



GCSE

## Chemistry B

General Certificate of Secondary Education

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

# Mark Scheme for January 2012

---

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, OCR Nationals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

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.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

© OCR 2012

Any enquiries about publications should be addressed to:

OCR Publications  
PO Box 5050  
Annesley  
NOTTINGHAM  
NG15 0DL

Telephone: 0870 770 6622  
Facsimile: 01223 552610  
E-mail: [publications@ocr.org.uk](mailto:publications@ocr.org.uk)

## Annotations

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

## Subject-specific Marking Instructions

Abbreviations, annotations and conventions used in the detailed Mark Scheme.

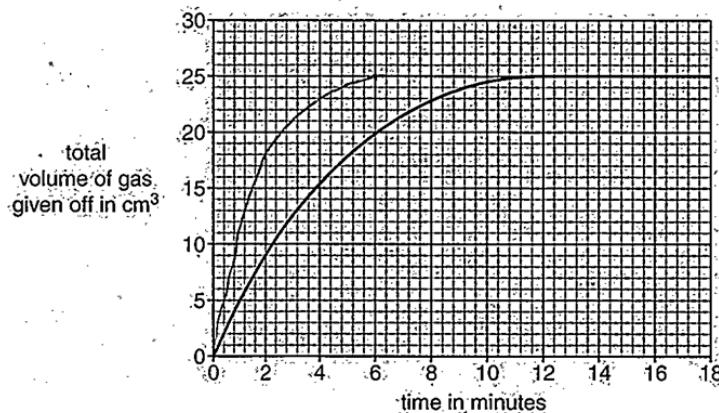
- / = alternative and acceptable answers for the same marking point
- (1) = separates marking points
- allow** = answers that can be accepted
- not** = answers which are not worthy of credit
- reject** = answers which are not worthy of credit
- ignore** = statements which are irrelevant
- ( ) = words which are not essential to gain credit
- = 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		Expected Answers	Marks	Additional Guidance
1	(a)	monomers (1)	1	<b>allow</b> alkenes
	(b)	(i) <b>E</b> (1)	1	
	(ii)	<b>E</b> (1)  insoluble (in oil) (1)  melting point is above 100°C (1)	3	<b>allow</b> 1 mark for <b>B</b> with the reason that melting point is above 100°C no marks if A, C or D chosen  <b>allow</b> it has the <b>highest</b> melting point <b>allow</b> melting point is 150°C <b>ignore</b> it has a high melting point <b>allow</b> won't melt carrying the oil  <b>ignore</b> density / strength
	(c)	packaging / cups / cartons / toys / insulation / furniture / coving / tiles / swimming floats / bubble wrap (1)	1	<b>allow</b> under fish tanks <b>allow</b> protection of goods items etc. <b>ignore</b> bottles
	(d)	does not rot / does not decompose / does not decay (1)	1	<b>allow</b> does not disintegrate / cannot break down <b>allow</b> takes a long time to break down / disintegrate / decay <b>ignore</b> does not break down quickly / hard to break down / takes a long time to go away
		<b>Total</b>	<b>7</b>	

Question		Expected Answers	Marks	Additional Guidance
2	(a)	carbon – 7 hydrogen – 16 (1)	1	<b>both</b> required for 1 mark
	(b)	oxygen (1)	1	<b>allow</b> O <sub>2</sub> or O
	(c) (i)	water (1)	1	<b>allow</b> H <sub>2</sub> O
	(ii)	lime water goes cloudy / lime water goes milky / a white precipitate is seen (1)  due to presence of carbon dioxide (1)	2	<b>allow</b> it goes white <b>ignore</b> it bubbles  <b>allow</b> due to presence of CO <sub>2</sub>
		<b>Total</b>	<b>5</b>	

Question		Expected Answers	Marks	Additional Guidance		
3	(a)	<p><b>one or two</b> correct (1)</p> <p>but</p> <p><b>all three</b> correct (2)</p>	2	toxic	✓	
	(b)	idea of safety to humans (1)	1	does not react	✓	
				irritates		✓
				soluble		(✓)
				<b>allow</b> to know if it has any side effects / so it does not harm the person wearing it / does not irritate the skin		
				<b>Total</b>	<b>3</b>	

Question		Expected Answers	Marks	Additional Guidance
4	(a)	(i) idea of colour change (1)	1	<b>allow</b> albumen goes coloured / changes to a white colour <b>ignore</b> egg goes hard
		(ii) <b>B</b> (1)	1	<b>allow</b> a new substance is made <b>allow</b> correct answer underlined, ringed or ticked but answer line takes precedence
	(b)	(i) carbon dioxide (1)	1	<b>allow</b> $\text{CO}_2$ <b>allow</b> water vapour / steam <b>ignore</b> just water
		(ii) to make it rise (1)	1	
	(c)	to stop food reacting with oxygen (1)	1	<b>allow</b> stop food reacting with air <b>ignore</b> to preserve food / prevent food going off / food lasts longer <b>ignore</b> to stop oxygen getting in
			Total	5

Question		Expected Answers	Marks	Additional Guidance
5	(a)	zinc chloride / hydrogen (1)	1	allow correct formulae $\text{ZnCl}_2$ / $\text{H}_2$ / H
	(b) (i)	6 (minutes)	1	
	(ii)	no more (dilute) hydrochloric acid / no zinc left (1)	1	allow reactants run out ignore no gas produced / graph is flat ignore the zinc is not reacting any more
	(c)	gradient steeper than original line (1) line ends at 25 cm <sup>3</sup> (1)	2	mark independently if line does not clearly start at origin, lose first marking point the line must not go above 25 cm <sup>3</sup> $\pm \frac{1}{2}$ square
				
			Total	5

Question		Expected Answers	Marks	Additional Guidance	
6	(a)	<p>one line correct (1)</p> <p>but</p> <p>all <b>three</b> lines correct (2)</p>	2	<div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">solvent</div> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">helps to stick paint</div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">binding material</div> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">gives the paint its colour</div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">pigment</div> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">thins the paint</div> </div>	
	(b)	solvent evaporates (1)	1	<p><b>allow</b> water evaporates / liquid evaporates</p> <p><b>allow</b> (paint) dries by evaporation</p> <p><b>allow</b> (binder) reacts with oxygen or air</p> <p><b>ignore</b> oil evaporates</p>	
	(c)	colloid (1)	1	<p><b>allow</b> correct answer ticked, circled or underlined in list but answer line takes precedence</p>	
	(d)	natural (1)	1	<p><b>allow</b> correct answer ticked, circled or underlined in list but answer line takes precedence</p>	
		<b>Total</b>	<b>5</b>		

Question			Expected Answers	Marks	Additional Guidance
7	(a)	(i)	their electrical conductivity (1)	1	<b>allow</b> both conduct electricity
		(ii)	<b>any one from:</b> aluminium is weaker (than iron) / iron is stronger (than aluminium)  aluminium does not rust / corrode and Iron rusts  aluminium is less dense (than iron) / iron is more dense (than aluminium)	1	answer must come from table  <b>allow</b> aluminium does not rust / corrode
		(b)	<b>any two from:</b> saves natural resources (1)  saves energy (1)  reduces disposal problems (1)	2	<b>allow</b> less metal ores are mined <b>allow</b> avoids environmental damage due to mining or quarrying <b>allow</b> otherwise we will run out of natural resources / we are not wasting materials  <b>allow</b> reduction in toxic material being dumped <b>allow</b> reduces need for landfill sites / saves land / reduces the amount of rubbish ( that goes into landfill sites ) / reduces waste / to make more space <b>ignore</b> references to harming or killing wildlife  <b>ignore</b> can be used to make other objects / cars  <b>ignore</b> it will help the environment / cause pollution
			<b>Total</b>	4	

Question		Expected Answers	Marks	Additional Guidance
8	(a)	78 (%) (1)	1	
	(b)	<p>idea that photosynthesis takes in or lowers carbon dioxide <b>and</b> gives out or increases oxygen (1)</p> <p>idea that respiration takes in or lowers oxygen <b>and</b> gives out or increases carbon dioxide (1)</p>	2	<p><b>allow</b> word or unbalanced symbol equation for photosynthesis  <math>\text{water} + \text{carbon dioxide} \rightarrow \text{glucose} + \text{oxygen}</math>  <math>\text{H}_2\text{O} + \text{CO}_2 \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2</math></p> <p><b>not</b> references to plants breathing</p> <p><b>allow</b> word or unbalanced symbol equation for respiration  <math>\text{glucose} + \text{oxygen} \rightarrow \text{water} + \text{carbon dioxide}</math>  <math>\text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2 \rightarrow \text{H}_2\text{O} + \text{CO}_2</math></p> <p><b>allow</b> photosynthesis gives out oxygen / takes in carbon dioxide  <b>and</b> respiration gives out carbon dioxide / takes in oxygen  scores 1</p>
		<b>Total</b>	<b>3</b>	

Question		Expected Answers	Marks	Additional Guidance
9	(a)	5 / five (1)	1	
	(b)	$\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$ (1)	1	<p><b>allow</b> any order of products  <b>allow</b> any correct multiples  <b>allow</b> = instead of <math>\rightarrow</math>  <b>not</b> and / &amp; instead of +  <b>allow</b> heat above arrow <b>but not</b> '+ heat' or '+ energy' in equation</p>
	(c)	concrete is poured into a metal support (1) aw / steel rods are put inside concrete / AW (1)	1	<p><b>allow</b> steel, iron instead of metal  <b>allow</b> frame, mesh, or cage instead of support  <b>allow</b> with metal (bars)</p>
		<b>Total</b>	<b>3</b>	

Question			Expected Answers	Marks	Additional Guidance				
10	(a)	(i)	(element <b>B</b> ) has one electron in the outer shell (1)	1					
		(ii)	(element <b>E</b> ) has three (electron) shells (1)	1	<b>allow</b> has 3 rings / 3 outer shells				
		(iii)	<b>D</b> (1)	1					
	(b)		fluorine (1)	1	<b>allow</b> F				
	(c)		<table border="1"> <tr> <td>relative charge</td> <td>relative mass</td> </tr> <tr> <td><b>0 / no charge / neutral</b></td> <td><b>1 / one</b></td> </tr> </table> (1)	relative charge	relative mass	<b>0 / no charge / neutral</b>	<b>1 / one</b>	1	both required for 1 mark <b>allow</b> +1 but <b>not</b> -1 for relative mass
relative charge	relative mass								
<b>0 / no charge / neutral</b>	<b>1 / one</b>								
			<b>Total</b>	<b>5</b>					

Question		Expected Answers	Marks	Additional Guidance
11	(a)	X – potassium Y – lithium Z – sodium	2	<b>one or two</b> correct (1)  <b>but</b>  all <b>three</b> correct (2)
	(b)	(sodium) reacts with air / reacts with oxygen (1)  reacts with water (1)	2	<b>allow</b> is a reactive metal / is very reactive score 1 if no other mark is given <b>allow</b> so it will not react with water / air <b>allow</b> because it oxidises / because it tarnishes  <b>allow</b> stops contact with water and or air scores 1  <b>allow</b> reacts with moist air for two marks  <b>ignore</b> (sodium) does not react with oil
	(c)	potassium chloride (1)	1	<b>not</b> potassium chlorine <b>allow</b> KCl
		<b>Total</b>	<b>5</b>	

Question		Expected Answers	Marks	Additional Guidance
12	(a)	any correct transition metal (1)	1	allow correct symbol instead of name
	(b)	breakdown of a compound / breakdown of a substance / breakdown of a chemical (1) when it is heated / AW / (1) <b>OR</b> compound makes two (or more) other compounds (1) when heated / AW (1)	2	<b>allow</b> break up <b>allow</b> breakdown of a molecule  <b>allow</b> substance makes two (or more) substances <b>allow</b> chemical makes two (or more) chemicals <b>allow</b> a molecule makes two (or more) molecules (1)
<b>Total</b>		<b>3</b>		

Question		Expected Answers	Marks	Additional Guidance
13	(a)	magnesium + oxygen $\rightarrow$ magnesium oxide (1)	1	<b>allow</b> reactants and products in either order <b>allow</b> correct formulae or mix of formulae and words $Mg + O_2 \rightarrow MgO$ symbol equation does not need to be balanced <b>ignore</b> incorrect balancing <b>allow</b> = instead of $\rightarrow$ <b>not</b> and / & instead of +
	(b)	ions (1)	1	<b>allow</b> correct answer ticked, circled or underlined in list if answer line is blank
	(c)	magnesium oxide has a very high melting point (1) (tick in 3 <sup>rd</sup> answer box)	1	more than 1 box ticked (0)
<b>Total</b>		<b>3</b>		

Question		Expected Answers	Marks	Additional Guidance
14	(a)	lead (1)	1	
	(b)	(tungsten has a) melting point above 2000°C (1)	1	<b>allow</b> tungsten has highest melting point <b>allow</b> it has a melting point of 3407°C <b>allow</b> reference to sufficiently low electrical conductivity to give high resistance <b>ignore</b> it has a very high melting point <b>ignore</b> references to other properties
	(c)	(i) (gold and/or tungsten are) too expensive (1)	1	
	(ii)	<b>any one from:</b> lead – high density or cheap (1) iron – high density or cheap (1) copper – high density or does not corrode (1)	1	<b>not</b> aluminium <b>ignore</b> other properties <b>ignore</b> just dense
		<b>Total</b>	<b>4</b>	

**OCR (Oxford Cambridge and RSA Examinations)**  
1 Hills Road  
Cambridge  
CB1 2EU

**OCR Customer Contact Centre**

**Education and Learning**

Telephone: 01223 553998  
Facsimile: 01223 552627  
Email: [general.qualifications@ocr.org.uk](mailto:general.qualifications@ocr.org.uk)

**[www.ocr.org.uk](http://www.ocr.org.uk)**

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored

**Oxford Cambridge and RSA Examinations**  
is a Company Limited by Guarantee  
Registered in England  
Registered Office; 1 Hills Road, Cambridge, CB1 2EU  
Registered Company Number: 3484466  
OCR is an exempt Charity

**OCR (Oxford Cambridge and RSA Examinations)**  
Head office  
Telephone: 01223 552552  
Facsimile: 01223 552553

© OCR 2012

