

## **GCSE**

### **Biology A / Additional Science A**

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

General Certificate of Secondary Education

### **Mark Scheme for June 2017**

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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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## Subject-specific Marking Instructions

Accept any clear, unambiguous response (including mis-spellings of scientific terms if they are *phonetically* correct, but always check the guidance column for exclusions).

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.*

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.

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	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Manchester	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Paris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Southampton	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Score:</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>NR</b>

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 RM Assessor 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		double ; four; proteins; nucleus	3	4 correct answers= 3 3/2 correct answers = 2 1 correct answers= 1
		<b>Total</b>	<b>3</b>	

Question		Answer	Marks	Guidance
2	a	<i>any three from:</i> (only plant cells have/it has) chloroplasts (1); (only plant cells have/it has) a vacuole (1); (only plant cells have/it has) a cell wall (1);	3	<b>accept</b> chlorophyll <b>ignore</b> wall on its own
	b	i	1	
	b	ii	1	<b>accept</b> adult embryo umbilical cord bone marrow
	c		1	
	d		1	
		<b>Total</b>	<b>7</b>	

Question	Answer	Marks	Guidance
3	<p><b>Level 3 (5-6 marks)</b> Correctly identifies both conclusions <b>AND</b> gives suggests methods to be used to ensure valid data is collected AND provides an explanation as to why these are important. <i>Quality of written communication does not impede communication of science at this level.</i></p> <p><b>Level 2 (3-4 marks)</b> Correctly identifies <b>both</b> conclusions <b>AND</b> suggests some methods to ensure valid data is collected. <i>Quality of written communication partly impedes communication of science at this level.</i></p> <p><b>Level 1 (1-2 marks)</b> Correctly identifies a conclusion OR suggests some methods to ensure valid data is collected. <i>Quality of written communication impedes communication of the science at this level.</i></p> <p><b>Level 0 (0 marks)</b> Insufficient or irrelevant science. Answer not worthy of credit.</p>	6	<p><b>This question is targeted at grades up to C</b></p> <p><b>Indicative scientific points may include:</b></p> <p><b>Conclusions</b> Conclusion 1 – Using rooting powder does increase the number of roots formed. (Accept reverse arguments) Conclusion 2 – Rooting Powder A is a more effective rooting powder / <b>accept</b> A is better/best Conclusion 3 – roots will grow without rooting powder/not much difference</p> <p><b>Variables to control</b></p> <ul style="list-style-type: none"> <li>• The same plant</li> <li>• The size of cuttings</li> <li>• The amount of rooting powder</li> <li>• The volume of (amount of) water</li> <li>• The amount of nutrients</li> <li>• The amount of light</li> <li>• Temperature</li> <li>• Leave the plants for the same amount of time</li> <li>• The type of soil</li> </ul> <p><b>Explanations</b></p> <ul style="list-style-type: none"> <li>• Amount of rooting powder could affect number of roots formed (more rooting powder, more roots)</li> <li>• Amount of water and light would affect the amount of photosynthesis which could in turn affect the root growth.</li> <li>• Amount of time would affect root growth, those left for longer would be more likely to grow more roots.</li> </ul> <p>Accept all sensible suggestions for methods and explanations. <b>Ignore reference to fair test.</b> <b>Ignore ref to growing faster, ignore repeats</b></p>
	<b>Total</b>	<b>6</b>	

Question			Answer	Marks	Guidance
4	a	i	storage of information (1) (and) retrieval/recall of information (1)	2	<b>accept</b> idea of information <b>accept</b> get <b>back</b> <b>ignore</b> memory/remember <b>ignore</b> short/long term memory <b>ignore</b> reuse of information
		ii	(cerebral) cortex (1)	1	<b>Accept</b> temporal lobe/parietal lobe/occipital lobe/frontal lobe/auditory cortex/visual cortex/Wernicke's area/Broca's area <b>Accept</b> frontal cortex / pre-frontal cortex  <b>Ignore</b> left / right hemisphere/sides of the brain
		iii	<i>Any two from:</i>  <i>Consequences of not having the biopsy</i> tumour may grow/spread; (secondary) tumours may form; he could die;  <i>Reasons to have the biopsy</i> chance of memory loss may be low; idea that memory may come back/John can re-learn the words; idea that benefits (of having the biopsy) outweigh risks (of having the biopsy); idea that tumour causes more harm than the biopsy ORA	2	<b>ignore</b> 'may have a tumour'
		iv	mitosis	1	spelling must be correct
	b		practice/play more often/ repetition	1	<b>accept</b> break into small parts/chunking <b>ignore</b> revise



	c		larger brains/more intelligent/more adaptable/better able to learn	1	<b>accept</b> more neurons <b>ignore</b> brain grows
			<b>Total</b>	<b>8</b>	

Question			Answer	Marks	Guidance
5	(a)	(i)	<i>any one from:</i>  eye (1); nose (1)	1	<b>accept</b> receptor cells in retina
		(ii)	(gastric) gland	1	<b>do not accept</b> stomach
	(b)		<b>any three from:</b> enzyme 1 (1); optimum pH is 2 (1); <b>only</b> works in acid conditions (1); does not work beyond pH 5/denatures at pH5 (1) works in pH values up to 3 (1); stomach contains acid (1);	3	<b>accept</b> reverse arguments  <b>accept</b> works in pH 1-5
	(c)		Blood	1	
	(d)	(i)	$5/10 \times 100$ (1)  $= 50\%$ (1)	2	award one mark for correct working
		(ii)	$24 \times 60 = 1,440$ (1) $3,000 \div 1,440 = 2.08$ (1)	2	award 2 marks for correct answer <b>accept</b> 2/2.1/2.083
		(iii)	they will produce more when food is present/less when there is no food	1	<b>accept</b> any idea that secretion will change when food consumed. <b>ignore</b> ref to <b>what</b> they eat.

	(e)	<p><i>any one from:</i>                      the drugs will <b>only</b> treat the symptoms; (1)                      they will not remove the problem/the tumour will still be there (1);                      the cancer could spread/grow (1);                      if the tumour is not removed the person could die (1)</p>	1	<p><b>ignore</b> side effects  <b>accept</b> tumour or cancer throughout  <b>accept</b> reverse argument</p>
		<b>Total</b>	<b>12</b>	

Question	Answer	Marks	Guidance
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6	a	<p><b>Level 3 (5-6 marks)</b> Correctly identifies 2 or more pieces of equipment that could be used and gives some details about how to use them. Quality of written communication does not impede communication of science at this level.</p> <p><b>Level 2 (3-4 marks)</b> Correctly identifies a piece of equipment that could be used and gives some details about how to use it. Quality of written communication partly impedes communication of science at this level.</p> <p><b>Level 1 (1-2 marks)</b> Makes appropriate suggestions about how to carry out the investigation. Quality of written communication impedes communication of the science at this level.</p> <p><b>Level 0 (0 marks)</b> Insufficient or irrelevant science. Answer not worthy of credit.</p>	6	<p><b>This question is targeted at grades up to C</b> <b>Indicative scientific points may include:</b></p> <p><b>Transect</b></p> <ul style="list-style-type: none"> <li>• line/belt</li> <li>• transect</li> <li>• stretching from beach through the dunes/between two points</li> <li>• marks out where samples will be taken</li> </ul> <p><b>Quadrat</b></p> <ul style="list-style-type: none"> <li>• point or square</li> <li>• quadrat</li> <li>• take several samples</li> <li>• samples taken in different places/at regular intervals</li> <li>• (to define) the area where observations will be made</li> <li>• record/photograph the number of plants/type of plant/ % cover</li> </ul> <p><b>Identification Key</b></p> <ul style="list-style-type: none"> <li>• use a key</li> <li>• (used to) identify the different plants</li> <li>• series of questions</li> <li>• with yes/no answers</li> </ul>	
	b	i	<b>osmosis (1)</b>	1	
		ii	carbon dioxide (1) oxygen (1)	2	<b>ignore</b> light, sunlight <b>ignore</b> formulae
			<b>Total</b>	<b>9</b>	

Question		Answer	Marks	Guidance
7	a	<p><b>Level 3 (5-6 marks)</b> Describes in detail a reflex arc <b>AND</b> explains why reflexes are important.</p> <p>Quality of written communication does not impede communication of science at this level.</p> <p><b>Level 2 (3-4 marks)</b> Gives a basic description of a reflex arc <b>AND</b> explains why reflexes are important.</p> <p>Quality of written communication partly impedes communication of science at this level.</p> <p><b>Level 1 (1-2 marks)</b> Gives a basic description of a reflex arc <b>OR</b> explains why reflexes are important. Quality of written communication impedes communication of the science at this level.</p> <p><b>Level 0 (0 marks)</b> Insufficient or irrelevant science. Answer not worthy of credit.</p>	6	<p><b>This question is targeted at grades up to C</b></p> <p><b>Indicative scientific points may include:</b></p> <p><b>Reflex arc</b></p> <ul style="list-style-type: none"> <li>• receptor detects stimulus</li> <li>• message travels as an electrical impulse</li> <li>• impulse generated in sensory neuron</li> <li>• impulse passed to relay neuron</li> <li>• impulse passed to motor neurone</li> <li>• synapses between neurons</li> <li>• effector generates the response</li> <li>• effector is a muscle in the eye</li> <li>• or gland or named example</li> </ul> <p><b>Why reflexes are important</b></p> <ul style="list-style-type: none"> <li>• they do not involve the brain</li> <li>• they are fast</li> <li>• they improve chances of survival</li> <li>• idea of preventing us from harming /damaging ourselves/protection (<b>accept</b> keeps safe)</li> </ul> <p><b>accept</b> stops things getting into the eye</p>
	b	<p><i>any one from:</i> pupil(1); knee (1); dropping a hot plate(1); example of newborn reflexes (grasping, stepping, sucking, rooting etc) (1)</p>	1	<p><b>accept</b> any correct example of a reflex e.g. : sneezing flinching</p> <p><b>ignore</b> breathing, yawning</p>

	c	<p><i>any one from:</i>  allows them to find <b>food</b>(1);  shelter from/avoid <b>predators</b> (1);  prevents them from <b>drying out</b>/ keeps them in the shade/damp (1);  helps find a <b>mate</b> (1)</p>	1	<p><b>ignore</b> survival, ref to harm.  <b>accept</b> prevents them from being eaten.</p>
	d	<p><i>any one from:</i>  speeds up (transmission of electrical) impulse/signal(1);  insulates neuron (from neighbouring cell) (1)</p>	2	<p><b>ignore</b> protection</p>
		<b>Total</b>	<b>10</b>	

Question		Answer	Marks	Guidance
<b>8</b>	a	24.25	1	
	b	27 (test B)	1	
	c	<b>C</b>	1	
	d	<p>D (1)  Because more cells burst in this solution/fewer not burst (1)</p>	2	<p>NB - award 1 mark for second statement even if wrong solution identified</p>
		<b>Total</b>	<b>5</b>	

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