



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.

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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
<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:

	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
A	information omitted
CON	contradiction

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	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 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.*

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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	<input type="checkbox"/>
Manchester	<input type="checkbox"/>
Paris	<input type="checkbox"/>
Southampton	<input type="checkbox"/>

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

- 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.

Question			Expected answer	Marks	Additional Guidance														
1	a	i	<table border="1"> <thead> <tr> <th></th> <th>Female horse</th> <th>Male donkey</th> </tr> </thead> <tbody> <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> </tbody> </table>		Female horse	Male donkey	Body cell			Sperm cell		31	Egg cell	32		2	Egg cell correct for horse = 1 mark Sperm cell correct for donkey = 1 mark		
				Female horse	Male donkey														
			Body cell																
			Sperm cell		31														
Egg cell	32																		
a	ii	63	1																
b		Meiosis	1																
c		<table border="0"> <thead> <tr> <th></th> <th>Cell growth</th> <th>Cell division</th> </tr> </thead> <tbody> <tr> <td>Nucleus splits into two</td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>Numbers of organelles increase</td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Chromosomes are copied</td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Copies of the chromosomes separate</td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </tbody> </table>		Cell growth	Cell division	Nucleus splits into two	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Numbers of organelles increase	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Chromosomes are copied	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Copies of the chromosomes separate	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4	1 mark for each correct row
	Cell growth	Cell division																	
Nucleus splits into two	<input type="checkbox"/>	<input checked="" type="checkbox"/>																	
Numbers of organelles increase	<input checked="" type="checkbox"/>	<input type="checkbox"/>																	
Chromosomes are copied	<input checked="" type="checkbox"/>	<input type="checkbox"/>																	
Copies of the chromosomes separate	<input type="checkbox"/>	<input checked="" type="checkbox"/>																	
			Total	8															

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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	

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Question	Expected Answers	Marks	Additional Guidance
3	<p>Level 3 (5-6 marks) Good description of the structure of DNA AND describes the job of the DNA in the cell.</p> <p>Quality of written communication does not impede communication of the science at this level</p> <p>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</p> <p>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</p> <p>Level 0 (0 marks) Insufficient or irrelevant science. Answer not worthy of credit</p>	6	<p>This question is targeted at grades up to C</p> <p>Indicative scientific points may include</p> <p>Job in the cell</p> <ul style="list-style-type: none"> • contains/holds the genetic code/genes • involved in/has instructions for the synthesis of proteins/enzymes/amino acids <p>ignore DNA makes/synthesises protein</p> <ul style="list-style-type: none"> • able to replicate (to produce new chromosomes) • stores information <p>DNA structure</p> <ul style="list-style-type: none"> • 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 <p>NB Base A pairs with T and C pairs with G covers the third, fourth AND fifth bullets.</p>
	Total	6	

Question			Expected Answers	Marks	Additional Guidance
4	(a)	(i)	Algae give carbon dioxide to the coral <input type="checkbox"/> Algae give chlorophyll to the coral <input type="checkbox"/> Algae give glucose to the coral <input checked="" type="checkbox"/> Algae give oxygen to the coral <input checked="" type="checkbox"/> Coral gives carbon dioxide to the algae <input checked="" type="checkbox"/> Coral gives chlorophyll to the algae <input type="checkbox"/> Coral gives glucose to the algae <input type="checkbox"/> Coral gives oxygen to the algae <input type="checkbox"/>	3	remove one mark for each additional incorrect answer
4	(a)	(ii)	cellulose (1) starch (1)	2	

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Question	Expected Answers	Marks	Additional Guidance
(b)	<p>Level 3 (5-6 marks) Explanation uses ideas from: photosynthesis , temperature and enzymes</p> <p>Quality of written communication does not impede communication of the science at this level</p> <p>Level 2 (3-4 marks) Explanation uses ideas from two of : photosynthesis , temperature, enzymes</p> <p>Quality of written communication partly impedes communication of the science at this level</p> <p>Level 1 (1-2 marks) Makes ref. to either photosynthesis OR temperature OR enzymes</p> <p>Quality of written communication impedes communication of the science at this level</p> <p>Level 0 (0 marks) Insufficient or irrelevant science. Answer not worthy of credit</p>	6	<p>This question is targeted at grades up to C</p> <p>Indicative scientific points may include</p> <p>Photosynthesis</p> <ul style="list-style-type: none"> • (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 <p>Temperatures</p> <ul style="list-style-type: none"> • temperature is too hot/ high/low/cold (algae die) ignore ref to figures • Reaction slows (photosynthesis) • Fewer collisions/ref to kinetic energy changes <p>NB Credit “reaction slows” only once (either temperature or photosynthesis)</p> <p>Enzyme</p> <ul style="list-style-type: none"> • enzyme works best / fastest at <u>optimum</u> 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

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

Question		Expected Answer	Marks	Additional Guidance															
5	a	<p>idea that colour / flower will be the same ORA for seeds ;</p> <p>ref. to clone / genetically identical; ORA for seeds;</p> <p>taking a cutting is a faster process / seeds would take longer to grow into a plant ; ORA</p>	3	Ignore cost															
	b	<table border="0"> <thead> <tr> <th>Structure</th> <th>Tissue</th> <th>Organ</th> </tr> </thead> <tbody> <tr> <td>Flowers</td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>Leaves</td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>Roots</td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>Xylem</td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </tbody> </table>	Structure	Tissue	Organ	Flowers	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Leaves	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Roots	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Xylem	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2	<p>Two ticks in the same row count as wrong</p> <p>4 correct = 2 marks</p> <p>3/2 correct = 1 mark</p>
Structure	Tissue	Organ																	
Flowers	<input type="checkbox"/>	<input checked="" type="checkbox"/>																	
Leaves	<input type="checkbox"/>	<input checked="" type="checkbox"/>																	
Roots	<input type="checkbox"/>	<input checked="" type="checkbox"/>																	
Xylem	<input checked="" type="checkbox"/>	<input type="checkbox"/>																	
		Total	5																

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Question	Expected Answer	Marks	Additional Guidance
6	<p>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</p> <p>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</p> <p>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</p> <p>Level 0 (0 marks) Insufficient or irrelevant science. Answer not worthy of credit</p>	6	<p>This question is targeted at grades up to E</p> <p>Indicative scientific points may include:</p> <p>How learning occurs</p> <p>Memory</p> <ul style="list-style-type: none"> • 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 <p>Ways to help remember info</p> <ul style="list-style-type: none"> • 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 <p>“read” on its own is insufficient.</p> <p>ignore ref to food, listening in class (not a revision technique)</p>
	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	<p>The drugs are very expensive. <input type="checkbox"/></p> <p>The benefits of taking the antidepressants outweigh the risks. <input checked="" type="checkbox"/></p> <p>The risk of serious side effects is low. <input checked="" type="checkbox"/></p> <p>All of the side effects are serious. <input type="checkbox"/></p> <p>Overdoses are always fatal. <input type="checkbox"/></p>	2	remove one mark for each additional incorrect answer
		Total	5	

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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	<p>Tamson has the faster reaction times. <input checked="" type="checkbox"/></p> <p>Owen's reaction time gets faster with each trial. <input type="checkbox"/></p> <p>The ranges of Owen's and Tamson's reaction times overlap. <input type="checkbox"/></p> <p>Owen had the greater range of reaction times. <input checked="" type="checkbox"/></p> <p>The range was the same for both Tamson's and Owen's trial. <input type="checkbox"/></p>	2	remove one mark for each additional incorrect answer
	c	<p>Any two from:</p> <p>allows you to identify outliers;</p> <p>gives you greater confidence in conclusion ;</p> <p>increases the reliability/repeatability;</p>	2	<p>ignore errors</p> <p>ignore references to accuracy or fair test</p>
	d	<p>any three from</p> <p>difficult to drop the ruler from exactly the same position each time;</p> <p>participant could be distracted;</p> <p>need more trials;</p> <p>may anticipate the drop;</p> <p>not holding the ruler steady;</p>	3	<p>accept any sensible suggestions</p>
Total			9	

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