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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Chemistry (Modular) 3423/F
Specification A

Mark Scheme

2005 examination - June series

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

GCSE CHEMISTRY (MODULAR) 3423/F
MARK SCHEME – FOUNDATION TIER (TERMINAL PAPER)
SUMMER 2005

3423/F Q1

	answers	extra information	mark
(a) (i)	nitrogen	accept N_2 do **not** accept N	1
(a) (ii)	carbon dioxide	accept CO_2	1
(b) (i)	corrosive		1
(b) (ii)	it increases/rises	accept it gets hotter ignore heat	1
total			4

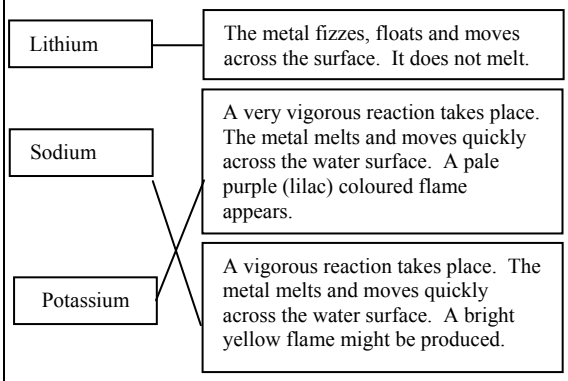
3423/F Q2

	answers	extra information	mark
(a)	correct plotting of points ($\pm \frac{1}{2}$ square)	deduct 1 mark for each error (max -2) if 0, 0 **not** plotted, deduct 1 mark	2
	line	smooth curve do **not** accept dot to dot	1
(b)	**Change made** / **How the rate of reaction would change**: The concentration of the sulphuric acid was increased. — increase The temperature of the dilute sulphuric acid was decreased. — decrease A catalyst was added. — increase		3
(c)	powder it/crush it	accept heat it	1
total			7

3423/F Q3

<table>
<tr><th></th><th>answers</th><th>extra information</th><th>mark</th></tr>
<tr><td>(a)</td><td>
<table>
<tr><th>Particles</th><th>In the nucleus</th><th>Outside the nucleus</th></tr>
<tr><td>protons</td><td>√</td><td></td></tr>
<tr><td>neutrons</td><td>√</td><td></td></tr>
<tr><td>electrons</td><td></td><td>√</td></tr>
</table>
</td><td></td><td>1
1
1</td></tr>
<tr><td>(b)</td><td>there are equal numbers of protons and electrons</td><td>accept positive and negative charges cancel each other out</td><td>1</td></tr>
<tr><td>(c)</td><td>3
4
3</td><td></td><td>1
1
1</td></tr>
<tr><td>total</td><td></td><td></td><td>7</td></tr>
</table>

3423/F Q4

	answers	extra information	mark
(a)		all 3 correct allow 1 mark for 2 or 1 correct	2
(b)	hydrogen	accept H_2 but **not** H	1
(c) (i)	blue	do **not** accept purple	1
(c) (ii)	alkali/alkaline/basic		1
total			5

3423/F Q5

	answers	extra information	mark
(a)	halogens		1
(b)	two		1
(c)	ions		1
(d)	top		1
total			4

3423/F Q6

	answers	extra information	mark
(a)	3 1 2	all 3 answers correct allow 1 mark for 2 or 1 correct answer	2
(b)	add water carefully/slowly/to make concentrated sulphuric acid	 accept H_2SO_4 instead of words	1 1
total			4

3423/F Q7

	answers	extra information	mark
(a) (i)	iron(II)	accept Fe(II) **or** Fe^{2+} accept iron but **not** iron(III) accept nickel	1
(a) (ii)	copper sulphate	mark independently	1 1
(a) (iii)	chloride	accept Cl^- but **not** Cl **or** Cl_2 **or** chlorine	1
(b)	add (dilute hydrochloric acid and) barium chloride (solution) white precipitate formed	accept correct formulae accept milky/cloudy/white	1 1
total			6

3423/F Q8

	answers	extra information	mark
(a)	oil is evaporated/boiled/heated		1
	vapours are condensed (at different temperatures)	accept turn to liquid	1
(b) (i)	sulphur dioxide	accept correct formula accept sulphur trioxide	1
(b) (ii)	carbon dioxide	accept correct formulae	1
	water		1
total			5

3423/F Q9

	answers	extra information	mark
(a)	acids only show acidic properties when water is present/water needed to produce hydrogen ions	accept idea of particles moving in solution	1
(b)	4		1
(c)	neutralisation/neutralising	accept neutral	1
total			3

3423/F Q10

	answers	extra information	mark
(a)	fermentation		1
(b)	carbon dioxide	accept CO_2	1
(c)	contains enzymes/(biological) catalysts they speed up the reaction		1 1
(d)	solvent/fuel/alcoholic drinks		1
total			5

3423/F Q11

	answers	extra information	mark
(a)	lower temperature reactions/lower pressure reactions/cheaper/use less energy/lower activation energy	accept speed up reaction do **not** accept can be re-used	1
(b)	less will be needed (to sweeten food)	do **not** accept it is sweeter (stem)	1
(c) (i)	3		1
(c) (ii)	60	accept 12 + 3 + 12 + 32 + 1 for 1 mark	2
total			5

3423/F Q12

	answers	extra information	mark
(a)	Haber		1
(b)	**Quality of written communication**		
	one mark for correct use of **two** scientific terms	temperature **or** °C/pressure **or** atmosphere/catalyst/reversible **or** equilibrium	1
	temperature of 450°C ± 50°	accept high/moderate temperature accept temperature of 450 (with no units) accept 450°C (without temperature) do **not** accept very high temperature	1
	pressure of 200 atmospheres	accept high pressure/200 atmospheres/pressure of 200/pressure of 100+	1
	iron is a catalyst	accept iron speeds up the reaction	1
	reaction is reversible/equilibrium	accept the idea that not all the nitrogen & hydrogen react/does not go to completion	1
total			6

3423/F Q13

	answers	extra information	mark
(a)	2 electrons transfer	accept diagrammatic answers only if they represent a clear explanation of what happens	1
	from magnesium/to oxygen	ignore charges on ions any reference to covalent bonding or sharing electrons = 0	1
(b)	ionic	accept electrovalent	1
(c)	electrostatic/attraction between (oppositely charged) ions	do **not** accept magnetic forces	1
total			4

3423/F Q14

	answers	extra information	mark
(a)	not all elements had been discovered/to allow for discovery of new elements (OWTTE)		1
(b)	noble/inert gases/group O	ignore group 8	1
(c)	71 – 75	allow 1 mark for:- (28 + 118) ÷ 2 **or** 60 – 70	2
(d)	germanium/Ge		1
total			5

3423/F Q15

	answers	extra information	mark
(a)	aluminium oxide	accept correct formula $A1_2O_3$	1
(b) (i)	anodising		1
(b) (ii)	the (aluminium) oxide coating is removed/dissolved	accept protective layer is removed/dissolved	1
(b) (iii)	positive/anode/+		1
(b) (iv)	oxygen	accept O_2 do **not** accept O	1
total			5

3423/F Q16

	answers	extra information	mark
(a)	a <u>mixture</u> of metals/a mixture of carbon and metals		1
(b)	the greater the amount of carbon the harder the steel	ignore brittle	1
(c)	chromium/nickel	accept chrome accept correct symbols	1
(d)	mass spectrometry/emission spectroscopy/absorption spectroscopy	accept flame photometer	1
total			4

3423/F Q17

	answers	extra information	mark
	Quality of written communication one mark for correct linking of ideas any **three** from • difficult to lather/forms scum (with soap) • water flows over/dissolves substances from rocks • calcium/magnesium (compounds) • addition of sodium carbonate/ion exchange	 accept calcium carbonate accept boiling/distillation	 1 3
total			4

3423/F Q18

	answers	extra information	mark
(a)	shale	accept (the one with) fossils/at the bottom/deepest	1
(b)	formed by currents **or** waves	some reference to <u>movement</u> of water needed do **not** accept erosion/rivers	1
(c)	sedimentary		1
total			3

3423/F Q19

<table>
<tr><th></th><th>answers</th><th>extra information</th><th>mark</th></tr>
<tr><td>(a)</td><td>aluminium is more reactive (than iron)/aluminium is higher in the reactivity series (than iron)/aluminium is higher than iron</td><td>accept converse</td><td>1</td></tr>
<tr><td>(b)</td><td>zinc is lower than calcium/is lower in the reactivity series/zinc is less reactive (than calcium)

cannot remove oxygen from calcium/cannot displace calcium</td><td>accept converse

no reaction is not sufficient</td><td>1

1</td></tr>
<tr><td>(c)</td><td><table><tr><td>They usually have high melting points.</td><td></td></tr><tr><td>They react very vigorously with water.</td><td>×</td></tr><tr><td>They are often used as catalysts in chemical reactions.</td><td></td></tr><tr><td>Their compounds are often coloured.</td><td></td></tr></table></td><td></td><td>1</td></tr>
<tr><td>total</td><td></td><td></td><td>4</td></tr>
</table>