OCR
Oxford Cambridge and RSA

GCSE

Biology A

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

General Certificate of Secondary Education

Mark Scheme for June 2014

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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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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
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:

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.
	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.

Question			Answer	Mark	Guidance
1	a		<table><tr><td>memory loss</td><td></td></tr><tr><td>clumsiness</td><td></td></tr><tr><td>problems with digesting food</td><td>✓</td></tr><tr><td>production of thick mucus</td><td>✓</td></tr><tr><td>not able to concentrate</td><td></td></tr></table> (2)	2	allow any indication in correct box (does not have to be ticks) if more than 2 boxes ticked deduct one mark per extra tick
	b	i	<table><tr><td></td><td></td><td colspan="2">Sharon</td></tr><tr><td></td><td></td><td>T</td><td>t</td></tr><tr><td rowspan="2">Eric</td><td>T</td><td>TT</td><td>Tt</td></tr><tr><td>t</td><td>Tt</td><td>tt</td></tr></table> (2)	2	one mark for correct parent genotypes (both Tt) one mark for correct completion of Punnett Square ecf for correct completion of Punnett Square from their genotypes allow tT for Tt
	b	ii	0.25 / 1/4 / 25% /1 in 4 / 1:3	1	ecf from Punnett Square i.e. this probability must match their Punnett Square in (b)(i) ignore 1 in 3 **do not allow** 3:1 / 4:1 / 1:4

Question			Answer	Mark	Guidance
	c		identify a positive reason for testing (1) (idea that) the benefits outweigh the risk (1)	2	allow idea of planning (even though given in the question) do not allow the idea that they want to know if the fetus has the disease unqualified allow inference that benefit outweighs the risk, e.g. “even though the test may be painful and inaccurate, it is more important to find out if the fetus has cystic fibrosis” note that mark-points may be linked, e.g. “benefits of being able to plan outweigh the possible problems” = 2 marks
	d		unethical / fetus is a living things with rights / should not interfere with nature / may harm the fetus/baby / may a cause a miscarriage (1)	1	allow religious argument do not allow vague references to harm ignore harm to mother/ideas about results being unreliable
			Total	**8**	

2	a		males: XY females: XX (1)	1	need both for the mark
	b	i	1000 (1)	1	
	b	ii	1200 (2)	2	correct answer = 2 marks allow one mark for correct working 1.2 x 1000 / (0.2 x 1000) + 1000
	b	iii	female fetuses terminated (1) female fetuses miscarried (1) disease affecting females fetuses (1) X sperm killed / more Y sperm (1) gender selection (1)	2	do not allow ‘kill female baby’ do not allow ‘more boy sperm’ ‘female fetuses aborted because they want boys’ = 2 marks
			Total	**6**	

Question			Answer	Mark	Guidance
3			**[Level 3]** Answer describes the role of genes AND the environment in determining our characteristics AND gives examples of characteristics determined by each. Answer also describes that some characteristics are controlled by both genes and the environment. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **[Level 2]** Answer describes the role of genes AND the environment in determining our characteristics AND gives at least one examples of characteristics determined by one of these. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **[Level 1]** Answer describes the role of genes OR the environment in determining our characteristics. 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 may include:** **genetic:** • some characteristics are determined by genes/chromosomes/DNA/alleles • inherited from our parents • examples include blood group, dimples, eye colour, gender **environment:** • some characteristics are determined by our environment • not inherited • examples include scars, tattoos **both:** • some characteristics are determined by both • examples include height, weight, hair colour ignore general references to ‘looks’ and ‘behaviour’ as examples (as given in stem of question)
			Total	**6**	

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Mark</th><th>Guidance</th></tr>
<tr><td>4</td><td>a</td><td></td><td>Idea of counts over time</td><td>1</td><td>allow BPM</td></tr>
<tr><td></td><td>b</td><td>i</td><td>6900</td><td>1</td><td>mark answer in table as this is what is asked
if no answer in the table, mark answer below question</td></tr>
<tr><td></td><td></td><td>ii</td><td>range: 4970 to 6900</td><td>1</td><td>allow ecf from bi
allow 6900 to 4970</td></tr>
<tr><td></td><td></td><td>iii</td><td>Alistair
Ian
Colin
Byron</td><td>1</td><td>ignore numbers</td></tr>
<tr><td></td><td></td><td>iv</td><td><table><tr><td>Ian has only just joined the running club</td><td></td></tr><tr><td>the measurements were only recorded once</td><td>✓</td></tr><tr><td>a person’s pulse rate may vary</td><td>✓</td></tr><tr><td>blood pressure measurements were not recorded</td><td></td></tr><tr><td>the men all had different diets</td><td></td></tr></table></td><td>2</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Total:</td><td>6</td><td></td></tr>
</table>

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Mark</th><th>Guidance</th></tr>
<tr><td>5</td><td>a</td><td></td><td>200.96 / 201.06 / 201.14 / 201.1 / 201 (2)</td><td>2</td><td>correct answer = 2 marks
3.14 x 8 x 8 / π x 8 x8/π x 8^2 = 1 mark</td></tr>
<tr><td></td><td>b</td><td></td><td><table><tr><td>The greater the clear area, the more bacteria have died.</td><td>✓</td></tr><tr><td>The bacteria may be resistant to antibiotic C.</td><td>✓</td></tr><tr><td>Antibiotic A is the least effective.</td><td></td></tr><tr><td>Water kills more bacteria than any antibiotic.</td><td></td></tr><tr><td>Antibiotic C must be water.</td><td></td></tr><tr><td>Antibiotic B is the most effective.</td><td>✓</td></tr></table></td><td>3</td><td>if more than 3 ticks, delete one mark for each extra tick</td></tr>
<tr><td></td><td>c</td><td></td><td>fair comparison of the antibiotics (1)
so there is the same amount of <u>antibiotic</u> (1)</td><td>2</td><td>allow fair test
ora</td></tr>
<tr><td></td><td>d</td><td></td><td>to check they’re safe/in case they are harmful/may have side effects/may cause allergic reactions/to see if they work (1)</td><td>1</td><td>do not allow vague statements e.g. ‘it might not be good for you’/’it might have an effect’</td></tr>
<tr><td></td><td></td><td></td><td>Total:</td><td>8</td><td></td></tr>
</table>

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Mark</th><th>Guidance</th></tr>
<tr><td>6</td><td></td><td></td><td>[Level 3]
Answer includes correct description of the correlation AND describes the correlation between one or more factors and deaths from heart disease. Quality of written communication does not impede communication of the science at this level.
(5 – 6 marks)
[Level 2]
Answer includes correct description of the correlation AND states one or more factors that would have the same correlation. Quality of written communication partly impedes communication of the science at this level.
. (3 – 4 marks)
[Level 1]
Answer includes correct description of the correlation OR states one or more factors that would have the same correlation. 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)</td><td>6</td><td>This question is targeted at grades up to C

Indicative scientific points may include:

describing correlation (on graph):

• as the amount of animal fat eaten increases, so does the death from heart disease/risk of heart disease increases as you eat more fat
• positive correlation

<table><tr><th>factors</th><th>Correlation of factor & Heart Disease</th></tr><tr><td>smoking</td><td>more smoking = more heart disease</td></tr><tr><td>salt</td><td>more salt = more heart disease</td></tr><tr><td>drinking alcohol</td><td>more alcohol = more heart disease</td></tr><tr><td>high blood pressure</td><td>higher blood pressure = more heart disease</td></tr><tr><td>stress</td><td>more stress = more heart disease</td></tr><tr><td>use of drugs</td><td>more drug use = more heart disease</td></tr><tr><td>age</td><td>older = more heart disease</td></tr><tr><td>obesity</td><td>more obese = more heart disease</td></tr></table>
ignore ref to fatty foods/takeaways/meat
do not allow ‘drinking’ unqualified
ignore ref to lack of exercise
ignore factors if they are linked to an outcome other than heart disease e.g smoking linked to lung cancer</td></tr>
<tr><td></td><td></td><td></td><td>Total:</td><td>6</td><td></td></tr>
</table>

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Mark</th><th>Guidance</th></tr>
<tr><td>7</td><td>a</td><td>i</td><td>flat/no increase initially (1)
increases later (1)</td><td>2</td><td>do not allow if candidates refer to number of animals instead of number of extinctions
ignore positive correlation</td></tr>
<tr><td></td><td></td><td>ii</td><td>40 000 or above</td><td>1</td><td></td></tr>
<tr><td></td><td>b</td><td>i</td><td><table><tr><td>Consequence of increased human population</td><td>Resulting impact on species</td></tr><tr><td>need for food / medicines / clothes</td><td>plants / animals killed / overhunting</td></tr><tr><td>need for housing / roads / farming land</td><td>destruction of habitats/specific example e.g deforestation</td></tr><tr><td>pollution/specific example of pollution</td><td>poisoning / kills animals / plants / destruction of habitats</td></tr><tr><td>humans introduce new species</td><td>kill others animals /plants / disrupt food webs</td></tr></table></td><td>2</td><td>one mark for correct consequence or impact
two marks only if these are in the same row of the table (as consequence and impact need to be linked)

do not allow vague reference to damage to a species</td></tr>
<tr><td></td><td>b</td><td>ii</td><td>not all extinctions caused by humans/some by natural causes e.g. natural predators, floods, disease</td><td>1</td><td></td></tr>
<tr><td></td><td>c</td><td></td><td><table><tr><td>Preventing extinctions is easy to do.</td><td></td></tr><tr><td>Many plants and animals are dangerous.</td><td></td></tr><tr><td>Biodiversity is important for sustainability.</td><td>✓</td></tr><tr><td>Scientists always work together in teams.</td><td></td></tr><tr><td>Some plants and animals provide us with vital resources.</td><td>✓</td></tr></table></td><td>2</td><td></td></tr>
<tr><td></td><td></td><td></td><td>Total:</td><td>8</td><td></td></tr>
</table>

Question	Answer	Mark	Guidance
8	**[Level 3]** Answer includes similarities AND differences between natural selection and selective breeding. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **[Level 2]** Answer includes one similarity AND/OR one difference. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **[Level 1]** Answer includes a feature of EITHER natural selection OR selective breeding. 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:** **similarities**: • they are both ways of breeding animals/plants • both produce changes in characteristics • both rely on variation in individuals • resulting from mutation/DNA changes • both select the most favourable characteristics • these characteristics are passed onto offspring • over time more individuals possess the characteristics **differences**: • NS occurs naturally and SB is controlled by humans • NS takes longer than SB ora • NS selects traits that are useful to survival and SB selects traits that are useful to humans • allow credit for examples to illustrate the differences
	Total:	**6**	

Question			Answer	Mark	Guidance
9	a		from top of diagram: B C A	2	two/three correct = 2 marks one correct = 1 mark
	b		*any two from* animals are eating the plant/feeding (1) digestion (1) carbon used in body to build new chemicals (1)	2	do not allow the movement/transfer of carbon
	c		*any two from* decay / decomposition / breakdown (1) of waste material or dead matter (1) recycling (1) microorganisms respire (1)	2	
			Total:	6	

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