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 2015

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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.

1. **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

2. **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.

3. 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>Expected answer</th><th>Marks</th><th>Additional Guidance</th></tr>
<tr><td>1</td><td>a</td><td>i</td><td>
<table>
<tr><th></th><th>Female horse</th><th>Male donkey</th></tr>
<tr><td>Body cell</td><td></td><td></td></tr>
<tr><td>Sperm cell</td><td></td><td>31</td></tr>
<tr><td>Egg cell</td><td>32</td><td></td></tr>
</table>
</td><td>2</td><td>Egg cell correct for horse = 1 mark
Sperm cell correct for donkey = 1 mark</td></tr>
<tr><td></td><td>a</td><td>ii</td><td>63</td><td>1</td><td></td></tr>
<tr><td></td><td>b</td><td></td><td>Meiosis</td><td>1</td><td></td></tr>
<tr><td></td><td>c</td><td></td><td>
<table>
<tr><th></th><th>Cell growth</th><th>Cell division</th></tr>
<tr><td>Nucleus splits into two</td><td></td><td>✓</td></tr>
<tr><td>Numbers of organelles increase</td><td>✓</td><td></td></tr>
<tr><td>Chromosomes are copied</td><td>✓</td><td></td></tr>
<tr><td>Copies of the chromosomes separate</td><td></td><td>✓</td></tr>
</table>
</td><td>4</td><td>1 mark for each correct row</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>8</td><td></td></tr>
</table>

Question			Expected answer	Marks	Additional Guidance
2	a		water (1) out of (1) osmosis (1)	3	
	b		lack of/no oxygen (1)	1	
	c		18 (1)	1	
			Total	5	

Question			Expected Answers	Marks	Additional Guidance
3			**Level 3 (5-6 marks)** Good description of the structure of DNA **AND** describes the job of the DNA in the cell. Quality of written communication does not impede communication of the science at this level **Level 2 (3-4 marks)** Good description of the structure of DNA **AND** job Quality of written communication partly impedes communication of the science at this level **Level 1 (1-2 marks)** Basic description of the structure of DNA OR job Quality of written communication impedes communication of the science at this level **Level 0 (0 marks)** Insufficient or irrelevant science. Answer not worthy of credit	6	**This question is targeted at grades up to C** **Indicative scientific points may include** **Job in the cell** • contains/holds the genetic code/genes • involved in/has instructions for the synthesis of proteins/enzymes/amino acids **ignore** DNA **makes/synthesises** protein • able to replicate (to produce new chromosomes) • stores information **DNA structure** • **double** helix (or description) • consists of 2 strands • has (4) bases • (bases are) A,T, C, G • A pairs with T **OR** C pairs with G **NB** Base A pairs with T and C pairs with G covers the third, fourth AND fifth bullets.
			Total	6	

Question			Expected Answers	Marks	Additional Guidance
4	(a)	(i)	Algae give carbon dioxide to the coral ☐ Algae give chlorophyll to the coral ☐ Algae give glucose to the coral ✓ Algae give oxygen to the coral ✓ Coral gives carbon dioxide to the algae ✓ Coral gives chlorophyll to the algae ☐ Coral gives glucose to the algae ☐ Coral gives oxygen to the algae ☐	3	remove one mark for each additional incorrect answer
4	(a)	(ii)	cellulose (1) starch (1)	2	

Question	Expected Answers	Marks	Additional Guidance
(b)	**Level 3 (5-6 marks)** Explanation uses ideas from: photosynthesis , temperature and enzymes Quality of written communication does not impede communication of the science at this level **Level 2 (3-4 marks)** Explanation uses ideas from two of : photosynthesis , temperature, enzymes Quality of written communication partly impedes communication of the science at this level **Level 1 (1-2 marks)** Makes ref. to either photosynthesis OR temperature OR enzymes Quality of written communication impedes communication of the science at this level **Level 0 (0 marks)** Insufficient or irrelevant science. Answer not worthy of credit	6	**This question is targeted at grades up to C** **Indicative scientific points may include** **Photosynthesis** • (If enzymes do not function) the rate of photosynthesis drops /stops • If there is no photosynthesis less/no glucose will be made • Less / no respiration • Idea of (temp) limiting factor for P/S **Temperatures** • temperature is **too** hot/ high/low/cold (algae die) **ignore** ref to figures • Reaction slows (photosynthesis) • Fewer collisions/ref to kinetic energy changes **NB** Credit "reaction slows" only once (either temperature or photosynthesis) **Enzyme** • enzyme works best / fastest at optimum temperature • Enzyme is damaged /denatured / changes shape (at **high** temperatures); **Ignore** killed / dies • Ref. To active site • ref to lock and key / substrate no longer complementary AW

Question			Expected Answers	Marks	Additional Guidance
		c	*any three from* sample or look at different areas of coral (where algae dead and alive) ; measure / change temperature; measure / change UV / light; record amount of living / dead algae ; ref. to correlation between either factor and dead algae;	3	**Award marks for natural habitat OR experimental situation** **Accept** coral for algae throughout **Accept** appropriate sampling techniques e.g. more UV, less algae
			Peer review is when the public evaluate the data [ ] Peer review is when scientists evaluate the data of other scientists [✓] Peer review is when both the public and scientists evaluate the data [ ] Peer review allows the public to keep up to date with the latest findings [ ] Peer review gives greater confidence in the findings [✓] Peer review means the scientists get paid [ ]		
			Total	**16**	

Question			Expected Answer	Marks	Additional Guidance
5	a		idea that colour / flower will be the same ORA for seeds ; ref. to clone / genetically identical; ORA for seeds; taking a cutting is a faster process / seeds would take longer to grow into a plant ; ORA	3	**Ignore** cost
	b		**Structure** **Tissue** **Organ** Flowers ☐ ✓ Leaves ☐ ✓ Roots ☐ ✓ Xylem ✓ ☐	**2**	Two ticks in the same row count as wrong 4 correct = 2 marks 3/2 correct = 1 mark
			Total	**5**	

Question			Expected Answer	Marks	Additional Guidance
6			**Level 3 (5-6 marks)** Good description of how learning occurs AND examples of ways that could be used to help remember the information. Quality of written communication does not impede communication of the science at this level **Level 2 (3-4 marks)** Basic description of how learning occurs **AND** examples of ways that could be used to help remember the information Quality of written communication partly impedes communication of the science at this level **Level 1 (1-2 marks)** Basic description of how learning occurs **OR** examples of ways that could be used to help remember the information Quality of written communication impedes communication of the science at this level **Level 0 (0 marks)** Insufficient or irrelevant science. Answer not worthy of credit	6	**This question is targeted at grades up to E** **Indicative scientific points may include:** **How learning occurs** Memory • memory is storage • memory is retrieval of information • memory can be short term • memory can be long term • info from the short term can be transferred • **neural** pathways/connections **Ways to help remember info** • repetition/write out • using a visual image/diagram/poster/cards/mind map/bright colours/patterns • read aloud/recite/make a song • testing • mnemonics • quiet room • rewards "read" on its own is insufficient. **ignore** ref to food, listening in class (not a revision technique)
			Total	**6**	

Question			Expected Answer	Marks	Additional Guidance
7	a		Fewer side effects; Can take with high blood pressure/doesn't cause high blood pressure; C has unpleasant side effects; overdose not likely to be fatal;	3	**Ignore** NO side effects She can't take drug A/D with high blood pressure. Assume "it" means drug B unless indicates otherwise.
	b		The drugs are very expensive. ☐ The benefits of taking the antidepressants outweigh the risks. ✓ The risk of serious side effects is low. ✓ All of the side effects are serious. ☐ Overdoses are always fatal. ☐	2	remove one mark for each additional incorrect answer
			Total	5	

Question			Expected Answer	Marks	Additional Guidance
8	a		$\frac{(32.5 + 26.8 + 24.7)}{3}$ (1) or $\frac{84}{3}$ 28 (1)	2	Credit 2 marks if correct answer is given without any workings shown
	b		Tamson has the faster reaction times. ✓ Owen's reaction time gets faster with each trial. The ranges of Owen's and Tamson's reaction times overlap. Owen had the greater range of reaction times. ✓ The range was the same for both Tamson's and Owen's trial.	2	remove one mark for each additional incorrect answer
	c		Any two from: allows you to identify **outliers;** gives you greater confidence in conclusion ; increases the reliability/repeatability;	2	**Ignore** errors **ignore** references to accuracy or fair test
	d		***any three from*** difficult to drop the ruler from exactly the same position each time; participant could be distracted; need more trials; may anticipate the drop; not holding the ruler steady;	3	**accept** any sensible suggestions
			Total	9	

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