OCR
RECOGNISING ACHIEVEMENT

GCSE

Biology A

General Certificate of Secondary Education

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

Mark Scheme for June 2013

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 scoris to annotate scripts:

?	indicate uncertainty or ambiguity
BOD	benefit of doubt
CON	contradiction
✖	incorrect response
ECF	error carried forward
⬭	draw attention to particular part of candidate's response
NBOD	no benefit of doubt
R	reject
✔	correct response
L1 , L2 , L3	indicate level awarded for a question marked by level of response
^	information omitted

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.

1.   **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.   If a candidate alters his/her response, examiners should accept the alteration.

    c.   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.

    eg 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.

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, eg 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.

eg if a question requires candidates to identify cities in England:

City	Box
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**

Question			Answer	Marks	Guidance
1	(a)		<table><tr><td>dimples</td><td>scars</td><td>weight</td></tr><tr><td>eye colour</td><td></td><td></td></tr></table>	2	4 correct = 2 marks 3 correct = 1 mark if a feature is placed in more than one column, does not score
	(b)		any 3 from: conclusion 1: 50:50 or 50% **chance** or **probability;** idea that it could be slightly more or less/will not be exactly 50/50; conclusion 2: is wrong; (having 2 girls) does not change probability/likelihood/ still 50% (chance)	3	could state that conclusion 1 is correct or incorrect answer which states that 50 **will** be male does not score this mark could cover both conclusions together without specifically relating to 1 or 2 by stating that both are wrong.
			Total	5	

Question	Answer	Marks	Guidance
2 **(a)**	embryos are tested and one has a single allele for cystic fibrosis a fetus has two alleles for cystic fibrosis a fifty year old woman has one copy of the allele for Huntington's disorder a twenty year old woman has one allele for Huntington's disorder to tell her children as soon as possible which embryo to implant to have a termination not to have any children	3	4 lines correct = 3 marks 2 or 3 lines correct = 2 marks 1 line correct = 1 mark 2 lines from one box negates that mark
(b)	idea that genetic disease/Steve & Val is much more serious/dangerous than polydactyly/Mel & Jo (1) (Steve & Val) May be more likely to have termination (1)	2	**accept** more life-threatening O.R.A.

Question			Answer	Marks	Guidance
■	**(c)**	**(i)**		1	gene in identical position to original give mark as long as there is a 50% overlap
		(ii)	2	1	**accept** any indication of correct response – eg underlining etc.
			Total	**7**	

Question			Answer	Marks	Guidance
3	(a)		**Level 3 (5–6 marks)** Good explanation of both Huntington's and cystic fibrosis using dominant and recessive with genotypes and correct and relevant diagrams used in explanation. Plus additional information such as explanation of carriers and chances of inheritance. Quality of written communication does not impede communication of the science at this level. **Level 2 (3–4 marks)** Correct explanation of Huntington's or cystic fibrosis using dominant and recessive. Quality of written communication partially impedes communication of the science at this level. **Level 1 (1–2 marks)** Makes a simple statement that Huntington's is dominant or cystic fibrosis is recessive. 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 at Level 3 may include** • correct diagram used to assist explanation • both cystic fibrosis and Huntington's correctly explained **Indicative scientific points at Level 2 may include** • cystic fibrosis – correct idea that can be carrier • both recessive alleles must be present to be a sufferer • Huntington's – only 1 allele means sufferer • diagram may be missing or incorrect **Indicative scientific points at Level 1 may include** • Cystic fibrosis is recessive • Huntington's is dominant • some linking of cystic fibrosis/carrier **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
			Total	**6**	

Question			Answer	Marks	Guidance
4	(a)		<table><tr><td>With a very low income, women are certain to get heart disease.</td><td></td></tr><tr><td>In women, each time income is halved, the risk of heart disease is doubled.</td><td></td></tr><tr><td>Men are more at risk of heart disease than women.</td><td>✓</td></tr><tr><td>With a high income, women are more at risk of heart disease than men.</td><td></td></tr><tr><td>There are other risk factors for heart disease apart from income.</td><td></td></tr><tr><td>No one at high income gets heart disease.</td><td></td></tr><tr><td>For men, the lower the income the greater the risk of heart disease.</td><td>✓</td></tr><tr><td>From middle to high income, the risk for women remains unchanged.</td><td>✓</td></tr></table>	3	if more than three boxes are ticked deduct one mark for each additional tick
	(b)		C; 4	2	**accept** any unambiguous indications using lines on table
	(c)		<table><tr><td>All the men should be the same height.</td><td></td></tr><tr><td>Both men and women should be chosen at random</td><td>✓</td></tr><tr><td>The sample size should be as large as possible</td><td>✓</td></tr><tr><td>The woman should all have a high income.</td><td></td></tr><tr><td>Only people with a history of heart disease should be included.</td><td></td></tr><tr><td>The two groups should be checked that they match on as many factors as possible.</td><td>✓</td></tr><tr><td>The study should be a double blind trial.</td><td></td></tr></table>	3	if more than three boxes are ticked deduct one mark for each additional tick
			Total	8	

Question			Answer	Marks	Guidance
5	**(a)**		damage; toxins;	2	**accept** any indication of correct choice eg lines from words
	(b)		idea of doubling; 6400	2	**accept** doubling even if does not start from 100, for 1 mark or **allow** 1 numerical mistake with correct method for 1 mark Doubling must be **bacteria numbers** not time correct answer scores 2 marks
	(c)		bacteria multiply **rapidly**; dead/damaged cells and/or toxins will increase **rapidly**; antibodies kill bacteria/lock onto; the sooner the antibodies are produced, the **less** damage will be caused	3	first, second, fourth points must be qualified **ignore** grow **ignore** spread **ignore** "fight" **reject** antibodies engulf (and kill) bacteria
			Total	**7**	

Question			Answer	Marks	Guidance
6			**[Level 3]** Explanation of resistance and how it can be avoided OR full description using general points. Quality of written communication does not impede communication of the science at this level. (5–6 marks) **[Level 2]** Use of idea of resistance and how it can be avoided, from general points. Quality of written communication partially impedes communication of the science at this level. (3–4 marks) **[Level 1]** makes basic points about antibiotics Quality of written communication impedes communication of the science at this level. (1–2 marks) **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 explaining resistance:** • some bacteria will be more resistant to the antibiotic than other bacteria due to mutation or variation • these will survive and breed. • non-resistant ones will die out. • because of rapid reproduction bacteria will soon be all resistant. • should make sure all bacteria killed (by finishing course or use new antibiotic) **Indicative general points:** • idea that bacteria can become resistant to antibiotics • antibiotics do not work on viruses • **only** work against bacteria & fungi • only when necessary • complete course of treatment. • new antibiotics are required to replace the ones that bacteria are now resistant to. • bacteria mutate **Indicative basic points:** • bacteria can change/evolve • (new antibiotics) to avoid side effects eg allergy • work against/kill bacteria/fungi • different antibiotics needed for different diseases. • antibiotic stops being effective/stops working

Question			Answer	Marks	Guidance
					beware answers where **people** become resistant **accept** microbes or pathogens but **ignore** reference to viruses **ignore** immune **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
				Total 6	

Question	Answer	Marks	Guidance	Question	Answer
7	**(a)**	**(i)**	0.1%	1	**accept** 0.09%
		(ii)	100%	1	
		(iii)	he needs to change to a new/different pesticide; that the pests are not resistant to OR because pest are now resistant to the old pesticide	2	**accept** insecticide or chemicals **accept** use a stronger pesticide **ignore** become immune **accept** alternative words for pest such as insect
		(iv)	any 2 from small area; small sample; pests may travel in and out of sample area; only did the test once/should repeat it	2	**ignore** same area **accept** only 1 farmer/farm
	(b)		any three from predator kills other species/other insects; predator becomes new food source; pest is no longer available as a food source; competition between new predator & existing predators; existing predators will eat other animals; usual predators of pest not available as a food source (for tertiary consumers);	3	**ignore** extinctions **ignore** reference to pest eating other animals/insects **accept** idea of interfering with existing predators or example, eg birds which eat insects would leave **ignore** predator may eat crops
			Total	**9**	

Question			Answer	Marks	Guidance
8	(a)		**Level 3 (5–6 marks)** Gives a description of evolution AND speciation using key terms. Quality of written communication does not impede communication of the science at this level. **Level 2 (3–4 marks)** Gives a description of evolution OR speciation using key terms. Quality of written communication partially impedes communication of the science at this level. **Level 1 (1–2 marks)** Makes a simple statement about evolution OR speciation 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 on Evolution may include** • Natural selection • variation • mutation • competition • selective survival/survival of best adapted/survival of fittest • reproduction • pass on characteristic/genes **Indicative scientific points on Speciation may include** • population gets **split** into two groups (eg new mountain range or new river etc) • reproductive isolation • different/changed environments • **split** populations become different • different species can not interbreed (eg due to mating seasons/courtship/genetic incompatibility) **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**

Question			Answer	Marks	Guidance
(b)			not breed with other beetles; to produce fertile offspring; **check** DNA; look for similarities/compare with others (**in DNA**)	2	**ignore** reference to comparing characteristics **NB** DNA is unknown = 2 marks
(c)	**(i)**		4	1	more than 1 number given = 0 **accept** any unambiguous indications using lines from statements
	(ii)		5	1	more than 1 number given = 0 **accept** any unambiguous indications using lines from statements
(d)			<table><tr><td>**make sense of the enormous diversity of organisms on Earth.**</td><td>✓</td></tr><tr><td></td><td></td></tr><tr><td>increase biodiversity.</td><td></td></tr><tr><td></td><td></td></tr><tr><td>improve sustainability.</td><td></td></tr><tr><td></td><td></td></tr><tr><td>reduce the number of disease causing predators.</td><td></td></tr><tr><td></td><td></td></tr><tr><td>show the evolutionary relationships between organisms.</td><td>✓</td></tr></table>	2	if more than two boxes are ticked, deduct one mark for each additional tick
			Total	**12**	
			Paper Total	**60**	

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