



**2012 Chemistry**

**Standard Grade - General**

**Finalised Marking Instructions**

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## Standard Grade Chemistry General

### 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 “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. 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 mark should be given for “burning” since the word “burned” appears in the text.

11. 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 <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.

12. Unless the question is clearly about a non-chemistry issue, eg costs in industrial chemistry, a nonchemical 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.

13. When it is very difficult to make a decision about a partially correct answer, a half mark can be awarded.
14. When marks have been totalled, a half mark should be rounded up.

**2012 Standard Grade Chemistry  
General Level**

**Marking Instructions**

**Part 1 – 20 marks**

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

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

Marking Instructions

Chemistry Standard Grade – General

Part 2

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
10 (a)	nucleus/nuclei Protons in the nucleus	1	Protons Nuclear	Protons Neutrons
(b)	halogens	1	Non-metals Diatomic (gases) Halide	Any other named family

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
11 (a)	Haber	1		
(b)	Unreactive/Less reactive/Low reactivity Not very/ highly reactive Does not react (easily) Low in E.C.S Lower than hydrogen It is low	1	Does not react quickly/mention of rate/speed/time on its own	
(c)	Steel/brass/bronze/solder (or any other acceptable alloy) / pewter  Gold – must mention specific named alloy eg 9ct, 18ct  But not – 24 ct/cast iron/sterling silver/dental amalgam	1	Chrome Aluminum alloy Iron alloy Gold on its own 24ct gold Amalgam	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
12 (a)	Correct labelling for the two segments shown – paraffin/30% (½) – aromatic/15% (½)  Final segment – asphalts (½)/5% (½)  If asphalt % is not in pie chart, check table – if correct in table award ½	2		
(b)	alkane(s)	1	anes	
(c)	$C_{20}H_{42}$  $H_{42}C_{20}$	1	Structural formula on its own $C_{20}H_{40+2}$	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
13 (a) (i)	A	1	pH3, 3, 18	
(ii)	< 5 BUT > 0	1	Less than 5 as a statement	
(b)	Hydrogen/H <sup>+</sup>	1	H H <sub>2</sub> proton	Correct formula with wrong name  & vice versa

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
14 (a)	styrene/monostyrene	1	phenyl ethene	
(b)	Polymerisation/addition polymerisation/addition	1	condensation polymerisation	
(c)	Renewable/biodegradable/or any definition of biodegradable/will not run out/infinite source  Does not use up finite resources  Unilimited source Sustainable Can be regrown Degrades Not made from fossil fuels (oil etc)	1	On their own: environmental friendly/ doesn't pollute, cheaper, does not produce toxic gases Easily obtained Can be recycled Any disadvantage of polystyrene Lasts longer	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
15 (a) (i)	chlorophyll	1	chloroplasts	
	(ii) Benedict's or Fehling's reagent turns red/orange/brick red/brown  (Must have reagent <b>and</b> colour correct)  Ignore starting colour	1 or 0	Green, yellow, mustard	
(b)	Volume of water/mass of water Mass of carbohydrate/amount/quantity/mass Distance between spoon and test-tube Particle size Position of thermometer Same test-tube/ size of test tube	1	Starting temperature Amount of water Same burning time Size of carbohydrate Volume of carbohydrate Height of water	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
<b>(c)</b>	(not sweet) and (does not dissolve) both required	<b>1 or 0</b>		
<b>(d)</b>	Oxygen/O/O <sub>2</sub>	<b>1</b>		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
16 (a)	Electron/ e <sup>-</sup>	1	negatively charged	
(b)	Any metal below zinc in electrochemical series	1	Hydrogen	
(c) (i)	More power/current/voltage Lasts longer/doesn't have to be replaced as often Can produce smaller batteries <u>More</u> portable Can power large devices/items Do not need to recharge battery as often Do not use as many batteries/less waste as don't need to throw out as many batteries	1	Saves energy Less pollution Cheaper/ use less finite resources More economical Less waste Portable/safer Rechargeable	
(ii)	Li <sub>2</sub> O (ignore any charges shown)	1		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
<b>(d)</b>	<p>Vertical scale + label (<math>\frac{1}{2}</math>)            Correct bar labelling (<math>\frac{1}{2}</math>)            Bars drawn correctly (1) (<math>\frac{1}{2}</math> box tolerance)            Deduct (<math>\frac{1}{2}</math>) mark for each incorrect bar, up to max of 1</p> <p>If line graph drawn – max of 1 mark</p> <p>Deduct maximum (<math>\frac{1}{2}</math>) mark if less than half of graph paper used on either axis</p> <p>Spike graph is OK</p> <p>Over two graphs max <u>1</u></p>	<b>2</b>		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
17 (a)	Nitrogen/N <sub>2</sub> and oxygen/O <sub>2</sub> Both required	1 or 0	N      O	
(b)	Lightning/electrical (thunder)storms	1	thunderstorms	
(c)	A given value less than 7 <7	1		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
18 (a)	Lattice/network	1	Covalent lattice Covalent network	
(b)	Ions not free to move/flow	1	Ions trapped Particles/they cannot move	Any mention of electrons
(c)	colourless or no colour	1	Clear	
(d)	Carbon/C Carbon monoxide/CO  Coke/charcoal/graphite	1	Carbon oxide	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
19 (a)	sodium carbonate $\text{Na}_2\text{CO}_3$ Ignore charges	1		
(b) (i)	$20^\circ\text{C} \pm 1$	1		
(ii)	As the temperature { increases decreases }  the solubility { increases decreases }  The solubility { increases decreases } as the  temperature { increases decreases }	1	Cause and effect wrong way round  As temperature increases it dissolves faster	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
20 (a) (i)	Cracking/catalytic cracking/thermal cracking	1		
(ii)	Water/H <sub>2</sub> O/hydrogen oxide/steam	1	Hydrogen dioxide Hydrogen peroxide	
(b)	It is unsaturated/not saturated Contains carbon to carbon double bond Contains C = C Contains double bond	1		
(c)	Lead iodide	1		

[END OF MARKING INSTRUCTIONS]