



General Certificate of Secondary Education

Science: Double Award (Modular)

3468/2F

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.

3468/2F Q1

	answers	extra information	mark
(a)	(long) roots		1
(b)	prevents water from evaporating	accept to reduce/stop water loss	1
total			2

3468/2F Q2

	answers	extra information	mark
(a)	any three from building quarrying farming 'dumping' waste	accept building of houses, roads, power stations	3
total			3

3468/2F Q3

	answers	extra information	mark
(a)	any three from: space water nutrients light carbon dioxide	accept land, room accept rain accept fertilisers, nitrates, minerals do not accept food do not accept just sun	3
(b)	herbicides		1
total			4

3468/2F Q4

question	answers	extra information	mark
	Quality of Written Communication 1 mark for correct sequencing burning → named gas → correct environmental problem		1
	any three from: coal / fossil fuel is <u>burned</u> (water vapour and carbon dioxide and) sulphur dioxide formed (gases) dissolve / react in rain make acid rain damages trees makes rivers /lakes acidic	accept nitrogen oxides accept dissolve / react in water vapour accept harms plants or animals or damage to buildings accept carbon dioxide is a greenhouse gas / causes global warming for 2 marks	3
total			4

3468/2F Q5

question	answers	extra information	mark
(a)		all three lines correct 2 marks one line or two lines correct 1 mark	2
(b)(i)	heat	accept thermal energy or energy (light is neutral)	1
(b)(ii)	oxygen magnesium oxide		1 1
total			5

3468/2F Q6

question	answers	extra information	mark
(a)	sugar		1
	alcohol		1
	carbon dioxide		1
	limewater		1
(b)	reversible	accept a correct description	1
(c)(i)	4 and 1	both answers must be correct	1
(ii)	53.5	if incorrect relative formula mass allow 1 mark for correct working accept e.c.f. from c(i) for 2 marks	2
total			8

3468/2F Q7

question	answers	extra information	mark
(a)(i)	the pushing force balanced by the friction	accept the pushing force equals friction or pushing force is too small or frictional force is too great	1
(ii)	any two from an unbalanced force acts on the model bus the model bus moves in same direction as pushing force and will speed up	accept forwards	2
(iii)	force (applied) distance (moved)	any order	1 1
(b)(i)	car is travelling fast driver has been drinking alcohol ice on the road		1 1 1
(ii)	tyres and road / ground		1
total			9

3468/2F Q8

question	answers	extra information	mark
(a)	equator spins sending messages		1 1 1
(b)	they would interfere with each other's signals		1
total			4

3468/2F Q9

question	answers	extra information	mark
(a)	carbon	any order	1
	hydrogen		1
(b)	fractional	accept description <ul style="list-style-type: none"> • heat or evaporate / boil (1mark) • separated when they condense or by boiling points (1 mark) 	1
	distillation		1
(c)	alkenes	accept names or unsaturated hydrocarbons	1
total			5

3468/2F Q10

question	answers	extra information	mark
(a)	20	accept twenty	1
(b)	correct division 35/15	accept smaller area labelled oil	1
	larger area labelled coal		1
(c)	can be started up very quickly		1
(d)(i)	carbon dioxide		1
(ii)	sulphur dioxide	accept nitrogen oxides	1
total			6

3468/2F Q11

question	answers	extra information	mark
(a)	all bars correct for greenfly, ladybird (\pm one square) and blackbird (less than one square)		1
	bars are centred	do not accept pyramid shape if all to left or right of centre	1
	bars are labelled (in correct sequence)		1
(b)	$\frac{1}{12}$ or 8.3% or 1:12	if answer is incorrect accept correct working out (eg $\frac{50}{600}$) for 1 mark accept 12 or 12:1 for 1 mark accept 8.3 for 1 mark (without %)	2
total			5

3468/2F Q12

question	answers	extra information	mark
(a)(i)	photosynthesis		1
(ii)	respiration	'anaerobic' is neutral	1
(iii)	microorganisms	accept microbes, bacteria, fungi, decomposers or any named microorganism	1
(b)	indication that carbon dioxide emissions contribute to global warming	accept 'greenhouse effect' for global warming	1
	argument for: in terms of decreases carbon dioxide emissions because less (fuel / energy used for) transport / imports		1
	argument against: in terms of increases carbon dioxide emissions because of (fuel / energy used for) heating and lighting greenhouses		1
total			6

3468/2F Q13

question	answers	extra information	mark
(a)	ammonium nitrate	accept NH_4NO_3 do not accept ammonia nitrate	1
(b)	different reactions need different catalysts		1
(c)	they are used over and over again	accept they are reused accept they are not used up accept they are not changed recycling is neutral	1
(d)	any two from they speed up reactions they reduce energy requirements they reduce costs	accept allow reactions to take place at a lower temperature accept make process more economic	2
(e)	(high pressure) increases the frequency of collisions	accept more collisions move faster is neutral	1
	this increases the rate of reaction	accept 'more successful collisions' for 2 marks	1
total			7

3468/2F Q14

question	answers	extra information	mark
	use less nitrate / fertiliser	accept use none	1
	any two from: explanation that with less or none the crops still grow make more land available to grow more crops monitoring of water legislation organic farming / manure genetically modified crops give babies bottled water	use a different fertiliser is neutral prevent nitrate fertiliser run off is neutral	2
total			3

3468/2F Q15

question	answers	extra information	mark
	use of any four as evidence from water oxygen soil experiment meteorite Earth's early atmosphere was similar to Mars' present atmosphere	accept argument for and / or against life on Mars	4
total			4

3468/2F Q16

	answers	extra information	mark
(a)(i)	acceleration / speeding up	do not accept acceleration increases	1
(ii)	constant / steady velocity	accept constant / steady speed	1
(b)	10 m/s ² or ms ⁻²	reject ms ² if answer not correct then allow 1 mark for acceleration = $\frac{\text{change in velocity}}{\text{time taken for change}}$ and allow 1 mark for <u>40(m/s)</u> 4(s)	3 1
total			6

3468/2F Q17

question	answers	extra information	mark
(a)	variable resistor	accept rheostat	1
(b)	voltmeter		1
(c)	straight line correct between 0.2 and 0.8	if line incorrect, or no line, and correct plots 0.2 to 0.8 award 1 mark	2
(d)	diode / rectifier		1
total			5

3468/2F Q18

question	answers	extra information	mark
	<p>Quality of written communication: 1 mark for correct sequencing</p> <p>magnet in produces voltage / current → magnet out produces voltage / current → in opposite direction</p> <p>any three from:</p> <p>magnet moved to coil / coil moved to magnet</p> <p>produces a current / voltage</p> <p>correct reference to induction</p> <p>magnet moved from coil / coil moved from magnet</p> <p>produces current / voltage</p> <p>correct reference to reversal of current / voltage</p>		1
			3
total			4