OCR
RECOGNISING ACHIEVEMENT

GCSE

Chemistry A

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

Unit 2: Modules C4, C5, C6

Mark Scheme for June 2010

Oxford Cambridge and RSA Examinations

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Facsimile: 01223 552610
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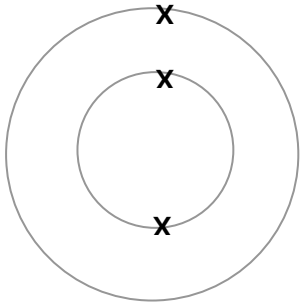
<table>
<tr><th colspan="3">Question</th><th>Expected Answers</th><th>Marks</th><th>Additional Guidance</th></tr>
<tr><td>1</td><td>a</td><td></td><td>FROM <u>dark grey</u> TO <u>purple</u> (1)</td><td>[1]</td><td>both colours required for 1 mark
Order must be clear.</td></tr>
<tr><td></td><td>b</td><td></td><td>I_2 (aq) (1)</td><td>[1]</td><td>both required for 1 mark

reject (ag)</td></tr>
<tr><td></td><td>c</td><td>i*</td><td>KF (1)</td><td>[1]</td><td>accept FK</td></tr>
<tr><td></td><td></td><td>ii*</td><td>melting point rises / becomes less negative (1)

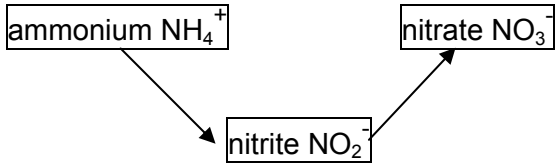
boiling point rises (1)

reactivity decreases (down the group) (1)</td><td>[3]</td><td>ignore references to atomic number or mass number</td></tr>
<tr><td></td><td>d</td><td></td><td><table><tr><th></th><th>true</th><th>false</th></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></td><td>[3]</td><td>all five correct = 3 marks
four correct = 2 marks
two or three correct = 1 mark
one or none correct = 0 marks</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>[9]</td><td></td></tr>
</table>

Question			Expected Answers	Marks	Additional Guidance
2	a	i	<table><tr><th>particle</th><th>name of particle</th><th>charge</th></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><th>relative mass</th></tr><tr><td>1</td></tr><tr><td>1</td></tr></table> (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
		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><th></th><th>true</th><th>false</th></tr><tr><td>...larger relative mass...</td><td></td><td>✓</td></tr><tr><td>...total charge...</td><td>✓</td><td></td></tr><tr><td>...more protons and electrons...</td><td></td><td>✓</td></tr><tr><td>...by gaining one electron.</td><td></td><td>✓</td></tr><tr><td>...shells of electrons...</td><td>✓</td><td></td></tr></table>	[2]	all five correct = 2 marks four correct = 1 mark three or less correct = 0 marks
			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	...ions give up electrons... ☐ More atoms of aluminium... ☐ ...same total number of electrons... ☑ (1) Aluminium...positive electrode. ☐	[1]	
			Total	[4]	

Question			Expected Answers	Marks	Additional Guidance
4*	a		SiO_2 (1) Al_2O_3 (1)	[2]	
	b		...less chlorine than sodium... ✓ (1) Chlorine is a gas. ☐ ...occurs in other compounds... ✓ (1) ...shows only metals. ☐ ...small amount of chlorine... ☐	[2]	
			Total	[4]	

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

Question			Expected Answers	Marks	Additional Guidance
5	b	ii	Alanine has a low melting point. ☐ Alanine is soluble in water. ☐ ...carbon, hydrogen and oxygen. ☑ (1) Alanine is non-toxic. ☐	[1]	
			Total	[6]	

Question			Expected Answers	Marks	Additional Guidance
6	a		rate is faster (1) particles are closer together / more particles in the same volume (1) more <u>frequent</u> collisions / more collisions per unit time (1)	[3]	**ignore** Energy arguments / activation energy arguments; **allow** <u>faster</u> collisions/ more successful collisions
	b		catalyst is not used up / unchanged (1)	[1]	**ignore** can be re-used / recycled / does not react. **ignore** speeds up the reaction.
	c*		7 1	[1]	**both** correct for 1 mark must be in correct order
	d*		calcium nitrate (1) carbon dioxide and CO_2 (1) water and H_2O (1)	[3]	 **reject** carbon monoxide **accept** hydrogen oxide numbers in formulae must be smaller than letters. e.g. **accept** CO2 or CO_2 / H2O or H_2O **reject** CO2 or CO^2 / H2O or H^2O **Maximum (2) marks** If extra numbers are written in front of formulae e.g. $2CO_2$ etc
			Total	[8]	

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** Cu2+ 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	$LiNO_3$ / $Li(NO_3)$ (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 LiNO3 **reject** any numbers in front of formula e.g. $2LiNO_3$ **reject** $Li^+NO_3^-$
			Total	[6]	

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

OCR Customer Contact Centre

14 – 19 Qualifications (General)
Telephone: 01223 553998
Facsimile: 01223 552627
Email: general.qualifications@ocr.org.uk

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