OCR
RECOGNISING ACHIEVEMENT

GCSE

Biology A

General Certificate of Secondary Education

Unit **A163/01:** Module B7 (Foundation Tier)

Mark Scheme for June 2013

Oxford Cambridge and RSA Examinations

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.

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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.

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:

	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

1. **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 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 should be blank (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:

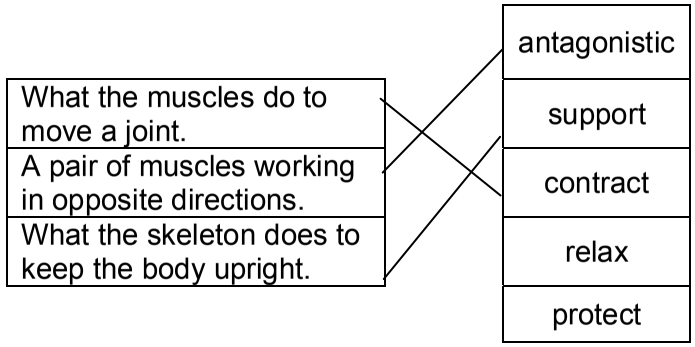
Descriptor	Award mark
A good match to the level descriptor	The higher mark in the level

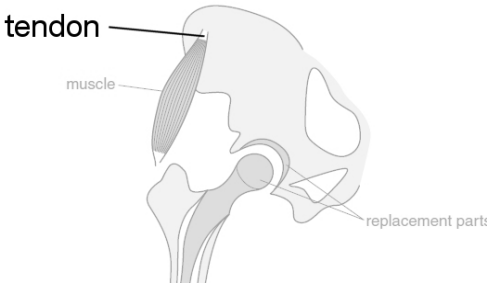
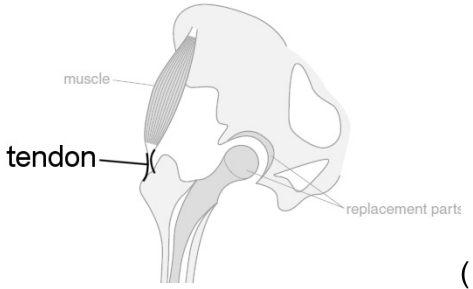
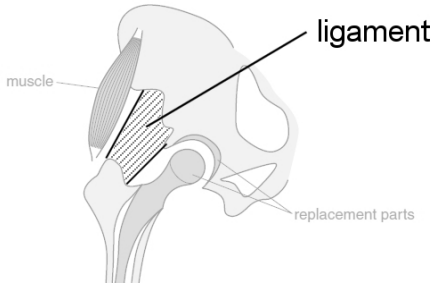
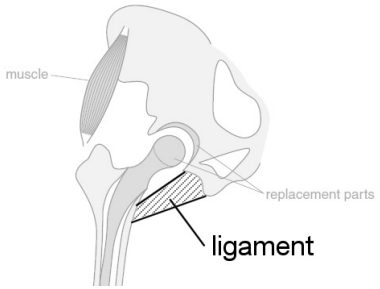
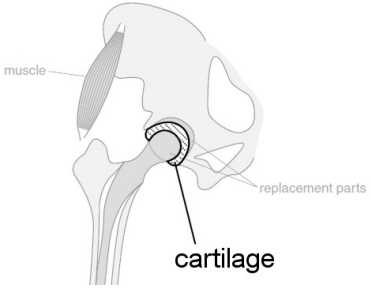
Just matches the level descriptor	The lower mark in the level

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)			3	

Question			Answer	Marks	Guidance
1	(b)		 **OR**  (1)  **OR**  (1)  (1)	3	1 mark for each correct label & drawing in correct position **max 1** for 3 correct labels with incomplete drawings

Question			Answer	Marks	Guidance
1	(c)	(i)	1 / 0.05 (1) 20 years (1)	2	Correct answer scores 2 marks
		(ii)	**any two from:** **idea** it will last his lifetime / longer / won't need replacing as often ; **idea** that it's reliable / new ceramics don't break / crack ; no safety issue as with metallic ; smooth / less friction	2	
		(iii)	**any two from:** exercise / how active / named active sport ; body mass / weight ; another relevant problem with the skeleton e.g. osteoporosis	2	
		(iv)	**any one from:** cause allergic reaction ; damage the bone / socket could crack ; risk of surgery / infection ; come loose	1	**Question is about the ceramic type** **reject** answers about metal ions entering blood **ignore** 'it could crack' as it refers to the ceramic **ignore** ideas about rejection
			Total	**13**	

Question			Answer	Marks	Guidance
2	(a)		306 (1) (306 x 2) 612 (1) 49 (1)	3	49 alone scores 3 marks **ignore** decimal places
	(b)		poor	1	**ecf** from (a) if value in (a) is between 0 and 200
	(c)		**any two from:** measuring results will vary / inaccurate ; idea that fitness score is in ranges and not a continuous score ; other factors such as BMI / mass / weight / age / (short term) injury	2	
			Total	**6**	

Question			Answer	Marks	Guidance
3			**Level 3 (5–6 marks)** Includes some basic and some higher components with an explanation of what they do. Quality of written communication does not impede communication of science at this level. **Level 2 (3–4 marks)** Include some structural components with an explanation of what they do. Quality of written communication partly impedes communication of science at this level. **Level 1 (1–2 marks)** Include some basic structural component(s) **OR** one component explained Quality of written communication impedes communication of science at this level. **Level 0** Insufficient or irrelevant science. Answer not worthy of credit.	6	**This question is targeted at grades up to G** **Indicative scientific points may include:** ***Specific*** **Higher** • hormones – chemical messengers • glucose – for respiration • carbon dioxide – from respiration • urea – waste • plasma (explained) carries substances **Basic** • red blood cells – haemoglobin – transport oxygen • white blood cells – destroy micro-organisms • platelets – clot blood • plasma (identified) – liquid part of blood ***General*** • Level 2 and 3 should include an explanation of what the components do. **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
			Total	**6**	

Question			Answer	Marks	Guidance
4	(a)		vena cava aorta ventricle auricle / atrium	2	4 correct = 2 marks 2 or 3 correct = 1 mark
	(b)		lungs → ← rest of body	1	both boxes correct for mark
	(c)		valve (1) stops back flow of blood / blood flows in one direction (1)	2	 **accept** (stops blood) backtracking / wrong direction
			Total	**5**	

Question			Answer	Marks	Guidance
5			**Level 3 (5–6 marks)** Includes detailed explanation of both heating **and** cooling, **OR** homeostasis **and** correct difference(s) from aquatic mammal. Quality of written communication does not impede communication of science at this level. **Level 2 (3–4 marks)** Includes explanation of either heating **or** cooling **and** correct difference(s) from aquatic mammal **OR** explanation of heating **AND** cooling **OR** Homeostasis but no correct differences with aquatic mammal Quality of written communication partly impedes communication of science at this level. **Level 1 (1–2 marks)** Includes limited explanation of either heating OR cooling Quality of written communication impedes communication of science at this level. **Level 0** Insufficient or irrelevant science. Answer not worthy of credit.	6	**This question is targeted at grades up to C** **Relevant points include:** ***General*** • should include too hot, too cold and how aquatic mammals may differ ***Specific*** **Homeostasis** • hypothalamus / receptors / effectors **Too hot** • vasodilation / blood flow near surface of skin increases • more heat radiated away • sweating • heat lost by evaporation / latent heat **Too cold** • vasoconstriction / blood flow near surface of skin decreases • heat stored in body core / less heat radiated away • shivering / increased respiration rate • generates heat **Differences** • e.g. aquatic mammal lives in water so sweat will not work / has (thick) fur / hair / waterproof do not look for layer of fat / blubber as this is not on the specification. **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
			Total	**6**	
6	**(a)**	**(i)**		2	read whole answer, as factor and outcome may

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td></td><td></td><td></td><td>factor = carbon (dioxide) level (increases) (1)

outcome = rate of photosynthesis increases (1)</td><td></td><td>be on same line but must be clear which is the factor and which is the outcome</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>(carbon dioxide levels are increasing) because
combustion / burning fuels / waste from human system
(so not closed loop)</td><td>1</td><td></td></tr>
<tr><td></td><td></td><td>(iii)</td><td><table><tr><td>plants release oxygen and animals release carbon dioxide.</td><td></td></tr><tr><td>deforestation reduces the amount of photosynthesis.</td><td></td></tr><tr><td>photosynthesis stops during winter months.</td><td>✓</td></tr><tr><td>animals cannot photosynthesise.</td><td></td></tr><tr><td>the amount of carbon dioxide in the air is much larger than the amount used in photosynthesis.</td><td>✓</td></tr></table></td><td>2</td><td>three ticks = 1 mark max.
four or more ticks = 0 marks</td></tr>
<tr><td></td><td>(b)</td><td>(i)</td><td>A</td><td>1</td><td></td></tr>
<tr><td></td><td></td><td>(ii)</td><td><table><tr><td>there is no waste because the output from one part of the system becomes the input for another part of the system.</td><td>✓</td></tr><tr><td>the waste output is always greater than the input.</td><td></td></tr><tr><td>there is no waste because the output from one part of the system is less than the input to another part of the system.</td><td></td></tr><tr><td>the waste output is always less than the input.</td><td></td></tr><tr><td>there is no waste because output from one part of the system is greater than the input to another part of the system.</td><td></td></tr></table></td><td>1</td><td>two or more ticks = 0 marks</td></tr>
</table>

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td></td><td>(c)</td><td></td><td>
<table>
<tr><td>prevents soil erosion</td><td>✓</td></tr>
<tr><td>reduces productivity</td><td></td></tr>
<tr><td>promotes cloud formation</td><td>✓</td></tr>
<tr><td>produces large numbers of fruits</td><td></td></tr>
<tr><td>produces new species</td><td></td></tr>
<tr><td>only photosynthesises during the daytime</td><td></td></tr>
<tr><td>prevents extremes of temperature</td><td>✓</td></tr>
</table>
</td><td>2</td><td>3 correct = 2 marks
2 correct = 1 mark

four ticks = 1 mark max.
five or more ticks = 0 marks</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>9</td><td></td></tr>
</table>

Question			Answer	Marks	Guidance
7			**[Level 3]** Includes reference to **getting** the gene AND **transferring** the gene AND **expressing** the gene. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **[Level 2]** Includes reference to **getting** the gene AND **transferring** the gene OR **getting** the gene AND **expressing** the gene. OR **transferring** the gene **AND expressing** the gene. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **[Level 1]** Includes reference to **getting** the gene OR **transferring** the gene OR **expressing** the gene. 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 D to C** **Indicative scientific points may include:** **Getting the gene** • identify gene • isolate gene • replicate gene **Transferring the gene** • put gene into vector • example of vector eg virus / aerosol / plasmid / phage • explanation of how insertion occurs **Expressing the gene** • idea that DNA is common in all organisms *in humans* • transferred gene makes Factor 8 *in bacteria* • transferred gene makes Factor 8 • bacteria reproduce • isolate / purify Factor 8 / give people Factor 8 **If they inject bacteria into human, then max L2** **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
			Total	**6**	

Question			Answer	Marks	Guidance
8	(a)		2 before 3; 3 before 1; 1 before 6; 6 before 5	2	2 or 3 steps correct for 1 mark 4 steps correct for 2 marks (Correct order 23165)
	(b)		0.001 0.000 001 **0.000 000 001** 0.000 000 000 001 0.000 000 000 000 001	1	
	(c)		virus is 1000 nm (in diameter) (1) therefore need <u>electron microscope</u> (1)	2	**accept** less than 2000nm **ignore** "need to use a more powerful microscope"
	(d)	(i)	not enough is known about nanoparticles (1) (10% are) released when socks are washed / into washing water (1)	2	**ignore** "may not be completely safe"
		(ii)	make them so none / less are released when washed	1	
	(e)		**idea** that 101nm may be just as dangerous as 99nm	1	**ignore** use less nanoparticles
			Total	**9**	
			Paper Total	**60**	

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