

Science A (Twenty First Century)

General Certificate of Secondary Education **J630**

Mark Scheme for the Units

January 2009

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by Examiners. It does not indicate the details of the discussions which took place at an Examiners' meeting before marking commenced.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

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GCSE Science A Twenty First Century (J630)

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Guidance for Examiners

1. Mark strictly to the mark scheme.
2. Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise.
3. Each separate marking point is indicated by a (1) at the end of that marking point.
4. Abbreviations, annotations and conventions used in the detailed Mark Scheme:

ORA	= or reverse argument
NOT	= point that is not given credit
AW/owtte	= alternative wording/or words to that effect: allow any expression that is clearly equivalent
/	= alternative and acceptable answers for the same marking point
<u>point</u>	= point must be present to gain the mark
(description)	= description which need not be present to gain the mark

E.g.

mark scheme shows 'work done in lifting / (change in) gravitational potential energy'
work done = 0 marks
work done lifting = 1 mark
change in potential energy = 0 marks
gravitational potential energy = 1 mark

5. If a candidate alters his/her response, examiners should accept the alteration.
6. The list principle: if a list of responses greater than the number requested is given, you work through the list from the beginning. Award one mark for each correct response, ignore any neutral response, and deduct one mark for any incorrect response, i.e. one which has an error of science. If the number of incorrect responses is equal to or greater than the number of correct responses, no marks are awarded. A neutral response is correct but irrelevant to the question.
7. If an answer is crossed out but not replaced, mark the crossed out answer.

A211/01 Modules B1, C1, P1 Foundation

Question		Expected Answers	Marks	Rationale
1	a	<p style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> nucleus <input checked="" type="checkbox"/> (1) </p>	1	if more than one box ticked, no mark
	b	<p style="text-align: center;"> <input type="checkbox"/> 1 <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </p>	1	if more than one box ticked, no mark
	c	<p style="text-align: center;"> <input type="checkbox"/> only one parent was involved <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> </p>	1	if more than one box ticked, no mark

Question			Expected Answers	Marks	Rationale									
1	d	i	male ZZ (1) <div style="text-align: center;"> <table border="1" style="margin: auto;"> <tr> <td></td> <td style="background-color: #cccccc;">W</td> <td style="background-color: #cccccc;">Z</td> </tr> <tr> <td style="background-color: #cccccc;">Z</td> <td style="background-color: #cccccc;">WZ</td> <td>ZZ</td> </tr> <tr> <td style="background-color: #cccccc;">Z</td> <td style="background-color: #cccccc;">WZ</td> <td>ZZ</td> </tr> </table> </div> (1)		W	Z	Z	WZ	ZZ	Z	WZ	ZZ	2	1 mark for male ZZ 1 mark for both boxes in grid ZZ
	W	Z												
Z	WZ	ZZ												
Z	WZ	ZZ												
		ii	<div style="text-align: center;"> <table style="border-collapse: collapse;"> <tr><td style="border: 1px solid black; width: 20px; height: 20px;"></td></tr> <tr><td style="border: 1px solid black; width: 20px; height: 20px;"></td></tr> <tr><td style="border: 1px solid black; width: 20px; height: 20px; text-align: center;">✓</td></tr> <tr><td style="border: 1px solid black; width: 20px; height: 20px;"></td></tr> <tr><td style="border: 1px solid black; width: 20px; height: 20px;"></td></tr> </table> 1:1 (1) </div>			✓			1	if more than one box ticked, no mark				
✓														
	e		males XY females XX	1	both required for 1 mark									
Total				7										

Question		Expected Answers	Marks	Rationale						
2	a	<p style="text-align: center;">T (true) or F (false)</p> <p>statement</p> <p>... made of DNA. <input type="checkbox"/> T</p> <p>... instructions to make DNA. <input type="checkbox"/> F</p> <p>... instructions to make proteins. <input type="checkbox"/> T</p> <p>... made of chromosomes. <input type="checkbox"/> F</p> <p>... found in chromosomes. <input type="checkbox"/> T</p>	2	<p>all five correct = 2 marks three or four correct = 1 mark two or less = 0 marks</p> <p>accept tick for T and cross for F reject blank for F</p>						
	b	4 (1)	1							
	c	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>for testing</th> <th>against testing</th> </tr> </thead> <tbody> <tr> <td>Yasmin</td> <td>Jon</td> </tr> <tr> <td>Sanath</td> <td>Chloe</td> </tr> </tbody> </table>	for testing	against testing	Yasmin	Jon	Sanath	Chloe	2	<p>4 correct = 2 marks 2 or 3 correct = 1 mark 1 correct = 0 marks</p>
for testing	against testing									
Yasmin	Jon									
Sanath	Chloe									
Total			5							

Question	Expected Answers	Marks	Rationale
3	<p>Stem cells are ...</p> <p>... made from heart cells that ...</p> <p>... specialised cells that ...</p> <p>... unspecialised cells that ...</p> <p>... can grow into new tissue types to ...</p> <p>... have many jobs to do and ...</p> <p>... produce new valves to treat disease.</p>	2	<p>1 mark for ... unspecialised cells that ...</p> <p>1 mark for ... can grow into new tissue types to ...</p>
Total		2	

Question		Expected Answers	Marks	Rationale	
4	a	<p>They will reduce air pollution in towns <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	1	if more than one box ticked, no mark	
	b	i	<p><input type="checkbox"/></p> <p>hydroelectric power station <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	1	if more than one box ticked, no mark
	b	ii	<p><input type="checkbox"/></p> <p>use low energy light bulb <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>insulate his house <input checked="" type="checkbox"/> (1)</p>	2	each extra tick beyond 2, deduct 1 mark
Total			4		

Question		Expected Answers	Marks	Rationale	
5	a		2	<p>all three lines correct = 2 marks</p> <p>2 or 1 line(s) correct = 1 mark</p>	
	b	i		1	if more than one indicated, no mark
		ii	water (1)	1	if more than one indicated, no mark
Total			4		

Question		Expected Answers	Marks	Rationale
6	a	Bridge Street (1)	1	if more than one street indicated, no mark
		... is not trapped by buildings <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1	if more than one box ticked, no mark
	b	70 - 124 (1)	1	both numbers needed allow 124 - 70
	c	i	2	1 mark for each correct answer accept either order
		ii	1	
Total			6	

Question		Expected Answers	Marks	Rationale
7	a	<div style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Edward <input checked="" type="checkbox"/> (1) </div>	1	if more than one box ticked, no mark
	b	<div style="text-align: center;"> Alex <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> Dan <input checked="" type="checkbox"/> (1) <input type="checkbox"/> </div>	2	each extra tick beyond 2, deduct 1 mark
	c	<div style="text-align: center;"> <input type="checkbox"/> Bernie <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div>	1	if more than one box ticked, no mark

Question		Expected Answers	Marks	Rationale
7	d	Alex <input checked="" type="checkbox"/> Bernie <input checked="" type="checkbox"/> <input type="checkbox"/> Dan <input checked="" type="checkbox"/> <input type="checkbox"/>	2	three correct ticks = 2 marks two correct ticks = 1 mark each extra tick beyond 3, deduct 1 mark
Total			6	
8		<p>Helium...</p> <p>Hydrogen...</p> <p>... is the 'fuel that is powering our Sun.</p> <p>...in the Universe before there were any stars.</p> <p>...is made inside stars.</p>	2	hydrogen - linked to top two boxes only = 1 mark helium - linked to one or both of bottom two boxes only = 1 mark
Total			2	

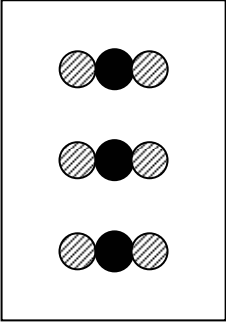
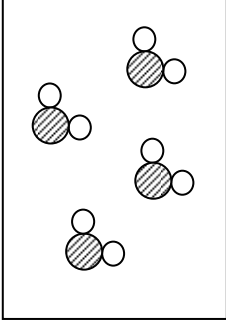



Question		Expected Answers	Marks	Rationale	
9	a	<div style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> Alfred Wegener <input checked="" type="checkbox"/> (1) </div>	1	if more than one box ticked, no mark	
	b	i	A (1) D (1)	2	1 mark each each extra letter beyond 2, deduct 1 mark
		ii	C (1)	1	
	c	i	2 and 4 (1)	1	both required for 1 mark
		ii	<div style="text-align: center;"> <input type="checkbox"/> fossils <input checked="" type="checkbox"/> (1) <input type="checkbox"/> </div>	1	
Total			6		

A211/02 Modules B1, C1, P1 Higher

Question			Expected Answers	Marks	Rationale									
1	a	i	male ZZ (1) <div style="text-align: center;"> <table border="1" style="margin: auto;"> <tr> <td></td> <td style="background-color: #cccccc;">W</td> <td style="background-color: #cccccc;">Z</td> </tr> <tr> <td style="background-color: #cccccc;">Z</td> <td>WZ</td> <td>ZZ</td> </tr> <tr> <td style="background-color: #cccccc;">Z</td> <td>WZ</td> <td>ZZ</td> </tr> </table> </div> (1)		W	Z	Z	WZ	ZZ	Z	WZ	ZZ	2	1 mark for male ZZ 1 mark for both boxes in grid ZZ
	W	Z												
Z	WZ	ZZ												
Z	WZ	ZZ												
		ii	1:1 (1)	1	allow 1/2 or 0.5 or 50% or 2:2 or 50:50 any correct ratio									
	b		WW, ZZ <div style="text-align: center;"> <table style="border-collapse: collapse;"> <tr><td style="border: 1px solid black; width: 20px; height: 20px;"></td></tr> <tr><td style="border: 1px solid black; width: 20px; height: 20px;"></td></tr> <tr><td style="border: 1px solid black; width: 20px; height: 20px; text-align: center;">✓</td></tr> <tr><td style="border: 1px solid black; width: 20px; height: 20px;"></td></tr> <tr><td style="border: 1px solid black; width: 20px; height: 20px;"></td></tr> </table> </div> (1)			✓			1	more than one tick = no marks allow any correct indication of choice e.g. WW, ZZ circled or cross rather than tick				
✓														
	c		Y (1) testes (1) ovaries (1)	3	allow SRY (sex determining region of Y chromosome) allow testicles allow ovary / female sex organs									
Total				7										

Question		Expected Answers	Marks	Rationale
2	a	<p style="text-align: center;">T (true) or F (false)</p> <p>statement</p> <p>... made of DNA. <input type="checkbox"/> T</p> <p>... instructions to make DNA. <input type="checkbox"/> F</p> <p>... instructions to make proteins. <input type="checkbox"/> T</p> <p>... made of chromosomes. <input type="checkbox"/> F</p> <p>... found in chromosomes. <input type="checkbox"/> T</p>	2	<p>all five correct = 2 marks three or four correct = 1 mark two or less = 0 marks</p> <p>accept tick for T and cross for F reject blank for F</p>
	b	diet (1)	1	
	c	<pre> graph LR A[therapeutic cloning] --- B[help select embryos] C[gene therapy] --- D[replaces faulty alleles] E[pre-implantation genetic diagnosis] --- F[produces stem cells for treatment] </pre>	2	<p>count the number of left hand boxes which are correctly linked all three correct = 2 marks one or two correct = 1 mark</p> <p>more than one line from a box on the left means that box is incorrect</p>

Question		Expected Answers	Marks	Rationale
2	d		2	<p>count the number of left hand boxes which are correctly linked all three correct = 2 marks one or two correct = 1 mark</p> <p>more than one line from a box on the left means that box is incorrect</p>
Total			7	

Question		Expected Answers	Marks	Rationale
3	a	hydrocarbon (1)	1	
	b	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>carbon dioxide</p> </div> <div style="text-align: center;">  <p>water</p> </div> </div>	3	<p>number and type of atoms in carbon dioxide correct = 1 mark</p> <p>accept </p> <p>accept  for </p> <p>similarly accept circle with O in for circle with diagonal lines and circle with H for open circle</p> <p>number and type of atoms in water correct = 1 mark</p> <p>number of molecules in both boxes correct = 1 mark</p>
	c	carbon monoxide (1) soot / carbon / particulate carbon / particulate(s) (1)	2	<p>answers in either order</p> <p>accept CO for carbon monoxide if both clearly capital letters</p> <p>reject Co</p> <p>accept C for carbon (should be capital C)</p>
	d	<p style="text-align: right;">carbon is soluble <input checked="" type="checkbox"/> (1)</p> <p style="text-align: right;"><input type="checkbox"/></p> <p>... increases the rate of photosynthesis <input checked="" type="checkbox"/> (1)</p> <p style="text-align: right;"><input type="checkbox"/></p> <p style="text-align: right;"><input type="checkbox"/></p>	2	<p>note point 7 in Guidance for Examiners</p> <p>if more than two ticks lose a mark for each extra tick</p>
Total			8	

Question		Expected Answers	Marks	Rationale
4	a	70 - 124 (1)	1	both numbers needed allow 124 - 70
	b	i	2	1 mark for each correct answer accept either order
		ii	1	
	c	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 100px; height: 50px; margin-bottom: 10px;"></div> <div style="border: 1px solid black; width: 100px; height: 50px; margin-bottom: 10px;"></div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 100px; height: 50px; margin-bottom: 10px;"> real difference in NO₂ between Bridge and Mill St </div> <div style="border: 1px solid black; width: 100px; height: 50px; margin-bottom: 10px;"></div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 100px; height: 50px; margin-bottom: 10px;"></div> <div style="border: 1px solid black; width: 100px; height: 50px; margin-bottom: 10px;"></div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 100px; height: 50px; margin-bottom: 10px;"></div> <div style="border: 1px solid black; padding: 5px; width: 100px; height: 50px; margin-bottom: 10px;"> range for Bridge St outside range for Mill St </div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 100px; height: 50px; margin-bottom: 10px;"></div> <div style="border: 1px solid black; width: 100px; height: 50px; margin-bottom: 10px;"></div> </div>	2	1 mark for 2nd box on left 1 mark for 4 th box on right more than one line between boxes on the left and right = no marks
Total			6	

Question		Expected Answers	Marks	Rationale
5	a	<p>Alex <input checked="" type="checkbox"/></p> <p>Bernie <input checked="" type="checkbox"/></p> <p><input type="checkbox"/></p> <p>Dan <input checked="" type="checkbox"/></p> <p><input type="checkbox"/></p>	2	<p>note that for Claire and Edward a blank box is a correct response, accept a cross.</p> <p>five correct responses = 2 marks</p> <p>three or four correct responses = 1 mark</p>
	b	<p>Alex <input checked="" type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>Dan <input checked="" type="checkbox"/></p> <p><input type="checkbox"/></p>	1	<p>tick by both Alex and Dan one mark (1)</p> <p>more than two ticks no marks</p>
	c	<p>Claire (1)</p> <p>Edward (1)</p>	2	<p>one mark per correct tick</p> <p>for each additional tick, beyond two, lose a mark</p>

Question		Expected Answers	Marks	Rationale
5	d	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;"><input type="checkbox"/></div> <div style="margin-bottom: 10px;">Bernie <input checked="" type="checkbox"/></div> <div style="margin-bottom: 10px;">Claire <input checked="" type="checkbox"/></div> <div style="margin-bottom: 10px;"><input type="checkbox"/></div> <div><input type="checkbox"/></div> </div>	1	tick or any other clear indication of choice by Bernie and Claire only both needed for 1 mark
Total			6	
6		<p>The diagram consists of two boxes on the left: 'Helium ...' (top) and 'Hydrogen ...' (bottom). On the right, there are three boxes: '... is the 'fuel that is powering our Sun.' (top), '...in the Universe before there were any stars.' (middle), and '...is made inside stars.' (bottom). Solid lines connect 'Helium ...' to the top and middle boxes, and 'Hydrogen ...' to the middle and bottom boxes. Dashed lines connect 'Helium ...' to the bottom box and 'Hydrogen ...' to the top box.</p>	2	hydrogen - linked to top two boxes only = 1 mark helium - linked to one or both of bottom two boxes only 1 mark
Total			2	

Question			Gd	Expected Answers	Marks	Rationale						
7	a	i	D	4 (1)	1							
		ii	CB	1 (1) and 5 (1)	2	one mark for each answers can be in either order						
	b		B	<p style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> South America and Africa <input checked="" type="checkbox"/> (1) <input type="checkbox"/> </p>	1	No mark if more than one tick						
	c		BA	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="background-color: #cccccc;">B</td> <td>E</td> <td>D</td> <td>F</td> <td>A</td> <td style="background-color: #cccccc;">C</td> </tr> </table>	B	E	D	F	A	C	2	E before D = 1 mark F before A but after D = 1 mark
B	E	D	F	A	C							
				Total	6							

A212/01 Modules B2, C2, P2 Foundation

Question		Expected Answers			Marks	Rationale																		
1	a			<table border="1"> <thead> <tr> <th>material</th> <th>synthetic</th> <th>made from living things</th> </tr> </thead> <tbody> <tr> <td>cotton</td> <td></td> <td>✓</td> </tr> <tr> <td>paper</td> <td></td> <td>✓</td> </tr> <tr> <td>poly(ethene)</td> <td>✓</td> <td></td> </tr> <tr> <td>PVC</td> <td>✓</td> <td></td> </tr> <tr> <td>silk</td> <td></td> <td>✓</td> </tr> </tbody> </table>	material	synthetic	made from living things	cotton		✓	paper		✓	poly(ethene)	✓		PVC	✓		silk		✓	3	<p>all five correct = 3 marks 4 or 3 correct = 2 marks 2 or 1 correct = 1 mark</p>
material	synthetic	made from living things																						
cotton		✓																						
paper		✓																						
poly(ethene)	✓																							
PVC	✓																							
silk		✓																						
	b			<p>The diagram consists of four boxes on the left and four on the right. Lines connect the boxes as follows: the top-left box to the top-right box, the middle-left box to the bottom-right box, the bottom-left box to the middle-right box, and the bottom-right box to the top-right box. The top-left box and the middle-right box are shaded grey.</p>	2	<p>3 lines correct = 2 marks 1 or 2 lines correct = 1 mark</p> <p>if any left-hand box has more than one line coming from it, ignore all those lines</p>																		

Question			Expected Answers	Marks	Rationale
1	c	i	<div style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> melting point <input checked="" type="checkbox"/> (1) </div>	1	no extra ticks allowed
1	c	ii	<div style="text-align: center;"> <input type="checkbox"/> flexibility <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> </div>	1	no extra ticks allowed
		iii	A (1)	1	
		iv	<div style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> It does not break easily. <input checked="" type="checkbox"/> (1) </div>	1	no extra ticks allowed
Total				9	

Question		Expected Answers	Marks	Rationale	
2	a	<p>The starting temperatures were different</p> <p style="text-align: right;"> <input type="checkbox"/> <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> </p>	1	no extra ticks allowed	
	b	i	32 - 38 (1)	1	allow 38 to 32
		ii	35 (1)	1	
		iii	<p>... best estimate of the true value</p> <p style="text-align: right;"> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> (1) <input type="checkbox"/> </p>	1	no extra ticks allowed
	c	<p>The starting temperature is the same.</p> <p style="text-align: right;"> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> (1) <input type="checkbox"/> </p> <p>The amounts of wool and fleece are the same.</p> <p style="text-align: right;"> <input checked="" type="checkbox"/> (1) </p>	2	one mark for each correct tick if three ticks present, deduct one mark more than three ticks = 0 marks	
Total			6		

Question			Expected Answers	Marks	Rationale
3	a	i	<u>photon</u> (s) (1)	1	allow photon, UV photon, UVA photon, UVB photon the word 'photon' is essential, however spelled
		ii	(uv) filter (1)	1	not sunscreen (also has reflector) unless qualified e.g. 'acts as filter'
		iii	reflect(s) (1)	1	allow titanium dioxide (not just titanium) or white powder
	b		Put fresh sunscreen on more often <input checked="" type="checkbox"/> (1) <input type="checkbox"/> Don't stay out too long in the Sun ... <input checked="" type="checkbox"/> (1) <input type="checkbox"/>	2	one mark for each correct tick if three ticks present, deduct one mark more than three ticks = 0 marks
	c		Ultraviolet radiation is ionising <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1	no extra ticks allowed
Total				6	

Question		Expected Answers				Marks	Rationale
4	a		statement	Dr Round	Prof Price	neither	both
			Carbon dioxide ...		✓		
			Some data show the Earth ...	✓			
			... has never gone up at all.			✓	
			... has gone up at some time.				✓
					4	each correct row = 1 mark ignore any row with more than one indication of choice unless extra ones are clearly crossed out	
	b		factor	outcome	correlation	caused	
			burning fuel	CO ₂ increases	✓	✓	
			CO ₂ in atmosphere	global warming	✓		
			industrial & agri dust	global warming	✓		
					3	each correct row = 1 mark	
		Total				7	

Question			Expected Answers	Marks	Rationale
5	a	i	immune (1)	1	
		ii	white blood cells (1)	1	
	b	i	D (1)	1	
		ii	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; justify-content: space-around; width: 100%;"> <div style="border: 1px solid black; padding: 2px; text-align: center;">... recognised quickly</div> <div style="border: 1px solid black; padding: 2px; text-align: center;">... produced quickly</div> </div> <div style="display: flex; justify-content: space-around; width: 100%; margin: 10px 0;"> <div style="border: 1px solid black; padding: 2px; text-align: center;">... different micro ...</div> <div style="border: 1px solid black; padding: 2px; text-align: center;">... recognised slowly</div> <div style="border: 1px solid black; padding: 2px; text-align: center;">... produced slowly</div> <div style="border: 1px solid black; padding: 2px; text-align: center;">... and then gets better.</div> </div> <div style="display: flex; justify-content: space-around; width: 100%;"> <div style="border: 1px solid black; padding: 2px; text-align: center;">... not recognised</div> <div style="border: 1px solid black; padding: 2px; text-align: center;">... not produced</div> </div> </div>	2	middle box in 2 nd column = 1 mark middle box in 3 rd column = 1 mark if either column has more than one box indicated, ignore that column
Total				5	
6	a		bacteria <input checked="" type="checkbox"/> (1) fungi <input checked="" type="checkbox"/> (1) <input type="checkbox"/>	1	both ticks correct and no extra tick = 1 mark
		b	<div style="border: 1px solid black; padding: 5px; display: flex; justify-content: space-around; width: 100%;"> B C A E D </div>	3	C anywhere before A = 1 mark A anywhere before E = 1 mark E anywhere before D = 1 mark e.g. (B)DACE gets 1 for 'A before E' if any letter is used twice, ignore it each time
Total				4	

Question		Expected Answers	Marks	Rationale																		
7	a	<p>... evaluate the methods used. <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p>... evaluate the analysis of the results. <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	2	<p>one mark for each correct tick</p> <p>if three ticks present, deduct one mark</p> <p>more than three ticks = 0 marks</p>																		
	b	<table border="1"> <thead> <tr> <th>factor</th> <th>increase</th> <th>decrease</th> </tr> </thead> <tbody> <tr> <td>cigarette smoking</td> <td>✓</td> <td></td> </tr> <tr> <td>regular moderate exercise</td> <td></td> <td>✓</td> </tr> <tr> <td>poor diet</td> <td>✓</td> <td></td> </tr> <tr> <td>stress</td> <td>✓</td> <td></td> </tr> <tr> <td>excessive alcohol drinking</td> <td>✓</td> <td></td> </tr> </tbody> </table>	factor	increase	decrease	cigarette smoking	✓		regular moderate exercise		✓	poor diet	✓		stress	✓		excessive alcohol drinking	✓		3	<p>all 5 rows correct = 3 marks</p> <p>4 or 3 row correct = 2 marks</p> <p>2 or 1 row correct = 1 mark</p> <p>ignore any row with more than one tick</p>
factor	increase	decrease																				
cigarette smoking	✓																					
regular moderate exercise		✓																				
poor diet	✓																					
stress	✓																					
excessive alcohol drinking	✓																					
		Total	5																			

A212/02 Modules B2, C2, P2 Higher

Question		Expected Answers	Marks	Rationale	
1	a	<p>The starting temperatures ...</p> <div style="display: flex; align-items: center; justify-content: center;"> <input type="checkbox"/> <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> </div>	1	no extra ticks allowed	
	b	i	32-38 (1)	1	allow 38 to 32
		ii	35 (1)	1	
		iii	<p>... best estimate of the true value</p> <div style="display: flex; align-items: center; justify-content: center;"> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> (1) <input type="checkbox"/> </div>	1	no extra ticks allowed

Question			Expected Answers	Marks	Rationale
1	c	i	<pre> graph LR A[thicker ...] --- B[increases ...] A --- C[... stays the same] B --- D[... better than it is] C --- D E[smaller ...] --- F[decreases ...] E --- C F --- G[... worse than it is] C --- G </pre>	2	one mark for each correct line thicker - increases – better (1) smaller - decreases – worse (1)
		ii	<div style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> </div> <p>no difference because the ranges <input checked="" type="checkbox"/> (1)</p>	1	more than one tick = 0 marks
Total				7	

Question			Expected Answers	Marks	Rationale
2	a	i	<p>There are stronger forces ... <input type="checkbox"/></p> <p><input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>... structure is higher in hdpe <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p>	2	1 mark for each correct tick if 3 ticks present, deduct 1 mark more than 3 ticks = 0 marks
		ii	increased crystallinity (1)	1	allow crystallinity on its own accept cross-linking do not allow vulcanisation
	b	i	plasticiser (1)	1	allow mis-spellings if answer is clear
		ii	<p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>how long the PVC is in use <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p>	1	more than one tick = 0 marks

Question			Expected Answers	Marks	Rationale
2	b	iii	<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="width: 60%;"> <p>The energy released when they ...</p> <p>The need for burning other fuels ...</p> </div> <div style="width: 30%; text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> (1) </div> </div>	2	1 mark for each correct tick. if 3 ticks present, deduct 1 mark more than 3 ticks = 0 marks
Total				7	

3	a	i	cinnamate(s) / dibenzoylmethane(s) (1)	1	allow ozone/ozone layer allow mis-spellings if answer is clear.						
		ii	photochemistry (1)	1	do not allow protochemistry or protonchemistry allow mis-spellings if answer is clear.						
	b		<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="background-color: #cccccc;">B</td> <td>A</td> <td>E</td> <td>F</td> <td>C</td> <td>D</td> </tr> </table>	B	A	E	F	C	D	2	all correct = 2 marks only one pair of letters misplaced (transposed) = 1 mark
B	A	E	F	C	D						
	c	i	4 (1)	1							
		ii	1 (1)	1							
Total				6							

Question		Expected Answers				Marks	Rationale	
4	a					3	each correct row = 1 mark ignore any row with more than one indication of choice unless extras are clearly crossed out	
		statement	Dr Round	Prof Price	neither			both
		Carbon dioxide is ...		✓				
		There is evidence for ...						✓
Reducing carbon dioxide ...			✓					
	b					3	each correct row = 1 mark	
		factor	outcome	correlation	caused			
		burning fuel	carbon dioxide increase	✓	✓			
		CO ₂ increase in the ...	global warming	✓				
... dust in the atmosphere	global warming	✓						

Question			Expected Answers	Marks	Rationale												
4	c		<div style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> clear scientific theory ... <input checked="" type="checkbox"/> (1) </div>	1	more than one tick = 0 marks												
Total				7													
5	a	i	immune (1)	1	allow mis-spellings if answer is clear												
		ii	white blood cells (1)	1	allow macrophages allow mis-spellings if answer is clear												
	b		<div style="text-align: center;"> <table border="0" style="width: 100%;"> <tr> <td style="border: 1px solid black; padding: 5px; width: 15%;">... recognised quickly</td> <td style="border: 1px solid black; padding: 5px; width: 15%;">... produced quickly</td> <td colspan="2"></td> </tr> <tr> <td style="border: 1px solid black; padding: 5px; width: 15%;">... infected by a micro ...</td> <td style="border: 1px solid black; padding: 5px; width: 15%;">... recognised slowly</td> <td style="border: 1px solid black; padding: 5px; width: 15%;">... produced slowly</td> <td style="border: 1px solid black; padding: 5px; width: 15%;">... and then gets better.</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px; width: 15%;">... not recognised</td> <td style="border: 1px solid black; padding: 5px; width: 15%;">... not produced</td> <td colspan="2"></td> </tr> </table> </div>	... recognised quickly	... produced quickly			... infected by a micro recognised slowly	... produced slowly	... and then gets better.	... not recognised	... not produced			2	middle box in 2 nd column = 1 mark middle box in 3 rd column = 1 mark if either column has more than one box indicated, ignore that column
... recognised quickly	... produced quickly																
... infected by a micro recognised slowly	... produced slowly	... and then gets better.														
... not recognised	... not produced																
Total				4													

Question		Expected Answers	Marks	Rationale
6	a	<p>... evaluate the methods used. <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p>... evaluate the analysis ... <input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	2	one mark for each correct tick if three ticks present, deduct one mark more than three ticks = 0 marks
	b		3	all four lines correct = 3 marks three correct = 2 marks two correct = 1 mark
Total			5	

Question			Expected Answers	Marks	Rationale					
7	a		viruses (1)	1	do not allow examples of viruses alone allow mis-spellings if answer is clear					
	b	i	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="background-color: #cccccc;">B</td> <td>C</td> <td>A</td> <td>E</td> <td>D</td> </tr> </table>	B	C	A	E	D	1	all four correct = 1 mark
B	C	A	E	D						
		ii	<div style="text-align: right;"> <input type="checkbox"/> <input type="checkbox"/> This will clearly show any side ... <input checked="" type="checkbox"/> (1) <input type="checkbox"/> </div>	1	more than one tick = 0 marks					

Question			Expected Answers	Marks	Rationale
7	b	iii	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 100px; height: 60px; margin-bottom: 5px;"></div> <div style="border: 1px solid black; width: 100px; height: 60px; margin-bottom: 5px;"></div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 100px; height: 60px; margin-bottom: 5px;"></div> <div style="border: 1px solid black; width: 100px; height: 60px; margin-bottom: 5px;"></div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 100px; height: 60px; margin-bottom: 5px;"></div> <div style="border: 1px solid black; width: 100px; height: 60px; margin-bottom: 5px;"></div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 100px; height: 60px; margin-bottom: 5px;"></div> <div style="border: 1px solid black; width: 100px; height: 60px; margin-bottom: 5px;"></div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 100px; height: 60px; margin-bottom: 5px;">neither the doctor nor the patient ...</div> <div style="border: 1px solid black; width: 100px; height: 60px; margin-bottom: 5px;">... changes to symptoms reliably</div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 100px; height: 60px; margin-bottom: 5px;"></div> <div style="border: 1px solid black; width: 100px; height: 60px; margin-bottom: 5px;"></div> </div>	2	left hand box correct = 1 mark right hand box correct = 1 mark more than one line = 0 marks
	c		<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="width: 200px;">Genetic mutations can result in ...</div> <div style="text-align: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> (1) <input type="checkbox"/> </div> </div>	1	more than one tick = 0 marks
Total				6	

A213/01 Modules B3, C3, P3 Foundation

Question			Expected Answers	Marks	Rationale
1	a	i	<div style="text-align: right;"> <input type="checkbox"/> <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> </div> <p style="text-align: center;">more power, less CO₂</p>	1	accept any clear indication of choice no extra choices allowed
		ii	<div style="text-align: right;"> <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> </div> <p style="text-align: center;">coal burns, produces CO₂</p>	1	accept any clear indication of choice no extra choices allowed
	b		<div style="text-align: right;"> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input checked="" type="checkbox"/> (1) </div> <p style="text-align: center;">... release radioactive material</p> <p style="text-align: center;">Taking apart nuclear ...</p>	2	each correct tick = 1 mark if 3 ticks present, deduct one mark 4 or more ticks present = 0 marks
Total				4	

Question			Expected Answers	Marks	Rationale
2	a	i	1.6 (mSv) (1)	1	accept correct figures written into table check table if answer line is blank
		ii	0.7 to 10 (mSv) (1)	1	both numbers required, in either order
	b	i	outlier (1)	1	accept anomaly
		ii	<p style="text-align: right;"> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> </p> Grant working closer to reactor ... (1)	1	accept any clear indication of choice no extra choices allowed
		iii	indication of adding first 6 and dividing by 6 (1) 2.1 (mSv) (1)	2	if all 7 results are averaged to give a mean of 2.8 (mSv), give 1 mark even if no working shown 2.1 with no working gets 2 marks
Total				6	

Question		Expected Answers	Marks	Rationale
3	a	<p>... slight risk of cancer worthwhile</p> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> (1) <input type="checkbox"/>	1	accept any clear indication of choice no extra ticks allowed
	b	<p>radioactivity very small within ...</p> <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <p>family not as close to source</p> <input checked="" type="checkbox"/> (1)	2	each correct tick = 1 mark if 3 ticks present, deduct one mark 4 or more ticks present = 0 marks
	c	<p>... radioactive chemicals everyday</p> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> (1)	1	accept any clear indication of choice no extra ticks allowed.
Total			4	

Question		Expected Answers	Marks	Rationale
4	a	environmental conditions changed <input checked="" type="checkbox"/> (1) ... organisms in food web died out <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/>	2	each correct tick = 1 mark if 3 ticks present, deduct 1 mark 4 ticks present = 0 marks
	b	common (1) diverge (1) extinct (1)	3	accept any clear method of choice, e.g. underlining if one choice is circled and another underlined, mark circled choice
Total			5	
5		... results could not be repeated. <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ... only genetic variation passed on. <input checked="" type="checkbox"/> ... were growing more crops. <input checked="" type="checkbox"/>	2	any two points allow full marks if all three possible answers are ticked two correct ticks plus an extra incorrect tick = 1 mark four ticks = 0 marks
Total			2	

Question			Expected Answers	Marks	Rationale															
6	a	i	3 (1)	1	accept 1 , or both 1 and 3 accept any clear indication of choice, e.g. ringing number in list above answer line															
		ii	4 (1)	1	accept any clear indication of choice, e.g. ringing number in list above answer line															
	b		<div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; justify-content: space-around; width: 100%;"> <div style="border: 1px solid black; padding: 5px; text-align: center;">sustainable</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">biodiversity</div> </div> <div style="margin-top: 20px;"> <div style="border: 1px solid black; padding: 5px; width: 80%; margin-bottom: 10px;">variety of living things within and between species</div> <div style="border: 1px solid black; padding: 5px; width: 80%; margin-bottom: 10px;">using resources in the best most profitable way</div> <div style="border: 1px solid black; padding: 5px; width: 80%; margin-bottom: 10px;">using resources so they can continue to be used</div> <div style="border: 1px solid black; padding: 5px; width: 80%;">gradual change of a population over time</div> </div> </div>	2	each correct line = 1 mark if a left-hand box has more than one line coming from it ignore all lines from that box															
	c		<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>NS</th> <th>SB</th> </tr> </thead> <tbody> <tr> <td>(changes affected ...)</td> <td>(✓)</td> <td></td> </tr> <tr> <td>over many ...</td> <td></td> <td>✓</td> </tr> <tr> <td>humans choose ...</td> <td></td> <td>✓</td> </tr> <tr> <td>plants or animals ...</td> <td>✓</td> <td></td> </tr> </tbody> </table>		NS	SB	(changes affected ...)	(✓)		over many ...		✓	humans choose ...		✓	plants or animals ...	✓		3	each correct row= 1 mark accept any clear indication of choice ignore any row with two choices
	NS	SB																		
(changes affected ...)	(✓)																			
over many ...		✓																		
humans choose ...		✓																		
plants or animals ...	✓																			
Total				7																

Question		Expected Answers	Marks	Rationale															
7	a	<table border="1"> <tr> <td></td> <td>carbon</td> <td>hydro</td> <td>nitro</td> <td>oxygen</td> </tr> <tr> <td>carb</td> <td>✓</td> <td>✓</td> <td></td> <td>✓</td> </tr> <tr> <td>protein</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> </table>		carbon	hydro	nitro	oxygen	carb	✓	✓		✓	protein	✓	✓	✓	✓	2	1 mark for each correct row
	carbon	hydro	nitro	oxygen															
carb	✓	✓		✓															
protein	✓	✓	✓	✓															
	b	<table border="1"> <tr> <td>E</td> <td>C</td> <td>D</td> <td>B</td> <td>A</td> </tr> </table>	E	C	D	B	A	3	C before D = 1 mark D before B = 1 mark B before A = 1 mark										
E	C	D	B	A															
Total			5																
8	a	Sally and Sam (1)	1	both required for 1 mark either order no extra names allowed															
	b	Emily (1)	1	no extra names allowed															
	c	Ali (1)	1	no extra names allowed															
	d	Shaun (1)	1	no extra names allowed															
Total			4																

Question		Expected Answers	Marks	Rationale
9	a	<p style="text-align: right;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> prevent the growth of microorganism <input checked="" type="checkbox"/> (1) </p>	1	accept any clear indication of choice
	b	<p style="text-align: right;"> <input type="checkbox"/> It has passed a safety test <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> </p>	1	accept any clear indication of choice
	c	<p style="text-align: right;"> <input type="checkbox"/> <input type="checkbox"/> to protect the health of the public <input checked="" type="checkbox"/> (1) <input type="checkbox"/> </p>	1	accept any clear indication of choice

Question		Expected Answers	Marks	Rationale
9	d	<input type="checkbox"/> <input type="checkbox"/> read list of additives on food labels <input checked="" type="checkbox"/> (1) know which additives may harm <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/>	2	each correct tick = 1 mark if 3 ticks present, deduct one mark 4 or more ticks present = 0 marks accept any clear indication of choice
Total			5	

A213/02 Modules B3, C3, P3 Higher

Question		Expected Answers	Marks	Rationale
1	a	<p>... slight risk of cancer worthwhile</p> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> (1) <input type="checkbox"/>	1	accept any clear indication of choice no extra ticks allowed
	b	<p>radioactivity very small within</p> <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <p>family not as close to source</p> <input checked="" type="checkbox"/> (1)	2	each correct tick = 1 mark if 3 ticks present, deduct one mark 4 or more ticks present = 0 marks
	c	<p>... radioactive chemicals everyday</p> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> (1)	1	accept any clear indication of choice no extra ticks allowed
Total			4	

Question			Expected Answers	Marks	Rationale
2	a	i	nuclear fuel processor: ½ small square below 3 - should be in space between grid lines nuclear reactor operator: 1 small square above 2 - should be on the grid line uranium miner: 2 small squares below 10 - should be on the grid line	1	any 2 bars correct = 1 mark
		ii	0.7 to 9.6 (mSv) (1)	1	not 0.7 to 8.9
	b		indication of adding first 6 and dividing by 6 (1) 2.1 (mSv) (1)	2	if all 7 are averaged to give a mean of 2.8 (mSv) give 1) mark even if no working shown 2.1 (mSv) with no working gets 2 marks
Total				4	

3	a			supports government	supports environmental group	4	1 mark for each correct row
			... do not produce CO ₂ ...	✓			
			an accident ...		✓		
			... for global warming	✓	✓		
			... much more expensive	✓			

Question		Expected Answers	Marks	Rationale
3	b	<p>The diagram shows two boxes on the left: 'Nuclear power station' and 'Wind farm'. Lines connect 'Nuclear power station' to three boxes on the right: 'Carbon dioxide is produced ...', 'Design of this power station ...', and 'Electricity is generated by a ...'. Lines connect 'Wind farm' to three boxes on the right: 'It does not have to be taken apart ...', 'There are no fuel costs.', and 'Electricity is generated by a ...'.</p>	2	<p>nuclear goes to top three boxes any two of the three correct boxes and no incorrect boxes for 1 mark</p> <p>wind farm goes to top middle and bottom boxes any two of the three correct boxes and no incorrect boxes for 1 mark</p>
		Total	6	
4		<p>Lysenko's results could not be ... <input checked="" type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>Breeding experiments with wheat ... <input checked="" type="checkbox"/></p> <p>Other countries that did not use ... <input checked="" type="checkbox"/></p>	2	<p>any two points = 2 marks</p> <p>allow full marks if all three possible answers are ticked two correct ticks plus an extra incorrect tick = 1 mark four ticks = 0 marks</p>
		Total	2	

Question			Expected Answers	Marks	Rationale																				
5	a	i	homeostasis (1)	1																					
		ii	<table border="1"> <tbody> <tr> <td>electrical</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>chemicals</td> <td></td> <td>✓</td> <td></td> </tr> <tr> <td>short-lived</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>slow</td> <td></td> <td>✓</td> <td></td> </tr> <tr> <td>receptor</td> <td></td> <td></td> <td>✓</td> </tr> </tbody> </table>	electrical	✓			chemicals		✓		short-lived	✓			slow		✓		receptor			✓	3	1 mark for each correct column (including blanks)
electrical	✓																								
chemicals		✓																							
short-lived	✓																								
slow		✓																							
receptor			✓																						
	b		brain spinal cord	1	both required for 1 mark either order 'spine' is not 'spinal cord'																				
			Total	5																					

Question		Expected Answers	Marks	Rationale	
6	a	<p style="text-align: right;"> <input type="checkbox"/> Statement 4 accounts for all the data ... <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> </p>	1	accept any clear indication of choice no extra ticks allowed	
	b		2	each correct line = 1 mark if a left hand box has more than one line coming from it ignore all lines from that box	
	c	i	sex cell / gamete / reproductive cell / egg / sperm / ovum / ovule / pollen (1)	1	not zygote, i.e. fertilised egg/ovum/ovule
		ii	<p style="text-align: right;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> ... would compete equally well. <input checked="" type="checkbox"/> (1) </p>	1	accept any clear indication of choice no extra ticks allowed

Question			Expected Answers	Marks	Rationale
6	d	i	Brian Zoe (1)	1	both required for 1 mark either order
		ii	Mark (1)	1	
			Total	7	

7	a		Sally Sam (1)	1	both required for 1 mark either order no extra names allowed
	b		Emily (1)	1	no extra names allowed
	c		Ali (1)	1	no extra names allowed
	d		Shaun (1)	1	no extra names allowed
			Total	4	

Question		Expected Answers	Marks	Rationale
8	a	carbon oxygen hydrogen	2	any order allow symbols C H O 3 correct = 2 marks 2 correct = 1 mark
	b	i	2	any order any 3 correct = 2 marks any 2 correct = 1 mark only 1 correct scores 0 marks
		ii	1	allow either or both no other letters allowed
	c	<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 80%;"> <input type="checkbox"/> Dig in manure. Spread compost and dig in. Grow leguminous crops such as clover. </div> <div style="width: 15%; text-align: center;"> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> </div> </div>	1	two or three correct choices = 1 mark
Total			6	

Question		Expected Answers	Marks	Rationale
9	a	<p>They stop the growth of harmful ... <input type="checkbox"/> (1)</p> <p>They keep food safe for longer. <input checked="" type="checkbox"/> (1)</p>	2	each correct tick = 1 mark if 3 ticks present, deduct one mark 4 or more ticks present = 0 marks
	b	<p>How much harm the chemical may cause. <input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input checked="" type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>Whether some people are more affected ... <input checked="" type="checkbox"/></p> <p>How likely it is that people will suffer harm ... <input checked="" type="checkbox"/></p>	1	three correct choices and four blanks = 1 mark no other combination scores any marks
	c	D (1)	1	accept any clear indication of choice
Total			4	

Grade Thresholds

General Certificate of Secondary Education
Science A (Specification Code J630)
January 2009 Examination Series

Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
A211/01	Raw	42	N/A	N/A	N/A	28	24	20	16	12	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A211/02	Raw	42	32	28	22	17	14	12	N/A	N/A	N/A
	UMS	50	45	40	35	30	25	23	N/A	N/A	N/A
A212/01	Raw	42	N/A	N/A	N/A	31	27	23	19	15	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A212/02	Raw	42	32	28	22	16	11	8	N/A	N/A	N/A
	UMS	50	45	40	35	30	25	23	N/A	N/A	N/A
A213/01	Raw	42	N/A	N/A	N/A	29	24	20	16	12	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A213/02	Raw	42	33	29	23	17	12	9	N/A	N/A	N/A
	UMS	50	45	40	35	30	25	23	N/A	N/A	N/A

Specification Aggregation Results

Overall threshold marks in UMS (ie after conversion of raw marks to uniform marks)

	Maximum Mark	A*	A	B	C	D	E	F	G	U
J630	300	270	240	210	180	150	120	90	60	0

The cumulative percentage of candidates awarded each grade was as follows:

	A*	A	B	C	D	E	F	G	U	Total No. of Cands
J630	0.4	4.9	23.1	56.2	77.5	89.9	96.4	99.6	100.0	445

For a description of how UMS marks are calculated see:

http://www.ocr.org.uk/learners/ums_results.html

Statistics are correct at the time of publication.

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