

**2006 Chemistry**

**Intermediate 2**

**Finalised Marking Instructions**

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**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 'distilling' (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**.

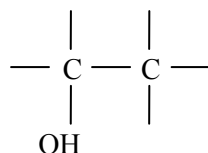
- 6 A half mark should be deducted for incorrect or missing units **only when stated in the marking scheme**.

- 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<sub>2</sub> group, a half mark should be deducted if the 'O' or 'N' are not bonded to a carbon, ie OH–CH<sub>2</sub> and NH<sub>2</sub>–CH<sub>2</sub>.

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

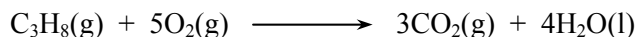


- 11 A symbol or correct formula should be accepted in place of a name **unless stated otherwise in the marking scheme**.

- 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.

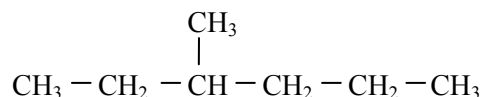


Name the kind of enthalpy change which the student measured.

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.

## 2006 Chemistry Intermediate 2

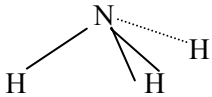
### Marking Scheme

#### Section A

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

**Marking Instructions****Chemistry Intermediate 2 2006****Section B**

<b>Question</b>	<b>Acceptable Answer</b>	<b>Mark</b>	<b>Worth ½</b>	<b>Worth 0</b>
<b>1 (a)</b>	Acid rain	<b>1</b>		
<b>(b) (i)</b>	$2\text{CH}_3\text{SH} + \text{H}_2 \longrightarrow \text{C}_2\text{H}_6 + 2\text{H}_2\text{S}$ (or multiple)	<b>1</b>		
<b>(ii)</b>	445°C	<b>1</b>		

Question	Acceptable Answer	Mark	Worth ½	Worth 0
2 (a)	A covalent bond is a pair of electrons shared by two atoms	1	A force of attraction between two non-metal atoms	
(b)	A pyramidal representation 	1		
(c) (i)	Paper X – Blue; Paper Y – Red	1	appropriate pH numbers (½)	
(c) (ii)	Ammonium chloride (correct formula accepted)	1	ammonia chloride (½)	

Question	Acceptable Answer	Mark	Worth ½	Worth 0
3 (a)	2 negative (2-)	1	negative	
(b)	$\text{Fe}^{3+} + 3\text{e}^- \longrightarrow \text{Fe}$	1		
(c)	Protons      26 Neutrons     30  Electrons     23	1/2 1/2  1		

Question	Acceptable Answer	Mark	Worth ½	Worth 0
4 (a)	The solution goes cloudy obscuring the cross A solid is formed/a precipitate is formed	1		The solution changes colour
(b)	At least three of the four points plotted correctly and a line drawn through them	1	Points plotted but no line drawn	
(c) (i)	0.050s <sup>-1</sup> (figure taken from graph ± half box tolerance)	1		
(ii)	8s	1		
(d)	So depth of liquid and hence amount of sulphur needed to obscure the cross is the same in each case	1	To make the experiment (comparison) fair	



Question	Acceptable Answer	Mark	Worth ½	Worth 0
5 (a)	Carboxyl group	1	Carboxylic acid group	
(b)	$\begin{array}{ccc} \text{CH}_3\text{OH} & \longrightarrow & \text{CH}_3\text{COOH} \\ 1 \text{ mole} & & 1 \text{ mole} \\ 32\text{g} & & 60\text{g} \\ \\ 16\text{g} & \longrightarrow & 30\text{g} \end{array}$	 1/2 1/2  1		

Question	Acceptable Answer	Mark	Worth ½	Worth 0
6 (a)	They provide the body with energy	1		
(b)	Carbon, hydrogen and oxygen	1		
(c)	Starch Sucrose (All three entries correct) Glucose	2	One entry correct (1 mark)	

Question	Acceptable Answer	Mark	Worth ½	Worth 0
7 (a)	$  \begin{array}{c}  \text{H} \quad \text{H} \\    \quad   \\  \text{H}-\text{C}-\text{C}-\text{O}-\text{H} \\    \quad   \\  \text{H} \quad \text{H}  \end{array}  $ <p>(No penalty for not expanding the OH)</p>	1	$  \begin{array}{c}  \text{H} \quad \text{H} \\    \quad   \\  \text{H}-\text{C}-\text{C}-\text{HO} \\    \quad   \\  \text{H} \quad \text{H}  \end{array}  $	
(b) (i)	<p>Ethanol <math>\longrightarrow</math> Ethene + water</p> <p>(Correct formulae acceptable)</p>	1		
(ii)	To prevent suckback	1		
(iii)	It is in a different state from the reactants	1		
(iv)	1 gram; the same	1		

Question	Acceptable Answer	Mark	Worth ½	Worth 0
8 (a) (i)	Methylpropane	1		
(ii)	Addition	1		
(b)	$\begin{array}{c} \text{H} \\   \\ \text{CH}_3 - \text{C} = \text{CH}_2 \end{array}$	1		

Question	Acceptable Answer	Mark	Worth ½	Worth 0
9 (a) (i)	Condensation	1		
(ii)	Amide link	1		
(iii)	So that both ends of each monomer react and a polymer chain can form	1		
(b)	Toughness or strength	1		

Question	Acceptable Answer	Mark	Worth $\frac{1}{2}$	Worth 0
10 (a)	Glowing red or glows brightly	1		
(b)	The aim of the experiment was to place the metals copper, magnesium and zinc in order of reactivity.	1		
(c)	Do not look directly at the burning magnesium	1		

Question	Acceptable Answer	Mark	Worth ½	Worth 0
11 (a)	Precipitation	1		
(b)	(i) $\text{Pb}^{2+}(\text{aq}) + 2\text{I}^{-}(\text{aq}) \longrightarrow \text{PbI}_2(\text{s})$	1		
	(ii) Spectator ions	1		

Question	Acceptable Answer	Mark	Worth ½	Worth 0
12 (a)	Exothermic	1		
(b) (i)	Hydrogen gas forms an explosive mixture with air	1		
(b) (ii)	Oxidation	1		
(c)	Because iron is lower in reactivity, magnesium will lose electrons more quickly when attached to it or Iron acts as a catalyst	1		



Question	Acceptable Answer	Mark	Worth ½	Worth 0
13 (a) (i)	Number of moles = Volume(l) * Concentration = 0.1 * 1 = 0.1	1/2  1/2		
(b) (i)	An acid where only some of the molecules dissociate to ions in water.	1	An acid with fewer H <sup>+</sup> (aq) than a	
(ii)	0.3 mol            follow through from 13(a) (i)  Description of any method which shows difference eg  Reaction with a metal or metal carbonate or conductivity or pH (1 mark)  Indication of the result that would be expected for test selected (1 mark)	2		

[END OF MARKING INSTRUCTIONS]