

**2005 Chemistry**

**Intermediate 2**

**Finalised Marking Instructions**

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

## Intermediate 2 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 related to 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 having 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 **unless stated otherwise in the marking scheme.**

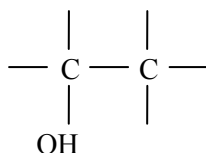
- 6 A half mark should be deducted for incorrect or missing units **only when stated in the marking scheme.**

- 7 Where a wrong numerical answer (already penalised) is carried forward to another step, no further penalty is incurred provided the result is used correctly.

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

- 9 With structures involving an  $-OH$  or an  $-NH_2$  group, a half mark should be deducted if the 'O' or 'N' are not bonded to a carbon, ie  $OH-CH_2$  and  $NH_2-CH_2$ .

- 10 When drawing structural formulae, a half mark should be deducted if the bond points to the 'wrong' atom, eg

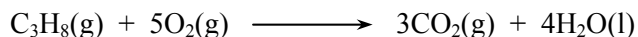


- 11 A symbol or correct formula should be accepted in place of a name **unless stated otherwise in the marking scheme.**

- 12 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.

- 13 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.

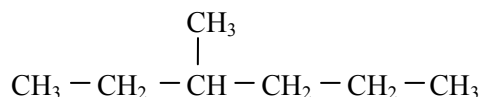


Name the kind of enthalpy change which the student measured.

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

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

**Example 1:** The structure of a hydrocarbon found in petrol is shown below.



Name the hydrocarbon.

Although not completely correct, the answer '3, methyl-hexane' should gain the full mark ie ignore wrong use of commas and dashes.

**Example 2:** A student measured the pH of four carboxylic acids to find out how their 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.

- 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.

## 2005 Chemistry Intermediate 2

### Marking Scheme

#### Section A

1	B	11	B	21	C
2	D	12	B	22	D
3	A	13	D	23	D
4	B	14	B	24	A
5	D	15	C	25	C
6	A	16	B	26	A
7	A	17	D	27	C
8	D	18	C	28	B
9	A	19	D	29	A
10	C	20	B	30	C



Question	Acceptable Answer	Mark	Worth ½	Worth 0
2 (a) (i)	$\text{Na}_2\text{CO}_3$ Or $(\text{Na}^+)_2\text{CO}_3^{2-}$	1		
(ii)	Sodium chloride / NaCl	1		
(b)	Rate of reaction is slower with ethanoic acid since it is a weak acid	1		

<b>3</b>	<b>(a)</b>	<b>(i)</b> Burns with a “pop”	<b>1</b>		
		<b>(ii)</b> Exothermic	<b>1</b>		
	<b>(b)</b>	<b>(i)</b> Labels, scale, points, line 4 x ½ mark	<b>2</b>		
		<b>(ii)</b> $85 \text{ cm}^3 \pm 1 \text{ cm}^3$ $85 \pm 1$ OR if candidates extrapolates graph value from graph $\pm$ half a box tolerance ( $\pm 1 \text{ cm}^3$ )	<b>1</b>		
	<b>(c)</b>	$1.8 \pm 0.05$	<b>1</b>		
	<b>(d)</b>	There would be a greater no. of collisions therefore faster rate of reaction	<b>1</b>	There are more particles present	

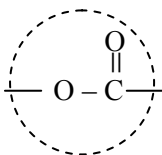
Question	Acceptable Answer	Mark	Worth ½	Worth 0
4 (a)	+ at gas; – at copper solid 2 x ½ mark Or at the appropriate side of power supply LHS + RHS -	1		
(b)	Waft gas towards nose Or Smell from a distance	1		
(c) (i)	Copper ions gain electrons	1		
(c) (ii)	$1.27/63.5 = 0.02$ moles	1		

Question	Acceptable Answer	Mark	Worth ½	Worth 0
5 (a)	$C_2H_4 + 3O_2 \rightarrow 2CO_2 + 2H_2O$	1		
(b)	Heterogeneous	1		

Question	Acceptable Answer	Mark	Worth ½	Worth 0
<p><b>6 (a) (i)</b></p>	$  \begin{array}{c}  \text{H} \quad \text{O} - \text{H} \quad \text{H} \\    \quad   \quad   \\  \text{H} - \text{C} - \text{C} - \text{C} - \text{H} \\    \quad   \quad   \\  \text{H} \quad \text{H} \quad \text{H}  \end{array}  $ <p>(no penalty for not showing bond between O and H of hydroxyl group)</p> <p><b>(ii)</b> hydration</p>	<p><b>1</b></p> <p><b>1</b></p>	<p>If bond is drawn to H of OH</p> <p>ie <math>\begin{array}{c} \text{HO} \\   \end{array}</math></p>	
<p><b>(b)</b></p>	<p>Hydrogen iodide/HI</p>	<p><b>1</b></p>		
<p><b>(c)</b></p>	$  \begin{array}{cccccc}  \text{CH}_3 & \text{H} & \text{CH}_3 & \text{H} & \text{CH}_3 & \text{H} \\    &   &   &   &   &   \\  - \text{C} - & \text{C} - & \text{C} - & \text{C} - & \text{C} - & \text{C} - \\    &   &   &   &   &   \\  \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H}  \end{array}  $	<p><b>1</b></p>		

Question	Acceptable Answer	Mark	Worth $\frac{1}{2}$	Worth 0
7 (a)	To neutralise the excess acid	1		
(b)	A No colour change/stays blue $\frac{1}{2}$ mark B Colour change to orange/brick red $\frac{1}{2}$ mark	1		

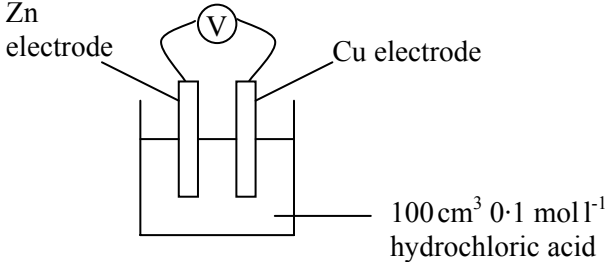
Question	Acceptable Answer	Mark	Worth ½	Worth 0
8 (a) (i)	Ethyl pentanoate	1		
(ii)	The molecules join together by eliminating water	1		
(b) (i)	Man-made (made from oil)	1		
(ii)	Ester group to be circled	1		



Question	Acceptable Answer	Mark	Worth ½	Worth 0
9 (a)	Allows reactions to be carried out at lower temperatures Or The catalyst can be re-used Or Lowers activation energy	1	Saves money	
(b)	Distillation	1		
(c)	Methane/CH <sub>4</sub>	1		

Question	Acceptable Answer	Mark	Worth ½	Worth 0
10 (a)	$  \begin{array}{c}  \text{H} \quad \text{H} \\    \quad   \\  \text{H}-\text{C}-\text{C}-\text{C} \\    \quad   \quad // \quad \backslash \\  \text{H} \quad \text{H} \quad \text{O} \quad \text{O}-\text{H}  \end{array}  $ <p>(OH of COOH need not be expanded)</p>	1		
(b)	Pentanoic acid	1		

Question	Acceptable Answer	Mark	Worth ½	Worth 0
11 (a)	3 Moles	1		
(b)	Propan – 1,2,3, – triol or glycerol	1		
(c)	Red/orange (any acid colour with Universal indicator)	1		

Question	Acceptable Answer	Mark	Worth ½	Worth 0
12 (a)		1	If any solution is labelled and this is correct	
(b)	Electrodes removed, cleaned and dried, replaced	1		
(c)	$\text{Zn} \rightarrow \text{Ni}$ 1 mark 0.5V                                      1 mark	2		



Question	Acceptable Answer	Mark	Worth ½	Worth 0
14 (a)	Magnesium hydroxide is insoluble; calcium chloride is soluble	1	A precipitate is formed	
(b)	Neutralisation	1		
(c)	$\text{Mg}^{2+} + 2\text{e}^{-} \longrightarrow \text{Mg}$	1		

[END OF MARKING INSTRUCTIONS]