



General Certificate of Secondary Education

Science: Double Award 3462/2F *Specification B*

Mark Scheme

2006 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.

Double Award (Co-ordinated) Foundation Tier 3462/2F

3462/2F Q1

question	answers	extra information	mark
(a)	sodium fizzes	apply the list principle to additional answers	1
	sodium moves around		1
	sodium sometimes melts		1
		after 3 marks deduct one mark for each additional tick	
(b)(i)	lower than sodium	accept low or very low (owtte) accept any position above Ag and below Na accept comparative reactivity answers do not accept at the bottom	1
(ii)	D		1
(c)	sodium nitrate + water	accept in any order accept circled within box do not accept sodium + nitrate do not accept formulae	2
total			7

3462/2F Q2

question	answers	extra information	mark
(a)	B		1
(b)	F		1
(c)	D		1
(d)	E		1
total			4

3462/2F Q3

question	answers	extra information	mark
(a)(i)	speeds it up (owtte)	accept answers such as ‘lowers activation energy’	1
(ii)	enzymes		1
(b)	lipases		1
	proteases		1
(c)	work at low temperatures or removes <u>stains</u> faster / better or removes <u>stains</u> that are difficult to remove by other means (owtte)	if stated must be below 40°C ignore reference to bacteria accept break down stains accept specific stains but not dirt do not accept gets washing whiter do not accept references to pollution / environment / cost	1
total			5

3462/2F Q4

question	answers	extra information	mark
(a)(i)	blistering		1
	reddening		1
(ii)	gloves / safety glasses / goggles / visor	ignore: overalls / apron / lab coat	1
(b)	hydroxide		1
(c)(i)	the metal will react / be dissolved / form a solution / gradually corrode away	<p>“it” = saucepan / metal</p> <p>accept answers in terms of production / evolution of H₂</p> <p>do not accept reference to rust</p> <p>(highly) reactive is insufficient</p> <p>ignore breakdown / wears away</p>	1
(ii)	burning splint / flame (owtte)		1
	pops (owtte)		1
total			7

3462/2F Q5

question	answers	extra information	mark
(a)(i)	magnesium	after two marks deduct one mark for each additional tick	1
	zinc		1
(ii)	corrode away / react with <u>air</u> and / or <u>water</u> / need to be replaced	accept dissolves “gets smaller” is insufficient ignore wears away / erodes do not accept rusts / rots / decays / decompose	1
(b)(i)	high in reactivity series / more reactive	accept high in reactivity (owtte) do not accept harder / stronger	1
(ii)	oxide	} can be in opposite order	1
	air		1
	water		1
total			7

3462/2F Q6

question	answers	extra information	mark
(a)	clockwise from top right argon / Ar nitrogen / N ₂ / N oxygen / O ₂ / O	1 mark for <u>all three</u> correctly placed any one incorrect – no mark (alphabetical order)(ArNO)	1
(b)		one mark for each correct line	1 1 1 1
total			5

3462/2F Q7

question	answers	extra information	mark
(a)	2 and 3	both for 1 mark	1
	2	accept less, more for 1 mark	
	4	accept less for 1 mark	1
(b)(i)	2 electrons on inner circle	accept 2, 1	1
	1 electron on outer circle		
(ii)	sodium	accept Na or circled in box	1
total			5

3462/2F Q8

question	answers	extra information	mark
(a)(i)	<u>heat</u> it	accept use a bunsen burner do not accept warm / evaporate	1
(ii)	water	accept H ₂ O	1
(iii)	white	accept circled in box	1
(b)(i)	add liquid / water to <u>anhydrous</u> / <u>white</u> copper sulphate		1
	it will turn blue		1
(ii)	increase		1
total			6

3462/2F Q9

question	answers	extra information	mark
(a)	accurate plotting of points ($\pm\frac{1}{2}$ square)	2 marks for all points 1 mark for 3 or 4 points accept if points cannot be seen and lines go through points	2
	sensible attempt at a smooth curve	may not be perfect but do not accept joining the dots ignore any extension before first point do not accept multiple lines that cover more than one large square	1
(b)(i)	75 seconds	accept answers correctly read from their graphs ($\pm \frac{1}{2}$ square) accept 73 to 77 without reference to graph	1
(ii)	rate doubles (owtte)	accept time halves accept speed doubles do not accept just gets faster etc. do not accept the rate of reaction takes half the time	1
(iii)	more particles (owtte)	n.b. they / them = particles accept molecules	1
	<u>more</u> collisions	max 1 mark for any reference to particles moving faster / gaining energy ignore reference to 'react'	1
total			7

3462/2F Q10

question	answers	extra information	mark
(a)(i)	broken down (owtte)	accept big molecules to small molecules or production of smaller molecules do not accept separated do not accept cracking / breaking down to elements do not accept mention of oxygen ignore decompose / decomposed	1
	by heat / high temperature	(owtte)	1
(ii)	carbon dioxide	accept CO ₂ do not accept CO ² , Co ₂ (apply halfway rule for O and ₂)	1
(iii)	to mix the reactants (owtte)	accept to increase rate of reaction accept idea of movement accept 'so that the reactants are heated evenly' (owtte) accept to ensure complete reaction	1
(b)(i)	coke	accept carbon / C do not accept coal / charcoal	1
	iron	accept Fe / pig iron / cast iron do not accept FE ignore references to solid / molten etc.	1
(ii)	oxygen removed (owtte)	accept gains electrons accept decrease in oxidation number / state do not accept oxide removed	1

Continued

3462/2F Q11

question	answers	extra information	mark
(a)	<p>Science marks</p> <p>any three from:</p> <ul style="list-style-type: none"> • inert / unreactive • not broken down / decomposed / non-biodegradable • by micro-organisms • causes litter • problems of waste disposal e.g. landfill • difficult to recycle • incineration / burning causes problems such as (air) pollution <p>QoWC</p> <p>1 mark which is awarded for the use of one of the following scientific words:</p> <ul style="list-style-type: none"> • (non-) biodegradable • micro-organism / bacteria • inert / unreactive • decomposed • toxic / poisonous 	<p>accept flooding (in India) by blocked drains</p> <p>accept does not rot / decay / disintegrate</p> <p>ignore erode and corrode</p> <p>must be linked to not broken-down</p> <p>can be implied</p> <p>must be linked to incineration</p> <p>annotate Q✓ or Q✗</p> <p>word must be used in correct context</p> <p>must be linked to air pollution</p>	<p>3</p> <p>1</p>

Continued

3462/2F Q11

question	answers	extra information	mark
(b)	any two from: <ul style="list-style-type: none"> • plastic tar is harder (than ordinary tar) • plastic tar has better resistance to water penetration (than ordinary tar) • plastic tar lasts longer (than ordinary tar) • using plastic waste to make plastic tar means less has to be disposed of in other ways i.e. buried / burned • plastic is recycled 	ignore cost / strength ignore saving tar or bitumen accept more waterproof accept it causes less pollution accept makes use of a waste product	2
total			6

3462/2F Q12

question	answers	extra information	mark
(a)	152	56 + 32 + (4 × 16) for 1 mark	2
(b)	36.8%	accept 37% / 36.84% etc accept error carried forward from (a) accept 36% for 1 mark or 56 / 152 × 100 (56 / (a) × 100) for 1 mark	2
(c)	7.3 to 7.4	accept error carried forward from (b) e.g. 36 → 7.2 20 × 36.84 / 100 (20 × (b) / 100) for 1 mark	2
total			6

3462/2F Q13

question	answers	extra information	mark
(a)	any three sensible properties e.g. transition elements are metals TM high melting points / boiling points TM hard / strong TM conduct electricity TM conduct heat TM sonorous TM ductile TM malleable TM high density TM are catalysts TM form positive ions	they = transition elements ignore references to colours ignore other chemical properties / reactivity if point is not made for TM accept converse for halogens accept halogens are diatomic / molecular / covalent ignore halogens form covalent <u>compounds</u> / bonds ignore electrons ignore solid	3
(b)(i)	hydrogen forms a 1+ ion	accept form a positive ion accept one electron in outer shell	1
(ii)	any one from: <ul style="list-style-type: none"> • can form 1– ion • forms diatomic molecule (owtte) or small molecule or molecular • (very) low boiling point/ melting point / gas • only needs one electron to fill outer shell • non metal • any other general property of non-metals 	accept form a negative ion ignore has covalent bonds	1
total			5

3462/2F Q14

question	answers	extra information	mark
	action by water running over the surface (owtte) on a beach / mud flats / river / under water etc	currents / waves / tides ignore action of wind any place where water may run over the sediment accept seabed do not accept rock	1 1
total			2

3462/2F Q15

question	answers	extra information	mark
(a)(i)	2	accept multiples i.e. 2, 4, 2, 2 any other numbers / symbols lose the mark	1
(ii)	warm / heat acid / mixture	do not accept heat MgO	1
	add MgO or mix together acid and MgO		1
	until no more will react	accept dissolve	1
	filter (off excess MgO)		1
	QoWC mark: awarded for getting any two steps in the correct not necessarily consecutive order	annotate Q✓ or Q✗	1
(b)(i)	magnesium / ions / it / they are <u>positive</u> / Mg ²⁺	accept magnesium ions / it / they gain electrons	1
	so are attracted / go / move to the negative electrode / cathode	from the negative electrode	1
(ii)	kill / destroy bacteria / microbes / germs etc.	accept disinfect / sterilise ignore purify / clean / get rid of bacteria n.b. kills bacteria and removes impurities = 0 marks	1
total			9