

GCE 2004

June Series



Mark Scheme

Biology B

BYB5/W

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.

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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.

BYB5/W**Question 1**

- (a) description of interspecific competition/competition between species/birds with beaks of different lengths;
link length of beaks to different positions of prey/reference to named bird with particular prey e.g. curlews with longer beaks able to feed on ragworms; 2
- (b) variation in beak length in curlews/one species;
longer/more curved beaked curlews outcompete/ at advantage;
suggested advantage e.g. larger/curled beaks access more food;
reproduction;
genes passed on (to offspring); 4 max
- (c) body has lower water potential;
water diffuses along a water potential gradient/by osmosis; 2
- Total 8
-

Question 2

- (a) *(1 mark for each precaution)*
(1 mark for each reason)
One precaution only from each area

Precaution	Reason
standardise source of leaves, e.g. same age/tree	same chemical composition;
standardise discs, e.g. same size	same S.A. for decomposition;
standardise treatment of discs, e.g. bury to same depth	same decomposers/named abiotic factor;
standardise soil conditions, e.g. water content/pH	affects enzyme/bacterial decomposition;

3 max

- (b) sharp decrease, levelling off/gradual decrease, decrease;
 increased decomposition due to increased temperature/warmer months;
 enzyme action increases due to increased temperature;
 rapid decrease due to removal of sugars/starch;
 cellulose takes longer to be digested; 3 max
- (c) secrete enzymes/cellulase/carbohydrase;
extracellular digestion;
 absorption of soluble/digested products/sugars; 3
- Total 9
-

Question 3

- (i) 2860-2970; 1
- (ii) $\frac{\text{answer to (i)} \times 100}{1\ 417\ 500} = 0.2\ \% - 0.21\ \%;$
 (correct answer = 2 mark)
- principle of mean energy in heather; = 1 mark
 $\frac{\text{energy absorbed}}$ 2
- (iii) energy lost as heat/by respiration/metabolic processes;
 qualified comment on the inefficiency of photosynthesis
 e.g. 25% efficient/energy lost as electrons passed on;
 carbon dioxide/temperature limiting; 2 max
- (b) only a proportion of heather eaten/not all plants eaten/energy lost in
 decay;
 not all food eaten is digested/energy lost in faeces;
 heat/energy lost due to respiration; 3
- Total 8
-

Question 4

- (a) generation of random co-ordinates;
use of 10 or more quadrats;
collection of all dog whelks in quadrat; 3
- (b) greater variation for sheltered population/population A;
range/spread around the mean; (or converse) 2
- (c) (i) smaller ratio means relatively larger foot/population B has
relatively large foot;
better able to grip;
larger/longer shells have greater area exposed/are subject
to greater force;
- (ii) wave action limits the max. L/A ratio/extremes;
valid point about age, e.g. greater age range on sheltered
shore/live longer on sheltered shore;
- (allow shell size marking point in either (c)(i) or (c)(ii) but
only credit once)* 4 max
- Total 9
-

Question 5

- (a) pioneers/suitable example colonise land;
example of change in environment;
enables change in species;
conditions change further/example to favour trees; 4
- (b) stable community/no further succession/final community; 1
- (c) roots unable to respire (aerobically);
active transport of minerals/other metabolic effect stops; 2
- (d) action of bacteria/decomposers inhibited/ fewer bacteria/decomposers;
acid conditions inhibits enzymes/enzymes denatured/changes active site;
H⁺ ions affect active site;
anaerobic conditions; 3 max
- Total 10
-

Question 6

- (a) proteins/amino acids broken down;
deamination/ammonification/ release of ammonium compounds;
conversion to nitrates;
by nitrifying bacteria/named bacterium;
nitrates absorbed into roots; 5
- (b) fewer nitrates in the soil for the next crop/plants grow less well
because of lack of nitrates;
requiring application of more fertiliser;
economic reason for using less fertiliser;
valid environmental reason explained e.g. nitrates leaching into
water/eutrophication/explanation/health related e.g drinking water; 2 max
- (c) production of phospholipids;
in cell membranes;
synthesis of ATP;
production of DNA;
production of RNA;
production of NADP; 4 max
- Total 11

Question 7

- (a) line drawn showing decrease then recovery; 1
- (b) high initially because sewage contains large numbers of
microorganisms/bacteria;
less organic material therefore fewer bacteria;
less oxygen used for breakdown/respiration; 3
- (c) decrease due to low oxygen;
increase due to large food supply/organic matter/sufficient
oxygen/little or no competition;
decrease due to increased (interspecific) competition from other
invertebrates/less food/organic matter; 3
- (d) increased ventilation/flow of water over gills;
maintains diffusion gradient for oxygen/increased oxygen absorbed /
into body; (*allow blood*)
enables *Asellus* to tolerate reduced oxygen content of water/
higher temperatures;
(more oxygen) for increased metabolic rate; 3 max
- Total 10

QWC (See guidance) 1