OCR
RECOGNISING ACHIEVEMENT

GCSE

Biology A

General Certificate of Secondary Education

Unit **A162/01**: Modules B4, B5, B6 (Foundation Tier)

Mark Scheme for January 2013

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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.

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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:

Annotation	Meaning
	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

Annotation	Meaning
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**

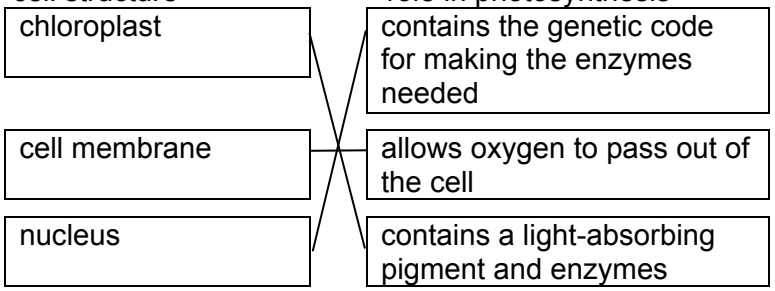
e. For answers marked by levels of response:
   i. **Read through the whole answer from start to finish**
   ii. **Decide the level** that **best fits** the answer – match the quality of the answer to the closest level descriptor
   iii. **To determine the mark within the level**, consider the following:

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)		carbon dioxide(1) glucose(1)	2	responses must be in the correct order **accept** correct formulae ie (6)CO_2 $C_6H_{12}O_6$ if formula must be subscript **accept** starch, sugar or any named carbohydrate on RHS
	(b)	(i)	10.8(1)	1	
		(ii)	C(1)	1	**accept** correct references to value if A given as response then check mean value of high and if between 14.8-15.2 then accept answer
		(iii)	***(confident because):*** the (mean) values are the same/similar/very close/closest (1) the results were repeated (ten times) (1) (repeats mean) results are repeatable/reliable/valid (1) ***(not confident because):*** size of bubbles vary (1) difficult to counting bubbles (1) size of pondweed might be different (in the two tubes) (1) the temperature might be different (in the two tubes) (1) need more data/tests (to be sure) (1)	2	**mark whole answer crediting any two points** must imply both values **ignore** accurate **ignore** ref to different species of pondweed (as given in the question) **allow** any other reasonable difference in variables **ignore** idea of human error **ignore** idea that data is wrong/inaccurate

Question			Answer	Marks	Guidance
1	(b)	(iv)	*any two from:* control the (water) temperature (in the test tubes) (1) control the pH (using a buffer) (1) use the same length/mass/amount/size of pondweed(1) same number of leaves(1) collect the (oxygen) bubbles to measure the volume (1) control carbon dioxide levels (1) use different species of pondweed (1) use other/ specific light intensity (1) leave experiment longer time (1)	2	**accept** any other feasible improvement **accept** use more replicates **ignore** amount
	(c)			2	3 correct lines = 2 marks 1 or 2 correct lines = 1 mark do not allow more than one line from each left hand box or to each right hand box

Question			Answer	Marks	Guidance
1	(d)		water **and** partially-permeable membrane (1)	1	**accept** H_2O **accept** semi or selectively for 'partial'
			Total	**11**	

Question			Answer	Marks	Guidance
2	(a)		carbon dioxide(1) ethanol(1)	2	**accept** any indication of correct response e.g underline delete one mark for each additional incorrect response
	(b)	(i)	*any three from* B increases faster than A (1) numbers double in B every hour (1) A doubles in first hour, but then slows (1) Both increase at the same rate in the first hour (1) numbers increase in both/they increase(1) B increases to 1600 (1) A increases to 390 (1)	3	
		(ii)	*any three from:* fermenter A uses up the oxygen/there is no oxygen(1) (therefore) they respire anaerobically after an hour(1) energy is needed for cell division/ growth/ reproduction(1) less energy released from anaerobic respiration ORA (1) so the rate of population growth slows(1)	3	OWTTE
	(c)		organic/ food (1) oxygen(1) methane(1) fuel(1)	4	responses **must** be in the correct order
			Total	**12**	

Question			Answer	Marks	Guidance
3	(a)		T, A, A, C, G, T	2	6 correct responses = 2 marks 5 or 4 correct responses = 1 mark 3 or less correct responses = 0 marks
	(b)	(i)	36% (1) C pairs with G / if G is 36%, C must be the same (1)	2	**allow** bonds/joins/goes together/matches **ecf** eg C pairs with T or A then C =14% because 36x2=72, 100-72=28, 28/2=14%
		(ii)	different genes code for/make different proteins / this (second) gene codes for a different protein/AW **(2)**	2	**allow** genes code for/make proteins = 1 mark
	(c)		nucleus **and** cytoplasm (1)	1	two correct responses in correct order = 1 mark

Question			Answer	Marks	Guidance
3	(d)		**(Level 3)** Answer gives a good description of the processes taking place and attempts to explain how they are controlled by genes. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **(Level 2)** Answer gives a description of the processes taking place, and includes some scientific details not shown on the diagram. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **(Level 1)** Answer gives a simple description of the processes taking place, but only includes points shown on the diagram. 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 at Level 1 include:** process A: • produces specialised cells • these cells can be used for tissue replacement process B: • produces unspecialised cells • these form a new cell culture **Indicative scientific points at Level 2 include:** • embryonic stem cells can be used to produce any other type of cell • differentiation • cells are replicating / dividing / mitosis • identical copies / cloning • example of tissue replacement • examples of a specialised cell **Indicative scientific points at Level 3 include:** • stem cells remain unspecialised until 8-cell stage • embryonic stem cells have the potential to switch on / off genes • switching on/off of specific genes leads to cell specialisation • genes that are switched on code for the proteins that the cell needs • different types of cell require different types of protein **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**

Question			Answer	Marks	Guidance
3	(e)		*any two from:* playing God/ against religious beliefs/it's not right/it's wrong (1) the embryo is destroyed/killed (1) the patient will be carrying genes/DNA from another person(1) surgery required but transplanted tissue may not function(1) tissue may be rejected(1) embryos could (be implanted in a uterus and) grow into a fetus/baby/new life(1) doctors will choose the patients for treatment(1)	2	**accept** any other realistic ethical issue **ignore** ref to cruelty embryo destroyed and not become a baby = 2 marks
			Total	**15**	

Question			Answer	Marks	Guidance
4	(a)		involuntary rapid short-lived	2	3 correct responses = 2 marks 1 or 2 correct = 1 mark **accept** any indication of correct response e.g underline delete one mark for each additional incorrect response
	(b)		E D A C B	2	5 correct = 2 marks 3 or 4 correct = 1 mark 2 or less correct = 0 marks

Question			Answer	Marks	Guidance
4	(c)		**Level 3** Answer gives a good description of Pavlov's experiment and makes a comparison of conditioning in Pavlov's dogs and little Albert, with the use of some correct scientific terminology. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **Level 2** Answer gives a description of Pavlov's experiment or makes a simple comparison of conditioning in Pavlov's dogs and little Albert. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **Level 1** Answer gives a simple description of Pavlov's experiment or shows some understanding of the little Albert experiment. 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 at Level 1 include:** Dog was given food Dog salivated Bell rung at same time as food given When bell rung on own dog salivated **Indicative scientific points at Level 2 include:** Process was repeated Dog associates food with bell Loud sound made as albert saw the rat so he associated rat with loud sound the processes are therefore similar for both Albert and Pavlov's dog; both examples show conditioned reflexes. **Indicative scientific points at Level 3 include:** Food is the primary stimulus Bell + food is conditioning Bell is secondary stimulus Salivation with bell is conditioned response/reflex Loud sound is the primary stimulus Rat + loud sound is conditioning Rat is the secondary stimulus Crying with the rat alone is conditioned response/reflex however, Albert was a non-repeated study whereas Pavlov repeated his dog experiments; **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
			Total	**10**	

Question			Answer	Marks	Guidance
5	(a)		central (nervous system)(1)	1	**accept** CNS
	(b)		cerebral cortex/cerebrum(1)	1	
	(c)	(i)	the noisi**er** it gets, the less you remember/get correct/get right (1) noise interferes with learning/ harder to concentrate (1)	2	**accept** reverse argument **accept** reverse argument e.g. in the quiet room there are less distractions
		(ii)	*any two from:* IQ of those involved/ good memory/how clever (1) age(1) (overall) health of those involved e.g mental health, tired(1) gender/sex of individuals(1) the number of people in the room (1)	2	**accept** any other correct/realistic suggestion

Question			Answer	Marks	Guidance
5	(c)	(iii)	**Level 3** Answer includes some learning techniques. Or describes a learning technique with examples of how it works. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **Level 2** Answer includes learning techniques or shows a knowledge of memory and may give an example of a learning technique Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **Level 1** Answer includes a learning technique or shows a knowledge of memory 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 points on Memory** Short term long term memory is the storage and retrieval of information **indicative points on learning techniques** patterns repetition colour light smell sound singing visualisation listening association writing reading **examples of learning techniques** using different colour-highlighting for all numbers in tens, twenties, thirties etc. using a well-known melody using the numbers in the correct order use different colours for every-other number use shapes/circles to break up the order into different areas - start, middle and end. Repeated reading Repetition especially over an extended period of time credit correct references to memory models to describe memory e.g. multi-store model . **Use the L1, L2, L3 annotations in Scoris; do not use ticks.**
			Total	**12**	

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