

# **Chemistry B**

General Certificate of Secondary Education

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

## **Mark Scheme for January 2011**

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

/	= alternative and acceptable answers for the same marking point
(1)	= separates marking points
<b>not</b>	= answers which are not worthy of credit
<b>reject</b>	= answers which are not worthy of credit
<b>ignore</b>	= statements which are irrelevant
<b>allow</b>	= answers that can be accepted
( )	= words which are not essential to gain credit
—	= underlined words must be present in answer to score a mark
ecf	= error carried forward
AW	= alternative wording
ora	= or reverse argument

Question		Expected Answers	Marks	Additional Guidance
1	(a)	potato written as the first ingredient on the food label (1)	1	
	(b)	to improve the colour or appearance of food / to stop food reacting with oxygen /  to stop oil and water from separating / stabiliser /  flavour enhancer / (1)	1	<b>allow</b> to give it colour  <b>allow</b> to stop the food going mouldy <b>allow</b> to preserve food <b>ignore</b> to make it last longer to keep food fresh is <b>not</b> sufficient but <b>allow</b> so it does not go off  <b>allow</b> to stop ingredients from separating  <b>allow</b> to add flavour or taste  <b>allow</b> to improve texture  more appetising is <b>not</b> sufficient
	(c)	(i) self-cooling drinks can (1)	1	more than one tick scores 0
		(ii) alkene (1)	1	<b>allow</b> correct answer ticked, circled or underlined in list if answer line is blank
		<b>Total</b>	<b>4</b>	

Question		Expected Answers	Marks	Additional Guidance	
2	(a)	oxygen (1)	1	<b>allow</b> air / O <sub>2</sub>	
	(b)	<b>any two from:</b> <b>EITHER</b> (propane) is more convenient / portable (as it is stored in small cylinders) (1) (propane) is easy to light (1) (propane) has a high energy value (1) <b>OR</b> (oil) is a liquid (1) (oil) has a high energy value (1) (oil) is easy to light (1) (oil) can be stored easily (1)	2	no mark for propane / oil - marks are for explanation if coal / natural gas scores 0 <b>allow</b> easy to carry	
	(c)	(i)	(spirit) burner (1)	1	<b>not</b> Bunsen burner
		(ii)	poisonous / toxic (1)	1	<b>allow</b> it kills you / reduces ability of blood to carry oxygen / forms carboxyhaemoglobin <b>ignore</b> harmful
	(d)	(i)	19 (1)	1	<b>allow</b> 19 written by question or on side of table <b>but</b> answer in the table takes precedence
		(ii)	B (1)	1	<b>allow</b> correct answer indicated in table if answer line is blank
		<b>Total</b>		<b>7</b>	

Question		Expected Answers	Marks	Additional Guidance
3	(a)	coal / (natural) gas (1)	1	ignore petroleum / named fractions of crude oil
	(b)	X = petrol Y = diesel Z = bitumen  all <b>three</b> correct (2) but <b>one</b> or <b>two</b> correct (1)	2	
	(c)	<b>any two from:</b> catalyst (1) high temperature (1)  converts large (hydrocarbon) molecules into small (hydrocarbon) molecules / makes more useful (hydrocarbon) molecules / makes more petrol / makes alkenes (1)	2	<b>allow</b> correct named catalyst, eg aluminium oxide / porcelain pot <b>allow</b> heat / quoted temperature of 300 to 1000 °C <b>ignore</b> references to pressure
		<b>Total</b>	<b>5</b>	

Question		Expected Answers	Marks	Additional Guidance
4	(a)	solvent - the liquid that dissolves a solid solute - the solid that dissolves in a liquid insoluble - a solid that does not dissolve in a liquid <b>all three</b> correct (2) <b>but</b> <b>one</b> or <b>two</b> correct (1)	2	
	(b)	carbon atoms = 4 hydrogen atoms = 8 oxygen atoms = 2  <b>all three</b> correct (2) <b>but</b> <b>one</b> or <b>two</b> correct (1)	2	
		<b>Total</b>	<b>4</b>	

Question		Expected Answers	Marks	Additional Guidance
5	(a)	marble (1)	1	
	(b)	<b>any two from:</b> take up land (1) (increased) noise (1) (increased) traffic (1) dust (1)	2	<b>allow</b> destroys habitats / AW <b>allow</b> lots of lorries on road instead of either noise or traffic <b>ignore</b> more pollution but <b>allow</b> more carbon monoxide in air / more oxides of nitrogen in air <b>allow</b> land has to be reconstructed when quarrying has finished / AW (1)
		<b>Total</b>	<b>3</b>	



Question		Expected Answers	Marks	Additional Guidance
6	(a)	solder (1)	1	
	(b)	lead (1)	1	
	(c)	low melting point / melts easily (1)	1	<b>ignore</b> references to electrical conductivity
	(d)	low density / AW (1)	1	<b>allow</b> lightweight <b>allow</b> because of its density <b>ignore</b> it is light but <b>allow</b> the aeroplane body is light
	(e)	saves (natural) resources / reduces disposal problems / reduces energy consumption (1)	1	<b>allow</b> copper is a finite resource / copper (ore) is scarce <b>allow</b> reduces toxic heavy metal pollution in water <b>ignore</b> environmentally friendly / less pollution
		<b>Total</b>	<b>5</b>	

Question		Expected Answers	Marks	Additional Guidance
7	(a)	thin the mixture / so the paint can be spread easily (1)	1	<b>allow</b> dissolves some ingredients / helps to mix the ingredients <b>ignore</b> helps paints to dry
	(b)	change colour when heated / change colour when cooled (1)	1	
	(c)	particles are mixed and dispersed through a liquid (1) solid particles are suspended in a liquid (1)	2	If more than two ticks, deduct one mark for each additional tick down to zero <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
		<b>Total</b>	<b>4</b>	

Question		Expected Answers	Marks	Additional Guidance
8	(a)	50 (seconds)	1	
	(b)	more crowded particles / more particles in the same volume / more particles per cm <sup>3</sup> (1)  more (frequent) collisions (1)	2	assume answer refers to concentrated acid but <b>allow</b> ora if dilute acid is specified <b>ignore</b> more particles / reaction is faster <b>allow</b> particles are closer together  <b>allow</b> more chance of collisions <b>not</b> faster collisions / quicker collisions
	(c)	increases / faster (1)	1	
	(d)	change the temperature / heat it / cool it (1)	1	<b>allow</b> increase temperature / decrease temperature <b>allow</b> use a catalyst <b>allow</b> stir or shake / not stir / not shake
		<b>Total</b>	<b>5</b>	

Question		Expected Answers	Marks	Additional Guidance
9	(a)	acid rain / (photochemical) smog (1)	1	<b>allow</b> effects of acid rain eg erodes buildings / corrodes metals / kills plants / kills animals <b>allow</b> destroys ozone layer <b>allow</b> makes low level ozone
	(b)	<b>any two from:</b> kills aquatic life / kills fish / kills animals (1) damages stonework / AW (1) damages metals / AW (1)	2	<b>not</b> kills plants or pond weed etc given in question
		<b>Total</b>	<b>3</b>	

Question	Expected Answers	Marks	Additional Guidance
10	sodium chloride – as a preservative iron – to make bridges chlorine – to make pesticides copper – to make electrical wiring  all <b>four</b> correct (3) <b>but</b> <b>two</b> or <b>three</b> correct (2) <b>but</b> <b>one</b> correct (1)	<b>3</b>	
	<b>Total</b>	<b>3</b>	

Question		Expected Answers	Marks	Additional Guidance	
11	(a)	rubidium / caesium / francium (1)	1	allow Rb / Cs / Fr	
	(b)	any two from: (very) reactive (1) reacts with air / reacts with oxygen (1) reacts with water (in air) (1)	2	allow reacts with moist air (2)	
	(c)	(i)	hydrogen (1)	1	allow H / H <sub>2</sub> not H2 / H <sup>2</sup>
		(ii)	sodium hydroxide (1)	1	allow NaOH
		(iii)	most reactive – potassium sodium least reactive – lithium (1)	1	allow correct symbols
		<b>Total</b>	<b>6</b>		

Question		Expected Answers	Marks	Additional Guidance
12	(a)	between 80 and 120 (1)	1	more than one box ticked scores zero
	(b)	29 (1)	1	
	(c)	sodium / magnesium / silicon / phosphorus / sulfur / chlorine / argon (1)	1	allow Na / Mg / Si / P / S / Cl / Ar
	(d)	correct <b>symbol</b> of any transition element	1	ignore names
	(e)	nucleus (1)	1	allow protons <b>and</b> neutrons
	(f)	proton: positive / + / +ve / +1 (1) neutron: 1 / one (1)	2	not -1
		<b>Total</b>	<b>7</b>	

Question		Expected Answers	Marks	Additional Guidance
13	(a)	electrolysis (1)	1	<b>allow</b> correct answer underlined, ticked or circled if answer line is blank
	(b)	bauxite (1)	1	
	(c)	aluminium oxide → aluminium + oxygen (1)	1	<b>allow</b> correct formulae or mix of correct formulae and words <b>allow</b> $\text{Al}_2\text{O}_3 \rightarrow \text{Al} + \text{O}_2$ <b>allow</b> = instead of arrow <b>not</b> and or & for +
	(d)	(graphite) anode / positive (electrode) (1)	1	
		<b>Total</b>	<b>4</b>	



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