



GCSE

Chemistry B

General Certificate of Secondary Education

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

Mark Scheme for June 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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Annotations

Annotation	Meaning
✓	correct response
✗	incorrect response
BD	benefit of the doubt
BDN	benefit of the doubt <u>not</u> given
ECF	error carried forward
IO	information omitted
IGN	ignore
REJ	reject
CON	contradiction

Subject-specific Marking Instructions

Annotation	Meaning
/	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			Answers	Marks	Guidance
1	(a)		any 2 from: oil slicks (1) damage to wildlife / sea life (1) damage to beaches (1)	2	allow hard to remove or consequence of the oil slick allow kills sea birds / fish / animals allow harmful to sea birds / fish / animals allow damage to habitats / ecosystems ignore references to pollution
	(b)	(i)	diesel (1)	1	allow correct answer ticked, circled or underlined in list if answer line is blank
		(ii)	lowest boiling point (1)	1	allow low or lower boiling point allow smaller the molecule the lower the boiling point
			Total	4	

Question			Answers	Marks	Guidance
2	(a)	(i)	a cup for hot drinks (1)	1	allow correct answer ticked, circled or underlined in list if answer line is blank
		(ii)	will not decay / decompose (by bacterial action) (1)	1	ignore it does not degrade
		(iii)	any one from: wastes a valuable resource (1) produces toxic or poisonous gases or fumes (1) produces a greenhouse gas (1)	1	ignore a dangerous or harmful gas allow kills allow produces carbon monoxide, sulfur dioxide allow produces carbon, soot allow named greenhouse gas e.g. carbon dioxide allow contributes to global warming ignore references to pollution ignore smoke
	(b)		poly(chloroethene) (1) propene (1)	2	chloroethene is intended to be in brackets and should not be ignored allow polychloroethene
	(c)		tick next to a reaction in which small molecules are joined together (1) (4 th tick box)	1	allow other ways of indicating the answer, eg answer circled or underlined.
			Total	6	

Question		Answers	Marks	Guidance
3	(a)	change in colour (1) change in mass (1)	2	allow green before and black afterwards allow 10.80g before and 10.20g afterwards allow decrease in mass
	(b)	(i) 9.5 (1)	1	ignore \pm
		(ii) copper sulfate (1)	1	allow Cu SO ₄
	(c)	(i) spirit burner	1	
		(ii) same apparatus / equipment / spirit burner / copper can / calorimeter / thermometer spirit burner same distance from can (1)	1	allow same starting temperature allow same temperature rise allow heat for same time ignore same mass of water each time ignore same mass of fuel
Total			6	

Question		Answers	Marks	Guidance
4	(a)	contains hydrogen and carbon atoms only (1)	1	allow contains only carbon and hydrogen not is a mixture of carbon and hydrogen only not contains only carbon and hydrogen molecules
	(b)	double (covalent) bond (between carbon atoms) (1)	1	allow formula fits C _n H _{2n} allow two bonds between carbon atoms
	(c)	12 (1)	1	
	(d)	C ₄ H ₁₀ (1)	1	allow H ₁₀ C ₄ not C4H10
Total			4	

Question		Answers	Marks	Guidance
5	(a)	steel (1)	1	
	(b)	marble / limestone (1)	1	
	(c)	glass / concrete (1)	1	
	(d)	granite (1)	1	
		Total	4	

Question		Answers	Marks	Guidance
6	(a)	toxic / poisonous (1)	1	allow kills allow higher level answers involving formation of carboxyhaemoglobin ignore dangerous / harmful
	(b)	acid rain / photochemical smog (1)	1	allow named effect of acid rain / smog eg plants dying allow makes ozone at low level / destroys the ozone layer / destroys ozone at high level allow causes asthma ignore greenhouse effect / global warming
	(c)	$N_2 + O_2 \rightarrow 2NO$ Correct formula (1) Balancing (1)	2	allow = instead of \rightarrow not and or & in equation allow any correct multiple including fractions balancing mark is dependent on the correct formulae allow one mark for correct balanced equation with minor errors in case or subscript e.g. $N_2 + O_2 \rightarrow 2NO$ or $N_2 + O_2 \rightarrow 2No$ if + heat / energy max one mark for correct formula but heat / energy can be above \rightarrow or =
	(d)	(i) nitrogen (1)	1	ignore N or N_2
		(ii) particles have little energy / particles are moving slowly (1) not many collisions (per second) (1)	2	no need for a comparison allow particles are moving slower / particles have less energy allow collisions are not successful / collisions are not energetic allow fewer collisions allow particles are far apart / concentration is very small
		Total	7	

Question		Answers	Marks	Guidance
7	(a)	any two from: (percentage of) glass decreases (1) (percentage of) metals decreases (1) (percentage of) plastic increases (1) (percentage of) other increases (1)	2	allow (percentage of) paper does not change (1) allow (percentage of) textiles does not change (1) allow (percentage of) organic waste does not change (1)
	(b) (i)	cars / cutlery (1)	1	allow any suitable use of steel other than as a building material
	(ii)	mixture of elements one of which is a metal	1	allow mixture of metals allow contains two (or more) metals not metals or elements bonded together not a compound of two metals
	(iii)	brass / bronze / amalgam / solder / nichrome / nitinol (1)	1	allow other correct alloys
	(c)	any two from: saves natural resources (1) cheaper than extracting metal (1) saves energy (1) reduces disposal problems / reduces litter / reduces use of land-fill sites (1)	2	
	(d) (i)	aluminium – none and iron – rusts (1)	1	allow aluminium corrodes slowly and iron rusts (easily) allow aluminium – No / Low and Iron – Yes / High not corrosive
	(ii)	iron is attracted to a magnet (aluminium is not) (1)	1	allow higher level answers in terms of the use of an electromagnet
		Total	9	

Question		Answers	Marks	Guidance										
8	(a)	magnesium + oxygen → magnesium oxide (1)	1	allow formulae instead of words allow symbol equation even if not balanced eg Mg + O ₂ → MgO (but case and subscript must be correct) allow = for → not and or & for + not + heat but heat can be above → or =										
	(b)	magnesium oxide has a high melting point (1) solid magnesium oxide does not conduct electricity (1)	2	If more than two properties marked with a tick mark the incorrect ones first. <ul style="list-style-type: none"> • If one incorrect maximum one mark • If two or more incorrect award 0 marks <table border="1" style="margin-top: 10px;"> <tr> <td>Magnesium oxide is a gas at room temperature.</td> <td></td> </tr> <tr> <td>Magnesium oxide has a high melting point.</td> <td>✓</td> </tr> <tr> <td>Magnesium oxide is a liquid at room temperature.</td> <td></td> </tr> <tr> <td>Solid magnesium oxide does not conduct electricity.</td> <td>✓</td> </tr> <tr> <td>Melted magnesium oxide does not conduct electricity.</td> <td></td> </tr> </table>	Magnesium oxide is a gas at room temperature.		Magnesium oxide has a high melting point.	✓	Magnesium oxide is a liquid at room temperature.		Solid magnesium oxide does not conduct electricity.	✓	Melted magnesium oxide does not conduct electricity.	
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	(c) (i)	magnesium atom has two more electrons / magnesium ion has two less electrons (1)	1	allow difference of two electrons allow magnesium atom has more electrons allow magnesium ion has less electrons										
	(ii)	24 (1)	1											
		Total	5											

Question		Answers	Marks	Guidance
9	(a)	17 (1)	1	
	(b)	7 (1)	1	allow VII / halogens / seven
	(c)	7 (1)	1	
	(d)	4 (1)	1	
	(e)	green (gas) (1)	1	not an incorrect state e.g. green liquid
		Total	5	

Question		Answers	Marks	Guidance
10	(a)	iron(II) sulfate (1)	1	
	(b)	lime water has gone milky (1)	1	allow it in reference to lime water
	(c) (i)	3 (1)	1	
	(ii)	green precipitate (1)	1	allow green solid / green grey solid
	(d)	yellow (1)	1	
		Total	5	

Question		Answers	Marks	Guidance
11	(a)	hydrogen – test with a burning splint / light with a flame (1) and get a squeaky pop (1) oxygen – test with a glowing splint (1) relights (1)	4	Mark test and result independently but must correspond to the correct gas to be awarded a mark allow two marks for burns with a squeaky pop allow one mark for a squeaky pop test allow burning splint for test and burns brighter for result
	(b)	H_2O (1)	1	
		Total	5	

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