetness	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
18 (a)	Compare/check result with colour (pH) chart	**1**	Check colour Check pH	
(b)	Any number less than 7 (0 – 6·9 inclusive)	**1**		
(c)	Aluminium oxide is insoluble	**1**		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
19 (a)	The higher the number of carbon atoms the lower the octane number **or** the lower the number of carbon atoms the higher the octane number The octane number decreases as the number of carbon atoms increases **or** the octane number increases as the number of carbon atoms decreases	**1**		
(b)	Greater than 98 but less than 109 (99 – 108 inclusive)	**1**		
(c)	Alkane octane number is lower/it is lower It is less than the octane number of the alkenes Alkene number is higher Alkene is higher/alkane is lower	**1**		

[END OF MARKING INSTRUCTIONS]