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OCR
RECOGNISING ACHIEVEMENT

GCSE

Biology A
Twenty First Century Science

General Certificate of Secondary Education **J633**

Mark Schemes for the Units

June 2009

J633/MS/R/09

Oxford Cambridge and RSA Examinations

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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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Guidance for Examiners

Additional Guidance within any mark scheme takes precedence over the following guidance.

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. Accept any clear, unambiguous response which is correct, e.g. mis-spellings if phonetically correct (but check additional guidance).

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/reject	=	answers which are not worthy of credit
ignore	=	statements which are irrelevant – applies to neutral answers
allow/accept	=	answers that can be accepted
(words)	=	words which are not essential to gain credit
words	=	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' (1)

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. Crossed out answers should be considered only if no other response has been made. When marking crossed out responses, accept correct answers which are clear and unambiguous.

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7. The list principle:

If a list of responses greater than the number requested is given, 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, e.g. 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:

Always check the additional guidance.

If there is a set of boxes, some of which should be ticked and others left empty, then judge the entire set of boxes.
If there is at least one tick, ignore crosses. If there are no ticks, accept clear, unambiguous indications, e.g. shading or crosses.
Credit should be given for each box correctly ticked. If more boxes are ticked than there are correct answers, then deduct one mark for each additional tick. Candidates cannot score less than zero marks.

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 <u>should be blank</u> (or have indication of choice crossed out).

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

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A221/01 Modules B1, B2, B3 Foundation Tier

Question			Expected Answers	Marks	Rationale
1	a		The cells of the embryo separated into two groups ✓	[1]	if more than one box is ticked then box scores zero **allow** any other clearly identified correct response e.g. shading in the box
1	b		There are differences between Neil and Ranjit caused by their environments. ✓	[1]	if more than one box is ticked then box scores zero **allow** any other clearly identified correct response e.g. shading in the box
1	c		Deciding whether or not the pregnancy should be terminated. ✓	[1]	if more than one box is ticked then box scores zero **allow** any other clearly identified correct response e.g. shading in the box
			Total	[3]	

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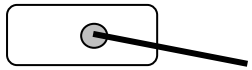
Question			Expected Answers	Marks	Rationale
2	a		 instructions for how an organism develops are found here	[1]	line should be drawn from the shaded circle, exiting the cell, and clearly heading towards the label box **accept** the label line if touches the edge or inner part of the shaded circle **reject** any separate labels that may be drawn by the candidate
2	b	i	recessive (1)	[1]	**allow** any other clearly identified response e.g. underlining or shading
2	b	ii	one (1)	[1]	
2	b	iii	50% (1)	[1]	**allow** any other clearly identified response e.g. underlining or shading
			Total	[4]	

Question			Expected Answers	Marks	Rationale
3	a		Jane (1) Peter (1)	[2	**accept** either way round
3	b		Peter (1)	[1]	
3	c		Stella (1)	[1]	
			Total	[4]	

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<table>
<tr><th colspan="3">Question</th><th>Expected Answers</th><th>Marks</th><th>Rationale</th></tr>
<tr><td>4</td><td></td><td></td><td>
<table>
<tr><th></th><th>genes</th><th>environment</th><th>both</th></tr>
<tr><td>Huntington’s disorder</td><td>✓</td><td></td><td></td></tr>
<tr><td>the sex of a person</td><td>✓</td><td></td><td></td></tr>
<tr><td>heart disease</td><td></td><td></td><td>✓</td></tr>
</table>
</td><td>[3]</td><td>one mark for each correct tick
see guidance if there is more than 1 tick on each line</td></tr>
<tr><td colspan="3"></td><td>Total</td><td>[3]</td><td></td></tr>
</table>

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Question			Expected Answers	Marks	Rationale
5	a		fatty diet ✓ smoking ✓	[1]	both ticks required for the mark if more than two boxes are ticked then each incorrect box loses one mark from the total for the question the candidate cannot score less than zero
5	b		Dave's blood vessels built up fatty deposits Dave's heart muscle did not get enough oxygen	[2]	if more than one line is drawn then line scores zero. one mark can be given for either the correct cause or correct effect only the candidate cannot score less than zero
5	c		food ✓	[1]	if more than one box is ticked then box scores zero **allow** any other clearly identified correct response e.g. shading in the box
			Total	[4]	

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Question			Expected Answers	Marks	Rationale
6	a		antibiotics do not work against viruses ✓ the bacteria are resistant to the antibiotics ✓	[2]	if more than two boxes are ticked then each incorrect box loses one mark from the total for the question the candidate cannot score less than zero
6	b		**D** (E) **B** (A) **C**	[2]	D before B = 1 mark B before C = 1 mark
			Total	[4]	

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Question			Expected Answers	Marks	Rationale
7	a		any age between 0 and 1½ inclusive (1)	[1]	**accept** 0-18 **months**
7	b		1 (years) (1)	[1]	
7	c		4 and 15 (1)	[1]	if more than one answer is ringed then ring scores zero the candidate cannot score less than zero **allow** any other clearly identified response e.g. underlining or shading
7	d		people did not have time to make enough antibodies ✓	[1]	if more than one box is ticked then box scores zero **allow** any other clearly identified correct response e.g. shading in the box
7	e	i	Jane (1)	[1]	
7	e	ii	Stella (1)	[1]	
			Total	[6]	

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Question			Expected Answers	Marks	Rationale
8	a		3500 million years (1)	[1]	if more than one answer is ringed then ring scores zero the candidate cannot score less than zero **allow** any other clearly identified response e.g. underlining or shading
8	b		could copy themselves ✓ ☐ ☐ ☐	[1]	if more than one box is ticked then box scores zero **allow** any other clearly identified correct response e.g. shading in the box
8	c		☐ ☐ ☐ natural selection ✓	[1]	if more than one box is ticked then box scores zero **allow** any other clearly identified correct response e.g. shading in the box

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Question			Expected Answers	Marks	Rationale
8	d		... would not have taken place. ☐ ... would have produced the same result. ☐ ... could have produced a different result. ✓ ... always happens more quickly. ☐ ... always happens more slowly. ☐	[1]	if more than one box is ticked then box scores zero **allow** any other clearly identified correct response e.g. shading in the box
			Total	[4]	

Question			Expected Answers	Marks	Rationale
9	a		Ranjit and Peter (1)	[2]	**accept** either way round if more than two answers are given then each incorrect answer loses one mark from the total for this question the candidate cannot score less than zero
9	b		Jane (1)	[1]	if more than one answer is given then score is zero
9	c		Peter (1)	[1]	if more than one answer is given then score is zero
			Total	[4]	

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<table>
<tr><th colspan="3">Question</th><th>Expected Answers</th><th>Marks</th><th>Rationale</th></tr>
<tr><td>10</td><td>a</td><td></td><td>cells that contract in muscles ✓
cells in glands found in the body ✓

[2]</td><td></td><td>if more than two boxes are ticked then each incorrect box loses one mark from the total for the question
the candidate cannot score less than zero</td></tr>
<tr><td>10</td><td>b</td><td></td><td>brain ✓

spinal cord ✓

[2]</td><td></td><td>if more than two boxes are ticked then each incorrect box loses one mark from the total for the question
the candidate cannot score less than zero</td></tr>
<tr><td>10</td><td>c</td><td></td><td><table><tr><th>hormonal system</th><th>nervous system</th></tr><tr><td>chemical
long lasting
slow</td><td>electrical
fast
short lasting</td></tr></table>[2]</td><td></td><td>hormonal system:
all three correct in any vertical order = 1 mark

nervous system:
all three correct in any vertical order = 1 mark</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>[6]</td><td></td></tr>
</table>

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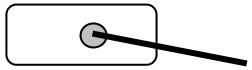
A221/02 Modules B1, B2, B3 Higher Tier

Question			Expected Answers	Marks	Rationale
1	a		 instructions for how an organism develops are found here	[1]	line should be drawn from the shaded circle, exiting the cell, and clearly heading towards the label box **accept** the label line if it touches the edge or inner part of the shaded circle **reject** any separate labels that may be drawn by the candidate
1	b	i	recessive (1)	[1]	**allow** any other clearly identified response e.g. underlining or shading
1	b	ii	one (1)	[1]	
1	b	iii	50% (1)	[1]	**allow** any other clearly identified response e.g. underlining or shading
			Total	[4]	

Question			Expected Answers	Marks	Rationale
2	a		Peter (1)	[1]	if more than one answer is given then score is zero
2	b		Jane Ali	[1]	both correct for 1 mark **accept** either way round if more than two answers are given then score is zero he candidate cannot score less than zero
2	c		Stella Ali	[1]	both correct for 1 mark **accept** either way round if more than two answers are given then score is zero the candidate cannot score less than zero
			Total	[3]	

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Question			Expected Answers	Marks	Rationale
3	a	i	XY (1)	[1]	**accept** YX OR xy OR yx **accept** mixed cases e.g. Xy
3	a	ii	XX (1)	[1]	**accept** xx **reject** mixed upper and lower cases
3	b		Sex is determined by a gene on both the X and the Y chromosome. Sex is determined by a gene on the X chromosome. Sex is determined by a gene on the Y chromosome. Sex is determine by the absence of a gene on the X and the Y chromosome. It causes the embryo to develop into a female. It stops the sex organs from developing into either ovaries or testes. It causes the sex organs to develop into either ovaries or testes. It causes the embryo to develop into a male.	[1]	if more than one line is drawn then score is zero the candidate cannot score less than zero
			Total	[3]	

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Question			Expected Answers	Marks	Rationale
4			Genes can code for structural proteins. ✓ Genes can code for enzymes. ✓ Genes are sections of a DNA molecule. ✓	[3]	If more than three boxes are ticked then each incorrect box loses one mark from the total for the question. The candidate cannot score less than zero.
			Total	**[3]**	

Question			Expected Answers	Marks	Rationale
5	a		any age between 0 and 1½ inclusive (1)	**[1]**	**accept** 0 – 18 <u>months</u>
5	b		1 (years) (1)	**[1]**	
5	c		4 & 15 (1)	**[1]**	if more than one answer is ringed then ring scores zero. the candidate cannot score less than zero **allow** any other clearly identified response e.g. underlining or shading

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Question			Expected Answers	Marks	Rationale
5	d		people did not have time to make enough antibodies ✓	[1]	if more than one box is ticked then box scores zero **allow** any other clearly identified correct response e.g. shading in the box
5	e	i	Jane (1)	[1]	
5	e	ii	Stella (1)	[1]	
			Total	[6]	

Question			Expected Answers	Marks	Rationale
6	a		Both drugs and placebos are used in the trial. ✓ Neither the doctor or the patient knows who is receiving the drug. ✓	[2]	if more than two boxes are ticked then each incorrect box loses one mark from the total for the question the candidate cannot score less than zero

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Question			Expected Answers	Marks	Rationale
6	b		Bacterial mutations can produce varieties that are less affected by the antibiotic. ✓ Bacteria become resistant to antibiotics. ✓	[2]	if more than two boxes are ticked then each incorrect box loses one mark from the total for the question the candidate cannot score less than zero
			Total	[4]	

Question			Expected Answers	Marks	Rationale
7	a		B (1)	[1]	if more than one answer is given then score is zero
7	b		C and D (1)	[2]	**accept** either way round if more than two answers are given then each incorrect answer loses one mark from the total for this question the candidate cannot score less than zero
7	c		A (1)	[1]	if more than one answer is given then score is zero
			Total	[4]	

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Question			Expected Answers	Marks	Rationale
8	a		Ranjit and Peter (1)	[2]	**accept** either way round if more than two answers are given then each incorrect answer loses one mark from the total for this question the candidate cannot score less than zero
8	b		Jane (1)	[1]	if more than one answer is given then score is zero
8	c		Peter (1)	[1]	if more than one answer is given then score is zero
			Total	[4]	

Question			Expected Answers	Marks	Rationale
9	a		direct and indirect human activity ✓ Introduction of a new predator species ✓	[1]	both answers correct for 1 mark if more than two boxes are ticked then score = zero **allow** any other clearly identified correct response e.g. shading in the box

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<table>
<tr><th colspan="3">Question</th><th>Expected Answers</th><th>Marks</th><th>Rationale</th></tr>
<tr><td>9</td><td>b</td><td></td><td>Organisms have a better chance of survival if they have a diverse food supply. ✓
The extinction of a species in a food web has implications for many other species. ✓</td><td>[1]</td><td>both answers correct for 1 mark
if more than two boxes are ticked then score = zero
allow any other clearly identified correct response e.g. shading in the box</td></tr>
<tr><td>9</td><td>c</td><td></td><td><table><tr><th>not likely to cause extinction</th><th>may cause extinction</th></tr><tr><td>B
C
F</td><td>A
D
E</td></tr></table></td><td>[3]</td><td>six correct = 3 marks
five correct = 2 marks
four correct = 1 mark
one, two or three correct = 0 marks

any letter written in both columns scores zero for that letter</td></tr>
<tr><td colspan="3"></td><td>Total</td><td>[5]</td><td></td></tr>
</table>

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Question			Expected Answers	Marks	Rationale
10	a		Human evolution shows different groups evolving from one common group. ✓ Some species became extinct. ✓	[2]	one mark for each correct answer if more than two boxes are ticked then each incorrect box loses one mark from the total for the question the candidate cannot score less than zero
10	b		A larger brain increases the chance of survival. ✓ A larger brain allowed the development of new skills. ✓	[2]	one mark for each correct answer if more than two boxes are ticked then each incorrect box loses one mark from the total for the question the candidate cannot score less than zero

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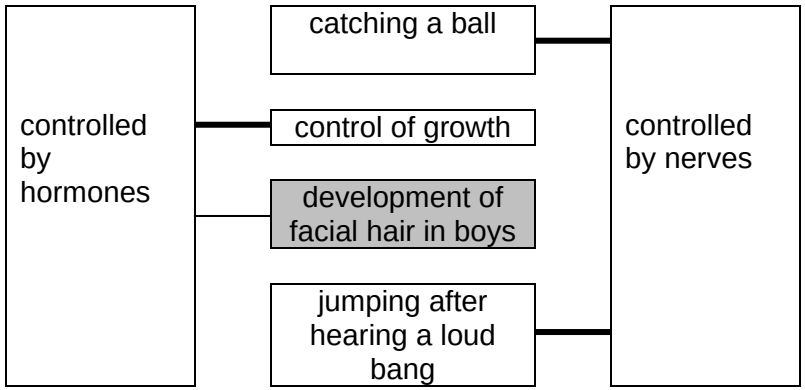
Question			Expected Answers	Marks	Rationale
10	c		**examples of responses**  	**[2]**	three lines correct = 2 marks two lines correct = 1mark. one line correct = 0 marks if more than three lines are drawn then each incorrect line loses one mark from the total for this question the candidate cannot score less than zero
			Total	**[6]**	

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A222/01 Modules B4, B5 and B6 Foundation Tier

Question			Expected Answers	Marks	Rationale
1	a		protein ✓ (1)	[1]	more than one response = 0 mark **accept** any clear response e.g. underline the correct sentence, use of a single cross, shade the box.
1	b		increases (1)	[1]	more than one response = 0 marks **accept** any clear response e.g. underline the correct sentence.
1	c		stop (1) shape (1)	[2]	1 mark per correct response in each sentence response is incorrect if more than one word per line
			Total	[4]	

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Question			Expected Answers	Marks	Rationale
2	a		a more concentrated solution of glucose ☐ ✓ ☐ (1)	[1]	more than one response = 0 marks **accept** any clear response e.g. underline the correct sentence, use of a single cross, shade the box.
2	b		more water molecules will move from B to A ☐ ☐ ✓ (1)	[1]	more than one response = 0 marks **accept** a clear response e.g. underline the correct sentence, use of a single cross, shade the box
2	c		diffusion water dilute concentrated	[2]	four correct = 2 marks two or three correct = 1 mark 0 or 1 correct = 0 marks response is incorrect if more than 1 word per space.
			Total	[4]	

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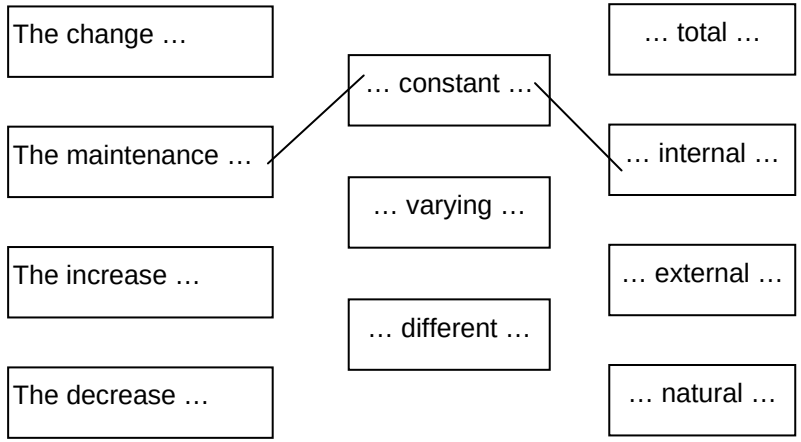
Question			Expected Answers	Marks	Rationale
3	a		increases slightly (1)	[1]	more than one response = 0 marks **accept** a clear response e.g. underlining the correct words.
3	b		brain skin brain	[2]	three correct responses = 2 marks one or two correct responses = 1 mark response is incorrect if more than one word per line
3	c		respiring (1)	[1]	more than one response = 0 marks **accept** a clear response e.g. underlining the correct word
3	d			[2]	one mark for each correct line if two lines or more on one side = 0 marks for that marking point.
			Total	[6]	

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Question			Expected Answers	Marks	Rationale
4	a		D (1)	[1]	more than one response = 0 marks
4	b		halves (1)	[1]	more than one response = 0 marks **accept** a clear response e.g. underlining the correct words.
4	c		… combination of chromosomes. ✓ … chromosomes from each parent. ✓ … chromosomes found in the sperm. ✓	[2]	look at each row 3 correct rows = 2 marks 2 correct rows = 1 mark deduct 1 mark for each additional incorrect response **accept** any clear response e.g. underlining the correct words, use of a single cross, shading of the box
4	d		46 (1)	[1]	more than one response = 0 marks **accept** any clear response e.g. underlining the correct word
			Total	[5]	

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Question			Expected Answers	Marks	Rationale
5	a		nucleus (1) cytoplasm (1)	[2]	correct response per box=1 mark if more than one response in box = 0 marks for that box
5	b		double (1) bases (1)	[2]	correct response per space = 1mark response is incorrect if more than one word per line.
5	c		Most animal cells become highly specialised. ✓ Some plant cells remain unspecialised. ✓	[2]	1 mark for each correct box. if more than two responses deduct 1 mark for each additional response **accept** any clear response e.g. underlining the correct words, use of a single cross, shading of boxes.
			Total	[6]	

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Question			Expected Answers	Marks	Rationale
6	a		phototropism (1)	[1]	more than one response = 0 marks **accept** phonetic spelling options
6	b		… give the plant a light source from above. ☐ ☐ ✓ ☐ (1)	[1]	more than one response = 0 marks **accept** any clear response e.g. underline the correct sentence, use of a single cross, shade the box
6	c		hormones (1) roots (1) unspecialised (1)	[3]	1 mark per correct response in each sentence response is incorrect if more than one word per line
			Total	**[5]**	

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Question			Expected Answers	Marks	Rationale
7	a		C A D B	[2]	three or four correct responses = 2 marks one or two correct responses = 1 mark if more than one response in any box then that box is an incorrect response.
7	b		… insulates the neuron from … ✓ (1) … increases the speed of transmission … ✓ (1)	[2]	1 mark for each correct response if more than two responses deduct one mark for each additional response 4 or 5 responses=0 marks **accept** any clear response e.g. underlining the correct words, use of a single cross, shading of box.
7	c		sensory neurons (1) motor neurons (1)	[2]	1 mark for correct response in each sentence response is incorrect if more than 1 word per line.
			Total	[6]	

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Question			Expected Answers	Marks	Rationale
8	a		learning language (1) thinking to solve problems(1)	[2]	1 mark per correct response if more than two responses deduct 1 mark per additional response. 4 or 5 responses =0 marks. **accept** any clear response e.g. underlining the correct words, ticking of correct response.
8	b		… storage and retrieval of information. ☐ ✓ ☐ (1)	[1]	more than one response = 0 marks **accept** any clear response e.g. underlining the correct words, use of a single cross, shading of box.
			Total	[3]	

Question			Expected Answers	Marks	Rationale
9	a		… are formed. ☐ ☐ ✓ ☐ (1)	[1]	more than one response = 0 marks **accept** any clear response e.g. underline the correct sentence, use a single cross, shade the box
9	b		repetition (1) new (1)	[2]	1 mark per correct response in each sentence response is incorrect if more than one word per line
			Total	[3]	

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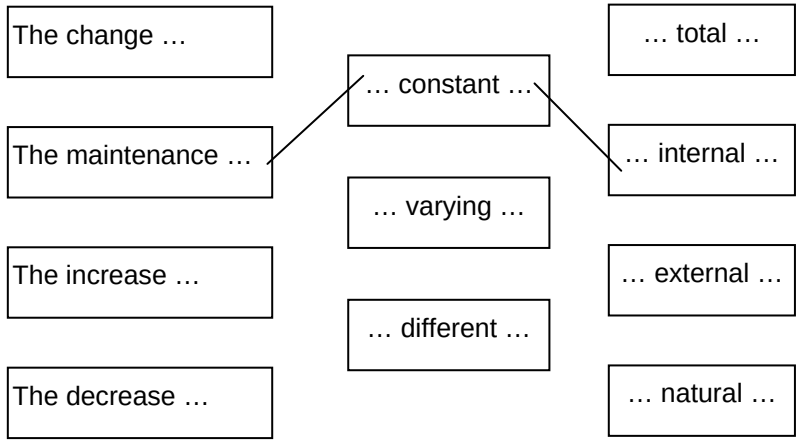
A222/02 Modules B4, B5 and B6 Higher Tier

Question			Expected Answers	Marks	Rationale
1	a		brain skin brain	[2]	three correct responses = 2 marks one or two correct responses = 1 mark response is incorrect if more than one word per line
1	b		respiring (1)	[1]	more than one response = 0 marks **accept** other clear response e.g. underline
1	c			[2]	one mark for each correct line if two lines or more on one side – 0 mark for marking point
			Total	[5]	

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Question			Expected Answers	Marks	Rationale
2	a		☐ ☐ ☐ … speed up chemical reactions in cells ☑ (1)	[1]	more than one response = 0 marks **accept** a clear response e.g. underline the correct sentence, use a single cross, shade the box
2	b		B C E D (2)	[2]	B before C = 1 mark C before E = 1 mark
2	c		… affects the shape of the active site … (1)	[1]	more than one response = 0 marks **accept** a clear response e.g. underline the correct sentence, use a single cross, shade the box
2	d		**right**: Jane, Sharon **wrong**: Paul, Scott	[2]	all four correct = 2 marks two or three correct = 1 mark 1 or 0 correct = 0 marks if a name appears in both boxes – incorrect response (one response cancels out the other)
			Total	**6**	

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Question			Expected Answers	Marks	Rationale
3	a		urea (1) *then (either order):* sugar (1) water (1)	[3]	
3	b	i	ADH	[1]	more than one response = 0 marks **accept** other clear response e.g. underline
3	b	ii	… increases. ☐ ✓ ☐ ☐ (1)	[1]	more than one response = 0 marks **accept** a clear response e.g. underline the correct sentence, use a single cross, shade the box
			Total	[5]	

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Question			Expected Answers	Marks	Rationale
4	a		phototropism (1)	[1]	more than one response = 0 marks **accept** phonetic spelling options
4	b		... give the plant a light source from above. ☐ ☐ ✓ ☐ (1)	[1]	more than one response = 0 marks **accept** a clear response e.g. underline the correct sentence, use a single cross, shade the box
4	c		hormones (1) roots (1) unspecialised (1)	[3]	1 mark per correct response in each sentence response is incorrect if more than one word per line
			Total	[5]	

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Question			Expected Answers	Marks	Rationale
5	a		bases (1) amino acids (1)	[2]	responses must be in the correct order response is incorrect if more than one term per line
5	b		… to form two new strands of DNA. ✓ (1)	[1]	more than one response = 0 marks **accept** a clear response e.g. underline the correct sentence, use a single cross, shade the box
5	c		Meiosis produces gametes. ✓ … new cells identical to each other. ✓ … each contain 46 chromosomes. ✓	[2]	three correct responses = 2 marks 2 correct responses = 1 mark 1 or 0 correct responses = 0 marks more than three responses deduct one mark for each additional response **accept** clear responses e.g. underline the correct sentences, shade the boxes, put crosses in correct boxes (if **no** ticks in other boxes)
			Total	[5]	

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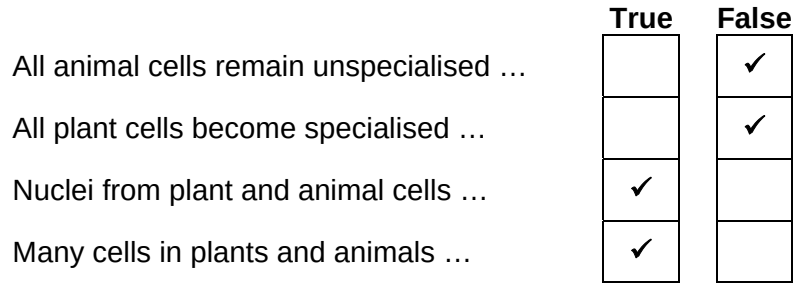
Question			Expected Answers	Marks	Rationale
6	a		mitosis unspecialised	[1]	responses must be in the correct order 1 mark = **both** correct responses more than two responses = 0 marks
6	b		8 cell stage	[1]	more than one response = 0 marks **accept** other clear response e.g. underline
6	c			[2]	all four correct responses = 2 marks two or three correct responses = 1 mark 1 or 0 correct responses = 0 marks if both boxes ticked on a line = incorrect response
			Total	[4]	

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Question			Expected Answers	Marks	Rationale
7	a		… are formed. ☐ ☐ ✓ ☐ (1)	[1]	more than one response = 0 marks **accept** a clear response e.g. underline the correct sentence, use a single cross, shade the box
7	b		repetition (1) new (1)	[2]	1 mark per correct response in each sentence response is incorrect if more than one word per line
			Total	[3]	

Question			Expected Answers	Marks	Rationale
8	a		D E C F A (3)	[3]	E before C (1) C before F (1) F before A (1)
8	b		… can only travel in one direction. ☐ ✓ ☐ ☐ (1)	[1]	more than one response = 0 marks **accept** a clear response e.g. underline the correct sentence, use a single cross, shade the box
			Total	[4]	

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Question			Expected Answers	Marks	Rationale
9	a		… saliva by a dog when a bell rings ✓ (1) … brightly-coloured caterpillars … ✓ (1)	[2]	one mark for each correct response if more than two responses deduct one mark for each additional response **accept** clear responses e.g. underline the correct sentences, shade the boxes, put crosses in correct boxes (if **no** ticks in other boxes)
9	b		A secondary stimulus is associated … ✓ The final response has no direct … ✓	[1]	two correct responses = 1 mark if more than two responses = 0 marks **accept** clear responses e.g. underline the correct sentences, shade the boxes, put crosses in correct boxes (if **no** ticks in other boxes)
9	c		brain neuron motor reflex arc	[2]	4 correct responses = 2 marks 2 or 3 correct responses = 1 mark 1 or 0 correct response = 0 marks response is incorrect if more than one term per space
			Total	[5]	

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A223/01 Ideas in Context plus Module B7 Foundation Tier

Question			Expected Answers	Marks	Rationale
1	a	i	3 (times) (1)	1	
		ii	**any two from:** longer than normal pregnancy; having older brothers/sisters; level of oestrogen / synthetic hormone / oestrogen;	2	
		iii	idea of … increases the chance of getting it / something that could cause harm (1)	1	**ignore** use of the word 'risk' **reject** causes disease **reject** 'what causes it' 'It' = the disease **accept** 'what could cause it'
	b		distance from one hip bone to the other / hip width (1)	1	
	c	i	beginning **and** end (1)	1	
		ii	changes to breast tissue (1)	1	
	d		women given synthetic hormone (to stop miscarriage) (1) babies/offspring/children were more at risk (of getting breast cancer) (1)	2	
	e		reliable / confident / significant / valid / confirm/ reduces effect of outliers (1)	1	**Ignore** accurate
	f		**any two from:** (develop/use) drugs; to lower/control oestrogen (to normal levels); regular screening for those at risk;	2	
			Total	**12**	

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Question			Expected Answers	Marks	Rationale
2			starts with the sun; autotrophs before heterotrophs; chemical energy used correctly;	2	All 3 correct = 2 marks 2 correct = 1 mark 1 correct = 0 marks reference to energy created/made/produced then max 1 mark
			Total	**2**	

Question			Expected Answers	Marks	Rationale
3			30 or 140-110 shown (1) 20 (1)	2	if 20 given then = 2 marks
			Total	**2**	

Question			Expected Answers	Marks	Rationale
4	a		A (is pyramid of) number (1) B (is pyramid of) (bio)mass (1)	2	**accept** pyramid of 'energy' for biomass
	b		A shows the numbers of organisms at each level (1) B shows (bio)mass/energy at each level (1)	2	use ecf e.g. if in (a) B is given as pyramid of number then mark (b) accordingly
			Total	**4**	

Question			Expected Answers	Marks	Rationale
5	a		water on left of arrow (1) oxygen on right of arrow (1)	2	
	b		(low) light / (low) temperature / (low) levels of carbon dioxide (1)	1	**accept** 'put in the dark' do not accept 'less Sun' (must be sunlight) **accept** (less) water do not accept reference to 'rain'
	c	**i** **ii**	starch / cellulose (1) proteins / polypeptides / peptides/ enzymes (1)	2	
			Total	**5**	

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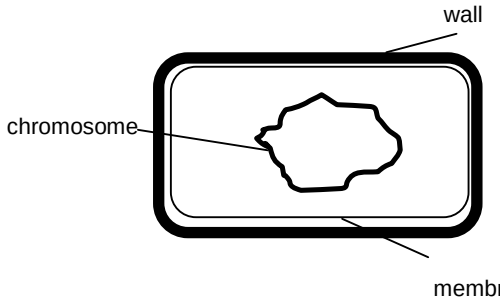
Question			Expected Answers	Marks	Rationale
6	a		**parasite** benefits (1) **host** gets harmed (1)	2	must specify which organism benefits and which is harmed
	b		**any three from:** identifying the three incorrect sentences; animals and plants can be parasites ; parasites can / sometimes kill their host; the parasite can live inside or outside of the host;	3	maximum 3 marks
			Total	**5**	

Question			Expected Answers	Marks	Rationale
7	a			3	
	b		**any two from:** quorn/TVP; yoghurt; antibiotics/named antibiotic; single cell protein; enzymes; alcohol/alcoholic drinks; cheese product; vinegar; insulin;	2	**accept** 'food'
	c		ethical (1) personal or religious belief / we should not do it / idea of morals / unnatural / wrong to do it / not based on data (1)	2	**reject** social arguments e.g. we do not understand the risks / might cause harm etc
			Total	**7**	

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Question			Expected Answers	Marks	Rationale
8	a		contract (1)	1	**accept** shorten
	b		heart rate increases (1) breathing rate increases (1) clear ordered answer (1)	3	answer must be relevant to the question, clear and easily understood
	c		glucose on left (1) lactic acid on right (1)	2	
	d		uses oxygen / releases more energy / releases CO_2 / does not produce lactic acid (1)	1	**accept** reverse argument if applied to anaerobic respiration
			Total	**7**	

Question			Expected Answers	Marks	Rationale
9	a		white cell - fights infection (1) platelet - clots blood (1) red cell - transports oxygen (1)	3	
	b		has (AB) antigens on red cells (1) no (AB) antibodies in plasma (1)	2	**ignore** reference to universal donors and recipients
	c		B (1) 4 chambers (in heart) / 2 circuits (through heart) (1)	2	must include heart in the description of the two circuits
			Total	**7**	

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Question			Expected Answers	Marks	Rationale
10	a		ligament - holds two bones together; tendon - attaches muscle to bone; synovial fluid - lubricates; cartilage - prevents bones rubbing together;	2	4 or 3 correct = 2 marks 2 or 1 correct = 1 mark
	b	i	allergies / symptoms / medication / alcohol consumption / cigarette consumption / physical activity / family history / previous treatment / elbow injury (1)	1	**not** blood type **not** 'has anyone else in your family sprained their elbow?'
		ii	to provide correct treatment / help with diagnosis / so that allergic response is not triggered by treatment (1)	1	**accept** make diagnosis
			Total	**4**	

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A223/02 Ideas in Context plus Module B7 Higher Tier

Question			Expected Answers	Marks	Rationale
1	a		(women given) synthetic hormone (to stop miscarriage) (1) **babies / offspring / children** were more at risk (of getting breast cancer) (1)	2	**ignore** reference to immature breast tissue
	b		idea of …increases/affects the chance of harm/disease/cancer / something that could/may cause harm/disease/cancer (1)	1	**reject** causes (harm/disease/cancer)
	c		reliable / confident / significant / valid / confirm / evidence / reduces effect of outliers;	1	**ignore** accurate
	d		experts e.g. scientists (read the article) (1) decide if it seems OK (1)	2	**ignore** colleagues / peers / other people second mark is for understanding the word 'review' e.g. accurate / idea of quality / trustworthiness / credible / reliable / not made up etc
	e		**any two from:** (develop) drugs / chemicals / treatment; to lower / control oestrogen (to normal levels); regular screening for those at risk;	2	
	f		DNA/genes/genetic code/allele for wide hips/oestrogen production (1) idea that it is the baby/children/daughter at risk (of breast cancer/wide hips/high oestrogen levels) (1)	2	**ignore** chromosomes **ignore** future generations e.g. wide hips / oestrogen gene can be passed to child = 2 marks

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Question			Expected Answers	Marks	Rationale
1	g		**any two from:** recognise that it is a correlation/link (rather than causation) e.g. idea of possible to have wide hips but not develop breast cancer; (but it) increases the risk; other risk factors / oestrogen may be involved;	2	'no / not a cause' on its own does not score 'yes' scores 0 marks
			Total	**12**	

Question			Expected Answers	Marks	Rationale
2			idea that starts with the Sun; idea of <u>autotrophs</u> before <u>heterotrophs</u>; chemical energy used correctly;	2	3 correct = 2 marks 2 correct = 1 mark 1 correct = 0 reference to energy created/made/produced then max 1 mark autotrophs get chemical energy from the Sun gets first marking point but **not** third marking point do not award chemical energy if candidate just links words with arrows
			Total	**2**	

Question			Expected Answers	Marks	Rationale
3			30 or 140-110 shown (1) 20 (1)	2	if 20 given then = 2 marks
			Total	**2**	

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Question			Expected Answers	Marks	Rationale
4	a		10 (1)	1	**Accept** ten
	b		**any 2 from:** energy is lost/wasted (from food chain); at each level; as heat/movement/waste/uneaten bits;	2	**ignore** reference to respiration / reproduction / 'bodily functions' / life processes / death / energy is used
	c		not enough energy / too much energy lost / too little energy (to support any more stages) (1)	1	**ignore** animals get fewer or bigger
			Total	**4**	

Question			Expected Answers	Marks	Rationale
5	a		water and carbon dioxide on left of arrow (1) glucose or starch **and** oxygen on right of arrow (1)	2	either way round either way round **allow** chemical equation providing it is correct
5	b		☐ temperature and carbon dioxide ☑ (1) ☐ ☐ carbon dioxide and light ☑ (1) ☐ ☐	2	if more than 2 boxes are ticked then lose 1 mark for each incorrect response candidate cannot score less than zero marks **Accept** any clearly correct response e.g. shading etc
	c	i	starch/cellulose (1)	1	
		ii	proteins/polypeptides/peptides/enzymes (1)	1	
			Total	**6**	

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Question			Expected Answers	Marks	Rationale
6	a		**red** (blood) cells recessive	1	both needed for 1 mark **accept** 'not dominant' or 'co-dominant'
	b		HH (1)	1	**ignore** 'healthy person'
	c		**any two from:** idea that carriers / allele have some protection from malaria / survive malaria (1) idea that these people (survive to) reproduce; (survivors) pass on allele / gene to next generation;	2	**accept** reverse argument more likely survive to reproduce = 2 marks **ignore** pass on sickle cell anaemia to next generation
			Total	**4**	

Question			Expected Answers	Marks	Rationale
7	a		 	2	3 correct = 2 marks 1 or 2 correct = 1 mark **ignore** plasmid / capsule
	b		how isolated e.g. cut / enzymes (1) vector transfers (idea of gene) (1) example of how transferred e.g. bacteriophage / plasmid / virus (1)	3	
	c		ethical (1) personal or religious belief /' we should not do it' / idea of morals / unnatural / wrong to do it / not based on data (1)	2	if first mark for ethical **is not awarded** do not award second mark **reject** social arguments e.g. we do not understand the risks or might cause harm etc
			Total	**7**	

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Question			Expected Answers	Marks	Rationale
8	a		… available supply of energy … ✓ (1) … muscle tissue to contract. ✓ (1)	2	if more than 2 boxes are ticked then lose 1 mark for each incorrect response candidate cannot score less than zero marks **accept** any clearly correct response e.g. shading etc
	b		glucose on left (1) lactic acid on right (1)	2	
	c		uses … → aerobic … → … molecule does not … → photo- … → … rest releases … → anaer- … → … muscles	4	6 lines correct = 4 marks 5 correct = 3 marks 4 correct = 2 marks 3 correct = 1 mark 2 or 1 correct =0 marks
	d		produces lactic acid / lactic acid broken down (1) idea of needing oxygen (1) **then** clear ordered answer (1)	3	answer must be clear and easily understood without a third reading required
			Total	**11**	

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Question			Expected Answers	Marks	Rationale
9	a		A - platelet – idea of clots blood (1) B - white cell – idea of kills microorganisms / produces antibodies / fights infection etc (1) C - red cell – idea of transports oxygen (1)	3	for A **accept** stops bleeding / seals wounds for B **accept** leucocyte or neutrophil and any correct method of killing microorganisms
	b		has (AB) antigens on red cells (1) no (AB) antibodies in plasma (1)	2	**ignore** reference to universal donors and recipients
			Total	**5**	

Question			Expected Answers	Marks	Rationale
10			**any two from:** one example of a measurement which could affect recovery e.g. weight/age/blood pressure/ level of fitness/diet/medical background / one example of a measurement which is directly related to the elbow injury e.g. range of movement / elapsed time since injury / pain level / amount of exercise done; idea of **change** or **comparison** before and after / improvement; accuracy of monitoring / equipment; reliability of data e.g. same time every day;	2	**ignore** progress as in stem of question
			Total	**2**	

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Grade Thresholds

General Certificate of Secondary Education
Biology A (Specification Code J633)
June 2009 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	26	22	19	16	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A221/02	Raw	42	39	35	31	27	23	21	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	26	22	18	15	12	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A222/02	Raw	42	37	32	26	21	16	13	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	23	19	15	11	7	0
	UMS	100	N/A	N/A	N/A	60	50	40	30	20	0
A223/02	Raw	55	45	37	29	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	30	26	23	19	15	12	9	0
	UMS	100	90	80	70	60	50	40	30	20	0
A230	Raw	40	33	31	28	25	21	18	15	12	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 2009. 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	16.6	46.8	76.2	92.7	98.0	99.4	99.9	100.0	100.0	16407

16793 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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