

# **Chemistry B**

General Certificate of Secondary Education

Unit **B641/01**: Modules C1, C2, C3 (Foundation Tier)

## **Mark Scheme for January 2013**

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.










All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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## Annotations

Annotation	Meaning
	correct response
	incorrect response
	benefit of doubt
	benefit of doubt <b>not</b> given
	error carried forward
	information omitted
	ignore
	reject
	contradiction

## Subject-specific Marking Instructions

Abbreviations, annotations and conventions used in the detailed mark scheme

/	=	alternative and acceptable conventions used in the detailed mark scheme
(1)	=	separates marking points
allow	=	answers that cannot be accepted
not	=	answers which are not worthy of credit
reject	=	answers which are not worthy of credit
ignore	=	statements which are irrelevant
( )	=	words which are not essential to earn credit
<u>    </u>	=	underlined words must be present in answer to score a mark (although not correctly spelt unless otherwise stated)
ecf	=	error carried forward
AW	=	alternative wording
ora	=	or reverse argument.

Question		Answer	Marks	Guidance
1	(a)	pork (1)	1	
	(b)	<b>any two from:</b> food colouring (1) flavour enhancer (1) emulsifier (1)	2	<b>allow</b> colouring (1) <b>allow</b> flavour(ing) or enhancer (1)  <b>allow</b> stabiliser (1) / acid regulator (1) / sweetener (1)
	(c)	oxygen (1)	1	<b>allow</b> O / O <sub>2</sub> (1)
<b>Total</b>			<b>4</b>	

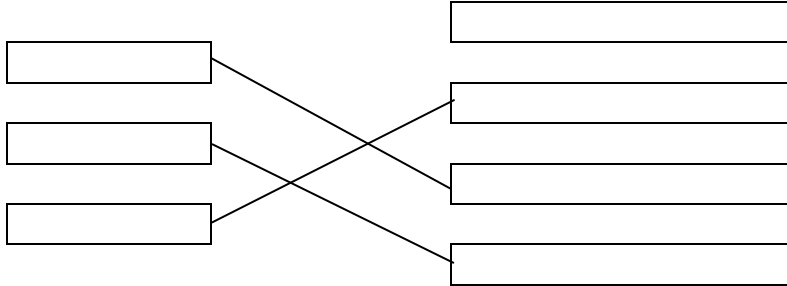
Question		Answer	Marks	Guidance
2	(a) (i)	14 / fourteen (1)	1	
	(ii)	2 / two (1)	1	
	(b)	oxygen (1)	1	<b>allow</b> correct answers ticked, circled or underlined in list if the answer line is blank answer line takes precedence
	(c) (i)	poisonous / toxic (1)	1	<b>allow</b> can kill / cause death / reacts with haemoglobin / reduces oxygen carrying ability of the blood (1)
	(ii)	carbon (1)	1	<b>allow</b> soot / C (1) <b>ignore</b> ash
<b>Total</b>			<b>5</b>	

Question		Answer	Marks	Guidance
3	(a)	(bitumen) has highest boiling point (1)	1	<b>allow</b> are large molecules / high molecular mass (1) <b>allow</b> high boiling point (1)
	(b)	contain (atoms of) hydrogen and carbon (1) only / AW (1)	2	<b>allow</b> H and C (1) <b>not</b> hydro <b>not</b> molecules of / mixture of hydrogen and carbon
	(c)	as a fuel (1)	1	<b>allow</b> (to power) cars / transport / anything powered or fuelled by petrol (1)
		<b>Total</b>	<b>4</b>	

Question		Answer	Marks	Guidance
4	(a)	new substance is formed / difficult to reverse (1)	1	<b>allow</b> large energy change / large heat change (1)
	(b)	(i)	1	<b>allow</b> any order of products <b>allow</b> correct formulae or mix of formulae and words; if words and formula given for a product mark the words and <b>ignore</b> formula <b>ignore</b> balancing if formulae used $2\text{NaHCO}_3 \rightarrow \text{Na}_2\text{CO}_3 + \text{CO}_2 + \text{H}_2\text{O}$  <b>not</b> hydrogencarbonate / sodium hydrocarbonate
		(ii)	1	<b>allow</b> puts gas in the cake / puts carbon dioxide in the cake / puts $\text{CO}_2$ in the cake (1) <b>allow</b> puts bubbles in the cake / cake expands (1) <b>not</b> puts air in the cake / puts incorrect gas in the cake
		(iii)	2	<b>ignore</b> use of an indicator / litmus paper  <b>allow</b> a white solid / precipitate / suspension is formed / goes milky / white (1)  <b>ignore</b> reference to blowing through straw <b>ignore</b> put out a lighted splint
			<b>Total</b>	<b>5</b>

Question		Answer	Marks	Guidance
5	(a)	D (1)	1	
	(b)	B (1)	1	
<b>Total</b>			<b>2</b>	

Question		Answer	Marks	Guidance
6	(a)	brass (1) solder (1)	2	<b>allow</b> correct answers ticked, circled or underlined in list if the answer line is blank answer line takes precedence
	(b)	<b>any two from:</b> protective layer on surface (1)  of (aluminium) oxide (1) which does not flake off (1)	2	<b>allow</b> permanent / impervious / insoluble for protective eg layer that prevents reaction with (moist) air scores (1) <b>allow</b> coating / barrier on surface for layer eg permanent coating scores (1)
	(c)	advantage – (aluminium) is less dense / <b>car body</b> will be lighter / easier to shape / easier to bend / ora (1)  disadvantage – aluminium is weaker (than steel) / aluminium is more expensive / not easily welded / ora (1)	2	<b>allow</b> density / flexibility / malleability (1) <b>allow</b> (aluminium) will give good fuel economy / (aluminium) makes the car more efficient to run (1) if reverse argument used then answer must be qualified eg it is more dense scores (0) but steel is more dense than aluminium scores (1) <b>allow</b> cost / weak (1) <b>ignore</b> references to hardness
	(d)	saves (natural) resources / saves energy / reduces waste / reduces litter (1)	1	<b>ignore</b> saves money / less pollution
<b>Total</b>			<b>7</b>	

Question		Answer	Marks	Guidance
7	(a)	additives (1)	1	
	(b)	thins the paint / dissolves ingredients (1)	1	<p><b>allow</b> to make it easier to spread / makes paint go where you want it (1)</p> <p><b>allow</b> mix the paint together (1)</p> <p><b>ignore</b> references to paint drying or sticking paint to the walls</p>
	(c)	to give it colour / make it coloured / aw (1)	1	<b>ignore</b> references to paint drying or sticking paint to the walls
	(d)	<p>oil paint – a paint that has a pigment dispersed in oil</p> <p>phosphorescent – a paint that glows in the dark</p> <p>thermochromic paint – a paint that changes colour when heated</p> <p>all <b>three</b> correct (2)</p> <p><b>one</b> or <b>two</b> correct (1)</p>	2	<p>multiple lines from type of paint scores 0 for that paint</p> 
<b>Total</b>			<b>5</b>	



Question			Answer	Marks	Guidance
8	(a)	(i)	80 (cm <sup>3</sup> ) (1)	1	
		(ii)	A (1)	1	<b>allow</b> correct answer indicated on graph if answer line is blank
		(iii)	0 – 20 (seconds) (1)	1	<b>allow</b> correct answer ticked, circled or underlined in list if answer line is blank answer line takes precedence
	(b)		acid runs out / aw (1)	1	<b>allow</b> 'not enough acid available' (1) <b>ignore</b> no more gas or bubbles produced
	(c)		<b>any two from:</b> increase temperature / hotter (acid) / heating / aw (1)  use more concentrated acid / aw (1)  use a catalyst (1)  stir / shake (1)	2	<b>allow</b> heat (1)  <b>allow</b> use stronger acid / use less water / use a more pure acid (1) <b>ignore</b> use more acid  <b>allow</b> explanations of methods given, eg increase temperature (1) because particles have more energy (1) and more collisions (1) increase concentration (1) because particles are more crowded (1) and more collisions (1) / add a catalyst (1) which will speed up the reaction whilst remaining unchanged itself (1)
			<b>Total</b>	<b>6</b>	

Question		Answer	Marks	Guidance
9	(a)	increases / goes up (1)	1	<b>allow</b> changes by 17 (ppm) / (concentration gets) stronger (1) <b>ignore</b> incorrect use of numbers
	(b)	any number from 340 to 500 <b>and</b> increased fuel consumption / higher population / greater awareness of impact has led to decrease / aw (1)	1	<b>no</b> mark for number on its own explanation must be consistent with given number <b>allow</b> less photosynthesis / deforestation / more industrialisation (1) <b>allow</b> one mark if answer indicates how they arrived at this number eg based on a pattern of numbers
		<b>Total</b>	<b>2</b>	

Question			Answer	Marks	Guidance
10	(a)	(i)	Ni and K (1)	1	<b>both</b> required <b>allow</b> nickel and potassium (1)
		(ii)	K and Na (1)	1	<b>both</b> required <b>allow</b> potassium and sodium (1)
		(iii)	Ni / Ag (1)	1	<b>allow</b> nickel / silver (1)
	(b)	(i)	blue (1)	1	more than one answer given scores (0)
		(ii)	orange (1)	1	more than one answer given scores (0)
			<b>Total</b>	<b>5</b>	

Question			Answer	Marks	Guidance
11	(a)		H <sup>+</sup> (1)	1	<b>allow</b> hydrogen ion (1) <b>not</b> hydrogen
	(b)		oxygen (1)	1	<b>allow</b> O <sub>2</sub> (1)
	(c)		lighted spill / splint / taper / light the gas (1)  squeaky pop / it pops / explodes (1)	2	<b>ignore</b> glowing splint  <b>allow</b> (squeaky) pop test for one mark only  result mark is dependent on the correct test except for 'use a glowing splint and gives a pop' scores 1
			<b>Total</b>	<b>4</b>	

Question			Answer	Marks	Guidance
12	(a)		6 / six (1)	1	
	(b)		12 / twelve (1)	1	
	(c)	(i)	4 / four / IV (1)	1	
		(ii)	2 / two (1)	1	
			<b>Total</b>	<b>4</b>	

Question			Answer	Marks	Guidance
13	(a)	(i)	fluorine / astatine (1)	1	<b>allow</b> F / F <sub>2</sub> / At / At <sub>2</sub> (1) <b>not</b> fluoride or astatide
		(ii)	increases / gets bigger / aw (1)	1	
	(b)		water treatment / kills microbes / making hydrochloric acid / making polymers (1)	1	<b>allow</b> in swimming pools / making PVC / keep water clean / sterilising babies' bottles / making bleach (1) <b>ignore</b> to kill germs / sterilise wounds / sterilising medical equipment
			<b>Total</b>	<b>3</b>	

Question		Answer	Marks	Guidance
14	(a)	lithium / Li (1)	1	<b>allow</b> strontium or calcium (1) <b>ignore</b> lithium chloride
	(b)	$Cl^-$ has a negative charge (1)	1	<b>allow</b> 'because of the – sign' (1)
	(c)	<b>any two from:</b> reacts with water (1) reacts with air / reacts with oxygen (1) reactive (1)	2	<b>allow</b> (oil) stops potassium reacting with water (1) <b>allow</b> (oil) stops potassium reacting with air / oxygen (1)  <b>allow</b> reacts with moist air for <b>two</b> marks <b>allow</b> violent reaction with water for <b>two</b> marks  <b>allow</b> because oil does not react with potassium for <b>one</b> mark
		<b>Total</b>	<b>4</b>	

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