

Science A
Twenty First Century Science

General Certificate of Secondary Education **J630**

Mark Scheme for the Units

January 2008

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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)

MARK SCHEMES FOR THE UNITS

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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 (1) at the end of that marking point.
- 4 Abbreviations, annotations and conventions used in the detailed Mark Scheme:
 - / = alternative and acceptable answers for the same marking point
 - (1)** = separates marking points
 - not** = answers which are not worthy of credit
 - reject** = answers which are not worthy of credit
 - ignore** = statements which are irrelevant
 - allow** = answers that can be accepted
 - () = words which are not essential to gain credit
 - = underlined words must be present in answer to score a mark
 - ecf** = error carried forward
 - AW / owtte** = alternative wording
 - ora** = or reverse argument

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 Annotations: the following annotations are available on SCORIS.
 - ✓ = correct response
 - ✗ = incorrect response
 - bod = benefit of the doubt
 - nbod = benefit of the doubt **not** given
 - ECF = error carried forward
 - ^ = information omitted
 - l = ignore
 - R = reject
- 6 If a candidate alters his/her response, examiners should accept the alteration.
- 7 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.

8 Marking method for tick boxes:

If there is a set of boxes, some of which should be ticked and others left empty, then you need to judge the entire set of boxes.

Eg If a question requires candidates to identify a city in England, then in the boxes

Edinburgh	
Manchester	
Paris	
Southampton	

the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third should be blank (or have indication of choice crossed out). For a two-mark question, the rationale would be:

All boxes are indicated scores 0 marks.

All boxes blank scores 0 marks.

All four boxes correct scores 2 marks.

Three boxes correct scores 1 mark.

Two boxes correct scores 1 mark.

Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	x	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	x		✓		✓	✓		✓	
Score:	2	2	1	1	1	1	0	0	0	NR

Mark Scheme A211/01 Modules B1, C1, P1 Foundation

Question		Expected Answers	Marks	Rationale												
1	a	<p>made of several layers <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>T</td></tr></table> (1)</p> <p>middle is called the mantle <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>F</td></tr></table> (1)</p> <p>outside layer is called the crust <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>T</td></tr></table> (1)</p> <p>made of tectonic plates <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>T</td></tr></table> (1)</p>	T	F	T	T	4	<p>allow ✓ for T and x for F</p> <p>second box blank does not count as F</p>								
T																
F																
T																
T																
	b	<p>mountains occur where plates meet <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td> </td></tr><tr><td>✓</td></tr><tr><td>✓</td></tr><tr><td>✓</td></tr></table></p> <p>seafloor spreading</p> <p>volcanoes and earthquakes</p>			✓	✓	✓	2	<p>if all 5 boxes are ticked, award no marks.</p> <p>if 4 boxes are ticked, deduct 1 mark from the score</p> <p>all three correct: 2 marks</p> <p>two correct: 1 mark</p> <p>one correct does not get a mark.</p> <p>allow T for ✓, F for blank.</p> <p>NB Two correct ticks = 1 mark, not two!</p>							
✓																
✓																
✓																
		Total	6													
2	a	<p>Shapley Curtis both</p> <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>✓</td><td> </td><td> </td></tr> <tr><td>✓</td><td> </td><td> </td></tr> <tr><td> </td><td>✓</td><td> </td></tr> <tr><td> </td><td> </td><td>✓</td></tr> </table> <p>(1) (1) (1) (1)</p>	✓			✓				✓				✓	4	<p>one mark for each correct row</p> <p>do not give a mark for any row with more than one tick</p>
✓																
✓																
	✓															
		✓														
	b	<p>supports Curtis <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr></table> (1)</p>		✓		1	no extra ticks allowed.									
✓																
	c	galaxies (1) away (from us) (1)	2	allow any clear indication of choice.												
	d	14 000 million (1)	1	allow any clear indication of choice.												
		Total	8													

Question		Expected Answers	Marks	Rationale						
3	a	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>E</td> <td>C</td> <td>B</td> <td>A</td> <td>D</td> <td>F</td> </tr> </table> <p>C before B (1) B before A (1) A before D (1)</p>	E	C	B	A	D	F	3	if any letter appears more than once, treat that letter as a blank in each occurrence. If lower case b and d (for example) cannot be distinguished, treat them as the same
E	C	B	A	D	F					
	b	i	<p>increase chance of cancer <input type="checkbox"/></p> <p>reach the age of thirty <input type="checkbox"/></p>	1	both correct (plus two blanks) for the one mark					
		ii	<p>80% with breast cancer genes <input type="checkbox"/> (1)</p>	1	no extra ticks allowed.					
		iii	Andy (1)	1	allow any clear indication of choice cannot have two (or more) names					
Total			6							
4	a	one copy (1) two copies (1) DNA (1)	3	allow '1 copy', 'one' or other clear indication of correct choice allow '2 copies', 'two' or other clear indication of correct choice						
	b	XY / X and Y (1)	1	either order not 'X or Y'						
	c	because she donated the egg <input type="checkbox"/> (1)	1	no extra ticks allowed						
	d	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td><input type="checkbox"/></td></tr> <tr><td><input type="checkbox"/></td></tr> <tr><td><input checked="" type="checkbox"/></td></tr> <tr><td><input checked="" type="checkbox"/></td></tr> <tr><td><input checked="" type="checkbox"/></td></tr> </table> <p>Jayne <input checked="" type="checkbox"/> (1) Sean <input checked="" type="checkbox"/> (1) Alison <input checked="" type="checkbox"/> (1)</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3	if all 5 boxes are ticked, award no marks if 4 boxes are ticked, deduct 1 mark from the score one mark for each correct choice	
<input type="checkbox"/>										
<input type="checkbox"/>										
<input checked="" type="checkbox"/>										
<input checked="" type="checkbox"/>										
<input checked="" type="checkbox"/>										
Total			8							

Question		Expected Answers	Marks	Rationale				
5	a	below below pass	2	3 correct: 2 marks 2 correct: 1 mark 1 correct : no marks NB two correct ticks = 1 mark not two				
	b	carbon dioxide and carbon monoxide (1) oxygen water (1)	2	CO ₂ and CO - either order allow O or O ₂ for oxygen, H ₂ O for water - order important both chemicals needed for each mark				
	c	i						
		lies well outside the range						
		<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td>✓</td></tr> <tr><td> </td></tr> </table> (1)			✓		1	no extra ticks allowed
✓								
		ii						
		0.02 to 0.04 / 0.02 – 0.04 / 0.02, 0.04 / 0.04 to 0.02 / 0.04 – 0.02/ 0.04, 0.02 (1)	1	both correct for one mark check decimal point: 0.2 to 0.4 is wrong				
		iii						
		sensor may not work reliably						
		<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td> </td></tr> <tr><td>✓</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table> (1)		✓			2	if 4 or 5 boxes are ticked, award no marks if 3 boxes are ticked, deduct 1 mark from the score one mark for each correct choice
✓								
		carbon monoxide may vary						
		<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td> </td></tr> <tr><td>✓</td></tr> </table> (1)		✓				
✓								
Total			8					

Question		Expected Answers	Marks	Rationale												
6	a	1% argon (smallest segment) 20% oxygen (medium segment) 79% nitrogen (largest segment)	2	argon correct (1) oxygen and nitrogen correct (1)												
	b	highest in morning and evening <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr><tr><td>✓</td></tr></table> (1) decreases overnight <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr></table> (1)		✓		✓		✓	2	if all 4 boxes are ticked, award no marks. if 3 boxes are ticked, deduct 1 mark from the score one mark for each correct choice						
✓																
✓																
✓																
	c	<table style="border-collapse: collapse; margin-left: 20px;"> <tr> <td style="border: 1px solid black; padding: 5px; width: 60px;">CO</td> <td style="border: none; padding: 0 10px;">-----</td> <td style="border: 1px solid black; width: 60px; height: 20px;"></td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">NO</td> <td style="border: none; padding: 0 10px;">\</td> <td style="border: 1px solid black; width: 60px; height: 20px;"></td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">N₂</td> <td style="border: none; padding: 0 10px;"> </td> <td style="border: 1px solid black; width: 60px; height: 20px;"></td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">CO₂</td> <td style="border: none; padding: 0 10px;">/</td> <td style="border: 1px solid black; width: 60px; height: 20px;"></td> </tr> </table>	CO	-----		NO	\		N ₂			CO ₂	/		2	ignore any link going to or coming from a box with more than one link 3 links correct (2) 1 or 2 links correct (1)
CO	-----															
NO	\															
N ₂																
CO ₂	/															
Total			6													
Paper Total			42													

Mark Scheme A211/02 Modules B1, C1, P1 Higher

Question		Expected Answers	Marks	Rationale
1	a	<p>made of tectonic plates <input type="checkbox"/></p> <p>mantle is liquid <input type="checkbox"/></p> <p>plates are on top of the mantle <input type="checkbox"/></p> <p>tectonic plates move about <input type="checkbox"/></p> <p>volcanoes and earthquakes <input type="checkbox"/></p> <p>mountains build up <input type="checkbox"/></p>	4	<p>6 correct (4)</p> <p>5 correct (3)</p> <p>4 correct (2)</p> <p>3 correct (1)</p> <p>note 1 or 2 correct = 0</p> <p>T or F must be clearly a T or an F rather than a combination or one overwritten on the other without clear decision</p> <p>if overwrite is clearly bolder then allow</p>
	b	<p><input type="checkbox"/></p> <p>ridges of solidified magma <input type="checkbox"/></p> <p>volcanoes and earthquakes <input type="checkbox"/></p>	1	<p>both correct for one mark</p> <p>allow any clear indication of choice.</p>
Total			5	

Question		Expected Answers	Marks	Rationale															
2	a	<table border="1"> <thead> <tr> <th>Shapley</th> <th>Curtis</th> <th>both</th> </tr> </thead> <tbody> <tr> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>✓</td> <td></td> <td></td> </tr> <tr> <td></td> <td>✓</td> <td></td> </tr> <tr> <td></td> <td></td> <td>✓</td> </tr> </tbody> </table>	Shapley	Curtis	both	✓			✓				✓				✓	4	one mark for each correct row
Shapley	Curtis	both																	
✓																			
✓																			
	✓																		
		✓																	
	b	<table border="1"> <thead> <tr> <th>supports Shapley</th> <th>supports Curtis</th> </tr> </thead> <tbody> <tr> <td>x</td> <td>x</td> </tr> <tr> <td>x</td> <td>✓</td> </tr> </tbody> </table>	supports Shapley	supports Curtis	x	x	x	✓	2	one mark for each correct row blank = X but if a mixture of X and blank boxes then blank = No Response									
supports Shapley	supports Curtis																		
x	x																		
x	✓																		
	c	<table border="1"> <tbody> <tr> <td>spiral nebulae are moving away</td> <td>✓</td> </tr> <tr> <td>theory that space is expanding</td> <td>✓</td> </tr> <tr> <td>there is a correlation</td> <td>✓</td> </tr> </tbody> </table>	spiral nebulae are moving away	✓	theory that space is expanding	✓	there is a correlation	✓	3	one mark for each correct ✓ see guidance 8 regarding marking for tick boxes									
spiral nebulae are moving away	✓																		
theory that space is expanding	✓																		
there is a correlation	✓																		
Total			9																

Question		Gd	Expected Answers	Marks	Rationale																								
3	a	D	XY / X and Y	1	either order not X or Y																								
	b	D	because she donated the egg <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>✓</td></tr><tr><td> </td></tr><tr><td> </td></tr><tr><td> </td></tr></table>	✓				1	no extra ticks allowed.																				
✓																													
	c	AA*	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>A</td><td> </td><td> </td></tr> <tr><td>B</td><td> </td><td> </td></tr> <tr><td>C</td><td>yes</td><td>yes</td></tr> <tr><td>D</td><td>no</td><td>no</td></tr> <tr><td>E</td><td>yes</td><td>no</td></tr> <tr><td>F</td><td>no</td><td>no</td></tr> <tr><td>G</td><td>yes</td><td>no</td></tr> <tr><td>H</td><td>yes</td><td>no</td></tr> </table>	A			B			C	yes	yes	D	no	no	E	yes	no	F	no	no	G	yes	no	H	yes	no	2	one mark for each correct column if any overwriting, allow if correct response is clearly bolder
A																													
B																													
C	yes	yes																											
D	no	no																											
E	yes	no																											
F	no	no																											
G	yes	no																											
H	yes	no																											
	d	BA	<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;">are clones</div> <div style="border: 1px solid black; padding: 5px;">mutations occur during development</div> </div> <div style="display: flex; justify-content: space-around; width: 100%; margin-top: 10px;"> <div style="border: 1px solid black; padding: 5px;">not exactly same DNA</div> <div style="border: 1px solid black; padding: 5px;">embryo split into two groups of cells</div> </div> <div style="display: flex; justify-content: space-around; width: 100%; margin-top: 10px;"> <div style="border: 1px solid black; width: 100px; height: 20px;"></div> <div style="border: 1px solid black; width: 100px; height: 20px;"></div> </div> </div>	2	one mark for each correct link if either left-hand box has more than one link, ignore that box																								
Total				6																									

Question		Gd	Expected Answers	Marks	Rationale
4	a		C	1	both correct (plus two blanks) for the one mark
			increase chance of cancer <input type="checkbox"/>		
			reach the age of thirty <input checked="" type="checkbox"/>		
	b		C	1	allow any clear indication of choice cannot have two (or more) names
Total				2	

5	a	i	D	fact (1)	1	
		ii	C	prediction (1)	1	
	b		BA	no nuclear replacement stem cells are from the patient	2	one mark for each correct ✓ see guidance 8 regarding marking for tick boxes
			<input checked="" type="checkbox"/>			
				<input checked="" type="checkbox"/>		
				<input type="checkbox"/>		
				<input type="checkbox"/>		
	c	i	B	1 and 3 (1)	1	either order
		ii	A	2, 5 and 6 (1)	1	any order
Total				6		

Question		Expected Answers	Marks	Rationale																
6	a	<p>limits have been set <input checked="" type="checkbox"/></p> <p>engine speed is a factor <input checked="" type="checkbox"/></p> <p>percentages of pollutant gases <input checked="" type="checkbox"/></p>	2	<p>3 correct (2)</p> <p>2 correct (1)</p> <p>1 correct = 0 marks</p> <p>see guidance 8 regarding marking for tick boxes</p>																
	b	<table border="1"> <thead> <tr> <th></th> <th>in fuel</th> <th>in air</th> <th>in both</th> </tr> </thead> <tbody> <tr> <td>carbon monoxide</td> <td></td> <td></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>sulphur dioxide</td> <td></td> <td></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>nitrogen oxides</td> <td></td> <td><input checked="" type="checkbox"/></td> <td></td> </tr> </tbody> </table>		in fuel	in air	in both	carbon monoxide			<input checked="" type="checkbox"/>	sulphur dioxide			<input checked="" type="checkbox"/>	nitrogen oxides		<input checked="" type="checkbox"/>		2	<p>mark each row separately, more than 1 tick in the row = 0 for that row</p> <p>3 correct rows (2)</p> <p>2 or 1 correct row(s)(1)</p>
	in fuel	in air	in both																	
carbon monoxide			<input checked="" type="checkbox"/>																	
sulphur dioxide			<input checked="" type="checkbox"/>																	
nitrogen oxides		<input checked="" type="checkbox"/>																		
	c	<p>lies well outside the range <input type="checkbox"/></p> <p><input checked="" type="checkbox"/></p> <p><input type="checkbox"/></p>	1	no extra ticks allowed																
	ii	0.02 to 0.04 / 0.02 – 0.04 / 0.02, 0.04 / 0.04 to 0.02 / 0.04 – 0.02/ 0.04, 0.02 (1)	1	<p>both correct for one mark</p> <p>check decimal point: 0.2 to 0.4 is wrong</p>																
	iii	<p>sensor may not work reliably <input checked="" type="checkbox"/></p> <p>carbon monoxide may vary <input checked="" type="checkbox"/></p>	2	<p>if 4 or 5 boxes are ticked, award no marks</p> <p>if 3 boxes are ticked, deduct 1 mark from the score</p> <p>one mark for each correct choice</p>																
Total			8																	

Question		Expected Answers	Marks	Rationale				
7	a	nitrogen monoxide/ NO (1) nitrogen/ N/N ₂ (1)	2	must be in correct order formula must be capital letters e.g. N 2 should be subscript e.g. N ₂ not N2				
	b	<div style="display: inline-block; border: 1px solid black; padding: 2px 10px;">CO₂</div> <div style="display: inline-block; border: 1px solid black; padding: 2px 10px; margin-left: 20px;">NO</div>	2	one mark for CO ₂ and one for NO formula must be capital letters e.g. N 2 should be subscript e.g. CO ₂ not CO2 or CO ²				
	c	Australia has highest population <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>F</td></tr></table> Australia produces more nitrogen dioxide <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>F</td></tr></table> UK produces less nitrogen dioxide <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>F</td></tr></table> Hungary produces less nitrogen dioxide <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>T</td></tr></table>	F	F	F	T	2	4 correct (2) 2 or 3 correct (1) 1 correct (0) if any overwriting, allow if correct response is clearly bolder.
F								
F								
F								
T								
Total			6					
Paper Total			42					

Mark Scheme A212/01 Modules B2, C2, P2 Foundation

Question		Expected Answers	Marks	Rationale																
1	a	<table border="1"> <thead> <tr> <th>True</th> <th>False</th> </tr> </thead> <tbody> <tr> <td></td> <td>✓</td> </tr> <tr> <td>✓</td> <td></td> </tr> <tr> <td></td> <td>✓</td> </tr> <tr> <td>✓</td> <td></td> </tr> </tbody> </table>	True	False		✓	✓			✓	✓		2	<p>any row with more than one tick or other indication of choice is wrong a blank row is wrong</p> <p>4 rows correct (2) 2 or 3 rows correct (1) 1 row correct (0)</p>						
True	False																			
	✓																			
✓																				
	✓																			
✓																				
	b	<table> <tr> <td></td> <td>film (card B)</td> <td>cup (card C)</td> </tr> <tr> <td>advantages</td> <td>1, 4, 6 (1)</td> <td>1, 5 (1)</td> </tr> <tr> <td>disadvantages</td> <td>3</td> <td>6 (1 for both)</td> </tr> </table>		film (card B)	cup (card C)	advantages	1, 4, 6 (1)	1, 5 (1)	disadvantages	3	6 (1 for both)	3	<p>advantages - 2 marks in total disadvantages - 1 mark in total</p>							
	film (card B)	cup (card C)																		
advantages	1, 4, 6 (1)	1, 5 (1)																		
disadvantages	3	6 (1 for both)																		
	c	i	751 (1)	1																
		ii	710 (1)	1	<p>if wrong outlier identified in I, allow ecf as below</p> <table border="1"> <thead> <tr> <th>outlier chosen</th> <th>acceptable response</th> </tr> </thead> <tbody> <tr> <td>705</td> <td>721.5 / 722 / 721</td> </tr> <tr> <td>710</td> <td>720.25 / 720</td> </tr> <tr> <td>715</td> <td>719</td> </tr> </tbody> </table>	outlier chosen	acceptable response	705	721.5 / 722 / 721	710	720.25 / 720	715	719							
outlier chosen	acceptable response																			
705	721.5 / 722 / 721																			
710	720.25 / 720																			
715	719																			
		iii	<table> <tr> <td></td> <td><input type="checkbox"/></td> <td></td> </tr> <tr> <td></td> <td><input type="checkbox"/></td> <td></td> </tr> <tr> <td>more results, better estimate</td> <td>✓</td> <td>(1)</td> </tr> <tr> <td></td> <td><input type="checkbox"/></td> <td></td> </tr> <tr> <td>repeating to check for reliability</td> <td>✓</td> <td>(1)</td> </tr> </table>		<input type="checkbox"/>			<input type="checkbox"/>		more results, better estimate	✓	(1)		<input type="checkbox"/>		repeating to check for reliability	✓	(1)	2	<p>one mark for each correct tick deduct one mark for each incorrect tick if more than two ticks used all 5 boxes ticked gets no marks.</p>
	<input type="checkbox"/>																			
	<input type="checkbox"/>																			
more results, better estimate	✓	(1)																		
	<input type="checkbox"/>																			
repeating to check for reliability	✓	(1)																		
		Total		9																

Question		Expected Answers	Marks	Rationale
2	a	2 (1)	1	allow any indication of choice
	b	small molecule (1) polymer (1) cross-link (1)	3	
	c	less flexible higher temperature a mixture of chemicals	2	allow any clear indication of choice 3 correct (2) 1 or 2 correct (1)
Total			6	

Question		Expected Answers	Marks	Rationale
3	a	infrared (1) photosynthesis (1) atmosphere (1) warmer (1)	4	allow incorrect spelling
	b	i	2	one mark for each correct tick deduct one mark for each incorrect tick if more than two ticks used
		ii	1	no extra ticks allowed
Total			7	

Question		Expected Answers	Marks	Rationale				
4	a	infrared radio waves ultraviolet X-rays <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>B</td></tr> <tr><td>A</td></tr> <tr><td>C</td></tr> <tr><td>D</td></tr> </table>	B	A	C	D	3	4 correct (3) 3 correct (2) 1 or 2 correct (1)
B								
A								
C								
D								
	b		3	one mark for each correct link as shown				
Total			6					

Question			Expected Answers	Marks	Rationale
5	a	i	<pre> graph LR A[stomach lining] --- B[produces acid] C[skin] --- D[contains chemicals] E[sweat and tears] --- F[physical barrier] C --- B E --- D </pre>	2	3 correct (2) 1 or 2 correct (1)
		ii	reproduce (1) symptoms (1) poisons (1)	3	
	b	i	15% (1)	1	allow any indication of choice
		ii	bacteria (1) fungi (1)	2	allow any indication of choice one mark for each correct choice deduct one mark for each incorrect choice if more than two are chosen
	c		in UK, TB in children is rare <input type="checkbox"/> (1) most never encounter a case <input checked="" type="checkbox"/> (1)	2	one mark for each correct tick deduct one mark for each incorrect tick if more than two ticks used all 5 boxes ticked gets no marks
Total				10	

Question		Expected Answers	Marks	Rationale	
6	a	<input type="text" value="B"/> <input type="text" value="A"/> <input type="text" value="C"/>	2	3 correct (2) 1 or 2 correct (1) allow the names	
	b	i	Sean (1)	1	ignore spelling
		ii	Jayne (1)	1	ignore spelling
		Total		4	
		Paper Total		42	

Mark Scheme A212/02 Modules B2, C2, P2 Higher

Question		Expected Answers	Marks	Rationale										
1	a	<table border="1"> <thead> <tr> <th>True</th> <th>False</th> </tr> </thead> <tbody> <tr> <td></td> <td>✓</td> </tr> <tr> <td>✓</td> <td></td> </tr> <tr> <td></td> <td>✓</td> </tr> <tr> <td>✓</td> <td></td> </tr> </tbody> </table>	True	False		✓	✓			✓	✓		2	<p>any row with more than one tick or other indication of choice is wrong a blank row is wrong</p> <p>4 rows correct (2) 2 or 3 rows correct (1) 1 row correct (0)</p>
True	False													
	✓													
✓														
	✓													
✓														
	b	<table> <tr> <td></td> <td>film (card B)</td> <td>cup (card C)</td> </tr> <tr> <td>advantages</td> <td>1, 4, 6 (1)</td> <td>1, 5 (1)</td> </tr> <tr> <td>disadvantages</td> <td>3</td> <td>6 (1 for both)</td> </tr> </table>		film (card B)	cup (card C)	advantages	1, 4, 6 (1)	1, 5 (1)	disadvantages	3	6 (1 for both)	3	<p>advantages - 2 marks in total disadvantages - 1 mark in total</p>	
	film (card B)	cup (card C)												
advantages	1, 4, 6 (1)	1, 5 (1)												
disadvantages	3	6 (1 for both)												
	c	i	695 (2) or 670 / 669.8 (1)	2										
		ii	<table border="1"> <thead> <tr> <th>True</th> <th>False</th> </tr> </thead> <tbody> <tr> <td></td> <td>✓</td> </tr> <tr> <td>✓</td> <td></td> </tr> <tr> <td></td> <td>✓</td> </tr> </tbody> </table>	True	False		✓	✓			✓	1		
True	False													
	✓													
✓														
	✓													
		iii	<table> <tr> <td></td> <td><input type="checkbox"/></td> </tr> <tr> <td>more results, better estimate</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>repeating to check for reliability</td> <td><input checked="" type="checkbox"/></td> </tr> </table>		<input type="checkbox"/>	more results, better estimate	<input checked="" type="checkbox"/>	repeating to check for reliability	<input checked="" type="checkbox"/>	1				
	<input type="checkbox"/>													
more results, better estimate	<input checked="" type="checkbox"/>													
repeating to check for reliability	<input checked="" type="checkbox"/>													
Total			9											

Question		Expected Answers	Marks	Rationale	
2	a		2	if any box has more than one link drawn to it, ignore all those links 4 correct links (2) 2 or 3 correct links (1)	
	b	i	<p>energy is put to good use <input checked="" type="checkbox"/></p> <p>shredded car tyre surface <input type="checkbox"/></p> <p>putting tyres in landfill <input checked="" type="checkbox"/></p> <p><input checked="" type="checkbox"/></p> <p><input type="checkbox"/></p>	2	3 correct ticks and two blanks : 2 marks 3 correct ticks, one extra tick and one blank: 1 mark 2 correct ticks and at least 2 blanks: 1 mark no other combination gets any marks
		ii	<p>raw materials used <input checked="" type="checkbox"/></p> <p>methods of disposal <input type="checkbox"/></p> <p>average time tyres used <input checked="" type="checkbox"/></p> <p><input checked="" type="checkbox"/></p> <p><input type="checkbox"/></p>	2	3 correct ticks and two blanks : 2 marks 3 correct ticks, one extra tick and one blank: 1 mark 2 correct ticks and at least 2 blanks: 1 mark no other combination gets any marks
Total			6		

Question		Expected Answers	Marks	Rationale							
3	a	weaker further from source <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>F</td></tr><tr><td>T</td></tr><tr><td>F</td></tr><tr><td>F</td></tr></table> (1) ionising radiation <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>T</td></tr></table> (1) non-ionising radiation <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>F</td></tr></table> (1) X-rays <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>F</td></tr></table> (1)	F	T	F	F	T	F	F	4	one mark for each correct letter allow the full 'true' or ✓ for T and 'false' or x for F blank boxes are wrong.
F											
T											
F											
F											
T											
F											
F											
	b	i	Melanie <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>✓</td></tr><tr><td></td></tr><tr><td></td></tr><tr><td></td></tr></table> (1) Mary <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>✓</td></tr></table> (1)	✓				✓	2	one mark for each correct tick deduct one mark for each incorrect tick if more than two ticks used	
✓											
✓											
		ii	Sunil <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td></td></tr><tr><td>✓</td></tr><tr><td></td></tr><tr><td></td></tr></table> (1)		✓			1	no extra ticks allowed		
✓											
Total			7								

Question			Expected Answers	Marks	Rationale
4	a	i	gamma (rays) / γ (1)	1	ignore spelling errors. if more than one term written, list principle applies treat any subsequent variety of the correct answer as neutral
		ii	gamma (rays) / γ , ultraviolet / UV, X-rays / X	1	all three needed for the mark - order and spelling are not important if more than three terms written, list principle applies treat any subsequent variety of a correct answer as neutral
		iii	ultraviolet / UV(1)	1	ignore spelling errors. if more than one term written, list principle applies treat any subsequent variety of the correct answer as neutral
	b			3	if any box has more than one link drawn to it, ignore all those links 4 correct links (3) 2 or 3 correct links (2) 1 correct link (1)
			Total	6	

Question		Expected Answers	Marks	Rationale								
5	a	acid in stomach <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td> </td></tr><tr><td> </td></tr><tr><td>✓</td></tr></table> (1)				✓	1	no extra ticks allowed				
✓												
	b	i symptoms (1)	1	ignore spelling errors.								
		ii B (1)	1									
	c	i 15% (1)	1	allow any indication of choice								
		ii Slows spread of disease TB microorganisms become resistant Result of mutations Increase spread of disease	<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>F</td></tr><tr><td>F</td></tr><tr><td>T</td></tr><tr><td>T</td></tr></table>	F	F	T	T	1	all correct for one mark blank boxes are wrong allow the full 'true' or ✓ for T and 'false' or x for F			
F												
F												
T												
T												
		iii fungus/ fungi/fungal (1)	1	ignore spelling errors if more than one term written, list principle applies treat any subsequent variety of the correct answer as neutral								
	d	in UK, TB in children is rare <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr></table> (1) most never encounter a case <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr></table> (1)			✓				✓		2	one mark for each correct tick deduct one mark for each incorrect tick if more than two ticks used all 5 boxes ticked gets no marks
✓												
✓												
Total			8									

Question			Expected Answers	Marks	Rationale					
6	a	i	C (1)	1	look at the letter on the dotted line, not the diagram, for this part					
		ii	X on the bulge in diagram A (1)	1	centre of X must be on the actual bulge in diagram A (the bulge is what diagram A has extra to diagram B)					
	b		oxygen / O ₂ / O(1)	1						
	c	i	may have other factors in common no mechanism has been suggested <table border="1" style="display: inline-table; vertical-align: middle; margin-left: 20px;"> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td>✓ (1)</td></tr> <tr><td>✓ (1)</td></tr> </table>				✓ (1)	✓ (1)	2	one mark for each correct tick deduct one mark for each incorrect tick if more than two ticks used all 5 boxes ticked gets no marks
✓ (1)										
✓ (1)										
ii	B (1)	1								
Total				6						
Paper Total				42						

Mark Scheme A213/01 Modules B3, C3, P3 Foundation

Question		Expected Answers	Marks	Rationale					
1	a	receptor stimuli nervous	3	one mark for each correct response allow incorrect spelling if intention clear more than one response from the list in any space =0 ignore words not from list					
	b	<table border="1" style="display: inline-table; vertical-align: top;"> <tr> <td>(E)</td> <td>D</td> <td>B</td> <td>A</td> <td>C</td> </tr> </table> D before B (1) B before A (1) A before C (1)	(E)	D	B	A	C	3	
(E)	D	B	A	C					
Total			6						

2	a	herring	1	one mark for correct response allow incorrect spelling if intention clear more than one response from the list =0 ignore words not from list				
	b	Fran	1	one mark for correct response allow incorrect spelling if intention clear more than one response from the list =0 ignore words not from list				
	c	i	1	one mark for correct response more than one response = 0				
		food chains always start with plants <table border="1" style="display: inline-table; vertical-align: top; margin-left: 20px;"> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td>✓</td></tr> <tr><td> </td></tr> </table>			✓			
✓								
		ii	1	one mark for correct response more than one response = 0				
		fewer mackerel <table border="1" style="display: inline-table; vertical-align: top; margin-left: 20px;"> <tr><td>✓</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>	✓					
✓								
Total			4					

Question		Expected Answers		Marks	Rationale										
3	a	Upright man Heidelberg man Neanderthal man Modern man	<table border="1"> <thead> <tr> <th>extinct</th> <th>not extinct</th> </tr> </thead> <tbody> <tr> <td>✓</td> <td></td> </tr> <tr> <td>✓</td> <td></td> </tr> <tr> <td>✓</td> <td></td> </tr> <tr> <td></td> <td>✓</td> </tr> </tbody> </table>	extinct	not extinct	✓		✓		✓			✓	1	one mark for a correct response in BOTH columns ignore any further correct responses any incorrect response given = 0 mark allow any clear statement e.g. ✓ or x or shading etc ignore x if combination of ✓ and x used
extinct	not extinct														
✓															
✓															
✓															
	✓														
	b	Upright man	<table border="1"> <tbody> <tr> <td>✓</td> </tr> <tr> <td></td> </tr> <tr> <td></td> </tr> <tr> <td></td> </tr> </tbody> </table>	✓				1	one mark for correct response more than one response = 0						
✓															
	c	i	A and C	1	both needed for one mark any order is acceptable										
		ii	B	1	allow any clear indication of correct response more than one response = 0										
Total				4											

Question		Expected Answers	Marks	Rationale
4	a	salt	1	allow any clear indication of correct response more than one response = 0
	b	i	2	3 correct = 2 marks 1 or 2 correct = 1 mark allow any clear statement e.g. ✓ or x or shading etc ignore x if combination of ✓ and x used
		ii	2	one mark for each correct response if more than 2 responses given, deduct one mark for each incorrect response
	c		2	one mark for each correct response if more than 2 responses given, deduct one mark for each incorrect response
Total			7	

Question		Gd	Expected Answers	Marks	Rationale												
5	a	G	<table border="1"> <tr> <td>nitrogen compounds</td> <td>increases</td> <td>decreases</td> </tr> <tr> <td>fungal disease</td> <td>✓</td> <td></td> </tr> <tr> <td>manure</td> <td>✓</td> <td></td> </tr> </table>	nitrogen compounds	increases	decreases	fungal disease	✓		manure	✓		1	<p>all 3 correct for one mark any extra responses = 0</p> <p>allow any clear statement e.g. ✓ or x or shading etc ignore x if combination of ✓ and x used</p>			
nitrogen compounds	increases	decreases															
fungal disease	✓																
manure	✓																
	b	FF	<table border="1"> <tr> <td>greenfly damage</td> <td>for</td> <td>against</td> </tr> <tr> <td>may leave residues</td> <td>✓</td> <td></td> </tr> <tr> <td>greenfly eaten by ladybirds</td> <td></td> <td>✓</td> </tr> <tr> <td>market crops as 'organic'</td> <td></td> <td>✓</td> </tr> </table>	greenfly damage	for	against	may leave residues	✓		greenfly eaten by ladybirds		✓	market crops as 'organic'		✓	2	<p>4 correct = 2 marks 2 or 3 correct = 1 mark 1 correct = 0 mark</p> <p>allow any clear statement e.g. ✓ or x or shading etc ignore x if combination of ✓ and x used</p>
greenfly damage	for	against															
may leave residues	✓																
greenfly eaten by ladybirds		✓															
market crops as 'organic'		✓															
	c	EE	<p>aflatoxin from mould (1) herbicide (1)</p>	2	<p>one mark for each correct response allow any clear indication of correct response if more than 2 responses given, deduct one mark for each incorrect response</p>												
	d	EE	<p>The diagram shows two boxes on the left: 'carbohydrates' and 'proteins'. On the right, there are three boxes: 'carbon, hydrogen, oxygen & nitrogen', an empty box, and 'carbon, hydrogen and oxygen'. Lines connect 'carbohydrates' to the top and bottom boxes, and 'proteins' to the top and middle boxes.</p>	2	<p>one mark for each correct link 2 lines from box on left loses mark for that link</p>												
Total				7													

Question			Expected Answers	Marks	Rationale												
6	a	i	absorbed by a sheet of paper <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>✓</td></tr><tr><td> </td></tr><tr><td> </td></tr></table>	✓			1	one mark for correct response more than one response = 0									
✓																	
		ii	can break up molecules <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr></table>		✓		1	one mark for correct response more than one response = 0									
✓																	
		iii	cancer may develop <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>✓</td></tr><tr><td> </td></tr><tr><td> </td></tr></table> cells may die <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr></table>	✓				✓		2	one mark for each correct response if more than 2 responses given, deduct one mark for each incorrect response						
✓																	
✓																	
	b		<table border="1" style="display: inline-table;"><tr><td>Cambs</td><td>Norfolk</td><td>Yorks</td></tr><tr><td>✓</td><td> </td><td> </td></tr><tr><td>✓</td><td>✓</td><td> </td></tr><tr><td> </td><td>✓</td><td> </td></tr></table>	Cambs	Norfolk	Yorks	✓			✓	✓			✓		4	mark each row separately 1 st row – 1mark for each correct response (2 responses =0) 2 nd row - 1mark for each correct response (3 responses =1) 3 rd row - 1mark for each correct response (2 responses =0) allow any clear statement e.g. ✓ or x or shading etc ignore x if combination of ✓ and x used
Cambs	Norfolk	Yorks															
✓																	
✓	✓																
	✓																
	c	i	Julian <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td> </td></tr><tr><td>✓</td></tr></table> Marion <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td> </td></tr><tr><td>✓</td></tr></table>			✓			✓	2	one mark for each correct response if more than 2 responses given, deduct one mark for each incorrect response						
✓																	
✓																	
		ii	Steve <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>✓</td></tr><tr><td> </td></tr><tr><td> </td></tr><tr><td> </td></tr></table>	✓				1	one mark for correct response more than one response = 0								
✓																	
Total				11													

Question		Expected Answers	Marks	Rationale					
7		<table border="1"> <tr><td>C</td></tr> <tr><td>B</td></tr> <tr><td>D</td></tr> <tr><td>A</td></tr> <tr><td>E</td></tr> </table>	C	B	D	A	E	3	shaded box is given on question paper so ignore 4 correct = 3 marks 2 or 3 correct = 2 mark 1 correct = 1 mark
C									
B									
D									
A									
E									
		Total	3						
		Paper Total	42						

Mark Scheme A213/02 Modules B3, C3, P3 Higher

Question		Expected Answers	Marks	Rationale					
1	a	receptor / sensory (1)	1	allow – sense reject – nerve					
	b	<table border="1"> <tr> <td>(E)</td> <td>D</td> <td>B</td> <td>A</td> <td>C</td> </tr> </table>	(E)	D	B	A	C	3	D before B = 1 mark B before A = 1 mark A before C = 1 mark
(E)	D	B	A	C					
	c	4 and 5	2	one mark for each correct response allow either order for correct responses allow – a clear indication of the correct response eg underline or circle numbers 4 and 5 in the question, if responses are not provided in the correct spaces if more than two responses - deduct one mark					
Total			6						

2	a	i	gene / allele	1	reject – chromosome								
		ii	mutation	1	allow – mutate reject – mutant								
	b		<table border="1"> <tr> <td>correct</td> <td>incorrect</td> </tr> <tr> <td>Ian</td> <td>April</td> </tr> <tr> <td>Fran</td> <td></td> </tr> <tr> <td>Jim</td> <td></td> </tr> </table>	correct	incorrect	Ian	April	Fran		Jim		2	all 4 correct = 2 marks deduct one mark for each incorrect or missing response
correct	incorrect												
Ian	April												
Fran													
Jim													
Total			4										

Question		Expected Answers	Marks	Rationale				
3	a	B	1	<p>allow – a clear indication of the correct answer eg underline or circle letter B in the question</p> <p>more than 1 response = 0 marks</p>				
	b	<p>become taller</p> <p>developed larger brains</p> <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td> </td></tr> <tr><td>✓</td></tr> <tr><td>✓</td></tr> <tr><td> </td></tr> </table>		✓	✓		1	<p>two correct responses = 1 mark</p> <p>more than 2 response = 0 marks</p> <p>allow a clear response eg. ✓ or X or shading etc.</p> <p>ignore X if combination of ✓ and X used</p>
✓								
✓								
	c	C and F	2	<p>one mark for each correct response</p> <p>allow either order for correct responses</p> <p>allow – a clear indication of the correct response eg underline or circle numbers 4 and 5 in the question, if responses are not provided in the correct spaces</p> <p>if more than two responses - deduct one mark</p>				
		Total	4					

Question			Expected Answers	Marks	Rationale															
4	a	i	<table border="1"> <tr> <td></td> <td>high</td> <td>low</td> </tr> <tr> <td>sugar</td> <td></td> <td>✓</td> </tr> <tr> <td>fat</td> <td>✓</td> <td></td> </tr> <tr> <td>salt</td> <td>✓</td> <td></td> </tr> </table>		high	low	sugar		✓	fat	✓		salt	✓		2	3 correct = 2 marks 1 or 2 correct = 1 mark accept a clear response eg ✓ or X or shading etc ignore X if combination of ✓ and X used			
	high	low																		
sugar		✓																		
fat	✓																			
salt	✓																			
		ii	does not know the outcome amount of crisps that she eats <table border="1"> <tr><td></td></tr> <tr><td>✓</td></tr> <tr><td>✓</td></tr> <tr><td></td></tr> </table>		✓	✓		2	one mark for each correct tick accept a clear response eg. ✓ or X or shading etc. ignore X if combination of ✓ and X used if more than two responses - deduct one mark											
✓																				
✓																				
	b	i	<table border="1"> <tr> <td></td> <td>carbohydrates</td> <td>proteins</td> </tr> <tr> <td>carbon</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>hydrogen</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>oxygen</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>nitrogen</td> <td></td> <td>✓</td> </tr> </table>		carbohydrates	proteins	carbon	✓	✓	hydrogen	✓	✓	oxygen	✓	✓	nitrogen		✓	2	one mark for each correct column accept a clear response eg. ✓ or X or shading etc ignore X if combination of ✓ and X used
	carbohydrates	proteins																		
carbon	✓	✓																		
hydrogen	✓	✓																		
oxygen	✓	✓																		
nitrogen		✓																		
		ii	amino acids amino acids tendons liver urea	3	5 correct responses = 3 marks 3 or 4 correct responses = 2 marks 2 correct responses = 1 mark accept a clear response eg. underline, shading, ticks etc															
	c		proves the article wrong too much fat is only one factor heart disease in the future correlation <table border="1"> <tr><td>F</td></tr> <tr><td>T</td></tr> <tr><td>F</td></tr> <tr><td>T</td></tr> </table>	F	T	F	T	2	4 correct responses = 2 marks 2 or 3 correct responses = 1 mark accept ✓ and X if used together reject ✓ or X if used alone											
F																				
T																				
F																				
T																				
Total				11																

Question		Expected Answers	Marks	Rationale						
5	a		2	mark left and right hand sides separately correct responses on left hand side = 1 mark correct responses on right hand side = 1 mark any other combination on a side – deduct 1 mark						
	b	<table border="1"> <tr> <td>highest risk chemicals</td> <td>x</td> </tr> <tr> <td>fresh food always safer</td> <td>x</td> </tr> <tr> <td>never cause health problems</td> <td>x</td> </tr> </table>	highest risk chemicals	x	fresh food always safer	x	never cause health problems	x	1	all 3 correct responses = 1 mark accept a clear response eg ✓ or shading etc.
highest risk chemicals	x									
fresh food always safer	x									
never cause health problems	x									
Total			3							

Question			Expected Answers	Marks	Rationale												
6	a	i	protons neutrons	1	two correct responses in correct order = 1 mark												
		ii	quarter of its activity at start impossible to predict exact activity	2	one mark for each correct tick deduct one mark for each incorrect tick if more than two ticks used allow a clear response eg. X or shading etc ignore X if combination of ✓ and X used												
	b		<table border="1"> <thead> <tr> <th>Cambs</th> <th>Norfolk</th> <th>Yorks</th> </tr> </thead> <tbody> <tr> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>✓</td> <td>✓</td> <td></td> </tr> <tr> <td></td> <td>✓</td> <td></td> </tr> </tbody> </table>	Cambs	Norfolk	Yorks	✓			✓	✓			✓		4	mark each row separately first row – 1 mark for correct ✓ (2 or 3 ✓ = 0 marks) second row - 1 mark for each correct ✓ (3 ✓ = 1 mark) third row – 1 mark for correct ✓ (2 or 3 ✓ = 0 marks) allow a clear response eg. ✓ or X or shading etc ignore X if combination of ✓ and X used
Cambs	Norfolk	Yorks															
✓																	
✓	✓																
	✓																
	c	i	Steve <input checked="" type="checkbox"/> Marion <input checked="" type="checkbox"/>	2	one mark per correct tick deduct one mark for each incorrect tick if more than two ticks used allow a clear response eg. X or shading etc ignore X if combination of ✓ and X used												
		ii	Debbie <input checked="" type="checkbox"/>	1	more than one response = 0 marks allow a clear response eg. ✓ or X or shading etc ignore X if combination of ✓ and X used												
Total				10													

Question		Expected Answers	Marks	Rationale
7		burnt to release heat energy steam used to turn turbines dangerous radioactive waste radioactive for thousands of years can cause cancer	4	5 correct responses = 4 marks 4 correct responses = 3 marks 3 correct responses = 2 marks 2 correct responses = 1 mark allow ✓ and X if used together reject ✓ or X if used alone
		Total	4	
		Paper Total	42	

Grade Thresholds

General Certificate of Secondary Education
Science A (Specification Code J630)
January 2008 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	29	25	21	17	13	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A211/02	Raw	42	32	27	22	18	15	13	N/A	N/A	0
	UMS	50	45	40	35	30	25	23	N/A	N/A	0
A212/01	Raw	42	N/A	N/A	N/A	32	27	23	19	15	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A212/02	Raw	42	33	28	23	18	13	10	N/A	N/A	0
	UMS	50	45	40	35	30	25	23	N/A	N/A	0
A213/01	Raw	42	N/A	N/A	N/A	30	26	22	18	14	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A213/02	Raw	42	34	29	24	20	16	14	N/A	N/A	0
	UMS	50	45	40	35	30	25	23	N/A	N/A	0

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	0.0	1.9	19.6	43.9	67.3	85.5	95.8	99.5	100.0	214

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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