

Biology A
Twenty First Century Science

General Certificate of Secondary Education **J633**

Mark Schemes for the Units

June 2008

J633/MS/R/08

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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.

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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 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

point = 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. 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.

E.g. 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.

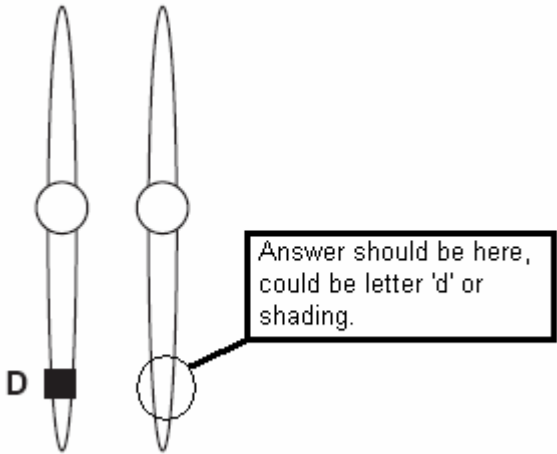
Three boxes correct scores 1 mark.

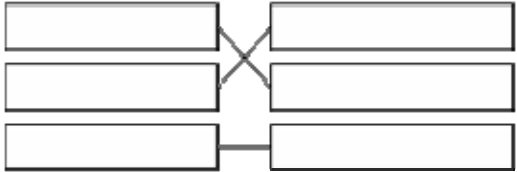
Two boxes correct scores 1 mark.

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

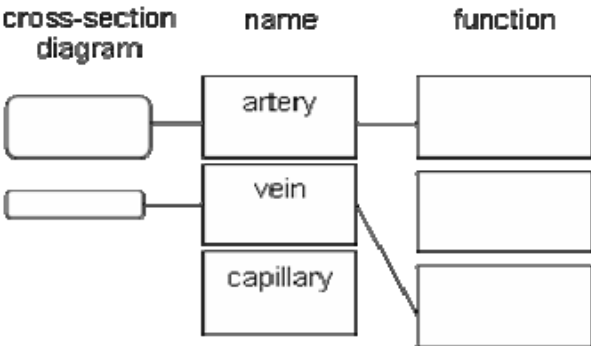
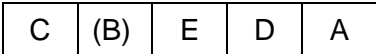


A221/01 Modules B1, B2, B3 Foundation Tier

Question		Expected Answers	Marks	Rationale								
1	a	<p>short of breath <input type="checkbox"/> (1)</p> <p>many chest infections <input checked="" type="checkbox"/> (1)</p>	2	accept ticks, crosses or shading if more than 2 responses deduct 1 mark for each incorrect response								
	b	<table border="1"> <tr> <td>combination</td> <td></td> </tr> <tr> <td>dd</td> <td>(1)</td> </tr> <tr> <td>(Dd)</td> <td></td> </tr> <tr> <td>DD</td> <td>(1)</td> </tr> </table>	combination		dd	(1)	(Dd)		DD	(1)	2	dd must be in top box DD must be in bottom box single d = 0 single D = 0
combination												
dd	(1)											
(Dd)												
DD	(1)											

1	c	<p>same position as D but on the right hand chromosome, e.g.</p> 	1	<p>this can be as a shading only on the right position on the chromosome or as a written letter d. position should be the same as on left chromosome.</p>
Total			5	

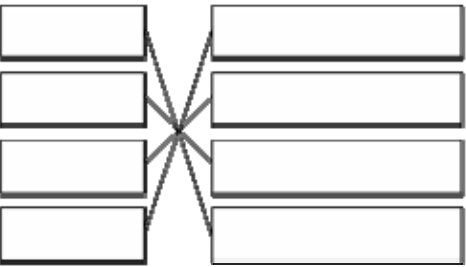
Question		Expected Answers	Marks	Rationale								
2	a	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td> </td><td> </td></tr> <tr><td>make the missing protein</td><td>✓</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table> (1)			make the missing protein	✓					1	more than one response = 0 marks accept a clear response eg. ✓ or X or shading etc. ignore X if combination of ✓ and X used
make the missing protein	✓											
	b	i	Jim	1	do not accept J for Jim							
		ii	Marion (1) Robert (1)	2	either order accept spelling errors if clearly attempting to identify correct person accept M for Marion and R for Robert							
		iii		2	all lines correct (2) two or one correct (1) more than one line from any left hand box negates any credit for that left hand box only							
	c	they are unspecialised <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr></table> (1) can develop into any kind of cell <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr></table> (1)		✓			✓	2	accept ticks, crosses or shading. if more than two responses deduct one mark for each incorrect response			
✓												
✓												
Total			8									

Question			Expected Answers	Marks	Rationale																				
3	a	i	<table border="1"> <tr> <td>benefit</td> <td>risk</td> <td>neither</td> <td></td> </tr> <tr> <td>(✓)</td> <td></td> <td></td> <td>(1)</td> </tr> <tr> <td></td> <td>✓</td> <td></td> <td>(1)</td> </tr> <tr> <td>✓</td> <td></td> <td></td> <td>(1)</td> </tr> <tr> <td></td> <td></td> <td>✓</td> <td>(1)</td> </tr> </table>	benefit	risk	neither		(✓)			(1)		✓		(1)	✓			(1)			✓	(1)	3	accept ticks, crosses or shading. more than 1 response in any row = 0 for that row ignore any responses added to top row.
		benefit	risk	neither																					
(✓)			(1)																						
	✓		(1)																						
✓			(1)																						
		✓	(1)																						
		ii	<p>safe form of the virus</p> <table border="1"> <tr><td></td></tr> <tr><td></td></tr> <tr><td>✓</td></tr> <tr><td></td></tr> </table> <p>(1)</p>			✓		1	accept ticks, crosses or shading. more than 1 response = 0																
✓																									
	b			1	if more than one line from left hand box then 0 marks ignore any links between boxes on the right hand side.																				
	c	i	14	1	accept 14 000 000/1 000 000 or 14/1																				
		ii	(15 000/60 000 000) x 100 (1) =0.025% (1)	2	for correct answer without working (2) (15 000/60 000 000) x 100 gains 1 mark or (15 000/60 000 000) 1 mark 15/600, 1/40 th or any correct ratio 1 mark																				
Total				8																					

Question	Expected Answers	Marks	Rationale
4 a	 <p>The diagram consists of three columns: 'cross-section diagram', 'name', and 'function'. Under 'cross-section diagram', there are three boxes: a large rounded rectangle (top), a smaller rounded rectangle (middle), and a very small rectangle (bottom). Under 'name', there are three boxes labeled 'artery', 'vein', and 'capillary'. Under 'function', there are three empty boxes. Lines connect the top diagram to 'artery', the middle diagram to 'vein', and the bottom diagram to 'capillary'. There are also lines connecting 'artery' to the top function box, 'vein' to the middle function box, and 'capillary' to the bottom function box.</p>	4	<p>1 mark for line from top diagram to name Artery. 1 mark for line from bottom diagram to name Vein. 1 mark for line from name Artery to top function. 1 mark for line from name Vein to bottom function. if two or more lines drawn from diagram or any box = 0 marks for that line. if two or more lines drawn to any box = 0 marks for that line. ignore line drawn from name capillary to middle function.</p>
b	 <p>A horizontal sequence of five boxes containing the letters C, (B), E, D, and A in order from left to right.</p>	3	<p>all correct (3) or C before E (1) E before D (1) D before A (1)</p>
c	<p>greater risk of heart attacks</p>  <p>(1)</p>	1	<p>more than one response = 0 marks accept a clear response eg. ✓ or X or shading etc. ignore X if combination of ✓ and X used</p>
d	<p>all have a correlation</p>  <p>(1)</p>	1	<p>more than one response = 0 marks accept a clear response eg. ✓ or X or shading etc. ignore X if combination of ✓ and X used</p>
Total		9	

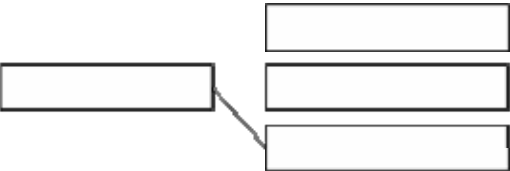
Question		Expected Answers	Marks	Rationale					
5	a	life could have arrived from space <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr></table> (1)		✓		1	more than one response = 0 marks accept a clear response eg. ✓ or X or shading etc. ignore X if combination of ✓ and X used		
✓									
	b	3500 (1) copy (1) data (1)	3	answers must be in correct order accept spelling mistakes accept any clear unambiguous indication, e.g. numbering of list					
		Total	4						
6		<table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>number</td></tr><tr><td>6</td></tr><tr><td>4</td></tr><tr><td>5</td></tr><tr><td>8</td></tr></table> (1) (1) allow 5* (1) (1)	number	6	4	5	8	4	apart from row two*, more than 1 number in any box = 0 for row two 4, 5 or 4+5 = 1 mark any other combination in box two = 0 mark
number									
6									
4									
5									
8									
		Total	4						
7		evolution (1) natural selection (1) prediction (1) confident (1)	4	words must be in correct order accept spelling mistakes accept any clear unambiguous indication, e.g. numbering of list					
		Total	4						
		Paper Total	42						

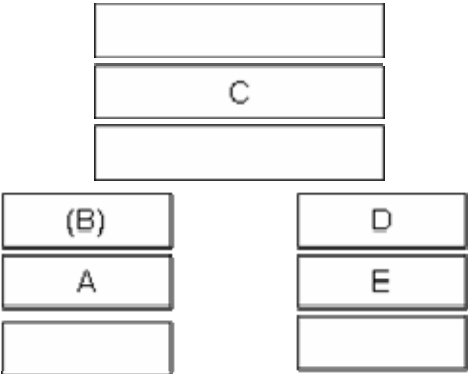
A221/02 Modules B1, B2, B3 Higher Tier

Question		Expected Answers	Marks	Rationale																					
1	a		3	all correct (3) three or two correct (2) one correct (1) if more than one line from left hand box mark as incorrect																					
	b	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%;"></td> <td style="width: 25%; text-align: center;">Philip</td> <td style="width: 25%; text-align: center;">Dd</td> </tr> <tr> <td></td> <td></td> <td colspan="2" style="text-align: center;">sperm</td> </tr> <tr> <td style="text-align: center;">Sharon</td> <td></td> <td style="text-align: center;">D</td> <td style="text-align: center;">d</td> </tr> <tr> <td style="text-align: center;">Dd</td> <td rowspan="2" style="text-align: center;">eggs</td> <td style="text-align: center;">D</td> <td style="text-align: center;">DD</td> <td style="text-align: center;">Dd</td> </tr> <tr> <td></td> <td style="text-align: center;">d</td> <td style="text-align: center;">Dd</td> <td style="text-align: center;">dd</td> </tr> </table>			Philip	Dd			sperm		Sharon		D	d	Dd	eggs	D	DD	Dd		d	Dd	dd	3	Philip box Dd (1) "egg boxes" D and d (1) either order. More than one letter in "egg boxes" is wrong fertilised egg boxes correctly filled in (1) Dd and dD are both correct if "egg boxes" not completed cannot award mark for fertilised egg boxes
		Philip	Dd																						
		sperm																							
Sharon		D	d																						
Dd	eggs	D	DD	Dd																					
		d	Dd	dd																					
		Total	6																						


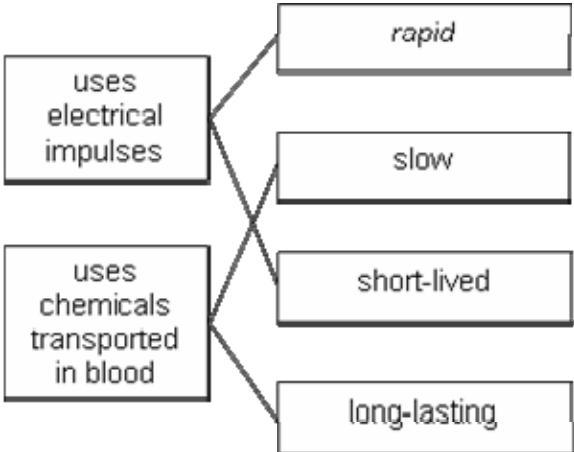
Question		Expected Answers	Marks	Rationale								
2	a	<table border="1"> <tr> <td></td> <td></td> </tr> <tr> <td>make the missing protein</td> <td>✓</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> </table> (1)			make the missing protein	✓					1	more than one response = 0 marks accept a clear response eg. ✓ or X or shading etc. ignore X if combination of ✓ and X used
make the missing protein	✓											
	b	i	Jim	1	do not accept J for Jim							
		ii	Marion (1) Robert (1)	2	either order accept spelling errors if clearly attempting to identify correct person accept M for Marion and R for Robert							
Total			4									

3	a	unspecialised/undifferentiated (1) nucleus (1) clone (1)	3	accept nuclei must be in correct order	
	b	i	C and F	1	either order is acceptable. accept any clear unambiguous indication
	b	ii	D and E	1	either order is acceptable. accept any clear unambiguous indication
Total			5		

Question		Expected Answers	Marks	Rationale			
4	a		1	if more than one line from left hand box then 0 marks ignore any links between boxes on the right hand side.			
	b	i	14	1	accept 14 000 000/1 000 000 or 14/1		
		ii	$(15\,000/60\,000\,000) \times 100 = 0.025\%$	2	for correct answer without working (2) $(15\,000/60\,000\,000) \times 100$ gains 1 mark or $(15\,000/60\,000\,000)$ 1 mark 15/600, 1/40 th or any correct ratio 1 mark		
	c	<p>risk of death from flu is greater than risk of side effects</p> <table border="1"> <tr><td>✓</td></tr> <tr><td></td></tr> <tr><td></td></tr> </table> <p>(1)</p>	✓			1	more than one response = 0 marks accept a clear response eg. ✓ or X or shading etc. ignore X if combination of ✓ and X used
✓							

Question	Expected Answers	Marks	Rationale
4 d		3	mark separately C correct (1) D and E correct, must be in correct order (1), A correct (1)
e	immune	1	
	Total	9	

Question		Expected Answers	Marks	Rationale						
5	a	greater risk of heart attacks <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	more than one response = 0 marks accept a clear response eg. ✓ or X or shading etc. ignore X if combination of ✓ and X used		
✓										
	b	all have a correlation <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td> </td></tr><tr><td>✓</td></tr></table> (1)			✓	1	more than one response = 0 marks accept a clear response eg. ✓ or X or shading etc. ignore X if combination of ✓ and X used			
✓										
	c	mechanism linking microorganisms <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> (1)					✓	1	more than one response = 0 marks accept a clear response eg. ✓ or X or shading etc. ignore X if combination of ✓ and X used	
✓										
	d i	(coronary) artery	1	allow arteries						
	ii	The blood is at high pressure <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><tr><td> </td></tr></table> (1)			✓				1	more than one response = 0 marks accept a clear response eg. ✓ or X or shading etc. ignore X if combination of ✓ and X used
✓										
Total			5							

Question	Expected Answers	Marks	Rationale
6 a	The article provides evidence for theory 1  (1)	1	more than one response = 0 marks accept a clear response eg. ✓ or X or shading etc. ignore X if combination of ✓ and X used
b	3500 (1) copy (1)	2	allow replicate / duplicate if list given any wrong answer cancels out correct answer so no mark
c i	nervous (1) hormone (1)	2	do not allow nerves/nerve cell/neurone/nerve system allow endocrine or hormonal for hormone but not named hormones eg. Adrenaline
	ii 	2	mark top left (1) and bottom left (1) independently lines must originate at left hand box need two lines from each left hand box for mark
	Total	7	

Question			Expected Answers	Marks	Rationale
7	a	i	6	1	only 6 more than one number/response = 0 marks accept correct written statement or part statement if clear which line eg. Hunted accept any clear unambiguous indication
		ii	4 and 5	1	both required, either order more than two numbers/responses given = 0 marks accept correct written statement or part statement if clear which line accept any clear unambiguous indication
		b	bio	1	allow species / biological
			Total	3	

8	a		prediction (1) confident (1)	2	words must be in correct order accept spelling mistakes accept any clear unambiguous indication, e.g. numbering of list
	b		sexual reproduction <input checked="" type="checkbox"/> mutation in sex cells <input checked="" type="checkbox"/>	1	one mark for each correct tick deduct one mark for each incorrect tick if more than two ticks used. Minimum mark 0. accept a clear response eg. X or shading etc ignore X if combination of ✓ and X used
			Total	3	

			Paper Total	42	
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A222/01 Modules B4, B5 and B6 Foundation Tier

Question		Expected Answers	Marks	Rationale									
1	a	excreting unwanted molecules (1) balancing water levels (1)	2	if more than 2 responses delete 1 mark for each additional response accept another clear correct response, e.g. underlining chosen answer									
	b	<table border="1"> <tbody> <tr> <td>sugar (glucose)</td> <td>-</td> <td>✓</td> </tr> <tr> <td>water</td> <td>-</td> <td>✓</td> </tr> <tr> <td>urea</td> <td>✓</td> <td>-</td> </tr> </tbody> </table>	sugar (glucose)	-	✓	water	-	✓	urea	✓	-	2	3 correct rows = 2 marks 2 correct rows = 1 mark 1 or 0 correct = 0 marks if ticks are correct, ignore crosses in the other boxes in each row accept another clear correct response in each row, e.g. a cross– but only if the other box in the row is blank
sugar (glucose)	-	✓											
water	-	✓											
urea	✓	-											
	c	increases (1)	1	more than one response = 0 marks accept another clear correct response eg underlining chosen answer									
		Total	5										

Question		Expected Answers	Marks	Rationale
2	a	homeostasis (1)	1	more than one response = 0 marks
	b		2	look at the links as they leave the left-hand boxes 3 correct = 2 marks 2 correct = 1 mark 1 or 0 correct = 0 marks
Total			3	

Question		Expected Answers	Marks	Rationale
3	a		4	<p>look at the links as they leave the left-hand boxes</p> <p>left set 3 correct = 2 marks left set 2 correct = 1 mark left set 1 or 0 correct = 0 marks right set 3 correct = 2 marks right set 2 correct = 1 mark right set 1 or 0 correct = 0 marks</p>
	b	from a dilute to a more concentrated solution through a partially permeable membrane (1)	1	more than one response = 0 marks accept another clear correct response, e.g. a cross, to indicate choice of statement
	c	add lots of water (1)	1	more than one response = 0 marks
		Total	6	

Question		Expected Answers	Marks	Rationale				
4	a	<div style="border: 1px solid black; padding: 2px; width: fit-content; margin-bottom: 5px;">fertilisation (1)</div> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin-bottom: 5px;">mitosis (1)</div> <div style="border: 1px solid black; padding: 2px; width: fit-content;">mitosis (1)</div>	3	if more than 3 responses deduct one mark for each additional response accept another clear correct response, e.g. lines linking the correct term to each box				
	b	... half that found in the parent cells. <div style="display: inline-block; vertical-align: middle; margin-left: 10px;"> <div style="border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center;"> <input type="checkbox"/> </div> <div style="border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-top: 2px;"> <input checked="" type="checkbox"/> </div> <div style="border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-top: 2px;"> <input type="checkbox"/> </div> </div> (1)	1	more than one response = 0 marks accept another clear correct response, e.g. a cross				
	c	<table border="1" style="border-collapse: collapse; text-align: center; width: 100%;"> <tr> <td style="width: 25%;">D</td> <td style="width: 25%;">B</td> <td style="width: 25%;">C</td> <td style="width: 25%;">A</td> </tr> </table>	D	B	C	A	2	B before C = 1 mark C before A = 1 mark
D	B	C	A					
Total			6					

Question			Expected Answers	Marks	Rationale
5	a	i	light (1)	1	more than one response = 0 marks accept another clear correct response, e.g. underlining chosen answer
	a	ii	phototropism (1)	1	more than one response = 0 marks accept another clear correct response, e.g. underlining chosen answer
	b	i	B (1)	1	more than one response = 0 marks accept another clear correct response, e.g. a line linking the correct letter to the space, or circle letter B
	b	ii	unspecialised cells (1)	1	more than one response = 0 marks accept another clear correct response, e.g. underlining chosen answer
	c		hormones (1)	1	more than one response = 0 marks accept another clear correct response, e.g. underlining chosen answer
			Total	5	

6	a		site of genetic code (1) <input type="text" value="A"/>	2	more than one response in each box = 0 marks accept another clear correct response, e.g. A line linking the correct letter to the box
			site of protein synthesis (1) <input type="text" value="B"/>		
	b		double (1) base (1)	2	each correct response = 1 mark must be in correct order accept another clear correct response, e.g. A line linking the correct term to the space
			Total	4	

Question			Expected Answers		Marks	Rationale
7	a	i	involuntary	<input checked="" type="checkbox"/>	1	First and second rows only must be ticked for (1) – ignore crosses in the third and fourth rows two correct responses = 1 mark accept another clear correct response in each of the two rows eg. a cross in both – but only if the third and fourth rows are blank
			rapid	<input checked="" type="checkbox"/>		
				<input type="checkbox"/>		
				<input type="checkbox"/>		
		ii	C (1)		1	more than one response = 0 marks accept another clear correct response, e.g. a line linking the correct letter to the space provided
		iii		<input type="checkbox"/>	2	1 mark for each correct response third and fourth rows must be ticked only to gain (2) - ignore crosses in the first and second rows accept another clear correct response in each of the two rows, e.g. a cross in both – but only if the first and second rows are blank
			insulate neuron from neighbouring cells	<input checked="" type="checkbox"/>		
			to speed up nerve impulses	<input checked="" type="checkbox"/>		
				<input type="checkbox"/>		
	b			<input type="checkbox"/>	1	more than one response = 0 marks accept another clear correct response, e.g. a cross
				<input type="checkbox"/>		
				<input type="checkbox"/>		
			to detect the stimulus	<input checked="" type="checkbox"/>		
Total					5	

Question		Expected Answers	Marks	Rationale
8	a	intelligence (1) language (1)	2	each correct response = 1 mark if more than two responses, delete 1 mark for each additional response accept another clear correct response eg underlining chosen answer
	b	Luke (1)	1	more than one response = 0 marks if no response, look at the diagram and accept the correct response, if indicated
Total			3	

9	a	blinking your eyes in bright light <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/> pulling your hand out of hot water <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/>	2	1 mark for each correct response first and third rows must be ticked only to gain (2) - ignore crosses in the second, fourth and fifth rows accept another clear correct response in each of the two rows eg. a cross in both – but only if the first and second rows are blank
	b	brain (1) spinal cord (1)	2	1 mark for each correct response if more than 2 responses delete 1 mark for each additional response accept another clear correct response eg underlining chosen answer
	c	peripheral (1)	1	more than one response (0) accept another clear correct response eg underlining chosen answer
Total			5	

Section Total			42	
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A222/02 Modules B4, B5 and B6 Higher Tier

Question		Expected Answers	Marks	Rationale	
1	a	homeostasis (1)	1	more than one response = 0 marks	
	b		2	look at the links as they leave the left-hand boxes 3 correct = 2 marks 2 correct = 1 mark 1 correct = 0 marks	
	c	i	enzymes (1)	1	more than one response = 0 marks accept any other clear response e.g. underlined
		ii	sweating (1) excretion of urine (1)	2	if more than two responses deduct 1 mark for each additional response accept any other clear response, e.g. underlined
Total			6		

Question		Expected Answers	Marks	Rationale									
2	a	<table border="1"> <tr> <td>concentrated sugar solution</td> <td>A</td> <td></td> </tr> <tr> <td>dilute sugar solution</td> <td>B</td> <td></td> </tr> <tr> <td>pure water</td> <td>C</td> <td></td> </tr> </table>	concentrated sugar solution	A		dilute sugar solution	B		pure water	C		2	<p>if more than one response in each row deduct 1 mark for each additional response</p> <p>3 correct = 2 marks 2 correct = 1 mark 1 or 0 correct = 0 marks</p>
concentrated sugar solution	A												
dilute sugar solution	B												
pure water	C												
	b	<p>dilute to more concentrated - partially permeable membrane</p> <table border="1"> <tr><td></td></tr> <tr><td></td></tr> <tr><td></td></tr> <tr><td>✓</td></tr> </table>				✓	1	<p>more than one response = 0 marks</p> <p>accept any other clear response, e.g. a cross – but only if the remaining rows are empty</p>					
✓													
	c	cell wall (1)	1	<p>More than one response = 0 marks</p> <p>accept any other clear response, e.g. underlined</p>									
	d	the cells burst (1)	1	<p>More than one response = 0 marks</p> <p>accept any other clear response, e.g. underlined</p>									
		Total	5										

Question		Expected Answers	Marks	Rationale				
3	a	B (1) D (1)	2	1 mark for each correct response if more than two responses deduct 1 mark for each additional response if no response – look at the diagram and accept the correct shapes, if indicated				
	b	i	1	active (site) (1) more than one response = 0 marks				
		ii	1	substrate concentration (1) more than one response = 0 marks accept any other clear response, e.g. underlined				
		iii	1	<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">the temperature of the solution</div> <table border="1" style="border-collapse: collapse; text-align: center;"> <tr><td style="width: 20px; height: 20px;"></td></tr> <tr><td style="width: 20px; height: 20px;"></td></tr> <tr><td style="width: 20px; height: 20px;"></td></tr> <tr><td style="width: 20px; height: 20px;">✓</td></tr> </table> <div style="margin-left: 10px;">(1)</div> </div> more than one response = 0 marks accept another clear correct response in the fourth row, e.g. a cross – but only if the first, second and third rows are blank				✓
✓								
Total			5					

Question		Expected Answers	Marks	Rationale				
4	a	A - fertilisation (1) B - mitosis (1) C - mitosis (1)	3	if more than 3 responses deduct 1 mark for each additional response accept another clear correct response, e.g. lines linking the correct term to each box or correct term written on the diagram at stage A, B or C.				
	b	half that found in the parent cells <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td> </td></tr><tr><td>✓</td></tr><tr><td> </td></tr></table> (1)		✓		1	more than one response = 0 marks accept another clear correct response, e.g. a cross but only if the first and third boxes are blank	
✓								
	c	<table border="1" style="display: inline-table;"><tr><td>D</td><td>B</td><td>C</td><td>A</td></tr></table>	D	B	C	A	2	B before C = 1 mark C before A = 1 mark
D	B	C	A					
Total			6					

Question			Expected Answers	Marks	Rationale						
5	a	i	number of cells <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="text-align: center;">✓</td></tr><tr><td> </td></tr><tr><td> </td></tr></table> width of stem <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="text-align: center;">✓</td></tr><tr><td> </td></tr><tr><td> </td></tr></table>	✓			✓			1	first and fourth rows only must be ticked for (1) – ignore crosses in the second and third rows two correct responses = 1 mark accept another clear correct response in each of the two rows, e.g. a cross in both – but only if the second and third rows are blank
✓											
✓											
		ii	Mica (1) Rachel (1)	2	if more than two responses deduct 1 mark for each additional response if no response – look at the diagram and accept the correct response for each person, if indicated						
	b	i	more auxin on the shaded side <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="text-align: center;">✓</td></tr><tr><td> </td></tr><tr><td> </td></tr></table> (1)	✓			1	more than one response = 0 marks accept another clear correct response in the first row, e.g. a cross – but only if the second and third rows are blank			
✓											
		ii	rate of cell growth increases (1)	1	More than one response = 0 marks accept any other clear response e.g. underlined						
Total				5							
6	a		<table border="1" style="display: inline-table;"><tr><td>(2)</td><td>3</td><td>1</td><td>2</td></tr></table>	(2)	3	1	2	2	3 correct = 2 marks 2 correct = 1 mark 1 or 0 correct = 0 marks		
(2)	3	1	2								
	b		1 (1)	1	more than one response = 0 marks accept any other clear response e.g. underlined						
Total				3							

Question			Expected Answers	Marks	Rationale
7	a	i	involuntary <input checked="" type="checkbox"/> rapid <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1	first and second rows only must be ticked for (1) – ignore crosses in the third and fourth rows two correct responses = 1 mark accept another clear correct response in each of the two rows e.g. a cross in both – but only if the third and fourth rows are blank
		ii	C (1)	1	more than one response = 0 marks accept another clear correct response e.g. a line linking the correct letter to the space provided
		iii	to insulate the neuron <input type="checkbox"/> to speed up nerve impulses <input checked="" type="checkbox"/> (1) <input checked="" type="checkbox"/> (1)	2	1 mark for each correct response third and fourth rows must be ticked only to gain (2) - ignore crosses in the first and second rows accept another clear correct response in each of the two rows e.g. a cross in both – but only if the first and second rows are blank
	b		to detect the stimulus <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> (1)	1	more than one response = 0 marks accept another clear correct response e.g. a cross
Total				5	

Question		Expected Answers	Marks	Rationale						
8	a	<table border="1" style="margin-left: 20px;"> <tr><td>D</td></tr> <tr><td>C</td></tr> <tr><td>A</td></tr> <tr><td>B</td></tr> </table>	D	C	A	B	3	4 correct = 3 marks 3 correct = 2 marks 2 correct = 1 mark 1 or 0 correct = 0 marks		
D										
C										
A										
B										
	b	decrease (1)	1	more than one response = 0 marks accept any other clear response e.g. underlined						
	c	<table style="margin-left: 20px;"> <tr> <td style="border: 1px solid black; width: 30px; height: 30px; text-align: center; vertical-align: middle;">1</td> <td style="border: 1px solid black; padding: 5px; margin-left: 10px;">can no longer transmit impulses</td> </tr> <tr> <td colspan="2" style="border: 1px solid black; padding: 5px; margin: 10px 0 10px 20px;">Is not affected</td> </tr> <tr> <td style="border: 1px solid black; width: 30px; height: 30px; text-align: center; vertical-align: middle;">2</td> <td style="border: 1px solid black; padding: 5px; margin-left: 10px;">continues to transmit impulses</td> </tr> </table>	1	can no longer transmit impulses	Is not affected		2	continues to transmit impulses	2	correct top line = 1 mark correct lower line = 1 mark if two or more lines lead from box 1 – do not award the first mark if two or more lines lead from box 2 – do not award the second mark
1	can no longer transmit impulses									
Is not affected										
2	continues to transmit impulses									
	d	increases (1)	1	more than one response = 0 marks accept any other clear response e.g. underlined						
Total			7							
Paper Total			42							

A223/01 Ideas in Context and Unit B7 – Foundation

Question			Expected Answers	Marks	Rationale
1	a	i	disease causing (1)	1	reject examples accept make you ill
		ii	organism on which the <u>pathogen</u> lives (1)	1	reject examples
	b		any two from: host does not die (1) pathogen does not die (1) that means pathogen will be passed on/ more time to reproduce (1)	2	maximum 2
	c	i	smallpox (virus)	1	
		ii	any two from: mumps (virus) (1) diphtheria bacterium (1) whooping cough (virus)(1) pneumonia bacteria tuberculosis (bacteria) (1) parainfluenza (virus) (1)	2	maximum 2
		iii	pure chance (1) competition (1)	2	

1	d	any two from: have evidence / data / experiment; (1) publishing / talk with other scientists; (1) (peer) reviews / work replicated; (1)	2	maximum 2 ignore 'proof' or 'scientist prove it' for first marking point
	e	any two from: symptoms / reaction / example of symptom e.g. headache (1) unwanted effects / unexpected (1) clear that it is caused by the vaccine / treatment (1)	2	maximum 2
Total			13	

Question			Expected Answers	Marks	Rationale
2	a	i	carbon dioxide (1) oxygen (1)	2	accept correct symbols
		ii	sun / light	1	
	b		for energy (1) for storage / insoluble (1) to make things they need/ use in other processes / named examples e.g. chlorophyll/cellulose/ enzymes (1)	3	
	c	i	something which stops photosynthesis going any faster (1)	1	accept it is a limiting factor for photosynthesis
		ii	give them more light owtte (1)	1	reject put in a greenhouse
		iii	increase temperature (1) increase carbon dioxide concentration (1)	2	
Total				10	

Question		Expected Answers	Marks	Rationale
3	a	cell wall / capsule / slime coat (1) (cell) membrane (1) DNA / chromosomes / genes (1)	3	reject nucleus and plasmid allow genetic information
	b	any three from the following ideas: identify gene (1) cut / isolate gene (1) idea of vector (1) use of enzyme (1) transfer / insert gene (1) bacteria divides (1) communication (1) QWC	4	maximum 3 from list each step must be biologically correct for each mark do not give mark for bacteria produces insulin QWC (1) needs only one read through to make grammatical sense even if content is wrong
	c	farmers make more profit (1) people have the right to decide (1) it is morally wrong (1)	3	accept other correct examples
	d	any three from : antibiotics / penicillin etc. (1) (single cell) protein / Mycoprotein / Quorn etc. (1) enzymes / rennin / cheese etc. (1) biodiesel / alcohol (1)	3	maximum 3 allow hormones; vaccines; drugs ignore medicine and named steroid hormones accept correctly named products e.g. penicillin
Total			13	

Question		Expected Answers	Marks	Rationale	
4	a	bone (1) ligaments (1) muscles (1) tendons (1)	4		
	b	i	structure 1: cartilage (1) structure 2: synovial fluid (1)	2	
		ii	protects bone (1) cushioning effect (1) lubricates joint (1) reduces friction/easier movement (1)	2	maximum 2
	c	pain / swelling/ difficult to move joint (1) rest / ice / cold compress / elevation / support it (1)	2	allow 'RICE'(acronym) (for 1) reject bandage	
Total			10		

Question			Expected Answers	Marks	Rationale
5	a	i	human	1	
		ii	flea	1	
	b	i	named parasite e.g. tapeworm/ leech/ hair lice / mosquito	1	reject flea
		ii	<p>tapeworm hooks/ suckers for attachment; thick cuticle / skin so not attacked by enzymes/resistant to the body chemicals so is not killed; both male and female so no need to find mate; flat so easy to absorb food/ large surface area; no intestines since food already digested;</p> <p>leech suckers for attachment; sharp teeth to pierce skin; can last long time between meals; chemicals to stop blood clotting;</p> <p>hair lice/ nits claws to hold on to hair; eggs (nits) attached to hair to avoid being dislodged; piercing mouthparts to get through skin; sucking mouthparts to suck up blood; small/ camouflaged so difficult to see;</p> <p>mosquito piercing mouthparts to get through skin; chemical to stop blood clotting; pumping action to suck up blood; wings to fly to find a new host. large number of eggs producing lots of offspring</p>	2	<p>maximum 2</p> <p>must relate to the named parasite in part b(i)</p>

Question		Expected Answers	Marks	Rationale
5	c	B (1) D (1)	2	
	d	cause disease (1) reduction of food (1)	2	
		Total	9	

A223/02 Ideas in Context and Unit B7 – Higher

Question		Expected Answers	Marks	Rationale
1	a	idea of reproduction (of pathogen) (1) idea of harm / disease OR pathogen gets some benefit (1) idea of spreading to other organisms (1)	3	ignore scientists prove it
	b	Idea of change e.g. flu (virus) mutates / antigens change (1) old vaccine / antibodies / wbc or immune system will not work (1)	2	accept flu becomes immune for second marking point do not accept people become <u>less</u> immune OR new type of flu
	c	the greater the survival time outside the body the greater the number of deaths caused (per 100 000 people infected) (1)	1	accept positive correlation

1	d	i	smallpox kills (more) people (1) can live (longer) outside the human body (1) ORA	2	accept tuberculosis, diphtheria, whooping cough as examples unless reverse argument given
		ii	any two from: have evidence / data / experiment (1) publishing / talk with other scientists (1) (peer) reviews / work replicated (1)	2	maximum 2 ignore 'proof' or 'scientist prove it' for first marking point
	e		any two from: symptoms / reaction / example of symptom e.g. headache (1) unwanted effects / unexpected (1) clear that it is caused by the vaccine / treatment (1)	2	maximum 2
Total				12	

Question		Expected Answers	Marks	Rationale
2	a	any two from: shortness of breath (1) tired / weak / lack of energy (1) <u>joint</u> pains (1) block blood vessels / no oxygen (1) red blood cells going sickle shaped / change shape (1)	2	maximum 2 ignore blood clots / bad circulation
	b	idea of mutated / faulty (allele/ gene) (1) which changes / codes the haemoglobin (1)	2	accept haemoglobin S (1) ignore reference to dominant and recessive
	c	has only one (faulty) allele / heterozygous (1) idea of few or no symptoms (1)	2	accept carries only one allele (1) accept does not have sickle cell anaemia reject incorrect reference to gene
	d	idea of gives resistance to <u>malaria</u> (1)	1	
	e	resistance to (malaria) means sickle cell (allele) / carriers survives (1) non-carriers likely to die (1) survivors breed / pass on (sickle cell allele) to next generation (1)	3	error carried forward from 2d better chance of survival = (2) more survive = (2)
Total			10	

Question		Expected Answers	Marks	Rationale
3	a	(cell) wall / capsule / slime coat (1) (cell) membrane (1) DNA / chromosomes / genes (1)	3	reject nucleus and plasmid allow genetic information
	b	any three from the following ideas: identify gene (1) cut / isolate gene (1) idea of vector (1) use of enzyme (1) transfer / insert gene (1) bacteria divides (1) communication (1) QWC	4	maximum 3 from list each step must be biologically correct for each mark. do not give mark for bacteria produces insulin. QWC 1 Needs only one read through to make grammatical sense even if content is wrong
	c	farmers make more profit (1) people have the right to decide (1) it is morally wrong (1)	3	accept other correct examples
	d	any three from: antibiotics / penicillin etc (1) (single cell) protein / mycoprotein / Quorn etc. (1) enzymes / rennin / cheese etc (1) biodiesel / alcohol (1)	3	maximum 3 allow hormones; vaccines; drugs; ignore medicine and named steroid hormones accept correctly named products e.g. penicillin
Total			13	

Question		Expected Answers	Marks	Rationale
4	a	ATP (1)	1	
	b	(more) energy needed (1) oxygen and glucose (supply energy) (1)	2	oxygen and glucose supply energy = 2
	c	i	4	mark both sections together
		ii		
		not enough oxygen / oxygen needed (1) produces lactic acid (1)		
		to remove carbon dioxide (1) break down (lactic) acid (1)		
	d	advantage oxygen not needed (1) disadvantage oxygen / debt has to be repaid / produces less energy / produces lactic acid / muscle pain (1)	2	allow still produce energy by only using glucose ignore faster / burst of energy allow oxygen debt produced
Total			9	

Grade Thresholds

General Certificate of Secondary Education
Biology A (Specification Code J633)
June 2008 Examination Series

Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
A221/01	Raw	42	N/A	N/A	N/A	30	25	20	16	12	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A221/02	Raw	42	36	32	26	20	13	9	N/A	N/A	0
	UMS	50	45	40	35	30	25	23	N/A	N/A	0
A222/01	Raw	42	N/A	N/A	N/A	28	24	20	17	14	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A222/02	Raw	42	36	31	25	20	15	12	N/A	N/A	0
	UMS	50	45	40	35	30	25	23	N/A	N/A	0
A223/01	Raw	55	N/A	N/A	N/A	28	23	18	13	8	0
	UMS	100	N/A	N/A	N/A	60	50	40	30	20	0
A223/02	Raw	55	47	39	30	21	16	13	N/A	N/A	0
	UMS	100	90	80	70	60	50	45	N/A	N/A	0
A229	Raw	40	33	29	25	21	17	13	10	7	0
	UMS	100	90	80	70	60	50	40	30	20	0
A230	Raw	40	33	30	26	23	19	16	13	10	0
	UMS	100	90	80	70	60	50	40	30	20	0

A229/A230 (Coursework) - The grade thresholds have been determined on the basis of the work that was presented for award in June 2008. The threshold marks will not necessarily be the same in subsequent awards.

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
J633	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
J633	13.8	50.1	81.0	94.5	98.7	99.7	100.0	100.0	100.0	11 730

12 143 candidates were entered for aggregation this series

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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