

## 2004 Chemistry SG General Finalised Marking Instructions

### Strictly Confidential

These instructions are **strictly confidential** and, in common with the scripts entrusted to you for marking, they must never form the subject of remark of any kind, except to Scottish Qualifications Authority staff. Similarly, the contents of these instructions must not be copied, lent or divulged in any way now, or at any future time, to any other persons or body.

### Markers' Meeting

You should use the time before the meeting to make yourself familiar with the question paper, instructions and any scripts which you have received. Do **not** undertake any final approach to marking until **after** the meeting. Please note any points of difficulty for discussion at the meeting.

**Note:** These instructions can be considered as final only after the markers' meeting when the full marking team has had an opportunity to discuss and finalise the document in the light of a wider range of candidates' responses.

### Marking

The utmost care must be taken when entering and totalling marks. Where appropriate, all summations for totals must be carefully checked and confirmed.

Where a candidate has scored zero marks for any question attempted, "0" should be entered against the answer.

### Recording of Marks

The mark for each **question**, where appropriate, should be entered **either** on the grid provided on the back page of the answer book, **or** in the case of question/answer books, on the grid (if provided) on the last page of the book. Where papers assess more than one element, care must be taken to ensure that marks are entered in the correct column.

The **Total** mark for each paper or element should be entered (in red ink) in the box provided in the top-right corner of the front cover of the answer book (or question/answer book).

**Always** enter the **Total** mark as a **whole number**, where necessary by the process of rounding up.

The transcription of marks, within booklets and to the Mark Sheet, should always be checked.

**Markers are reminded that they must not write comments on scripts.**

# 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.

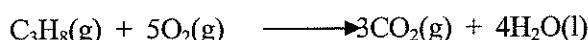
8. Ignore the omission of one H atom from a full structural formula provided the bond is shown.

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, C<sub>3</sub>H<sub>8</sub> 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 <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.

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.

**2004 Standard Grade Chemistry**  
**General Level**

**Marking Instructions**

**Part 1 – 20 marks**

1 (a) B 1 or 0

(b) E 1 or 0

(c) A and F 1 or 0

2 (a) D 1 or 0

(b) B and F 1 or 0

(c) C 1 or 0

3 (a) C 1 or 0

(b) E 1 or 0

4 (a) C 1 or 0

(b) D and E 1 or 0

(c) A 1 or 0

5 (a) D 1 or 0

(b) C and F 1 or 0

6 (a) A 1 or 0

(b) C 1 or 0

7 (a) A 1 or 0

(b) B 1 or 0

8 (a) A 1 or 0

(b) C and E 2 or 1 or 0

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

**Marking Instructions****Chemistry Standard Grade - General****Section B**

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
9 (a)	Chemical which burns/combusts $\frac{1}{2}$ Giving out energy/heat/light $\frac{1}{2}$	1	reacts keeps things going heat with O <sub>2</sub>	
(b)	$\frac{1}{2}$ mark for any 4 of the following: millions of years ago/ dead plants/ buried under mud/ high temp or pressure/ chemical change decay/decompose/bacteria etc.	2	organism/living things long time fossil	animals
(c)	Oil or (natural) gas/peat/methane	1	oil derivatives	oil + petrol

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
10 (a)	Magnesium, zinc, aluminium or correct symbol	1	Na or other highly reactive metal	
(b)	Zinc, Zn	1		
(c)	Provides a surface barrier, prevent, exclude, coat $\frac{1}{2}$ Stopping air or water, $O_2 \frac{1}{2}$	1	elements	
(d)	Brass or solder, bronze, 9ct gold etc	1	steel, chrome, copper + nickel	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
11 (a)	Man made, not natural, made in lab, made by scientists	1	artificial, made with chemicals	
(b)	$  \begin{array}{c}  \text{H} & \text{H} & \text{H} & \text{H} & \text{H} \\    &   &   &   &   \\  \text{C} & - & \text{C} & - & \text{C} & - & \text{C} & - & \text{C} \\    & &   & &   & &   & &   \\  \text{H} & & \text{H} & & \text{H} & & \text{H} & & \text{H}  \end{array}  $ <p>ignore one missing end bond both missing <math>\text{-}\frac{1}{2}</math></p>	1	$  \begin{array}{c}  \text{H} \\    \\  \text{C} \\    \\  \text{H}  \end{array}  $ <p>H added at end</p>	
(c)	<p>Broken down by bacteria, broken down <math>\frac{1}{2}</math> Or broken down naturally Or rots, decays, decomposes</p>	1	<p>wears down, wears out, dissolves, disappears, digestion</p>	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
12 (a)	Bleach, detergent <u>both</u>	1		
(b)	Vertical scale and label $\frac{1}{2}$ mark  Bars labelled $\frac{1}{2}$ mark  Bar height correct 1 mark ( $\frac{1}{2}$ box tolerance)(- $\frac{1}{2}$ each wrong bar)  Deduct $\frac{1}{2}$ mark if less than half width/height of graph paper used.(by bars) - $\frac{1}{2}$ if 2 bars interchanged spikes = narrow bars	2	line graph max 1	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
13 (a)	<p>Diagram illustrating the Haber-Bosch process:</p> <pre> graph LR     A((N2 + H2)) --&gt; B[ ]     B --&gt; C((NH3))     C --&gt; D[ ]     D --&gt; E((NH4NO3))     C --&gt; F[ ]     F --&gt; G((NH4+))     G --&gt; H((H2))     H --&gt; I((N2 + H2))     </pre> <p>Acceptable answers for the empty boxes:</p> <ul style="list-style-type: none"> <li>Hydrogen (<math>H_2</math>)</li> <li>Hydrogen (<math>H_2</math>)</li> <li>Nitrogen and <math>N_2</math> (<math>H_2</math>)</li> <li>Nitrogen and <math>N_2</math> (<math>H_2</math>)</li> <li>Ammonia (<math>NH_3</math>)</li> <li>Ammonia (<math>NH_3</math>)</li> <li>Ammonium (<math>NH_4^+</math>)</li> <li>Ammonium (<math>NH_4^+</math>)</li> <li>Ammonium nitrate (<math>NH_4NO_3</math>)</li> <li>Ammonium nitrate (<math>NH_4NO_3</math>)</li> </ul> <p>Deduct 1/2 for each incorrect response.</p>	2	H unreacted gas/N/H ammonium ammonia nitric	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
(b)	<p>Table drawn <math>\frac{1}{2}</math> mark</p> <p>Suitable headings <math>\frac{1}{2}</math> mark</p> <p>Correct entries 1 mark</p> <p>horizontal table acceptable</p>	<p>+</p> <p>enough</p>	<p>2</p> <p><math>-\frac{1}{2}</math> each wrong/missing entry</p>	graph 0

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
14 (a)	Magnesium, Sulphur and Oxygen all required Mg S O	1	Mg S O <sub>2</sub>	
(b)	Solvent	1		
(c) (i)	Precipitation, precipitate	1		
	(ii) Barium Sulphate, Ba SO <sub>4</sub> ignore charges		Barium sulphite	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
15 (a)	To complete the circuit, provide ions, act as salt bridge, act as electrolyte, let ions flow, act as ion bridge	1	complete all, balancing charges, act as bridge, help to conduct electrons	
(b)	From nickel to copper	1		
(c)	Mercury or silver or gold or platinum or symbol	1		
(d)	Cells need to be replaced or recharged Run out, lower V, expensive, not as powerful	1	reference to toxicity, pollution, leakage, flammability or environment	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
16 (a)	 allow one missing H	1	shortened structural formula dot/cross version	
(b)	$C_4H_{10}$ $H_{10}C_4$	1	other type of formula	
(c)	Propene	1	Cyclopropane	
(d)	Carbon (soot)	1	coal, charcoal, coke, graphite	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
17 (a) (i)	Speeds up some reactions, must refer to <u>increases</u> in rate	1	affects speed slow down reaction work better	
(ii)	0.1g/same	1		
(b)	0.1g manganese dioxide 50 cm <sup>3</sup> of 2 mol/l hydrogen peroxide must use numbers	½ mark ½ mark	1 same	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
18 (a)	Stopper with correct opening Line across top of tube Inlet tube <b>below</b> liquid surface	1	Use of arrows	
(b)	$32 \text{ cm}^3$	1		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
19 (a)	Iodine (solution) / $I_2$	1	Iodide	
(b)	Ethanol, ethanal etc	1		
(c) (i)	As temperature of fermentation increases % alcohol decreases	1	wrong cause/effect relationship	
(ii)	12.5% >12 <13	1		

[END OF MARKING INSTRUCTIONS]