



GCSE

Chemistry A

General Certificate of Secondary Education **A322/02**

Unit 2: Modules C4, C5, C6

Mark Scheme for June 2010

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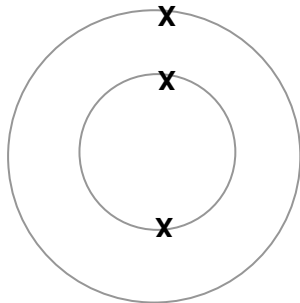
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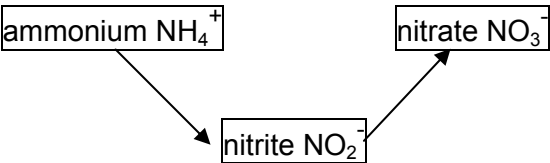
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Question			Expected Answers	Marks	Additional Guidance																		
1	a		FROM <u>dark grey</u> TO <u>purple</u> (1)	[1]	both colours required for 1 mark Order must be clear.																		
	b		I ₂ (aq) (1)	[1]	both required for 1 mark reject (ag)																		
	c	i*	KF (1)	[1]	accept FK																		
		ii*	melting point rises / becomes less negative (1) boiling point rises (1) reactivity decreases (down the group) (1)	[3]	ignore references to atomic number or mass number																		
	d		<table><tr><td></td><td>true</td><td>false</td></tr><tr><td>...is a gas.</td><td></td><td>✓</td></tr><tr><td>...has a lower melting point...</td><td></td><td>✓</td></tr><tr><td>...has one electron...</td><td></td><td>✓</td></tr><tr><td>...forms an ion...</td><td>✓</td><td></td></tr><tr><td>...reacts with iron more slowly...</td><td>✓</td><td></td></tr></table>		true	false	...is a gas.		✓	...has a lower melting point...		✓	...has one electron...		✓	...forms an ion...	✓		...reacts with iron more slowly...	✓		[3]	all five correct = 3 marks four correct = 2 marks two or three correct = 1 mark one or none correct = 0 marks
	true	false																					
...is a gas.		✓																					
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...reacts with iron more slowly...	✓																						
			Total	[9]																			

Question			Expected Answers	Marks	Additional Guidance																		
2	a	i	<table><tr><td>particle</td><td>name of particle</td><td>charge</td></tr><tr><td>●</td><td>neutron</td><td>0</td></tr><tr><td>○</td><td>proton</td><td>+1</td></tr></table> } (1) <table><tr><td>relative mass</td></tr><tr><td>1</td></tr><tr><td>1</td></tr></table> } (1)	particle	name of particle	charge	●	neutron	0	○	proton	+1	relative mass	1	1	[2]	charge on proton must have + sign accept 'neutral/none/no charge' for charge on neutron and 'positive' for charge on proton. accept +1 for relative mass but reject -1						
particle	name of particle	charge																					
●	neutron	0																					
○	proton	+1																					
relative mass																							
1																							
1																							
		ii	3 electrons showing configuration 2,1 (1) 	[1]	2 X's anywhere in first shell, 1 X anywhere in second shell accept any other symbols for electrons e.g. e or o																		
	b		<table><tr><td></td><td>true</td><td>false</td></tr><tr><td>...larger relative mass...</td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td>...total charge...</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>...more protons and electrons...</td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td>...by gaining one electron.</td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td>...shells of electrons...</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr></table>		true	false	...larger relative mass...	<input type="checkbox"/>	<input checked="" type="checkbox"/>	...total charge...	<input checked="" type="checkbox"/>	<input type="checkbox"/>	...more protons and electrons...	<input type="checkbox"/>	<input checked="" type="checkbox"/>	...by gaining one electron.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	...shells of electrons...	<input checked="" type="checkbox"/>	<input type="checkbox"/>	[2]	all five correct = 2 marks four correct = 1 mark three or less correct = 0 marks
	true	false																					
...larger relative mass...	<input type="checkbox"/>	<input checked="" type="checkbox"/>																					
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...shells of electrons...	<input checked="" type="checkbox"/>	<input type="checkbox"/>																					
			Total	[5]																			

Question			Expected Answers	Marks	Additional Guidance
3	a		(oxide ions / negative ions) move to <u>positive</u> electrode / move to the <u>anode</u> (1) and then... lose electrons / form oxygen molecules / form oxygen gas / form O ₂ (1)	[2]	ignore references to movement of metal ions / aluminium ions; allow attracted to... for 'move' accept 'form oxygen' alone ignore 'form oxygen <u>atoms</u> ' ignore 'forms a gas' alone
	b	i	108 tonnes (1)	[1]	
		ii	<div>...ions give up electrons... <input type="checkbox"/></div> <div>More atoms of aluminium... <input type="checkbox"/></div> <div>...same total number of electrons... <input checked="" type="checkbox"/> (1)</div> <div>Aluminium...positive electrode. <input type="checkbox"/></div>	[1]	
			Total	[4]	

Question			Expected Answers	Marks	Additional Guidance
4*	a		SiO ₂ (1) Al ₂ O ₃ (1)	[2]	
	b		<div>...less chlorine than sodium... <input checked="" type="checkbox"/> (1)</div> <div>Chlorine is a gas. <input type="checkbox"/></div> <div>...occurs in other compounds... <input checked="" type="checkbox"/> (1)</div> <div>...shows only metals. <input type="checkbox"/></div> <div>...small amount of chlorine... <input type="checkbox"/></div>	[2]	
			Total	[4]	

Question			Expected Answers	Marks	Additional Guidance
5	a		 <p>Fully correct = (2)</p> <p>(1) mark for either...</p> <p>All three names correct in correct places;</p> <p>All three formulae correct in correct places;</p> <p>Any 2 boxes fully correct;</p>	[2]	ignore extra words in boxes unless more than one name or formula of a substance is given.
	b	i	<p>higher <u>percentage</u> mass of C / ORA (1)</p> <p>lower number of carbon <u>atoms</u> / more hydrogen <u>atoms</u> / 3 carbon <u>atoms</u> and 7 hydrogen <u>atoms</u> (1)</p> <p>hydrogen has a lower <u>atomic</u> mass / hydrogen <u>atoms</u> are lighter / carbon has a mass of 12 and hydrogen has a mass of 1 (1)</p>	[3]	<p>ignore 'has 40% mass of carbon and/or 8% hydrogen'</p> <p>accept 'higher mass of carbon in the compound' or 'in the molecule'</p> <p>ignore 'higher mass of carbon' alone</p> <p>ignore 'There are <u>only</u> 3 carbon atoms'; If number of atoms are given, they must be correct.</p> <p>accept reverse arguments If atomic masses of atoms are given, they must be correct.</p>

Question			Expected Answers	Marks	Additional Guidance
5	b	ii	<p>Alanine has a low melting point. <input type="checkbox"/></p> <p>Alanine is soluble in water. <input type="checkbox"/></p> <p>...carbon, hydrogen and oxygen. <input checked="" type="checkbox"/> (1)</p> <p>Alanine is non-toxic. <input type="checkbox"/></p>	[1]	
			Total	[6]	

Question		Expected Answers	Marks	Additional Guidance
6	a	<p>rate is faster (1)</p> <p>particles are closer together / more particles in the same volume (1)</p> <p>more <u>frequent</u> collisions / more collisions per unit time (1)</p>	[3]	<p>ignore Energy arguments / activation energy arguments;</p> <p>allow <u>faster</u> collisions/ more successful collisions</p>
	b	catalyst is not used up / unchanged (1)	[1]	<p>ignore can be re-used / recycled / does not react.</p> <p>ignore speeds up the reaction.</p>
	c*	<p>7</p> <p>1</p>	[1]	<p>both correct for 1 mark</p> <p>must be in correct order</p>
	d*	<p>calcium nitrate (1)</p> <p>carbon dioxide and CO₂ (1)</p> <p>water and H₂O (1)</p>	[3]	<p>reject carbon monoxide</p> <p>accept hydrogen oxide</p> <p>numbers in formulae must be smaller than letters. e.g. accept CO₂ or CO₂ / H₂O or H₂O</p> <p>reject CO₂ or CO² / H₂O or H²O</p> <p>Maximum (2) marks If extra numbers are written in front of formulae e.g. 2CO₂ etc</p>
		Total	[8]	

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June 2010

Question			Expected Answers	Marks	Additional Guidance
7	a	i	188 (1)	[1]	
		ii	1.26 g (2) For (1) mark 0.63 g (1)	[2]	allow 1.3 g for (2) allow 0.6 g for (1)
	b	i	Cu^{2+} (1)	[1]	accept Cu^{+2} Charge must be superscripted. reject $\text{Cu}2+$ or Cu_{2+} or Cu_2^+ or 2Cu^{2+} reject '2+' alone
		ii	sulfuric (acid) / H_2SO_4 (1)	[1]	If formula given must be fully correct as shown. allow phonetic spellings of sulfuric e.g. 'sulffurik', but reject 'sulfur'.
		iii	LiNO_3 / $\text{Li}(\text{NO}_3)$ (1)	[1]	allow NO_3Li reject capital I in Li, e.g. LiNO_3 Number 3 must be smaller or subscripted e.g. reject LiNO^3 or LiNO_3 reject any numbers in front of formula e.g. 2LiNO_3 reject Li^+NO_3^-
			Total	[6]	

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