

GCSE

Biology A

Unit **A161/01**: Modules B1, B2, B3 (Foundation Tier)

General Certificate of Secondary Education

Mark Scheme for June 2017

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.

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.

© OCR 2017

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
<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 RM Assessor to annotate scripts:

	indicate uncertainty or ambiguity
	benefit of doubt
	contradiction
	incorrect response
	error carried forward
	draw attention to particular part of candidate's response
	no benefit of doubt
	reject
	correct response

L1 , L2 , L3	indicate level awarded for a question marked by level of response
^	information omitted

12. 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.*

- 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	<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

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 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	(a)	<p>nucleus</p> <div style="display: flex; flex-direction: column; align-items: flex-end; gap: 5px;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> (1) </div>	1	two or more ticks = 0 marks
	(b)		1	gene must be drawn on the right-hand chromosome, horizontally aligned with the existing black bar accept a line in the correct region
	(c)	<p>may ;</p> <p>2</p>	1	BOTH correct for 1 mark
Total			3	

Question		Answer	Marks	Guidance
2	(a)	<i>any two from:</i> difficulty breathing ; coughing ; (frequent) chest infections ; difficulty in digesting food	2	accept any correct symptom

	(b) O/L	<p>[Level 3] Full descriptions of alleles present AND lack of symptoms for both people. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p>[Level 2] Correct points made for both people. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p>[Level 1] Correct points made for only one person. Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p>[Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p>This question is targeted at grades up to C Indicative scientific points may include:</p> <p><i>Byron:</i></p> <ul style="list-style-type: none"> • cystic fibrosis (CF) is caused by a recessive allele • symptoms/disease/it will only appear if you only have two copies / are homozygous • Byron only has one copy / is a carrier / is heterozygous <p><i>Tania:</i></p> <ul style="list-style-type: none"> • Huntington's disease is caused by a dominant allele • symptoms/disease/it will appear if you only have one copy / are heterozygous • the symptoms are usually late onset • symptoms (e.g. clumsiness, memory loss, inability to concentrate, mood changes, tremors) could be mistaken for tiredness/other illnesses (before they become severe) <p>do not credit Tania is a carrier one faulty allele</p> <p>do not credit one faulty allele for Byron or Tania</p> <p>Use the L1, L2, L3 annotations in RM Assessor; do not use ticks.</p>
--	------------	--	---	--

Question		Answer	Marks	Guidance
2	(c)	so that she can be more confident/sure that the result is accurate/not a false negative/to make sure the result is correct (1)	1	accept more reliable
	(d) O/L	(idea that telling) an employer could decrease the likelihood of getting/keeping a job/promotion (1) (idea that telling) an insurance company could increase the cost/refuse (life/health/travel/car) insurance (premium) (1)	2	accept 'difficulties getting mortgage/credit', as alternative for mark point 2 do not accept increase cost of medical care
		Total	11	

Question		Answer	Marks	Guidance
3	(a)	<p>any three from:</p> <p>because they get alleles from both parents (1)</p> <p>the <u>allele</u>/combination of <u>alleles</u> inherited from each parent may be different (1)</p> <p>sperm and egg (nuclei) fuse/combine during fertilisation (1)</p> <p>idea that there will be variation between the kittens (1)</p>	3	<p>allow chromosomes/genes/genetic information/DNA</p> <p>credit the idea that the allele for one colour fur may be dominant and the other recessive</p> <p>credit examples of variation in kittens e.g fur colour</p>
	(b) (i)	<p>all ;</p> <p>all ;</p> <p>some ;</p>	2	<p>three correct = 2 marks</p> <p>one or two correct = 1 mark</p>
	(ii)	unspecialised (1)	1	credit undifferentiated / totipotent / pluripotent
Total			6	

Question		Answer	Marks	Guidance
4	(a)		2	two or three correct lines = 2 marks one correct line = 1 mark
	(b)	<p style="text-align: right;"><input type="checkbox"/></p> <p style="text-align: right;"><input type="checkbox"/></p> <p>hormones <input checked="" type="checkbox"/></p> <p>nerves <input checked="" type="checkbox"/></p> <p style="text-align: right;"><input type="checkbox"/></p>	1	BOTH correct ticks required for 1 mark three or more ticks = 0 marks
	(c)	sweating / breathing/exhaling / (excreting) urine / faeces / vomiting / tears / mucus (1)	1	
Total			4	

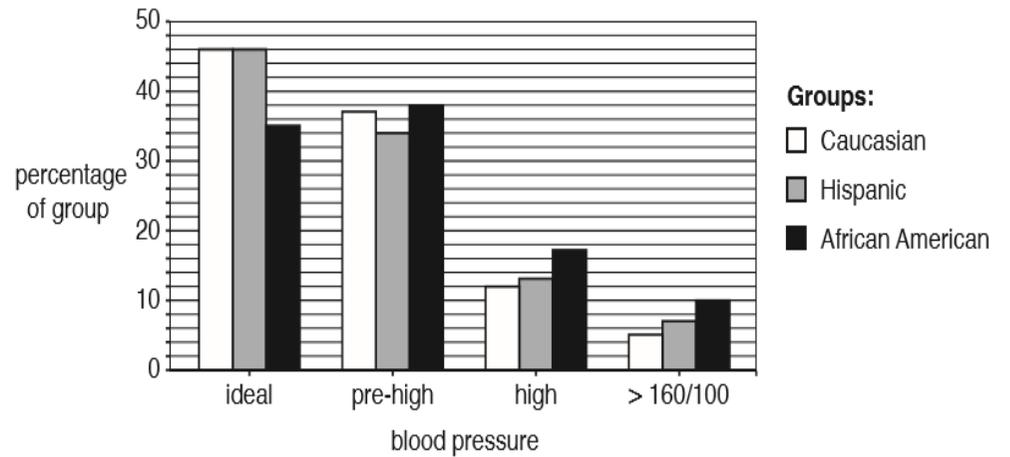
Question	Answer	Marks	Guidance
5	<p>[Level 3] Correct points made for both people, including reference to Sophie’s memory cells AND making antibodies AND quickly enough to destroy the pathogen before it could cause symptoms. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p>[Level 2] Correct points made for both people. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p>[Level 1] Correct points made for only one person. Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p>[Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p>This question is targeted at grades up to C</p> <p>Indicative scientific points may include:</p> <p><i>Sophie had chicken pox so:</i></p> <ul style="list-style-type: none"> • already immune • white blood cells/immune system produced antibodies (against the microorganism) • has memory cells • antibodies remain (in her body/blood) • (second infection triggers) fast(er)/immediate response by (memory/white blood cells/antibodies) • microorganism destroyed so the symptoms don’t develop <p><i>Callum has not previously had chicken pox so:</i></p> <ul style="list-style-type: none"> • not immune • no antibodies (to fight the disease) • has no memory cells • idea of delay in response by white blood cells • (white blood cells) to create antibodies • microorganism not destroyed before it caused symptoms <p>Use the L1, L2, L3 annotations in Scoris; do not use ticks.</p>
		6	

Question		Answer	Marks	Guidance
6	(a)	<p><i>(Katrina)</i></p> <p><i>any two from:</i></p> <p>idea that she has the most / more / higher <u>risk factors</u> ;</p> <p>she is overweight ;</p> <p>she smokes ;</p> <p>she has stressful job / high stress levels ;</p> <p>she doesn't exercise much</p>	2	<p>no credit for selecting Katrina; marks are awarded for the explanation</p> <p>do not credit "risk", as this is stated in the question</p>
	(b)	<p><i>any one from:</i></p> <p>reduce salt in her diet / eat fewer salted peanuts ;</p> <p>reduce alcohol/wine intake / drink less alcohol / drink alcohol in moderation</p>	1	
Total			3	

Question		Answer	Marks	Guidance
7	(a)	contracting relaxed/relaxing	1	BOTH correct for 1 mark accept "systolic / in systole" accept "diastolic / in diastole"
	(b)	any number/range between 60 and 80 inclusive (1)	1	
	(c) (i)	46 (1)	1	
	(ii)	38 (1)	1	
	(iii)	<i>answer: 70</i> (2)	2	correct working: $7 \div 100 \times 1000$ (1)

		<p>(iv) Caucasian (1)</p> <p>O/L has a high percentage/46% in the ideal category and a low percentage/5% in the >160/100 category :</p> <p>has a high percentage/83% in the first two categories (“ideal” and “pre-high”) ;</p> <p>has the lowest percentage/ only 12% in high category</p> <p>has the lowest percentage/only 5% in the > 160/100 category (1)</p>	<p>2</p>	<p>accept reverse argument (only 17% in the last 2 categories)</p>
			<p>Total</p>	<p>8</p>

Copy of graph for reference:



Question		Answer				Marks	Guidance
8						3	all five correct ticks = 3 marks three or four correct ticks = 2 marks one or two correct ticks = 1 marks ignore any row that contains more than one tick
		...larger beaks than others.	✓				
		...variation and natural selection.		✓			
		...different types of food.	✓				
		...suited to their environment.		✓			
		...published in 1859.			✓		
Total					3		

Question	Answer	Marks	Guidance
9	<p>[Level 3] Describes three processes involved in the recycling of carbon. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p>[Level 2] States several processes involved in recycling carbon AND describes one of the named processes. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p>[Level 1] States some processes involved in recycling carbon OR makes a relevant point about the recycling of carbon. Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p>[Level 0] Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p>This question is targeted at grades up to E</p> <p>Indicative scientific points may include:</p> <ul style="list-style-type: none"> • <i>Respiration</i> • occurs in the tree/plants • occurs in animals/consumers/decomposers • breaks down glucose • makes/releases carbon dioxide/CO₂, (into the air) • <i>Decomposition/decay</i> • by decomposers/bacteria/microorganisms • in the ground/soil • breaks down/decay dead organisms/rots • makes/releases carbon dioxide/CO₂ (into the air) • <i>Combustion/burning</i> • wood/leaves burnt as fuel • dead organisms turned into fossil fuels • fossil fuels burnt • makes/releases carbon dioxide/CO₂ (into the air) • <i>Photosynthesis</i> • plants absorb carbon dioxide/CO₂ (from the air) • carbon dioxide/CO₂ used to make glucose <p>Use the L1, L2, L3 annotations in Scoris; do not use ticks.</p>
		6	

Question		Answer	Marks	Guidance
10	(a)	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="width: 150px; height: 100px; border: 1px solid black;"></div> <div style="width: 150px; height: 100px; border: 1px solid black;"></div> <div style="width: 150px; height: 100px; border: 1px solid black;"></div> <div style="width: 150px; height: 100px; border: 1px solid black;"></div> <div style="width: 150px; height: 100px; border: 1px solid black; text-align: center;">the Sun</div> </div>	1	two or more ticks = 0 marks
	(b)	lettuces eaten (by caterpillars) (1)	1	
	(c) (i)	<i>any one from:</i> uneaten parts ; excreted/waste products ; (radiated/waste) heat / respiration ; removal of standing crop ; death/decomposition	2	accept movement
	(ii)	9200 (2)	2	accept correct working for one mark 10000-800 (1)

Question		Answer	Marks	Guidance
	(iii) O/L	answer: 0.2 (to 1 sig fig) (2)	2	correct working: $16 / 10\,000 \times 100$ (1) correct answer given to 2 sig figs (0.16) = 1 mark
	(d) O/L	any two from: efficiency of energy transfer to the predators would be too low ; not a lot of owls at the top of the food chain to eat ; the predators would use more energy hunting owls than they would get from eating them	2	ignore suggestions not related to energy (e.g. owls fly too high for predators to catch; owls kill predators with their sharp claws, etc.) accept little energy left in the food chain/system do not accept references to the amount of energy in an individual owl, needs to refer to energy in population or stage
Total			10	

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

© OCR 2017

