OCR
RECOGNISING ACHIEVEMENT

GCSE

Biology A

General Certificate of Secondary Education

Unit **A222/01**: Modules B4, B5, B6 (Foundation Tier)

Mark Scheme for June 2012

Oxford Cambridge and RSA Examinations

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates 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.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

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.

Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

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
words	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
BOD	benefit of doubt
CON	contradiction
	incorrect response
ECF	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
NBOD	no benefit of doubt
R	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 <u>and</u> 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 <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**

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.

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>1</td><td>(a)</td><td></td><td>
<table>
<tr><th></th><th>salts</th><th>urea</th><th>water</th></tr>
<tr><td>filtered out of the blood</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>reabsorbed back into the blood</td><td>✓</td><td>(✓)</td><td>✓</td></tr>
</table>
</td><td>2</td><td>one mark for each correct row

(50% of urea is reabsorbed back into the blood (✓))</td></tr>
<tr><td></td><td>(b)</td><td></td><td>more dilute;
increase;</td><td>2</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>4</td><td></td></tr>
</table>

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>2</td><td>(a)</td><td></td><td>proteins;
speed up reactions (in cells) / catalyst;</td><td>2</td><td>accept biological catalyst = 2 marks</td></tr>
<tr><td></td><td>(b)</td><td></td><td>molecules/substrate with the correct shape;

can fit into the enzyme;</td><td>2</td><td>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</td></tr>
<tr><td></td><td>(c)</td><td>(i)</td><td>20</td><td>1</td><td></td></tr>
<tr><td></td><td></td><td>(ii)</td><td><table><tr><th></th><th>becomes faster</th><th>slows down</th><th>stays the same</th></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></td><td>2</td><td>one mark for each correct response</td></tr>
<tr><td></td><td></td><td>(iii)</td><td>stop working / denatured;</td><td>1</td><td>ignore out of shape/deformed / melts</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>8</td><td></td></tr>
</table>

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)		<table><tr><td>All the genes in every tree cell remain active .</td><td></td></tr><tr><td>All the genes in every tree cell become inactive.</td><td></td></tr><tr><td>Some of the genes in every tree cell are active.</td><td>✓</td></tr><tr><td>The number of genes in every tree cell changes.</td><td></td></tr></table>	1	
	(b)		hormones ;	1	
	(c)		grow towards the light / increased light; (therefore) increased photosynthesis / makes more food;	2	**ignore** easier to get light
			Total	**4**	

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>5</td><td>(a)</td><td></td><td>nucleus / chromosomes;
cytoplasm / ribosomes / rough ER;</td><td>1</td><td>ignore gene / genes
two correct responses = 1 mark
accept phonetic spellings, correct abbreviations e.g. RER</td></tr>
<tr><td></td><td>(b)</td><td></td><td><table>
<tr><th>The DNA molecule…</th><th>true</th><th>false</th></tr>
<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>
</table></td><td>2</td><td>5 correct = 2 marks
4 correct = 1 mark
3 correct = 0 marks</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>3</td><td></td></tr>
</table>

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><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>	1	
	(b)		brain AND spinal cord;	1	
	(c)		<table><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>	1	
			Total	**3**	

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

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

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

Education and Learning
Telephone: 01223 553998
Facsimile: 01223 552627
Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored

Oxford Cambridge and RSA Examinations
is a Company Limited by Guarantee
Registered in England
Registered Office; 1 Hills Road, Cambridge, CB1 2EU
Registered Company Number: 3484466
OCR is an exempt Charity

OCR (Oxford Cambridge and RSA Examinations)
Head office
Telephone: 01223 552552
Facsimile: 01223 552553