

GCSE

Biology A

Session: 2010 June
Type: Mark scheme
Code: J633
Units: A221; A222; A223

Biology A

General Certificate of Secondary Education **A221/01**

Unit 1: Modules B1, B2, B3

Mark Scheme for June 2010

UCLES

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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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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
<u>words</u>	= 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. 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
I	= ignore
R	= reject

6. If a candidate alters his/her response, examiners should accept the alteration.
7. 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.

E.g.

For a one mark question, where ticks in boxes 3 and 4 are required for the mark:

Put ticks (✓) in the two correct boxes.

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be worth 0 marks.

Put ticks (✓) in the two correct boxes.

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be worth one mark.

Put ticks (✓) in the two correct boxes.

<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be worth one mark.

8. 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.

9. 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 should be blank (or have indication of choice crossed out).

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

Question		Expected Answers	Marks	Additional Guidance
1	a	nucleus (1)	[1]	accept phonetic spelling accept indication on diagram
	b	<p>to store glucose from digestion <input type="checkbox"/></p> <p>to describe how to make proteins <input checked="" type="checkbox"/> (1)</p> <p>to release energy by respiration <input type="checkbox"/></p> <p>to transport materials around the cell <input type="checkbox"/></p>	[1]	if no ticks, allow any other indication of correct response eg underlining, cross, shaded, smiley face etc
	c	<p>... very long DNA molecules ... <input checked="" type="checkbox"/> (1)</p> <p>... very short DNA molecules ... <input type="checkbox"/></p> <p>... very short chromosomes ... <input type="checkbox"/></p> <p>... very long chromosomes ... <input type="checkbox"/></p>	[1]	if no ticks, allow any other indication of correct response eg underlining, cross, shaded, smiley face etc
Total			[3]	

Question		Expected Answers	Marks	Additional Guidance
2	a	23 (1)	[1]	accept underline, tick, all four distractors crossed out
	b	<p>both from her mother <input type="checkbox"/></p> <p>both from her father <input type="checkbox"/></p> <p>neither ... <input type="checkbox"/></p> <p>one from and one from ... <input checked="" type="checkbox"/> (1)</p>	[1]	if no ticks, allow any other indication of correct response eg underlining, cross, shaded, smiley face etc
	c	<p>... one dominant allele. <input type="checkbox"/></p> <p>... two dominant alleles. <input type="checkbox"/></p> <p>... one recessive allele. <input type="checkbox"/></p> <p>... two recessive alleles. <input checked="" type="checkbox"/> (1)</p> <p>... one and one ... <input type="checkbox"/></p>	[1]	if no ticks, allow any other indication of correct response eg underlining, cross, shaded, smiley face etc
Total			[3]	
3		discussion of privacy issue eg right to know vs right not to tell (1) any correct statement to Amrit (1) any correct statement to Raj (1)	[3]	responses must clearly indicate Amrit/employee or Raj/ employer
Total			[3]	

Question		Expected Answers	Marks	Additional Guidance
4	a	<p>... using high frequency sound. <input type="checkbox"/></p> <p>... engulfing them. <input checked="" type="checkbox"/></p> <p>... drowning them. <input type="checkbox"/></p> <p>... digesting them. <input checked="" type="checkbox"/></p> <p>... making antibodies. <input checked="" type="checkbox"/></p> <p>... using an electrical impulse. <input type="checkbox"/></p> <p>... making antigens. <input type="checkbox"/></p> <p>... using high speed collisions. <input type="checkbox"/></p> <p>... injecting them with hormones. <input type="checkbox"/></p>	[2]	<p>3 correct responses = 2 marks 2 or 1 correct responses = 1 mark if no ticks, allow any other indication of correct response eg underlining, cross, shaded, smiley face etc</p>

Question		Expected Answers	Marks	Additional Guidance
4	b	<p>presence of nitrogen gas <input type="checkbox"/></p> <p>acidic <input type="checkbox"/></p> <p>cold <input type="checkbox"/></p> <p>wet <input type="checkbox"/> (1)</p> <p>presence of food <input type="checkbox"/> (1)</p> <p>dry <input type="checkbox"/></p> <p>warm <input checked="" type="checkbox"/> (1)</p> <p>presence of carbon dioxide <input type="checkbox"/></p>	[3]	if no ticks, allow any other indication of correct response eg underlining, cross, shaded, smiley face etc
	c	<p>any three from:</p> <p>saliva – enzymes/chemicals;</p> <p>sweat - acidic / chemicals;</p> <p>tears - enzymes / chemicals;</p> <p><u>stomach</u> – acid;</p> <p>mucous/wax – traps microorganisms;</p>	[3]	<p>name of barrier must be linked to correct method of operating</p> <p>allow 'clots and scabs covering wounds'</p> <p>ignore non-biological names</p> <p>ignore gut</p>
		Total	[8]	

Question		Expected Answers	Marks	Additional Guidance								
5	a	smoke cigarettes <input type="checkbox"/> exercise regularly <input checked="" type="checkbox"/> (1) drink a lot of alcohol <input type="checkbox"/> have a poor diet <input type="checkbox"/> reduce his stress level <input checked="" type="checkbox"/> (1)	[2]	if no ticks, allow any other indication of correct response eg underlining, cross, shaded, smiley face etc								
	b	artery; decrease; oxygen; heart;	[2]	all four correct = 2 marks two or three correct = 1 mark one correct = 0 marks accept clear deletion of incorrect alternative								
	c	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>high risk</th> <th>low risk</th> </tr> </thead> <tbody> <tr> <td>C</td> <td>A</td> </tr> <tr> <td></td> <td>B</td> </tr> <tr> <td></td> <td>D</td> </tr> </tbody> </table>	high risk	low risk	C	A		B		D	[2]	four correct = 2 marks three or two correct = 1 mark ignore same letter in both boxes the letters must be clear
high risk	low risk											
C	A											
	B											
	D											
Total			[6]									

Question		Expected Answers	Marks	Additional Guidance
6	a	Peter (1)	[1]	
	b	Ranjit (1)	[1]	
	c	Stella (1)	[1]	
	d	Jane and Ranjit (1)	[1]	either way round
Total			[4]	

7			[2]	three correct lines = 2 marks two correct lines = 1 mark one correct line only = 0 marks more than three lines – deduct 1 mark for each additional line
Total			[2]	

Question		Expected Answers	Marks	Additional Guidance
8	a	<p>... Dead Sea Scrolls <input type="checkbox"/></p> <p>stories ... <input type="checkbox"/></p> <p>the fossil record <input checked="" type="checkbox"/> (1)</p> <p>... on other planets <input type="checkbox"/></p> <p>... in DNA <input checked="" type="checkbox"/> (1)</p> <p>... internet ... <input type="checkbox"/></p>	[2]	if no ticks, allow any other indication of correct response eg underlining, cross, shaded, smiley face etc
	b	could; natural;	[1]	two correct = 1 mark accept clear deletion of incorrect alternative
	c	some species find it hard to survive / become extinct (1) new adaptations become favourable (1)	[2]	one mark is for differential survival / or clear named example a second mark for some being better adapted
		Total	[5]	

Question	Expected Answers	Marks	Additional Guidance
<p>9 a</p>		<p>[1]</p>	<p>shading may be extended into the 'L' shape then give mark shaded area must not extend significantly beyond the L shape shading must not go into central area</p>
<p>b i</p>	<p>All common ancestor. <input checked="" type="checkbox"/> (1)</p> <p>Only one common ancestor. <input type="checkbox"/></p> <p><i>Australopithecus</i> ... <input type="checkbox"/></p> <p>None common ancestor. <input type="checkbox"/></p> <p><i>Homo erectus</i> ... <input type="checkbox"/></p>	<p>[1]</p>	<p>if no ticks, allow any other indication of correct response eg underlining, cross, shaded, smiley face etc</p>

Question			Expected Answers	Marks	Additional Guidance
9	b	ii	<p>... central evolution. <input type="checkbox"/></p> <p>... convergent evolution. <input type="checkbox"/></p> <p>... divergent evolution. <input checked="" type="checkbox"/> (1)</p> <p>... negative evolution. <input type="checkbox"/></p>	[1]	if no ticks, allow any other indication of correct response eg underlining, cross, shaded, smiley face etc
		iii	<i>Homo sapiens</i> (1)	[1]	accept humans
	c		<p>any two from: idea that brain got bigger / larger / complex / developed; (better chance of) survival / breeding / pass on genes; idea of intelligence eg brighter / smarter; example of intelligence e.g. using tools / speech / talking / writing / fire ;</p>	[2]	<p>ignore live longer</p> <p>ignore learning / knowledge / thinking / self aware / memory</p> <p>ignore communication / building / hunting / farming / use of hands/ bipedal</p>
	d		<p>any two from: idea that not enough evidence / data / results;</p> <p>idea of conflicting data/evidence/results / two different explanations or interpretations;</p> <p>loss of sponsorship etc;</p>	[2]	<p>ignore reference to God</p> <p>ignore arguments about loss of face;</p> <p>ignore reference to “thinking you are right”</p> <p>ignore no evidence</p> <p>ignore reference to different experiments.</p> <p>do not credit specific reference to Darwin or theories of evolution</p>
			Total	[8]	

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E.g. mark scheme shows 'work done in lifting / (change in) gravitational potential energy' (1)

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 work done lifting = 1 mark
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 gravitational potential energy = 1 mark

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The following annotations are available on SCORIS.

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E.g.

For a one mark question, where ticks in boxes 3 and 4 are required for the mark:

Put ticks (✓) in the two correct boxes.

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be worth 0 marks.

Put ticks (✓) in the two correct boxes.

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be worth one mark.

Put ticks (✓) in the two correct boxes.

<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be worth one mark.

8. 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.

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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).

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

Question		Expected Answers	Marks	Additional Guidance
1	a	Y (1)	[1]	accept Y or Y with chromosome above
	b	gene causes development of testes (1)	[1]	accept gene codes for/causes production of testosterone/androgens/TDF ignore SRY ignore reference to male sex organs
	c	height (1)	[1]	
Total			[3]	

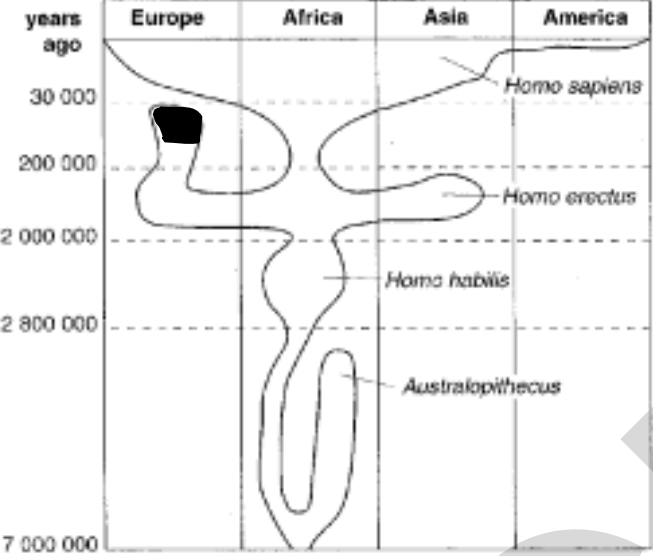
2	a	mum and dad (1)	[1]	accept parents reject one of her parents / mum OR dad
	b	i recessive (1)	[1]	
		ii A (1)	[1]	
		iii B, C and E (1)	[1]	three correct = 1 mark accept any order
		iv we do not know if E has passed on the CF allele (1) we do not know if E's wife has the CF allele / is a carrier (1) if E's wife has got the CF allele we do not know if she's passed it on (1)	[3]	NB "Her mum" = "E's wife"
Total			[7]	

Question		Expected Answers	Marks	Additional Guidance
3	a	any two from: he may not want to know; privacy; may affect his employment prospects; could affect insurance (costs); false neg / false pos / reliability arguments;	[2]	ignore moral or religious answers
	b	any staffing implication answer (1) any financial implication answer (1)	[2]	eg sacking / redeployment / H&S / suitability of roles ignore to see who is healthy, without implication eg sickness pay / cost company / loss of production
		Total	[4]	

Question		Expected Answers	Marks	Additional Guidance
4	a	nucleus from a body cell (1)	[1]	
	b	<p>... asexual reproduction ... <input checked="" type="checkbox"/> (✓)</p> <p>... photocopies ... <input type="checkbox"/></p> <p>... bacteria ... <input checked="" type="checkbox"/> (✓)</p> <p>... artist's drawing ... <input type="checkbox"/></p> <p>identical twins <input checked="" type="checkbox"/> (✓)</p> <p>... sperm ... <input type="checkbox"/></p>	[2]	<p>three correct responses = 2 marks two correct responses = 1 mark if more than three boxes ticked then minus 1 mark for each incorrect answer</p> <p>allow any other indication of correct response if no ticks, eg underlining, cross, shaded, smiley face etc</p>
	c	environmental factors only (1)	[1]	accept any other indication of correct response
	d	<p>... unspecialised can develop ... <input checked="" type="checkbox"/> (1)</p> <p>... unspecialised... ... cannot develop ... <input type="checkbox"/></p> <p>... treat diseases. <input checked="" type="checkbox"/> (1)</p> <p>... grow different species ... <input type="checkbox"/></p> <p>... specialised can develop ... <input type="checkbox"/></p> <p>... specialised cannot develop ... <input type="checkbox"/></p>	[2]	<p>if more than two boxes ticked then minus 1 mark for each incorrect answer</p> <p>allow any other indication of correct response if no ticks, eg underlining, cross, shaded, smiley face etc</p>
		Total	[6]	

Question		Expected Answers	Marks	Additional Guidance
5	a	<div style="border: 1px solid black; display: inline-block; padding: 2px;"> <div style="background-color: black; width: 20px; height: 15px; display: inline-block;"></div> D E C A </div> <p>D before E (1) E before C (1) C before A (1)</p>	[3]	
	b	<p>... hormonal high mutation ... <input type="checkbox"/></p> <p>... hormonal low mutation ... <input type="checkbox"/></p> <p>... immune high mutation ... <input checked="" type="checkbox"/> (1)</p> <p>... immune low mutation ... <input type="checkbox"/></p> <p>... nervous high mutation ... <input type="checkbox"/></p> <p>... nervous low mutation ... <input type="checkbox"/></p> <p>... reproductive high mutation ... <input type="checkbox"/></p> <p>... reproductive low mutation ... <input type="checkbox"/></p>	[1]	<p>if more than one box ticked then 0 marks</p> <p>allow any other indication of correct response if no ticks, eg underlining, cross, shaded, smiley face etc</p>
		Total	[4]	
6	a	Peter (1)	[1]	
	b	Ranjit (1)	[1]	
	c	Stella (1)	[1]	
	d	Jane and Ranjit (1)	[1]	either way round
		Total	[4]	

Question		Expected Answers	Marks	Additional Guidance
7	a	Ben; Louise;	[1]	two correct responses = 1 mark responses must be in the correct order if no response then open up full screen to check for answers elsewhere
	b	what – inactive / fake / not real drug / look alike / blank (1) why - to test/compare results / idea of control (1) when - if health / life of patient would be at risk without effective treatment / if effective treatment is needed(1)	[3]	accept used instead of actual drug accept to eliminate / control named factors ignore used in drugs trials – as that is in stem ignore to see if illness has a psychological cause ignore should not be used on sick people ignore ill patients should be given the NEW drug being trialled / should not be given the placebo
		Total	[4]	

Question	Expected Answers	Marks	Additional Guidance
<p>8 a</p>		<p>[1]</p>	<p>shading may be extended into the 'L' shape then give mark shaded area must not extend significantly beyond the L shape shading must not go into central area</p>
<p>b i</p>	<p>All common ancestor. <input checked="" type="checkbox"/> (1)</p> <p>Only one common ancestor. <input type="checkbox"/></p> <p><i>Australopithecus</i> ... <input type="checkbox"/></p> <p>None common ancestor. <input type="checkbox"/></p> <p><i>Homo erectus</i> ... <input type="checkbox"/></p>	<p>[1]</p>	<p>allow any other indication of correct response if no ticks, eg underlining, cross, shaded, smiley face etc</p>

Question			Expected Answers	Marks	Additional Guidance
8	b	ii	<p>... central evolution. <input type="checkbox"/></p> <p>... convergent evolution. <input type="checkbox"/></p> <p>... divergent evolution. <input checked="" type="checkbox"/> (1)</p> <p>... negative evolution. <input type="checkbox"/></p>	[1]	allow any other indication of correct response if no ticks, eg underlining, cross, shaded, smiley face etc
		iii	<i>Homo sapiens</i> (1)	[1]	accept humans
	c		<p>any two from: idea that brain got bigger / larger / complex / developed; (better chance of) survival / breeding / pass on genes; idea of intelligence eg brighter / smarter; example of intelligence eg using tools / speech / talking / writing / fire;</p>	[2]	<p>ignore live longer</p> <p>ignore learning / knowledge / thinking / self aware / memory</p> <p>ignore communication / building / hunting / farming / use of hands/ bipedal</p>
	d		<p>any two from: idea that not enough evidence / data / results;</p> <p>idea of conflicting data/evidence/results / two different explanations, theories or interpretations;</p> <p>loss of sponsorship etc;</p>	[2]	<p>do not credit specific reference to Darwin or theories of evolution</p> <p>ignore no evidence</p> <p>ignore reference to God</p> <p>ignore arguments about loss of face;</p> <p>ignore reference to “thinking you are right”</p> <p>ignore reference to different experiments / different ideas.</p>
			Total	[8]	

Question	Expected Answers	Marks	Additional Guidance
9	<p>It proves ... <input type="checkbox"/></p> <p>It increases ... <input checked="" type="checkbox"/> (1)</p> <p>It makes no difference ... <input type="checkbox"/></p> <p>It decreases ... <input type="checkbox"/></p> <p>It agrees with ... <input checked="" type="checkbox"/> (1)</p> <p>It disagrees with ... <input type="checkbox"/></p>	[2]	<p>if more than two boxes ticked then minus 1 mark for each incorrect answer</p> <p>allow any other indication of correct response if no ticks, eg underlining, cross, shaded, smiley face etc</p>
	Total	[2]	

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GCSE

Biology A

General Certificate of Secondary Education **A222/01**

Unit 2: Modules B4, B5, B6 (Foundation Tier)

Mark Scheme for June 2010

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of pupils of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, OCR Nationals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

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Question		Expected Answers	Marks	Additional Guidance																
1	a	proteins (1) speed up (chemical) reactions / OWTTE (1)	[2]	eg make reactions faster accept are catalysts as an alternative to speed up reactions																
	b	lock and key model (1)	[1]	more than one response = 0 marks accept any clear indication eg underlining																
	c	<div style="text-align: right;"> <input type="checkbox"/> <input type="checkbox"/> temperature <input checked="" type="checkbox"/> (1) </div>	[1]	more than one response = 0 marks accept any clear indication of the correct answer only																
			ii	increase / OWTTE (1)	[1]	eg be faster/speed up/ <u>be</u> higher not higher on its own														
Total			[5]																	
2	a	<table border="1" style="display: inline-table; vertical-align: middle;"> <thead> <tr> <th>chemical</th> <th>completely</th> <th>partly</th> <th>not</th> </tr> </thead> <tbody> <tr> <td>water</td> <td></td> <td style="text-align: center;">✓</td> <td></td> </tr> <tr> <td>sugar</td> <td style="text-align: center;">✓</td> <td></td> <td></td> </tr> <tr> <td>urea</td> <td></td> <td style="text-align: center;">✓</td> <td style="text-align: center;">✓</td> </tr> </tbody> </table> (1) (1) (1)	chemical	completely	partly	not	water		✓		sugar	✓			urea		✓	✓	[3]	look at the responses to each of the three rows each correct row = 1 mark allow urea tick in middle or right-hand column but not in both more than one response in any row = 0 marks for that row accept any clear indication of the correct answer only
		chemical	completely	partly	not															
water		✓																		
sugar	✓																			
urea		✓	✓																	
b	volume (of urine produced) increases / OWTTE (1) concentration (of urine produced) is more dilute (1) the water levels in the blood/body fall (1)	[3]	eg more urine produced not urinate more accept concentration is weaker ignore references to colour changes in urine accept body is dehydrated/becomes dehydrated																	
Total			[6]																	

Question			Expected Answers	Marks	Additional Guidance
3	a	i	the maintenance of a constant internal environment / OWTTE (1)	[1]	accept 'inside body' = internal environment ignore references to internal temperature
		ii	energy gain is the same as energy loss / OWTTE (1)	[1]	accept 'input' = gain, 'output' = loss accept 'they are the same'/balanced accept 'it' = energy gain
	b		receptors (1) skin (1) brain (1)	[3]	if more than three responses, deduct 1 mark for each additional response candidate cannot score less than zero marks accept clear indication of correct response eg use of arrows
	c		respiration (1)	[1]	accept a clear indication of correct response eg underlined, other options deleted more than one response ticked = 0 marks
			Total	[6]	
4	a		increases (1) DNA (1)	[2]	responses must be in the correct order accept an arrow from correct word to correct space
		b	23 (1)	[1]	more than one response = 0 marks accept any clear indication of the correct answer only eg underlining, tick etc
			Total	[3]	

Question		Expected Answers	Marks	Additional Guidance
5	a	<p>Only some remain active.</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p>	[1]	<p>more than one response = 0 marks</p> <p>accept any clear indication of the correct response only</p>
	b	hormones (1)	[1]	<p>more than one response = 0 marks</p> <p>accept any clear indication of the correct response only</p>
	c	<p>... have specialised cells. <input checked="" type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p>... make specific proteins ... <input checked="" type="checkbox"/></p>	[1]	<p>both answers need to be correct to gain 1 mark</p> <p>more than 2 responses = 0 marks</p> <p>accept any clear indication of the correct response only</p>
Total			[3]	

Question		Expected Answers				Marks	Additional Guidance
6	a	description		label		[1]	more than one response in each box = 0 marks accept any clear indication of correct responses eg use of linking arrows with diagram, correct description alongside label on diagram (A = genetic code, B = proteins) or nucleus = A, cytoplasm = B within the box
		where the genetic code is found		A			
		where proteins are made		B			
	b	DNA ...				[3]	four rows correct = 3 marks three rows correct = 2 marks one or two rows correct = 1 mark more than one response in a row, deduct 1 mark accept any clear indication of correct response eg tick, other options crossed out, clearly underlined, shaded
... strands		1	2	3	4		
... bases		2	3	4	5		
... bases ...		single	pairs	triplets	fours		
shape ...		circular	cubic	helix	zig-zag		
		Total				[4]	

Question		Expected Answers	Marks	Additional Guidance
7	a	brain (1)	[1]	more than one response = 0 marks accept any clear indication of the correct response only
	b	<p>... storage and retrieval ..</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p>	[1]	more than one response = 0 marks accept any clear indication of the correct response only
	c	<p>short-term and long-term ...</p> <p><input type="checkbox"/></p> <p><input checked="" type="checkbox"/> (1)</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	[1]	more than one response = 0 marks accept any clear indication of the correct response only
	d	brain new	[1]	two correct responses = 1 mark responses must be in the correct order accept arrow from correct word to correct space
Total			[4]	

Question		Expected Answers	Marks	Additional Guidance
8	a	protect itself (1)	[1]	accept stop itself being eaten/becoming prey / stop things trying to eat it / to avoid predators or predation ignore camouflage / hiding ignore references to damage unless referring to being eaten
	b	any two from: grasping; sucking; startle reflex eg jumping when they hear a noise; plantar (foot curling); rooting reflex eg turning its head in response to cheek being stroked; pupil reflex;	[2]	not blinking not crying not pupils dilating unless qualified not reacts to sound
	c	brain (1) spinal cord (1)	[2]	if more than 2 responses deduct 1 mark for each additional response accept any clear indication of the two correct responses
		Total	[5]	

Question		Expected Answers	Marks	Additional Guidance
9	a	light sensory	[1]	both responses in the correct order needed for the mark accept clear indication of correct response eg use of arrows
	b	moving away from fire is voluntary (1) jumping (in response to the spark) is involuntary (1)	[2]	accept for 1 mark a general statement explaining what is meant by voluntary and involuntary reflexes eg voluntary is something you choose to do whilst involuntary is something you cannot control/automatic examples used in response must be from the stem of the question
	c	i membrane <input type="checkbox"/> <input checked="" type="checkbox"/> (1) <input type="checkbox"/> <input type="checkbox"/>	[1]	more than one response = 0 marks accept any clear indication of correct response eg other options crossed out, clearly underlined, shaded, circled accept cross – only without ticks more than one response = 0 marks
		ii insulates the neuron (from surrounding cells) / OWTTE (1) increases the speed of the transmission of a nerve impulse (1)	[2]	ignore stops interference from surrounding cells accept a clear reference to saltatory response / jumping of impulse = increased speed of transmission accept sends information more quickly.
Total			[6]	

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Biology A

General Certificate of Secondary Education **A222/02**

Unit 2: Modules B4, B5, B6 (Higher Tier)

Mark Scheme for June 2010

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Question			Expected Answers	Marks	Additional Guidance
1	a	i	the maintenance of a constant internal environment (1)	[1]	OWTTE Accept 'inside body' = internal environment Ignore references to internal temperature
		ii	energy gain is the same as energy loss (1)	[1]	OWTTE Accept 'input' = gain, 'output' = loss Accept 'they are the same'/balanced Accept 'it' = energy gain
	b		receptors (1) skin (1) brain (1)	[3]	if more than three responses, deduct one mark for each additional response candidates cannot score less than zero marks accept clear indication of correct response eg use of arrows
	c		respiration (1)	[1]	more than one response = 0 marks accept a clear indication of correct response eg underlined, other options deleted, tick
Total				[6]	

2	a		[1]	three correct lines = 1 mark more than one line from left hand boxes = 0 marks	
	b	mechanism/process use of a feedback loop/changes being reversed (1) outcome (conditions kept) constant / creates a balance / (establish a) set point/normal level (1) detail within the process (created due to action of) antagonistic effectors / OWTTE (1)	[3]	accept correct scenario details for artificial systems – look for key marking points	
Total				[4]	

Question	Expected Answers		Marks	Additional Guidance
3	a	eating food (1) respiring (1)	[2]	if more than two responses – deduct 1 mark for each additional response Accept a clear indication of correct response eg. underlined, other options deleted, tick
	b	i	[1]	if more than one response = 0 marks Accept a clear indication of correct response eg. underlined, other options deleted, tick
		ii	[3]	responses must be in context of excess water ignore account of ADH under conditions of low water intake
			Total	[6]

4	a	<table border="1"> <thead> <tr> <th>description</th> <th>label</th> </tr> </thead> <tbody> <tr> <td>where the genetic code is found</td> <td>A</td> </tr> <tr> <td>where proteins are made</td> <td>B</td> </tr> </tbody> </table>	description	label	where the genetic code is found	A	where proteins are made	B	[1]	more than one response in each box = 0 marks accept a clear indication of correct response eg use of linking arrows with diagram, correct description alongside label on diagram (A = genetic code, B = proteins) or nucleus = A, cytoplasm = B within the box																			
description	label																												
where the genetic code is found	A																												
where proteins are made	B																												
	b	<table border="1"> <thead> <tr> <th>DNA ...</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>... strands</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>... bases</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> </tr> <tr> <td>... bases ...</td> <td>single</td> <td>pairs</td> <td>triplets</td> <td>fours</td> </tr> <tr> <td>shape ...</td> <td>circular</td> <td>cubic</td> <td>helix</td> <td>zig-zag</td> </tr> </tbody> </table>	DNA ...	1	2	3	4	... strands	1	2	3	4	... bases	2	3	4	5	... bases ...	single	pairs	triplets	fours	shape ...	circular	cubic	helix	zig-zag	[3]	four rows correct = 3 marks three rows correct = 2 marks one or two rows correct = 1 mark more than one response in a row means that this row is incorrect accept any clear indication of correct response eg tick, other options crossed out, clearly underlined, shaded
DNA ...	1	2	3	4																									
... strands	1	2	3	4																									
... bases	2	3	4	5																									
... bases ...	single	pairs	triplets	fours																									
shape ...	circular	cubic	helix	zig-zag																									
		Total	[4]																										

Question		Expected Answers	Marks	Additional Guidance															
5	a	Jo and Ray (1)	[1]	two correct responses = 1 mark more than two responses = 0 marks accept responses in either order accept linking arrows to correct people on the diagram															
	b	a set of chromosomes / different genes from each parent (1)	[1]	ignore reference to 50% chromosomes/ 'information' accept alleles/DNA															
	c	i organelles (1) eight (1)	[2]	if more than two responses, deduct 1 mark for each additional response candidate cannot score less than zero marks responses must be in the correct order accept linking arrows to correct words in list															
		ii <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>true</th> <th>false</th> </tr> </thead> <tbody> <tr> <td>The cells no longer contain the same genes.</td> <td></td> <td>✓</td> </tr> <tr> <td>Some of the genes are no longer active.</td> <td>✓</td> <td></td> </tr> <tr> <td>Each cell produces only the specific proteins it needs.</td> <td>✓</td> <td></td> </tr> <tr> <td>The cells form different types of tissues.</td> <td>✓</td> <td></td> </tr> </tbody> </table>		true	false	The cells no longer contain the same genes.		✓	Some of the genes are no longer active.	✓		Each cell produces only the specific proteins it needs.	✓		The cells form different types of tissues.	✓		[2]	four rows correct = 2 marks three rows correct = 1 mark two or one rows correct = 0 marks accept a clear indication of correct response eg shaded, circled, crosses (if no ticks)
	true	false																	
The cells no longer contain the same genes.		✓																	
Some of the genes are no longer active.	✓																		
Each cell produces only the specific proteins it needs.	✓																		
The cells form different types of tissues.	✓																		
		Total	[6]																

Question		Expected Answers	Marks	Additional Guidance
6	a	meristem (1)	1	more than one response = 0 marks accept a clear indication of correct response eg underlined, other options deleted, tick
	b	auxin (1)	1	more than one response = 0 marks accept a clear indication of correct response eg underlined, other options deleted, tick
	c	stays the same unspecialised genes	2	three correct = 2 marks two correct = 1 mark one or zero correct = 0 marks if more than three responses – deduct 1 mark for each additional response candidate cannot score less than zero marks accept clear indication of correct response eg use of arrows
Total			[4]	
7	a	light sensory	1	need both responses in the correct order accept clear indication of correct response eg use of arrows
	b	i	1	more than one response = 0 marks accept a clear indication of correct response eg other options crossed out, clearly underlined, shaded, circled, cross (if no ticks)
		ii	2	ignore 'stops interference' from surrounding cells accept sends information more quickly accept a clear reference to saltatory response / jumping of impulse = increased speed of transmission
Total			[4]	

Question		Expected Answers	Marks	Additional Guidance					
8	a	<table border="1" style="margin: auto;"> <tr> <td>F</td> <td>A</td> <td>D</td> <td>C</td> <td>E</td> </tr> </table>	F	A	D	C	E	2	<p>F before A A before D D before C</p> <p>three correct steps = 2 marks one or two correct steps = 1 mark zero correct steps = 0 marks</p> <p>if B is included in overall response, continue to mark and look for sequence eg F before A</p>
F	A	D	C	E					
	b	the sensory neuron membrane does not contain the chemical receptor (binding sites) / OWTTE (1)	1						
	c	serotonin not reabsorbed (by pre synaptic vesicles) / serotonin reabsorption site is blocked (1)	1	ignore 'serotonin stays in synapse'					
Total			[4]						

Question		Expected Answers	Marks	Additional Guidance												
9	a	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">B</td> <td style="width: 40%;"></td> <td style="width: 50%;"></td> </tr> <tr> <td style="text-align: center;">C</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">A</td> <td></td> <td></td> </tr> </table>	B			C			A			2	<p>B before C (1 mark), C before A (1 mark)</p> <p>if more than two responses, deduct 1 mark for each additional response</p> <p>accept clear indication of correct response eg use of arrows</p>			
B																
C																
A																
	b	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">true</th> <th style="text-align: center;">false</th> </tr> </thead> <tbody> <tr> <td>The bell was used ...</td> <td style="text-align: center;">✓</td> <td></td> </tr> <tr> <td>The conditioned reflex ...</td> <td></td> <td style="text-align: center;">✓</td> </tr> <tr> <td>The dog learned ...</td> <td style="text-align: center;">✓</td> <td></td> </tr> </tbody> </table>		true	false	The bell was used ...	✓		The conditioned reflex ...		✓	The dog learned ...	✓		2	<p>three rows correct = 2 marks two rows correct = 1 mark one or zero rows correct = 0 marks</p> <p>accept a clear indication of correct response eg shaded, circled, crosses (if no ticks)</p>
	true	false														
The bell was used ...	✓															
The conditioned reflex ...		✓														
The dog learned ...	✓															
Total			[4]													

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Biology A

General Certificate of Secondary Education **A223/01**

Unit 3: Ideas in Context plus B7 (Foundation Tier)

Mark Scheme for June 2010

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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
<u>words</u>	= 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. 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
I	= ignore
R	= reject
6. If a candidate alters his/her response, examiners should accept the alteration.
7. 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.

E.g.

For a one mark question, where ticks in boxes 3 and 4 are required for the mark:

Put ticks (✓) in
the two correct
boxes.

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be
worth 0 marks.

Put ticks (✓) in
the two correct
boxes.

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be
worth one mark.

Put ticks (✓) in
the two correct
boxes.

<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be
worth one mark.

8. 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.

9. 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 should be blank (or have indication of choice crossed out).

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

Question		Expected Answers	Marks	Additional Guidance
1	a	<p>any two from: no where to lay eggs/less breeding sites; no food / less food / more competition; exposure to predators / predators can see them; idea of migration;</p>	[2]	ignore no where to live/no home
	b	56 (1)	[1]	accept 56 out of 124 or 56/124 reject 45 %
	c	<p>action stop using (long) fishing lines (1) soon because population is being reduced (by 100 000 a year) / leading to extinction; low reproductive rate / lay only a small number of eggs / slow to mature / long time for population to recover (1)</p>	[2]	
	d	<p>any two from: cannot count all/enough of the birds; difficult to count because birds spread over wide area / birds keep moving; by the time all the birds had been counted some would have died / been born;</p>	[2]	ignore references to migration
	e	<p>ban use of/stop using diclofenac (1) remove the excess carcasses (as soon as the cattle dies) (1)</p>	[2]	
	f	idea of world wide / gone forever / all dead (1)	[1]	
	g i	<p>any two from: idea of fewer organisms; idea of fewer species / less variety; in a (specific) place eg ecosystem, habitat, world, Earth, planet, environment; QWC (1)</p>	[3]	<p>ignore extinction QWC answer is clear on first reading even if incorrect.</p>

Question			Expected Answers	Marks	Additional Guidance
1	g	ii	idea of ecosystem more stable / effect on other species / keep food chains or webs going / maintains a potential resource for humans (1)	[1]	ignore reference to gene pool ignore extinction
	h		£5000 m (1)	[1]	accept 500 x 10 or £5 000 million or 5 000 000 000
			Total	[15]	
2	a		autotroph – rose / lettuce heterotroph – greenfly/ladybird/owl/shrew/ caterpillar/robin	[1]	both required for mark
	b		autotrophs – make own food (1) heterotrophs – do not make own food / eat food (1)	[2]	ignore references to making energy
	c	i	sun (1)	[1]	
		ii	food / eating / feeding;	[1]	accept consume for eat
		iii	any two from: heat; movement; sound; respiration; excretion/urine; egestion/defecating/faeces; uneaten parts;	[2]	accept examples of movement eg flying ignore waste
			Total	[7]	

Question		Expected Answers	Marks	Additional Guidance
3	a	<div style="display: flex; justify-content: space-around; gap: 20px;"> <div style="border: 1px solid black; padding: 5px; width: 30px; text-align: center;">B</div> <div style="border: 1px solid black; padding: 5px; width: 30px; text-align: center;">C</div> <div style="border: 1px solid black; padding: 5px; width: 30px; text-align: center;">A</div> </div>	[2]	B in first box (1) C before A (1)
	b	storage / converted into starch (1) respiration / energy (1) converted into other chemicals / growth / repair / making seeds (1)	[3]	do not accept list of chemical without qualification
	c	any three from: humus/dead organisms; biomass / living things; inorganic materials / clay/ sand / rocks / minerals or named minerals; air; water;	[2]	3 correct = 2 marks 2 or 1 correct = 1 mark ignore examples of dead things eg worm ignore examples of living things eg worm ignore reference to fertilisers ignore names gases
		Total	[7]	
4	a	temperature; carbon dioxide; light;	[2]	accept in any order ignore heat / water / minerals 3 correct = 2 marks 2 correct = 1 mark 1 correct = 0 marks
	b	any three from: errors in counting; do not know the volume of the bubbles/gases in bubble / bubbles different sizes; some of the oxygen is used by respiration; some bubbles will stick to the pond weed / not float to top; 1 minute not long enough;	[3]	ignore 'human error' on its own ignore mention changing variable such as temperature as it is only for 1 minute
		Total	[5]	

Question		Expected Answers	Marks	Additional Guidance	
5	a	parasite benefits / feeds on other organism (1) host is harmed (1)	[2]	ignore 'lives off' unless qualified accept disease as harm	
	b	correct example (1) feature 1 (1) feature 2 (1)	[3]	features described must be appropriate to parasitic life style	
	c	disease/illness/infection/death / less food production (1)	[1]	accept correct named illness eg malaria	
Total			[6]		
6		one mark for each set of words used correctly: idea that DNA is the cause of the problem / makes someone the carrier of the disease / faulty gene (1) DNA/gene taken from white blood cells (1) gene probe attaches to (mutated) gene / DNA (1) use of autoradiography to locate gene probe (1)	[4]	ignore reference to cheek cells ignore reference to UV and fluorescence	
	Total			[4]	
7	a	carbon dioxide (1) water (1)	[2]	accept either way round	
	b	i	any two from: to supply/use more energy/ATP; by respiration; to avoid anaerobic respiration / lactic acid build up; to contract faster / longer / idea of muscles working harder;	[2]	
		ii	breathing rate increase (1) heart beat increases (1)	[2]	accept heavier/deeper breathing
Total			[6]		

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Biology A

General Certificate of Secondary Education **A223/02**

Unit 3: Ideas in Context plus B7 (Higher Tier)

Mark Scheme for June 2010

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of pupils of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, OCR Nationals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

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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
<u>words</u>	= 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. 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
I	= ignore
R	= reject

6. If a candidate alters his/her response, examiners should accept the alteration.
7. 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.

E.g.

For a one mark question, where ticks in boxes 3 and 4 are required for the mark:

Put ticks (✓) in
the two correct
boxes.

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be
worth 0 marks.

Put ticks (✓) in
the two correct
boxes.

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be
worth one mark.

Put ticks (✓) in
the two correct
boxes.

<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be
worth one mark.

8. 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.

9. 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 should be blank (or have indication of choice crossed out).

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

Question			Expected Answers	Marks	Additional Guidance
1	a	i	<p>any two from: idea of fewer organisms; idea of fewer species / less variety; in a (specific) place eg ecosystem, habitat, world, Earth, planet, environment;</p> <p>QWC (1)</p>	[3]	<p>ignore extinction</p> <p>QWC answer is clear on first reading even if incorrect.</p>
		ii	<p>idea of ecosystem more stable / effect on other species / keep food chains or webs going / maintains a potential resource for humans (1)</p>	[1]	<p>ignore reference to gene pool ignore extinction</p>
	b		<p>idea of world wide / gone forever / all dead (1)</p>	[1]	
	c		<p>any two from: test dead vultures (for diclofenac); test live vultures (for diclofenac); then compare effect of different amounts / (work out) lethal amount;</p>	[2]	<p>test vultures for diclofenac = 1 mark ignore any reference to other drugs ignore ban diclofenac to see if numbers of deaths decreases ignore any reference to experiments on vultures as species is on verge of extinction and would not be allowed</p>
	d		<p>idea that numbers are only over a 26 year period / does not say when data collected / no dates specified / there is no graph (1)</p>	[1]	<p>ignore any reference to 2008 study</p>
	e		<p>idea that it may not be reliable / atypical results / idea of not enough data / need replication (1)</p>	[1]	<p>ignore accuracy</p>
	f		<p>they might be dying / problems caused in their winter (feeding) sites (1)</p> <p>they might be dying / problems caused on their migration routes (1)</p>	[2]	<p>ignore gone to different site allow the cause may not be in their summer nesting sites for 1 mark warning migration must refer to numbers falling not just moving from one site to another</p>
	g		<p>any two from: vultures smaller (body mass) / ORA; idea that vultures eat meat from <u>lots of/many</u> cows/cattle; idea that poison accumulates in vultures / concentrated;</p>	[2]	<p>ignore vultures eat cattle or cows containing diclofenac because the plural is not specific enough</p>
			Total	[13]	

Question	Expected Answers	Marks	Additional Guidance
2	transferred into glucose/sugar/starch/ photosynthesis (1) one example of what chemical energy is used for eg respiration / cellulose / protein (1)	[2]	accept word or symbol equation for 1 mark ignore make food / growth / repair / energy alone
	Total	[2]	
3	a		
	correct food chain (1) four or five trophic levels drawn (1) each step getting smaller from bottom to top (1) correct label of organism (1)	[4]	food chain must have arrows pointing in the right direction. examples of food chains are: lettuce --> caterpillar --> shrew --> owl lettuce --> caterpillar --> robin --> owl rose --> caterpillar --> shrew --> owl rose --> caterpillar --> robin --> owl rose --> greenfly --> ladybird --> robin --> owl ignore producer / primary / secondary consumer
	b		
	idea that energy is transferred / shows energy at each level (1) takes into account the mass / size of an organism (1)	[2]	accept idea of ignoring numbers of organisms in pyramid of biomass. ignore references to the shape of the pyramid
	Total	[6]	

Question		Expected Answers	Marks	Additional Guidance
4	a	starch is not soluble / glucose is soluble (1) so will stay where put (inside cells) / no osmotic effect (1)	[2]	ignore will not be lost
	b	i 12 noon / noon / mid day / 12pm (1)	[1]	ignore 12 reject 12am
		ii 7.30 } = (1) am } = (1) 4.30 } pm }	[2]	7.30 and 16.30 = 2 marks accept morning and afternoon
		iii idea that photosynthesis is greater than respiration / cannot photosynthesise at night / ORA (1) idea of to make food or glucose or starch / have more energy (1)	[2]	do not credit reference to X and Y, only to respiration and photosynthesis ignore references to CO ₂ and oxygen do not penalise references to making / creating energy
		Total	[7]	
5	a	temperature; carbon dioxide; light;	[2]	accept in any order ignore heat / water / minerals 3 correct = 2 marks 2 correct = 1 mark 1 correct = 0 marks
	b	any three from: errors in counting; do not know the volume of the bubbles/gases in bubble / bubbles different sizes; some of the oxygen is used by respiration; some bubbles will stick to the pond weed / not float to top; 1 minute not long enough;	[3]	ignore 'human error' on its own ignore mention changing variable such as temperature as it is only for 1 minute
		Total	[5]	

Question		Expected Answers	Marks	Additional Guidance
6	a	<p>any two from: mutated / faulty allele / changed gene or DNA; is co-dominant / recessive; alters haemoglobin / shape of Red Blood Cell; idea of less oxygen;</p>	[2]	
	b	<p>idea that it protects against malaria (1)</p> <p>idea that people with sickle cell are more likely to survive (than non carriers) / ORA (1)</p> <p>and reproduce / pass (gene / sickle cell anaemia) on to next generation / ORA (1)</p>	[3]	ignore reference to natural selection
		Total	[5]	
7		<p>one mark for each set of words used correctly: idea that DNA is the cause of the problem / makes someone the carrier of the disease / faulty gene (1)</p> <p>DNA/gene taken from white blood cells (1)</p> <p>gene probe attaches to (mutated) gene / DNA (1)</p> <p>use of autoradiography to locate gene probe (1)</p>	[4]	<p>ignore reference to cheek cells</p> <p>ignore reference to UV and fluorescence</p>
		Total	[4]	

Question	Expected Answers	Marks	Additional Guidance
8 a	(used) to make ATP (1)	[1]	accept released as heat
b	muscle contracts / shorter / fatter (1)	[1]	reject relax
c	any two from: different levels of fitness/physical condition/ exercise; do different sports; idea of different genetic makeup/age/gender;	[2]	ignore environmental factors such as life style / size and weight
d	glucose only on left (1) lactic acid only on right (1)	[2]	ignore 'energy'
	Total	[6]	

9 a	<table style="display: inline-table; vertical-align: middle;"> <tr><td>B</td><td rowspan="2" style="font-size: 2em; vertical-align: middle;">}</td><td rowspan="2" style="vertical-align: middle;">= (1)</td></tr> <tr><td>A</td></tr> </table> antigens <table style="display: inline-table; vertical-align: middle; margin-left: 20px;"> <tr><td rowspan="2" style="font-size: 2em; vertical-align: middle;">}</td><td rowspan="2" style="vertical-align: middle;">= (1)</td></tr> <tr><td>antibodies</td></tr> </table>	B	}	= (1)	A	}	= (1)	antibodies	[2]																								
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B	x	✓	x	✓																													
AB	✓	✓	✓	✓																													
O	x	x	x	✓																													
c	blood will clot (1) idea of blocking blood vessels / stop blood flow / stroke (1)	[2]	ignore heart attack																														
	Total	[7]																															

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