

**Biology A**

General Certificate of Secondary Education

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

**Mark Scheme for January 2013**

---

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 2013






## Annotations

Used in the detailed Mark Scheme:

Annotation	Meaning
/	alternative and acceptable answers for the same marking point
(1)	separates marking points
<b>not/reject</b>	answers which are not worthy of credit
<b>ignore</b>	statements which are irrelevant - applies to neutral answers
<b>allow/accept</b>	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:

Annotation	Meaning
	indicate uncertainty or ambiguity
	benefit of doubt
	contradiction
	incorrect response
	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

Annotation	Meaning
	no benefit of doubt
	reject
	correct response
	draw attention to particular part of candidate's response
	information omitted

### 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.*

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		✓		✓	✓		✓	
<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>

- 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)	(i)	Any two of: idea of reducing numbers of species / less variety; idea of reducing population size / fewer organisms; in a specific place; QWC for correct use of <b>either species or population / habitat / ecosystem</b> ;	3	e.g. ecosystem / habitat
		(ii)	food / crops <b>and</b> medicines	1	both needed for mark
	(b)		idea that extinction is worldwide / gone forever / all dead	1	
	(c)		idea that it may go up or down (vary) but trend is in an overall direction	1	<b>ignore</b> ideas about repeat readings
	(d)		they might be dying / problems caused in their winter feeding grounds;  they might be dying / problems caused on their migration routes;  idea that more birds hatched than die at summer nesting site;	2	<b>ignore</b> gone to different site
	(e)		birds of prey have less biomass (in pyramid); idea that birds of prey eat meat from lots of different animals; idea that DDT accumulates / more concentrated in birds of prey;	2	
	(f)		determine lethal dose of DDT in birds; analyse dead birds for DDT;	2	
			<b>Total</b>	<b>12</b>	

Question		Answer	Marks	Guidance
2	(a)	starch is not soluble / glucose is soluble; so (starch) will stay where put (inside cells) / no osmotic effect;	2	<b>ignore</b> will not be lost
	(b)	(i)	12:00 noon / noon / midday / 12pm	1 <b>ignore</b> 12 <b>reject</b> 12am
		(ii)	7.30 <b>and</b> 4.30 (1); AM <b>and</b> PM (1);	2 7.30 and 16.30 (2) <b>accept</b> morning and afternoon for am and pm
<b>Total</b>			<b>5</b>	

Question		Answer	Marks	Guidance
3	(a)	D A F B	2	D before A A before F F before B  <b>three correct = 2</b> <b>two correct = 1</b> <b>one correct = 0</b>
	(b)	30 or 140 – 110; 20%;	2	20 scores both marks (2)
	(c)	idea of instrument error; idea of human error;	2	<b>ignore</b> false reading
<b>Total</b>			<b>6</b>	



Question		Answer	Marks	Guidance
4	(a)	(cell) wall / capsule / slime coat; (cell) membrane; DNA/chromosome/genes;	3	<b>reject</b> nucleus and plasmid <b>accept</b> genetic information
	(b)	any <b>three</b> from the following ideas:  identify gene; cut/isolate gene; idea of vector; use of enzyme; transfer/insert gene; bacteria divide/multiplies/reproduces;	3	each step must be biologically correct for each mark  <b>do not give mark</b> for 'bacteria produces insulin'
		<b>Total</b>	<b>[6]</b>	

Question		Answer	Marks	Guidance
5	(a)	<p>symbiosis: both benefit <b>or</b> a (close) relationship between two organisms;</p> <p>commensalism: one may gain but the other does not suffer or gain;</p>	2	<p><b>reject</b> reference to parasite in both marking points</p> <p><b>ignore</b> any reference to <b>host</b></p> <p><b>ignore</b> contact</p>
	(b)	<p>idea that parasite gains;</p> <p>idea that host suffers;</p>	2	
	(c)	<p>correct name;</p> <p>correct feature;</p> <p>how a feature is used;</p>	3	<p>Correctly named parasite = 1 mark</p> <p>Then, does the feature match the parasite = 1 mark</p> <p>Then, does feature match the explanation = 1 mark</p> <p>e.g.</p> <p>tapeworm – hooks – hold onto gut = 3 marks</p> <p>tapeworm – hooks – absorb food = 2 marks</p> <p>look for feature and explanation anywhere in answer</p> <p>if no correct parasite, candidate can get max 1 for feature linked to explanation</p>
	(d) (i)	<p><b>any 2 from</b></p> <p>pains;</p> <p>shortness of breath;</p> <p>lack of energy/tiredness or weakness;</p> <p>swelling;</p>	2	<p><b>ignore</b> references to red blood cells/lack of oxygen/headache</p>

Question		Answer	Marks	Guidance
	(ii)	idea of normal gene/allele / idea of sickle gene/allele / heterozygous;  idea that <b>some</b> RBCs are sickle shaped / <b>some</b> RBCs are normal shaped;  (parasite/Plasmodium/malaria) cannot attack/live in/enter/affect (sickle-shaped) RBCs;	2	<b>ignore</b> white blood cells <b>accept</b> blood cells <b>accept</b> deformed  <b>ignore</b> bacteria
<b>Total</b>			<b>11</b>	

Question		Answer	Marks	Guidance
6	(a)	tendon – attaches muscles to bone; ligament – holds two bones together; synovial fluid – lubricates; cartilage – prevents bones rubbing together/shock absorber;	2	<b>4 or 3 correct = 2 marks</b> <b>2 or 1 correct = 1 mark</b>
	(b) (i)	<b>any one from</b> allergies / symptoms / medication / alcohol consumption / cigarette consumption / physical activity / family history / previous treatment / previous elbow injury	1	<b>ignore</b> blood type <b>ignore</b> 'has anyone else in your family sprained their elbow?'
	(ii)	available for other medical practitioners / to provide correct treatment / help with diagnosis / so that allergic response is not triggered by treatment	1	<b>accept</b> make diagnosis
<b>Total</b>			<b>4</b>	

Question		Answer	Marks	Guidance
7		<p><b>one mark for each set of words used correctly</b></p> <p>Idea that DNA is the cause of the problem / makes someone the carrier of the disease or faulty gene;</p> <p>DNA / gene taken from white blood cells;</p> <p>gene probe attaches to (mutated) gene / DNA;</p> <p>use of autoradiography to locate gene probe;</p>	4	<p><b>accept</b> separated into single strands</p> <p><b>ignore</b> ref. to UV and fluorescence</p>
<b>Total</b>			<b>4</b>	

Question		Answer	Marks	Guidance
8	(a) (i)	breaths faster / deeper; heart beats faster;	2	either order
	(ii)	contract / shorten	1	<p><b>ignore</b> tighten</p> <p><b>accept</b> correct reference to ATP</p> <p><b>reject</b> relax / stretch</p>
	(b)	idea that it depends upon what Jasmine is doing; example of variation between individuals;	2	<p>e.g. work harder / different activities or training</p> <p>e.g. age / gender / fitness level / genetic</p> <p><b>ignore</b> diet / stress</p>
	(c)	lactic acid;      energy;	2	<p>either order</p> <p><b>accept</b> ATP for energy</p>
<b>Total</b>			<b>7</b>	
<b>Paper Total</b>			<b>55</b>	

**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](mailto:general.qualifications@ocr.org.uk)

**[www.ocr.org.uk](http://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 2013

