

Mark Scheme for June 2012

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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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Annotations

Used in the detailed Mark Scheme:

Annotation	Meaning
/	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	credit alternative wording / or words to that effect
ORA	or reverse argument

Available in scoris to annotate scripts:

	indicate uncertainty or ambiguity
	benefit of doubt
	contradiction
	incorrect response
	error carried forward
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	no benefit of doubt
	reject
	correct response
	draw attention to particular part of candidate's response
	information omitted

Subject-specific Marking Instructions

- a. Accept any clear, unambiguous response (including mis-spellings of scientific terms if they are *phonetically* correct, but always check the guidance column for exclusions).
- b. 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 the third and fourth boxes are required for the mark:

✗
✗

*This would be worth
1 mark.*

✓
✗

*This would be worth
0 marks.*

✗
✗
✓
✓

*This would be worth
1 mark.*

- c. 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.

d. Marking method for tick-box questions:

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 and other markings. If there are no ticks, accept clear, unambiguous indications, e.g. shading or crosses. Credit should be given according to the instructions given in the guidance column for the question. 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 cities in England:

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

- e. For answers marked by levels of response:
- i. **Read through the whole answer from start to finish**
 - ii. **Decide the level that best fits** the answer – match the quality of the answer to the closest level descriptor
 - iii. **To determine the mark within the level**, consider the following:

Descriptor	Award mark
A good match to the level descriptor	The higher mark in the level
Just matches the level descriptor	The lower mark in the level

- iv. Use the **L1**, **L2**, **L3** annotations in Scoris to show your decision; do not use ticks.

Quality of Written Communication skills assessed in 6-mark extended writing questions include:

- appropriate use of correct scientific terms
- spelling, punctuation and grammar
- developing a structured, persuasive argument
- selecting and using evidence to support an argument
- considering different sides of a debate in a balanced way
- logical sequencing.

Question		Answer	Marks	Guidance			
1	(a)		2	one mark for each correct row (50% of urea is reabsorbed back into the blood (✓))			
		filtered out of the blood			✓	✓	✓
		reabsorbed back into the blood			✓	(✓)	✓
	(b)	more dilute; increase;	2				
Total			4				

Question		Answer	Marks	Guidance												
2	(a)	proteins; speed up reactions (in cells) / catalyst;	2	accept biological catalyst = 2 marks												
	(b)	molecules/substrate with the correct shape; can fit into the enzyme;	2	accept enzyme has the correct shape to fit the molecule (2) accept cannot fit into other molecules (1) ignore the enzyme is like a lock and the substrate is like a key												
	(c) (i)	20	1													
	(ii)	<table border="1"> <tr> <td></td> <td>becomes faster</td> <td>slows down</td> <td>stays the same</td> </tr> <tr> <td>collision rate</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>rate of reaction</td> <td>✓</td> <td></td> <td></td> </tr> </table>		becomes faster	slows down	stays the same	collision rate	✓			rate of reaction	✓			2	one mark for each correct response
	becomes faster	slows down	stays the same													
collision rate	✓															
rate of reaction	✓															
	(iii)	stop working / denatured;	1	ignore out of shape/deformed / melts												
Total			8													

Question			Answer	Marks	Guidance
3	(a)	(i)	homeostasis/ thermoregulation /temperature regulation / temperature control;	1	accept phonetic spellings
		(ii)	(energy) loss is the same as/ equals (energy) gain;	1	accept visa versa accept they are balanced / happen at the same rate / they even out OWTTE
	(b)		use of receptors; in skin for external temperature; in brain/hypothalamus for blood temperature;	3	OWTTE need to make correct link between the site and the temperature detected accept heat for temperature
Total				5	

Question		Answer	Marks	Guidance	
4	(a)	All the genes in every tree cell remain active .	1		
		All the genes in every tree cell become inactive.			
		Some of the genes in every tree cell are active.			✓
		The number of genes in every tree cell changes.			
	(b)	hormones ;	1		
	(c)	grow towards the light / increased light; (therefore) increased photosynthesis / makes more food;	2	ignore easier to get light	
		Total	4		

Question		Answer	Marks	Guidance																		
5	(a)	nucleus / chromosomes; cytoplasm / ribosomes / rough ER;	1	ignore gene / genes two correct responses = 1 mark accept phonetic spellings, correct abbreviations e.g. RER																		
	(b)	<table border="1"> <thead> <tr> <th>The DNA molecule...</th> <th>true</th> <th>false</th> </tr> </thead> <tbody> <tr> <td>... has a double helix shape.</td> <td>✓</td> <td></td> </tr> <tr> <td>... is found in chromosomes.</td> <td>✓</td> <td></td> </tr> <tr> <td>.... is made from four strands.</td> <td></td> <td>✓</td> </tr> <tr> <td>... contains five different types of bases.</td> <td></td> <td>✓</td> </tr> <tr> <td>... has bases which always pair up in the same way.</td> <td>✓</td> <td></td> </tr> </tbody> </table>	The DNA molecule...	true	false	... has a double helix shape.	✓		... is found in chromosomes.	✓	 is made from four strands.		✓	... contains five different types of bases.		✓	... has bases which always pair up in the same way.	✓		2	5 correct = 2 marks 4 correct = 1 mark 3 correct = 0 marks
The DNA molecule...	true	false																				
... has a double helix shape.	✓																					
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.... is made from four strands.		✓																				
... contains five different types of bases.		✓																				
... has bases which always pair up in the same way.	✓																					
Total			3																			

Question		Answer	Marks	Guidance
6	(a)	mitosis;	1	
	(b)	(i) organelles; separate; separate; grow;	4	
		(ii) 23;	1	
		(iii) idea of gametes fusing / fertilising (with each other); to obtain the correct or normal number of chromosomes / 46 or 23 pairs of chromosomes;	2	accept join / combine for fuse accept prevent doubling of chromosome number with each generation
		Total	8	

Question		Answer	Marks	Guidance										
7	(a)	<table border="1"> <tr> <td>...to find a mate.</td> <td></td> </tr> <tr> <td>...to keep warm.</td> <td></td> </tr> <tr> <td>...to find more food.</td> <td></td> </tr> <tr> <td>...to hide from a predator.</td> <td>✓</td> </tr> <tr> <td>...to get more oxygen for respiration.</td> <td></td> </tr> </table>	...to find a mate.		...to keep warm.		...to find more food.		...to hide from a predator.	✓	...to get more oxygen for respiration.		1	
...to find a mate.														
...to keep warm.														
...to find more food.														
...to hide from a predator.	✓													
...to get more oxygen for respiration.														
	(b)	brain AND spinal cord;	1											
	(c)	<table border="1"> <tr> <td>learning how to ride a bicycle</td> <td></td> </tr> <tr> <td>remembering your telephone number</td> <td></td> </tr> <tr> <td>writing a letter</td> <td></td> </tr> <tr> <td>reducing the size of your pupils when a bright light is shone into your eyes</td> <td>✓</td> </tr> </table>	learning how to ride a bicycle		remembering your telephone number		writing a letter		reducing the size of your pupils when a bright light is shone into your eyes	✓	1			
learning how to ride a bicycle														
remembering your telephone number														
writing a letter														
reducing the size of your pupils when a bright light is shone into your eyes	✓													
Total			3											

Question		Answer	Marks	Guidance								
8	(a)	cerebral cortex / cerebrum / cerebral hemispheres	1	ignore frontal lobe / pre frontal lobe reject cerebellum								
	(b)	<table border="1"> <tr> <td>...always long term.</td> <td></td> </tr> <tr> <td>...feeling disappointed.</td> <td></td> </tr> <tr> <td>...responding to a stimulus.</td> <td></td> </tr> <tr> <td>...the storage and retrieval of information.</td> <td>✓</td> </tr> </table>	...always long term.		...feeling disappointed.		...responding to a stimulus.		...the storage and retrieval of information.	✓	1	
...always long term.												
...feeling disappointed.												
...responding to a stimulus.												
...the storage and retrieval of information.	✓											
	(c)	<table border="1"> <tr> <td>...become simple reflex arcs.</td> <td></td> </tr> <tr> <td>...stop transmitting impulses.</td> <td></td> </tr> <tr> <td>...transmit impulses more quickly.</td> <td></td> </tr> <tr> <td>...are more likely to transmit impulses than others.</td> <td>✓</td> </tr> </table>	...become simple reflex arcs.		...stop transmitting impulses.		...transmit impulses more quickly.		...are more likely to transmit impulses than others.	✓	1	
...become simple reflex arcs.												
...stop transmitting impulses.												
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...are more likely to transmit impulses than others.	✓											
Total			3									

Question		Answer	Marks	Guidance				
9	(a)	<table border="1"> <tr> <td>axon</td> <td>B</td> </tr> <tr> <td>fatty sheath</td> <td>C</td> </tr> </table>	axon	B	fatty sheath	C	1	two correct responses = 1 mark
axon	B							
fatty sheath	C							
	(b)	<p>idea of less insulation (from nearby neurons);</p> <p>idea of decrease in speed of (nerve) impulse/ transmission;</p>	2	<p>accept impulses leak out ignore idea of protection of the neuron ignore leak of information</p> <p>accept signal / message / information</p>				
	(c)	synapse;	1					
		Total	4					
		Overall total	42					

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