OCR
Oxford Cambridge and RSA

GCSE

Biology A

Unit **A162/01**: Modules B4, B5, B6 (Foundation Tier)

General Certificate of Secondary Education

Mark Scheme for June 2014

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, Cambridge Nationals, Cambridge Technicals, 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.

Annotations

Used in the detailed Mark Scheme:

Annotation	Meaning
BP	Blank Page – this annotation **must** be used on all blank pages within an answer booklet (structured or unstructured) and on each page of an additional object where there is no candidate response.
/	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:

	correct response
	incorrect response
BOD	benefit of doubt
NBOD	no benefit of doubt
ECF	error carried forward
0 , L1 , L2 , L3	indicate level awarded for a question marked by level of response
^	information omitted
CON	contradiction

R	reject
	indicate uncertainty or ambiguity
	draw attention to particular part of candidate's response

ADDITIONAL OBJECTS: You **must** assess and annotate the additional objects for each script you mark. Where credit is awarded, appropriate annotation must be used. If no credit is to be awarded for the additional object, please use annotation as agreed at the SSU.

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. 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**

d 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>Idea of speeding up ;</td><td>1</td><td></td></tr>
<tr><td></td><td>b</td><td></td><td>
<table>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>Enzymes have an active site.</td><td>✓</td></tr>
<tr><td>Enzymes are made from instructions in genes.</td><td>✓</td></tr>
<tr><td>.</td><td></td></tr>
<tr><td>Enzymes are proteins.</td><td>✓</td></tr>
<tr><td></td><td></td></tr>
</table>
</td><td>3</td><td>minus 1 mark for each additional incorrect tick.</td></tr>
<tr><td></td><td>c</td><td>i</td><td>Break down (stains);</td><td>1</td><td>accept makes stains soluble / digests stains
ignore removes / destroys / eats stains</td></tr>
<tr><td></td><td></td><td>ii</td><td>30°C optimum temperature;
enzymes will not work/denatured at 90°C / at high temperatures;</td><td>2</td><td>accept “works best at 30 °C”</td></tr>
<tr><td></td><td>d</td><td></td><td>works best at pH6;
works over a range of pH3 to pH9;
does not work at all below pH3 / above pH9;</td><td>3</td><td>accept(pH6) is optimum
accept range of pH4 to pH8
ignore reference to “temperature”</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>[10]</td><td></td></tr>
</table>

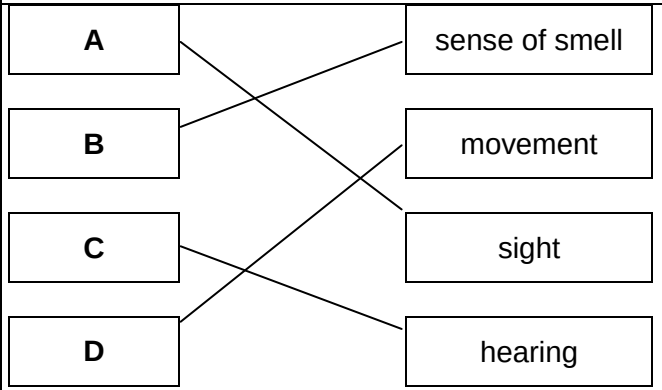
Question			Answer	Marks	Guidance
2			**[Level 3]** Correct description or correct word equation AND suggestion why rate is fast. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **[Level 2]** Description or correct word equation OR partial description and suggestion why rate is fast. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **[Level 1]** Product / reactant / light / chlorophyll OR suggestion why rate is fast. Quality of written communication impedes communication of the science at this level. (1 – 2 marks) **[Level 0]** Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	**This question is targeted at grades up to E** **Indicative scientific points for photosynthesis may include:** • chlorophyll / pigment / green used • takes place in leaf • needs light • uses carbon dioxide • uses water • makes oxygen • makes glucose • word equation **Link stated between a suggested feature of the plant and photosynthesis and rapid growth e.g**. idea that photosynthesis is more efficient more chloroplasts / leaves darker green leaves spread out to catch a lot of light / lots of leaves good roots / **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
			Total	**[6]**	

Question			Answer	Marks	Guidance
3	a		A= aerobic **AND** B= anaerobic;	1	
	b		2880/ 150; 19.2 / 19 / 19.2:1 / 19:1/ 96:5 ;	2	**Accept** 1440/75 or 960/50 or 288/15 or 96/5 or 480/25 **for first MP** Correct answer = 2 marks **Ignore** units
	c		To prevent / reduce production of lactic acid; Type A provides a lot of energy / type B provides little energy;	2	**accept** avoid pain / cramp
	d	i	A no correlation or description ; B positive correlation or description ; C negative correlation or description ; D positive correlation or description ;	4	e.g. In A / 1st section / 0 – 30 mins, one goes up and one stays the same e.g. In B / 2nd section / 30 – 60 mins, both go up e.g. In C / 3rd section / 60 – 75 mins, one goes up , the other goes down e.g. In D /4th section /75 – end, both go down
		ii	Repeat the same training a number of times. ✓ Repeat her training but only run for 60 minutes. Run more slowly so that her heart rate does not rise too much. Repeat the same experiment on other runners.	1	
			Total	[10]	

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>4</td><td>a</td><td></td><td><table><tr><td>embryo</td><td></td></tr><tr><td>zygote</td><td>✓</td></tr><tr><td>fetus</td><td></td></tr><tr><td>gametes</td><td></td></tr></table></td><td>1</td><td></td></tr>
<tr><td></td><td>b</td><td></td><td>Idea of doubling shown;
7;</td><td>2</td><td>
correct answer 7 alone scores 2 marks</td></tr>
<tr><td></td><td>c</td><td></td><td>3;</td><td>1</td><td></td></tr>
<tr><td></td><td>d</td><td></td><td>stem cells;
Specialise at a later time;</td><td>2</td><td>
accept change into other cells / named example</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>[6]</td><td></td></tr>
</table>

Question			Answer	Marks	Guidance
5			**[Level 3]** Includes good description of both mitosis and meiosis and makes reference to chromosomes. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **[Level 2]** Correctly names both meiosis and mitosis linked to correct processes OR correctly identifies one process and gives a good description. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **[Level 1]** Refers to cell division. Quality of written communication impedes communication of the science at this level. (1 – 2 marks) **[Level 0]** Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	**This question is targeted at grades up to C** **Indicative scientific points about meiosis may include:** • a type of cell division that produces gametes. • cells produced have half the number of chromosomes of parent cell **Indicative scientific points about mitosis may include:** • produces body cells. • copies of chromosomes separate • nucleus divides • cells are genetically identical to each other. • cells are genetically identical to parent cells. **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
			Total	**[6]**	

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>6</td><td>a</td><td></td><td>
<table>
<tr><td>Root growth requires lower concentration of hormone than shoot growth</td><td>✓</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>The hormone causes a greater rate of shoot growth than root growth.</td><td>✓</td></tr>
</table>
</td><td>2</td><td></td></tr>
<tr><td></td><td>b</td><td></td><td>Phototropism;</td><td>1</td><td></td></tr>
<tr><td></td><td>c</td><td></td><td>Light needed for photosynthesis;
Makes food;</td><td>2</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>[5]</td><td></td></tr>
</table>

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>7</td><td>a</td><td></td><td> 
</td><td>3</td><td>4 correct = 3
3 or 2 correct = 2
1 correct = 1</td></tr>
<tr><td></td><td>b</td><td></td><td>D;
Because it makes (fingers) move / all other are sensory;</td><td>2</td><td>
need to have D correct for second marking point to be awarded</td></tr>
<tr><td></td><td>c</td><td>i</td><td><table>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>The patient may not benefit personally from the research.</td><td>✓</td></tr>
<tr><td>The patient needs to give informed permission for the research.</td><td>✓</td></tr>
</table></td><td>2</td><td></td></tr>
</table>

<table>
<tr>
<td></td><td></td><td>ii</td>
<td>
<table>
<tr><td>People are more willing to accept risk when it is something that they choose to do.</td><td>✓</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>The correct action is the one that leads to the best outcome for most people.</td><td>✓</td></tr>
<tr><td></td><td></td></tr>
</table>
</td>
<td>2</td><td></td>
</tr>
<tr>
<td></td><td>d</td><td></td>
<td>
<table>
<tr><td></td><td></td></tr>
<tr><td>The finger would feel numb.</td><td>✓</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td>The fingers would not move</td><td>✓</td></tr>
<tr><td></td><td></td></tr>
</table>
</td>
<td>2</td><td></td>
</tr>
<tr>
<td></td><td></td><td></td><td>Total</td><td>[11]</td><td></td>
</tr>
</table>

Question			Answer	Marks	Guidance
8			**[Level 3]** Some detail of nervous pathway involved, and may include some description of squirrel behaviour. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **[Level 2]** Reference to sense organ / receptor / brain / nerves / muscles and may include description of squirrel behaviour. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **[Level 1]** Description of squirrel behaviour OR why it does it Quality of written communication impedes communication of the science at this level. (1 – 2 marks) **[Level 0]** Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)	6	**This question is targeted at grades up to C** **Indicative scientific points may include:** • receptors • sensory neuron • processing centre • coordination • motor neuron • effector / muscle /adrenaline (epinephrine) • impulses are electrical • impulses are fast • impulses are short lived • reference to synapses • relevant suggestion of what squirrel does • explanation of why squirrel does it / idea of increased survival. **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
			Total	**[6]**	
			Paper total	**60**	

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