



ASSESSMENT and  
QUALIFICATIONS  
ALLIANCE

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# Mark scheme January 2004

## GCE

### Biology B

### Unit BYB1

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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.

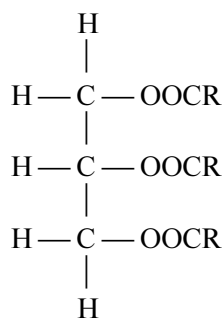
Examiners should record 1 or 0 at the end of the paper in the Quality of Written Communication lozenge. This mark should then be transferred to the designated box on the cover of the script.

**Question 1**

- (a) (i) microvilli; (*reject brush border*) 1
- (ii) increased surface area (for diffusion); 1
- (b) (i)  $\frac{16 \times (1000)}{0.1}$  / principle of measuring scale bar; (*15 –17 tolerance*)  
160000; (*correct answer award 2 marks*) 2
- (ii) electron microscope has a greater resolving power / objects closer together can be distinguished;  
electron (beams) have a shorter wavelength; 2
- (c) short diffusion pathway /short pathway to the centre /  
large SA:V ratio for faster, more diffusion; 1
- Total 7
- 

**Question 2**

- (a) 3 fatty acids attached;  
ester bond correct;  
(*H on glycerol component, O attached to carbon, R at other end*)



- 2
- (b) not made of monomers/many repeating units; 1
- (c) (many) mitochondria present in brown fat cells;  
mitochondria release heat/energy; (*ignore ATP*)  
white fat cells for fat storage / reduced fat storage in brown fat cells; 3
- Total 6
-

**Question 3**

- (a) (i) substances/molecules have more (kinetic) energy/moving faster;  
(*reject vibrate*)  
increased collisions / enzyme substrate complexes formed; 2
- (ii) causes denaturation/tertiary structure/shape change;  
H<sup>+</sup>/ionic bonds break;  
(shape) of active site changed;  
substrate no longer binds/not complementary to (active site); 3 max
- (b) all substrate changed into product / reaction is complete;  
same amount of product formed;  
same initial substrate concentration; 2 max
- Total 7
- 

**Question 4**

- (a) C<sub>12</sub> ; H<sub>22</sub>O<sub>11</sub> ; 2
- (b) (i) heat with Benedict's;  
yellow/brown/orange/red; 2
- (ii) (yes) (*may appear on second line*)  
more precipitate in sample **B**;  
both sugars are reducing sugars/ give a positive test; 2
- Total 6
- 

**Question 5**

- (a) passive/do not require energy/ATP;  
movement down a concentration gradient / by diffusion;  
go through phospholipid (bilayer) / not by protein/carriers;  
(*not by active transport gains mark if no other mark awarded*) 2 max
- (b) active transport; 1  
occurs when oxygen present because energy/respiration required,  
or against a concentration gradient because there is no uptake in curve **Z**; 1
- (c) concentration inside cells higher than surrounding solution; 1
- (d) diffusion is proportional to the concentration gradient; 1
- Total 6
-

**Question 6**

- (a) (i) hydrolyse/break peptide bonds;  
from within the molecule/centre of the molecule/  
forms short(er) chains/peptides; 2
- (ii) creates more ends/increased surface area  
(for exopeptidases to work on); 1
- (b) (i) phenylalanine 1
- (ii) change the solvent;  
rotate through 90°/2 way chromatography; 2
- (c) (i) Stomach 2  
SI mid 1  
SI low 3; (*all three correct for mark*) 1
- (ii) polypeptide/peptide; 1
- (iii) absorption (of amino acids through gut wall); 1
- Total 9

**Question 7**

- (a) (*explanation must be linked to structures to gain second mark for each linked pair*)

filaments/lamellae ;	large SA;
gill plates or secondary lamellae;	
large number of capillaries;	to remove oxygen / to maintain a gradient;
thin epithelium;	short diffusion pathway;
pressure changes;	to bring in more water / to maintain gradient;
countercurrent flow (or description);	exchange/diffusion along whole length / concentration gradient maintained / equilibrium not achieved / blood always meets water with higher oxygen concentration;

6

- (b) (i) requires 20 cm<sup>3</sup> of oxygen / extracts 7.2 cm<sup>3</sup> of oxygen  
(*reject if referring to volume of water*)/  $\frac{20}{7.2}$ ;  
2.7/2.8 (dm<sup>3</sup>h<sup>-1</sup>); (*correct answer award 2 marks*) 2
- (ii) high (relative) density/heavy;  
requires large input of energy;  
difficult to push back out; 2 max

- (c) *(for each pair second point must be linked to first)*  
to provide same amount of oxygen;  
need to have more water flowing over gills;  
OR  
metabolic rate/respiration increases (with increase in temperature);  
so more oxygen required; 2 max

Total 12

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QWC (See guidance)

1