2007 Chemistry

Intermediate 1

Finalised Marking Instructions

Intermediate 1 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**.

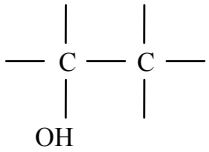
6 A half mark should be deducted for incorrect or missing units **only when stated in the marking scheme**.

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 $–NH_2$ 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_3H_8 burned to give 82·4 kJ of energy.

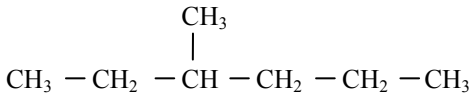
$$C_3H_8(g) + 5O_2(g) \longrightarrow 3CO_2(g) + 4H_2O(l)$$

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_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.

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	C	11	B
2	B	12	D
3	B	13	B
4	A	14	A
5	D	15	D
6	C	16	C
7	A	17	B
8	D	18	D
9	B	19	A
10	A	20	C

Section B

Question	Acceptable Answer	Mark	Worth ½	Worth 0
1 (a)	Toxic Poisonous Can kill Deadly	**1**		Very dangerous harmful irritant
(b)	C_2H_5OH C_2H_6O CH_3CH_2OH	**1 or 0**	C2H5OH	
(c)	Unable to live/manage without it Need it all the time Crave it; dependent on it	**1**		Like it; Can't function without it; Love it; Wanting more
2 (a)	Test Tube B Egg white Middle test tube	**1 or 0**		
(b)	That they are strong Hard to break	**1**		

Question	Acceptable Answer	Mark	Worth ½	Worth 0
3 (a) (i)	7	**1 or 0**		
(ii)	Colour of pH paper was matched to the chart colour (Need to demonstrate relationship between colour and pH scale)	**1 or 0**		Acids are 1-6 Red is acid
(b)	It was dissolved in water It was made into a solution Use damp pH paper Put (universal) indicator in solution	**1 or 0**	Make it into a liquid Liquify	Heat to melt Heated to liquid
4 (a) (i)	Labelled (with units) appropriate scale	**½** **½**	Maximum 1 mark for bar graph	
(ii)	points plotted line drawn	**½** **½**		
(b)	-16°C (+/- 1°C) Or acceptable answer from candidates graph	**1 or 0**	+ 16°C (or no negative sign)	

Question	Acceptable Answer	Mark	Worth ½	Worth 0
(c) (i)	Energy	**1**		Insulation or warmth
(ii)	Heart disease Obesity/heart attacks/strokes Clogging arteries	**1**		High blood pressure; high cholesterol
5 (a) (i)	Sodium and chlorine	**½ ; ½**		chloride
(ii)	To make ammonia/fertilisers	**1**		Fuel for cars
(b)	Bacteria/bugs/germs	**1**		
(c)	Breaks grease into droplets (which can be washed off with water) Breaks into smaller pieces	**1**		Breaks bonds in molecules Melts the grease Takes the grease away

Question	Acceptable Answer	Mark	Worth ½	Worth 0
6 (a) (i)	Diagram showing power supply, bulb and copper pin connected (in series) using connecting wires (frame circuit around the question – will the circuit work?)	**1 or 0**		
(ii)	Bulb will light/bulb will go on	**1 or 0**		Gets brighter
(b)	Thermosetting	**1**		Any specific name of a plastic
7 (a)	Coke Waste gases Hot air Lime	**½** **½** **½** **½**		
(b)	2614	**1 or 0**		
(c)	Acid rain/acid Sulphuric acid	**1**		Pollution Incorrect acid

Question	Acceptable Answer	Mark	Worth ½	Worth 0
8 (a)	To complete the circuit (response that demonstrates an understanding that it is necessary for the electricity to pass through)	**1 or 0**		
(b)	Tin Lead Copper Silver Gold	**1**		mercury
(c)	Chemicals are used up Ions are used up Magnesium is used up/dissolved	**1 or 0**		Energy used up Battery runs out Rots away Particles decrease
9 (a)	Air (oxygen) Water/rain/moisture/H_2O	**½** **½**		Salt water Acid rain
(b)	Magnesium is more reactive Magnesium protects the iron by sacrificing itself Magnesium is high in ECS (or reverse)	**1 or 0**		Magnesium reacts with oxygen or water Physical barrier Magnesium reacts faster
(c)	Painting/oil/coating with plastic Attach a block of Zinc/electroplating/galvanizing	**1**		

Question	Acceptable Answer	Mark	Worth ½	Worth 0
10 (a)	Calcium	**1 or 0**		
(b) (i)	6	**1 or 0**		
(ii)	to make them work so they can get to the roots (solubility of fertiliser and access to roots)	**1 or 0**		Washed away
11 (a)	Light/sun Chlorophyll	**1 or 0**		Heat/energy Green stuff
(b) (i)	Polymerisation	**1 or 0**		
(ii)	To store energy; store food To use (energy) later	**1 or 0**		Starch is what they eat For food
(iii)	Blue/black	**1 or 0**		

Question	Acceptable Answer	Mark	Worth ½	Worth 0
12 (a)	To reduce/prevent global warming (or any effect of global warming) To reduce/prevent Greenhouse Effect	**1 or 0**		Burning/pollution
(b)	2016 (or any extension from the graph – evidence based)	**1**		
(c)	Produces only water when burned Does not make carbon dioxide Does not have carbon Does not have a carbon footprint	**1 or 0**		Not a hydrocarbon

[END OF MARKING INSTRUCTIONS]