GCE 2005
January Series

ASSESSMENT and QUALIFICATIONS ALLIANCE

Mark Scheme

Biology Specification B

BYB6 Applied Ecology

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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Guidance on the award of the mark for Quality of Written Communication

Quality of Written Communication assessment requires candidates to:

- select and use a form and style of writing appropriate to purpose and complex subject matter;
- organise relevant information clearly and coherently, using specialist vocabulary when appropriate; and
- ensure text is legible, and spelling, grammar and punctuation are accurate, so that meaning is clear.

For a candidate to be awarded 1 mark for quality of written communication on the question identified as assessing QWC in a unit test, the minimum acceptable standard of performance should be:

- the longer parts (worth 4 marks or more) should be structured in a reasonably logical way, appropriate and relevant to the question asked;
- ideas and concepts should be explained sufficiently clearly to be readily understood. Continuous prose should be used and sentences should be generally be complete and constructed grammatically. However, minor errors of punctuation or style should not disqualify;
- appropriate AS/A level terminology should be used. Candidates should not use such phrases as 'fighting disease', 'messages passing along nerves', 'enzymes being killed' etc, but a single lapse would not necessarily disqualify. Technical terms should be spelled correctly, especially where confusion might occur, e.g. mitosis/meiosis, glycogen/glucagon.

The Quality of Written Communication mark is intended as a recognition of competence in written English. Award of the mark should be based on overall impression of performance on the question identified on the paper as assessing QWC. Perfection is not required, and typical slips resulting from exam pressure such as 'of' for 'off' should not be penalised. Good performance in one area may outweigh poorer performance in another. Care should be taken not to disqualify candidates whose lack of knowledge relating to certain parts of a question hampers their ability to write a clear and coherent answer; in such cases positive achievement on other questions might still be creditworthy. No allowance should be made in the award of this mark for candidates who appear to suffer from dyslexia or for whom English is a second language. Other procedures will be used by the Board for such candidates.

Examiners should record 1 or 0 at the end of the paper in the Quality of Written Communication lozenge. This mark should then be transferred to the designated box on the cover of the script.

BYB6/A

Question 1

(a) large surface area;
so increases heat loss (to the air);

OR

increased blood flow into ears;
so increases heat loss; 2 max

(b) more movement needs greater energy use/ muscle contraction;
more heat generated through respiration;

OR

in sun, more heat absorbed;
harder to lose heat by sweating/vasodilation; 2 max

Total 4

Question 2

(a) **two** suitable examples, e.g.
reduction in insect predators from ponds, because ponds kept shallow;
reduction in animals that prefer pH outside 5-7, because lime added;
reduction in species that feed on/live on trees/shrubs,
because these are removed/eaten by sheep/rabbits; 2 max

(b) conservation (measures) tends to stop this;
keep communities the same;
(adding lime) stops abiotic change/pH change;
no climax community/community of trees and shrubs;
sheep/rabbits prevent growth of shrubs/trees; 3 max

Total 5

Question 3

(a) **two** appropriate problems, e.g.
kill useful insects, such as pollinators;
kill predators of pest leading to later increase in pest numbers;
kill non-pest insects which are food for other animals; 2 max

(b) (i) increased use of insecticides/greater selection pressure; 1

(ii) mutations;
producing alleles/genes giving resistance;
natural selection/described;
leads to increased frequency of alleles/genes in population/insect; 3 max

Total 6

Question 4

(a) (i) very long/deep roots, to reach water deep in the soil/
nitrogen-fixing bacteria, to provide a source of nitrogen
for growth in poor soil; 1

(ii) interspecific; 1

(ii) (mesquite) proteins/amino acids (ploughed) into soil/
nodules ploughed in;
(decomposers) bacteria/ fungi feed on these;
excrete ammonia;
nitrifying bacteria convert these to nitrites/nitrates;
absorbed by roots of grasses and increase their growth;
increases recycling of other ions/phosphate/potassium; 3 max

(b) control organism a parasite/ predator;
specific to pest;
population varies with population of pest;
controls size of pest population but does not kill all;
keeps pest population low enough to prevent significant (economic)
damage; 3 max

Total 8

Question 5

(a) (i) many small trees with low mass (at start) and
fewer trees surviving but with much greater mass (to the left); 1

(ii) closer the trees are/larger the population, the more
limited the resources per plant; 1

(b) reduces transpiration/evaporation of water from leaves;
stomata do not open as much;
guard cells photosynthesise less/water potential changes;
less water moves in transpiration stream/drawn up xylem; 2 max

Total 4

Question 6

(a)	(i)	description of **two** differences, e.g. largest circles/stocks in 1984; greatest decreases in south/east/lower latitudes; total disappearance in some areas/fewer sites with fish;	2 max
	(ii)	**two** valid suggestions, e.g. same size mesh (of nets); same time of sampling; same depth of fishing; speed of boat;	2 max
(b)	(i)	the amount of fish that can be caught and allow the population to remain constant (and high); where difference between birth and death rates/ recruitment is maximum;	2
	(ii)	percentage of stock caught remains about the same/ about 50%; but mass of cod caught falls;	2
			Total 8

Question 7

(a)		not biodegradable/ not broken down by enzymes/ deposited in tissues; taken up by producers and thus passed up food chains; accumulated in tissues of organisms at each (trophic) level;	2
(b)	(i)	with hormone (third column) cadmium produces large/ significant/45% fall in enzyme production; without hormone (second column) no significant effect on enzyme production with cadmium;.	2 max
	(ii)	transcription/described; mRNA produced; translation at ribosomes/described;	3
	(iii)	fewer fish become sexually mature/fertile/breed.	1
			Total 8

Question 8

(a)	(i)	leaf area per unit ground area;	1
	(ii)	gross productivity/ photosynthetic product minus (losses due to) respiration;	1

(b) (i) small leaves at top and bottom/none at bottom and largest leaves in the middle; 1

(ii) bottom of stem has no leaves/no photosynthesis but stem tissues respire; 1

(c) line on respiration side of vertical line at top and bottom of stem and on photosynthesis side in the middle; 1

(a) carbon dioxide does not combine directly with ribulose bisphosphate/ binds with PEP;
product has four carbon atoms rather than three/ 4 carbon acid/ oxaloacetate formed;
different enzyme used to fix carbon dioxide;
site of carbon dioxide fixation; 2 max

Total 7