OCR
RECOGNISING ACHIEVEMENT

GCSE

Biology A

General Certificate of Secondary Education

Unit **A223/02:** Ideas in Context plus B7 (Higher Tier)

Mark Scheme for June 2012

Oxford Cambridge and RSA Examinations

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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:

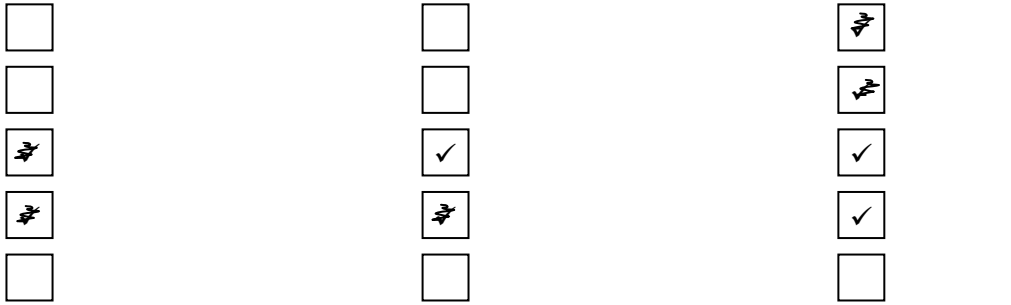
	indicate uncertainty or ambiguity
BOD	benefit of doubt
CON	contradiction
	incorrect response
ECF	error carried forward
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
NBOD	no benefit of doubt
R	reject
	correct response
	draw attention to particular part of candidate's response
^	information omitted

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	
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**

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 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	Marks	Guidance
1	(a)		the number / variety / range / different (of species / organisms present in a habitat) (1)	1	**accept** genetic variation / variation within a species **ignore** diversity
	(b)	(i)	(75% of 600 =) 450 (1) (600 + 450 =) 1050 (1)	2	1050 = 2 marks **ecf**
		(ii)	no increase (on 600 / previous value) (1)	1	
		(iii)	*any two from:* affect / idea of damage they may have on the food web / ecosystem / biodiversity / (1) damaged explained or qualified e.g. may be a predator (1) interbreed (1) introduce disease / affect (human) health (1)	2	**ignore** ideas about monitoring **ignore** ideas about protection **accept** named example
		(iv)	*any two from:* idea of too big an area (1) too many to count / takes too long (1) cannot find them all / don't know about them (1) idea that numbers are changing all the time / species move around (in and out of Europe) / migration (1) sightings / sampling can only be an estimate (1) alien interbreeds with native species (1)	2	**ignore** ideas of reproduction i.e. number changing should refer to number of species not numbers within a population
	(c)	(i)	idea of introduction / release of ….. (1) idea of using a living organism / predator (1) hunt / eat / kill / destroy (to reduce numbers of a different living organism) (1)	2	**ignore** reference to humans as living organisms correct example e.g. release ladybirds to eat greenfly = 2
		(ii)	difficult to control the released organism / could become a new pest (1) might eat a different species (1) idea of damage or an effect to the food chain / web / ecosystem / habitat / biodiversity (1)	2	**accept** may replace another species i**gnore** ref to environment as this is in the stem
			Total	**12**	

Question			Answer	Marks	Guidance
2	(a)		light (energy) absorbed by chlorophyll / chloroplast(1) (energy used to rearrange) water and carbon dioxide (atoms) (1) to make glucose and oxygen (1)	3	**allow** one mark for word equation without explanation equation and text must agree with other
	(b)	(i)	*any two from:* to make cellulose (1) to make protein / enzymes / amino acids (1) to make fats (1) to make chlorophyll (1) respiration / to release energy (1) osmosis (1)	2	**ignore** for growth
		(ii)	*any two from:* insoluble (1) stays put (1) low osmotic effect (1)	2	ORA
	(c)		active transport (1) needs energy / ATP (1) against concentration / diffusion gradient (1)	3	**accept** correct description of conc grad
			Total	**10**	

Question			Answer	Marks	Guidance
3	(a)		faulty / recessive allele / co-dominant / gene (1) changes **haemoglobin** molecule / shape of **red blood cell** (1)	2	**accept** genetic disorder / disease / mutation
	(b)		*any two from:* pain (in joints) (1) tired / lack of energy / breathless / weakness / dizziness (1) pale skin / jaundice (1) cold hands and feet (1)	2	
	(c)		*any four from:* having sickle cell / carrier gives protection from malaria (1) sickle-cell / carriers more likely to survive ….. (1) reproduce / pass on gene / allele (1) percentage of population having allele increases in malarial areas (1) idea that single allele still gives protection but only mild form of sickle cell (1)	4	 **ignore** 'natural selection' unless explained **accept** more people have it
			Total	**8**	

Question			Answer	Marks	Guidance
4	(a)		*any three from:* **Isolation i.e.** gene cut or extracted from DNA of daffodil OR enzyme used to cut (1) **Replication** replication of gene (1) **Vector named** eg virus / plasmid / bacteria / gold bullet idea (1) **Explanation of transfer e.g.** gene enters **rice/host** cells / nucleus / chromosome / DNA (1)	3	**allow** "take the gene" for first marking point **must** refer to cells / nucleus / chromosome / DNA
	(b)	(i)	Anita (1)	1	
		(ii)	Jane (1)	1	
		(iii)	Peter (1)	1	
			Total	**6**	

Question			Answer	Marks	Guidance
5	(a)		*any two from:* idea that ATP can store / release energy (1) very quickly (1) from glucose / respiration (1) for muscle (contraction) (1)	2	**ignore** reference to ADP
	(b)	(i)	anaerobic respiration (1) not enough oxygen (1) produces lactic acid (1)	3	**ignore** reference to oxygen debt
		(ii)	releases less energy (1)	1	**ignore** reference to lactic acid
		(iii)	can survive or respire without <u>oxygen</u> / with limited <u>oxygen</u> (1)	1	
			Total	**7**	

Question			Answer	Marks	Guidance
6	(a)		idea that blood goes through <u>heart</u> twice for each circulation (1)	1	**incorrect** context of the word "heart" does not score
	(b)	(i)	a valve (1) prevent blood flowing backwards / goes in right direction(1)	2	**ignore** name of valve **accept** correctly labelled diagram for "valve"
		(ii)	<u>veins</u> (1)	1	veins and arteries is incorrect
	(c)		*any three from:* plasma / tissue fluid out of blood (1) oxygen out of blood (1) oxygen into cells (1) diffuses (1) **QWC** (1)	4	QWC = makes sense and includes some correct biology **Please put ✓ or X against +1 to show if QWC has been awarded or not.**
			Total	**8**	

Question			Answer	Marks	Guidance
7	(a)		*any one from each group:* **recorded e.g.** doctor cannot be expected to remember all the details / saves consultation time (1) **made available e.g.** malpractice (1) idea that patient may be unconscious (1) idea that doctor may be absent (1) example of other type of practitioner e.g. second opinion / other doctor / different hospital / part of a team /consultant / nurse / radiographer / physiotherapist / district nurse etc. (1)	2	**ignore** any reference to using data for research **ignore** other / different (medical) **practitioners** / someone else **ignore** patient may be allergic UNLESS patient is unconscious
	(b)		*any one from each group:* **example of factors that make it accurate e.g**. idea of measure to a small increment / precise / clinical thermometer / digital thermometer (1) **example of factors that make it reliable e.g.** idea of take it several times (at once) / use same thermometer / same time of day (1) same place on body (1)	2	**ignore** mistakes / or direct reference accuracy **ignore** take it several times a day
			Total	**4**	
			Paper Total	**55**	

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