

2006 Chemistry

Standard Grade – Credit

Finalised Marking Instructions

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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.

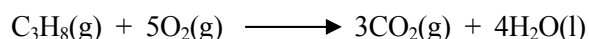
3. If a right answer is followed by additional information which does not conflict, the additional information should be ignored, whether correct or not.

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 Instructions 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 Instructions**.
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, C₃H₈ 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 ₃ COOH	1.65
CH ₂ ClCOOH	1.27
CHCl ₂ COOH	0.90
CCl ₃ 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 Cl₂, 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.

**2006 Standard Grade Chemistry
Credit Level**

Marking Instructions

Part 1 – 20 marks

- | | | | |
|---|-----|---------|-------------|
| 1 | (a) | B | 1 or 0 |
| | (b) | C | 1 or 0 |
| | (c) | E | 1 or 0 |
| 2 | (a) | E and F | 1 or 0 |
| | (b) | B | 1 or 0 |
| 3 | (a) | C | 1 or 0 |
| | (b) | E | 1 or 0 |
| | (c) | B | 1 or 0 |
| 4 | (a) | A and B | 1 or 0 |
| | (b) | D and F | 1 or 0 |
| 5 | (a) | B and E | 1 or 0 |
| | (b) | B | 1 or 0 |
| | (c) | C and F | 1 or 0 |
| 6 | (a) | F | 1 or 0 |
| | (b) | C | 1 or 0 |
| | (c) | A and D | 2 or 1 or 0 |
| 7 | (a) | D | 1 or 0 |
| | (b) | C and F | 2 or 1 or 0 |


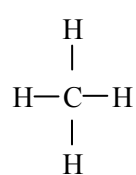
Please note that **NO HALF MARKS** are awarded in Part 1.

Marking Instructions

Chemistry Standard Grade - Credit

Part 2

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
8 (a)	$ \begin{array}{c} \text{F} \quad \text{F} \\ \quad \\ \text{C} = \text{C} \\ \quad \\ \text{F} \quad \text{F} \end{array} $	1	Repeating unit	
(b)	Thermoplastic/thermalplastic	1	Synthetic	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
9 (a)	<p>(i) Isotopes</p> <p>(ii) $1 \quad {}^1\text{H} \quad {}^1_1\text{H}$ Deduct ½ if wrong units given</p> <p>(iii) ${}^2\text{H} \quad p = 1 \quad n = 1$ ${}^1\text{H} \quad p = 1 \quad n = 0$</p>	<p>1</p> <p>1</p> <p>1</p>		
(b)	<p>A reasonable attempt at a tetrahedral structure</p> 	1	<p>A planar structure even with the word Tetrahedral</p>  <p>Ignore pyramidal</p>	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
10 (a)	Left to right on the wire/near the wire	1	Arrow on salt bridge Arrow in solution	Arrow on salt bridge Arrow in solution
(b)	Reduction	1	Redox	Redox
(c)	Blue Ignore initial colour	1	Purple Black Green	Purple Black Green

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
11 (a)	Oxygen (air) and water or moisture Both for 1 mark	1	Salt Iron	Salt Iron
(b)	FM = 685 1 mark % Pb = $621/685 \times 100 = 90.6/90.65/90.66/90.7/91$ 1 mark 90.6/90.65/90.7/91 on its own 2 marks Maximum 1 mark if atomic numbers used Deduct ½ mark for each arithmetical error Deduct 1 mark for chemical error Deduct ½ mark if 90.6 (rounded wrong way) 90 – deduct ½ mark if working shown	2	If % O calculated max 1	
(c)	Cr_2O_3 $(\text{Cr}^{3+})_2(\text{O}^{2-})_3$ Both ion charges must be given If ion charges are shown, they must be correct with correct use of brackets.	1	Only 1 ion charge	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
12 (a)	Both scales correct ($\frac{1}{2}$) Both labels correct ($\frac{1}{2}$) including units Plots correct ($\frac{1}{2}$) Joining points ($\frac{1}{2}$) including zero [allow $\frac{1}{2}$ box tolerance] [allow 1 plotting error] Deduct max $\frac{1}{2}$ if less than $\frac{1}{2}$ paper used in either direction Bar graph max 1 Straight line graph max 1	2		
(b)	30 cm ³ +/- 1 – If no graph Answer should be checked against candidate's graph	1		
(c)	36 – 40	1	35 – 40 Greater than 35 About 40	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
13 (a)	Fructose Galactose	1		
(b)	Condensation	1		
(c) (i)	Ethanol or correct formula	1	Ethenol/ethanal	
(ii)	Yellow/orange/red/pink	1	green-yellow brown	brown green

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
14 (a)	Air/atmosphere Electrolysis of water	1	Oxygen tank Plants/trees/sky Photosynthesis Water (on its own) Burning potassium permanganate	
(b)	No carbon dioxide produced Helps the environment No carbon monoxide produced Cleaner to the environment Environmentally friendly No (less) harmful gases/poisonous/ toxic fumes Fossil fuels not used up Water is the only product No pollution/less pollution No greenhouse gases Renewable/infinite/won't run out/lasts longer No fumes	1	Cheaper Lead Safer More energy efficient No soot Economically friendly	
(c)	$\text{H}_2 \longrightarrow 2\text{H}^+ + 2\text{e}^-$ $\text{H}_2 \xrightarrow{2\text{e}^-} 2\text{H}^+$ Ignore state symbol	1		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
15 (a)	2 moles \longrightarrow 1 mole (½) 88g \longrightarrow 32g (½) 22g \longrightarrow 8g (1) If 44g > 32g on its own ½ mark If then used with follow through max 1½ marks 8 on its own 2 marks No units required Maximum 1 mark if atomic numbers are used Deduct ½ mark for each arithmetical error Deduct 1 mark chemical error Max 1 if use N ₂ as product (14g)	2	16g on its own	
(b)	Circle longer	1		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
16 (a)	$\text{Ba(OH)}_2 + 2\text{NH}_4\text{Cl} \rightarrow 2\text{NH}_3 + \text{BaCl}_2 + 2\text{H}_2\text{O}$ <p>Or correct multiples</p>	1		
(b)	<p>pH paper (½) turns blue /purple/dark green (½) Universal indicator Litmus – blue/purple</p> <p>HCl/Hydrogen chloride ½ White fumes ½ If hydrochloric acid is used they must say concentration</p>	1	Green Alkaline Smell Cool down and measure Boiling point Dilute HCl	Green
(c)	It will freeze/turn to ice/solid	1	Cools down Expand	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
17 (a)	Electrolysis	1	Decomposition Electrolysis	
(b)	<p>(i) Hydrochloric acid</p> <p>(ii) Covalent Ignore network/molecular</p> <p>(iii) Bubbles of gas (chlorine/Cl₂) Chlorine gas Bubbling Effervescence/fizzing Gas Green/yellow gas Cl₂ (g)</p>	<p>1</p> <p>1</p> <p>1</p>	<p>Not ionic</p> <p>Green/ yellow colour Chlorine on its own</p>	<p>Bubbles of Hydrogen or any other gas</p>

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
18 (a)	15.6	1		
(b)	<p>1 mole NaOH reacts with 1 mole HCl (½)</p> <p>1 x 20 x conc = 1 x 15.6 x 0.2 (½)</p> <p>conc = $\frac{1 \times 15.6 \times 0.2}{20}$ (½)</p> <p>= 0.156 (½)</p> <p>0.156 on its own – 2 marks No need for units</p> <p>N⁰ mols C x V (½)</p> <p>$\frac{0.2 \times 1 \times 15.6}{0.00312}$ (½)</p> <p>$\frac{0.00312}{0.2}$ (½)</p> <p>0.156 (½)</p> <p>Allow correct follow on using incorrect answer from part (a).</p> <p>½ for formula which works</p>	2	0.2 On its own	

(c)	Evaporate/boil the water/heat/distillation Crystallise/leave it overnight/few days (Leave it) to dry Filter then evaporate	1	Burn it Dry it	
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Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
19 (a)	$ \begin{array}{cccccc} \text{H} & \text{H} & & \text{O} & \text{H} & \text{H} \\ & & & & & \\ \text{H}-\text{C} & -\text{C}- & \text{O}- & \text{C}- & \text{C}- & \text{C}-\text{H} \\ & & & & & \\ \text{H} & \text{H} & & \text{H} & \text{H} & \end{array} $ <p>Allow one missing H as long as bond is there</p> <p>OR</p> <p>Allow one missing C – H bond</p>	1	Missing C to C bond or C to O bond(s)	
(b)	Hydrolysis Hydrolysing	1	Reversible (but does not negate) Decomposition Hydrolysatation	

[END OF MARKING INSTRUCTIONS]