



# GCSE

## Chemistry B

General Certificate of Secondary Education

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

## Mark Scheme for January 2012

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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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




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## Annotations

Annotation	Meaning
	correct response
	incorrect response
	benefit of the doubt
	benefit of the 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 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

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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>	

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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>	

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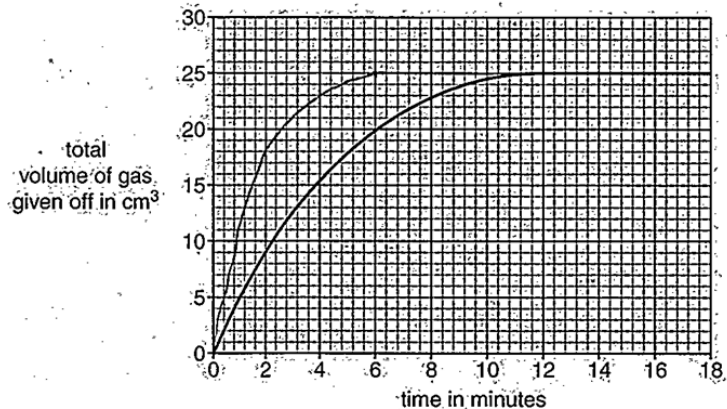
Question			Expected Answers	Marks	Additional Guidance		
3	(a)		<b>one</b> or <b>two</b> correct (1)  but  <b>all three</b> correct (2)	2			
					toxic		✓
					does not react	✓	
					irritates		✓
					soluble		(✓)
	(b)		idea of safety to humans (1)	1	<b>allow</b> to know if it has any side effects / so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

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> CO <sub>2</sub> <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
			<b>Total</b>	<b>5</b>	

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

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Question			Expected Answers	Marks	Additional Guidance
6	(a)		<p><b>one</b> line correct (1)</p> <p><b>but</b></p> <p>all <b>three</b> lines correct (2)</p>	2	
	(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	<b>allow</b> correct answer ticked, circled or underlined in list but answer line takes precedence
	(d)		natural (1)	1	<b>allow</b> correct answer ticked, circled or underlined in list but answer line takes precedence
			<b>Total</b>	<b>5</b>	



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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>	<b>4</b>	

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Question			Expected Answers	Marks	Additional Guidance
8	(a)		78 (%) (1)	1	
	(b)		idea that photosynthesis takes in or lowers carbon dioxide <b>and</b> gives out or increases oxygen (1)  idea that respiration takes in or lowers oxygen <b>and</b> gives out or increases carbon dioxide (1)	2	<b>allow</b> word or unbalanced symbol equation for photosynthesis water + carbon dioxide → glucose + oxygen $\text{H}_2\text{O} + \text{CO}_2 \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2$  <b>not</b> references to plants breathing  <b>allow</b> word or unbalanced symbol equation for respiration glucose + oxygen → water + carbon dioxide $\text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2 \rightarrow \text{H}_2\text{O} + \text{CO}_2$  <b>allow</b> photosynthesis gives out oxygen / takes in carbon dioxide <b>and</b> respiration gives out carbon dioxide / takes in oxygen scores 1
			<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	<b>allow</b> any order of products <b>allow</b> any correct multiples <b>allow</b> = instead of → <b>not</b> and / & instead of + <b>allow</b> heat above arrow <b>but not</b> '+ heat' or '+ energy' in equation
	(c)		concrete is poured into a metal support (1) aw / steel rods are put inside concrete / AW (1)	1	<b>allow</b> steel, iron instead of metal <b>allow</b> frame, mesh, or cage instead of support <b>allow</b> with metal (bars)
			<b>Total</b>	<b>3</b>	

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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>					

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Question			Expected Answers	Marks	Additional Guidance
11	(a)		X – potassium Y – lithium Z – sodium	2	<b>one</b> or <b>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>	

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Question			Expected Answers	Marks	Additional Guidance
12	(a)		any correct transition metal (1)	1	<b>allow</b> 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 $\text{Mg} + \text{O}_2 \rightarrow \text{MgO}$ 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>	

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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>	

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