



**2008 Chemistry**

**Intermediate 2**

**Finalised Marking Instructions**

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## 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 '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.**

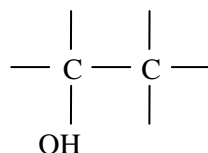
- 6 A half mark should be deducted for incorrect or missing units **only when stated in the marking scheme.**

- 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

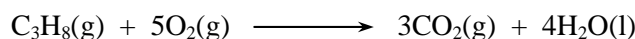


- 11 A symbol or correct formula should be accepted in place of a name **unless stated otherwise in the marking scheme.**

- 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.

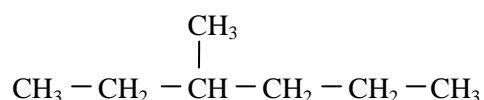


Name the kind of enthalpy change which the student measured.

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.

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### Marking Scheme

#### Section A

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

Marking Instructions

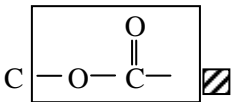
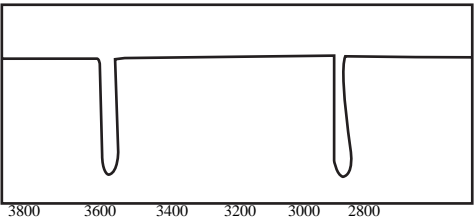
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Section B

Question	Acceptable Answer	Mark	Worth ½	Worth 0
1 (a)	Transition (metal)	1 or 0		
(b) (i)	29 34 29 36	4 × ½	Allow follow through 34 29 36 29 1 mark	
(b) (ii)	isotopes	1 or 0		
2 (a)	46g	1 or 0		
(b) (i)	46-37 = 9g	1 or 0	46-37 Follow through for wrong answer supported by working	
(b) (ii)	Filtration/filter/filtering	1 or 0		

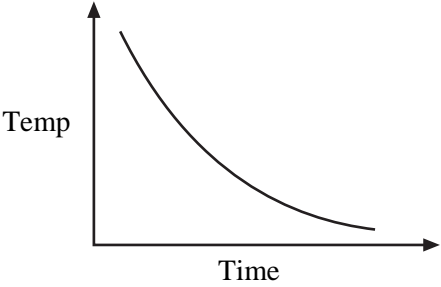
Question	Acceptable Answer	Mark	Worth ½	Worth 0
3 (a)	$4 \text{N}_2\text{O} + \text{CH}_4 \rightarrow 4 \text{N}_2 + \text{CO}_2 + 2\text{H}_2\text{O}$ (or multiples of)	1 or 0		
(b)	Different (physical) state/form from reactants	1 or 0		Mention of products Different state
(c)	Products released/move/leave from catalyst surface	1 or 0		Gas given off/ reactants leaving
(d)	Sulphur poisons the catalyst; sulphur blocks the active sites; sulphur prevents reactants from binding/adsorbing	1 or 0		Denature/toxic Take a bond Sticks
4 (a)	Breakdown of a compound/solution (to its elements) by passing electricity through it.	1 or 0		Molecules/ions/ electrons
(b)	Allows the products to be identified/To make sure the products are produced at only one electrode/Direction of electrons stays the same/Electrodes keep the same charge	1 or 0		
(c) (i)	Positive Negative	½ ½		
(ii)	By carefully smelling the gas Smells like a swimming pool Wafting the gas carefully to your nose (Bleaches) blue litmus paper	1 or 0	(blue)litmus paper (red)litmus paper	Colour of gas pH paper bubbles

Question	Acceptable Answer	Mark	Worth ½	Worth 0
5 (a)	Tetrahedral Tetrahedron	1 or 0		Tetra/3D
(b) (i)	$\begin{array}{c} \text{F} \quad \text{F} \\   \quad   \\ \text{F}-\text{C}-\text{C}-\text{H}; \\   \quad   \\ \text{F} \quad \text{H} \end{array} \quad \begin{array}{c} \text{H} \quad \text{H} \\   \quad   \\ \text{F}-\text{C}-\text{C}-\text{F} \\   \quad   \\ \text{F} \quad \text{F} \end{array}$ <p>Allow shortened structural formula <math>\text{CF}_3\text{CH}_2\text{F}</math> <math>\text{CHF}_2\text{CHF}_2</math></p>	1 or 0	If Fl used -½ since question is testing structure	
(ii)	Chlorine/Cl/Cl <sub>2</sub>	1 or 0		CL/cl/chloride
(iii)	Shorter atmospheric life/biodegrades faster	1 or 0	Will not damage the ozone layer as much	
6 (a)	hydroxyl	1 or 0		Alkanol/hydroxide
(b)	$\begin{array}{c} \text{H} \quad \text{H} \\   \quad   \\ -\text{C}-\text{C}- \\   \quad   \\ \text{H} \quad \text{OH} \end{array}$ <p>Allow shortened formula but must show bonds</p>	1 or 0		$\begin{array}{c} \text{H} \quad \text{H} \\   \quad   \\ \text{C} = \text{C} \\   \quad   \\ \text{H} \quad \text{OH} \end{array}$
(c)	Soluble in water/dissolves Breaks down in water Degrades in water Disintegrates in water	1 or 0	Breaks down Disintegrates	Melt mixed

Question	Acceptable Answer	Mark	Worth ½	Worth 0
7 (a)	Man-made/made by chemists/scientists/man Does not occur naturally Not natural	1 or 0		Fake Artificial Made by chemical industry
(b)		1 or 0		
(c)	Glycerol/glycerine Propan-1,2,3-triol	1 or 0	Propan—triol Propan-1,2,3-iol	Diglycerol Monoglycerol glyceride
8 (a)	Carbon-carbon double bond; C=C Double covalent bond	1 or 0	C=	
(b)	Absorption at 2800-3000 and at 3600 	1 or 0	For absorption at 3600 If 3 peaks – ½ if absorption 3600 included	For absorption at 2800 only



Question	Acceptable Answer	Mark	Worth ½	Worth 0
9 (a)	Glucose/C <sub>6</sub> H <sub>12</sub> O <sub>6</sub>	1 or 0		Incorrect formula
(b)	Iodine/I/I <sub>2</sub>	1 or 0		iodide
(c) (i)	Plotting points Drawing/line	½ ½		
(ii)	1/0.0125 = 80secs	1 or 0	1/0.0125	
10 (a)	Protein molecules become unravelled; the bonds holding the protein molecules are broken; Shape of the molecule is changed; Specific shape is changed Destroyed	1 or 0		Killed/damaged/ amino acids
(b)	Using an acid/marinating in lime juice/marinating in citric acid	1 or 0		Marinate Change pH Hydrolysis
(c)	Bonds are weak Bonds are not strong Polar bonds are weak Hydrogen bonds are weak	1 or 0		Not tight Quite loose

Question	Acceptable Answer	Mark	Worth $\frac{1}{2}$	Worth 0
(d)		1 or 0		

Question	Acceptable Answer	Mark	Worth $\frac{1}{2}$	Worth 0
<b>11 (a)</b>	2 moles Al $\rightarrow$ 6 moles Ag	$\frac{1}{2}$		
	(1 mole $\rightarrow$ 3 moles and follow through)			
	54g $\rightarrow$ 648g	$\frac{1}{2}$		
	1g $\rightarrow$ 648/54g			
	0.135g $\rightarrow$ 648/54 $\times$ 0.135g <hr/> $=1.62$ g	$\frac{1}{2}$ $\frac{1}{2}$		
<b>(b)</b>	Measure mass of beaker at start and again at the end. (Should have decreased.) Find mass difference	<b>1 or 0</b>	Weigh it Mass decreased Measure mass of beaker	
<b>12 (a)</b>	Carbon dioxide (CO <sub>2</sub> )	<b>1 or 0</b>		Carbon oxide
<b>(b)</b>	C <sub>6</sub> H <sub>8</sub> O <sub>7</sub>	<b>1 or 0</b>		C6H8O7
<b>(c)</b>	weak	<b>1 or 0</b>		

Question	Acceptable Answer	Mark	Worth ½	Worth 0
13 (a)	precipitation	1 or 0		
(b)	Nitric (acid)/Hydrogen nitrate HNO <sub>3</sub>	1 or 0		Nitrate acid
(c)	Red	1 or 0		
14 (a)	Completes the circuit Allows ions to move To allow electricity to flow freely Carry current	1 or 0		Any mention of electrons/acts as a conductor/ion bridge
(b) (i)	Oxidation/loss of electrons	1 or 0		
(ii)	Aluminium hydroxide (or correct formula, if ionic formula used must be correct)	1 or 0		Aluminium oxide

Question	Acceptable Answer	Mark	Worth ½	Worth 0
15 (a)	KMnO <sub>4</sub> (or correct formula, if ionic formula used must be correct)	1 or 0		K(MnO <sub>4</sub> )
(b)	Provides reaction with oxygen; Releases oxygen when heated;	1 or 0		Burns with oxygen Catalyst
(c)	Reaction would be too vigorous Reaction would be too violent Descriptions of violent reactions	1 or 0		Too reactive Too fast Hurts your eyes

[END OF MARKING INSTRUCTIONS]