



ASSESSMENT and  
QUALIFICATIONS  
ALLIANCE

# Mark scheme January 2003

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## GCE

### Biology B

### Unit BYB1

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**Guidance on the award of the mark for Quality of Written Communication on Section B of Unit Tests**

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 Section B 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 Section B. 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 Section B in the Quality of Written Communication lozenge. This mark should then be transferred to the designated box on the cover of the script.

## Unit 1: Core Principles

### Section A

#### Question 1

(a)	D;	1
(b)	A;	1
(c)	B;	1
(d)	E;	1
	Total	4

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#### Question 2

(a)	A mitochondrion;	1
	B nucleus;	1
	C endoplasmic reticulum / rough ER / ER; ( <i>reject smooth ER, ribosomes neutral</i> )	1
(b)	ref to proteins / glycoproteins / enzymes / lipids / hormones; ref to <b>fate</b> of proteins / glycoproteins / enzymes / lipids / hormones; ( <b>linked to previous mark e.g. vesicles / exocytosis / packaging / synthesis / processing / modifying</b> ) <b>If neither of these:</b> reference to vesicles / exocytosis / packaging / synthesis / processing / modifying gains 1 mark  ( <i>Max 1 mark if incorrect function given</i> )	2
(c)	30 000–34 000 gains 2 marks;;	2
	<b>If neither of these:</b> evidence of sensible measured diameter ÷ actual (0.0005 mm) gains 1 mark	
	Total	7

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**Question 3**

- (a) (i) **A / E**; (*names of glands neutral*). (*Allow correct indication on diagram*). 1
- (ii) **E / F**; (*names of glands neutral*). (*Allow correct indication on diagram*). 1
- (b) (i) (stratified epithelium) allows for cells damaged by passage of food /  
resists damage as food passes; (*facilitates stretching neutral, 'protection'  
unqualified neutral*) 1
- (muscle layers) move food along / peristalsis; 1
- (ii) cells similar (in structure);  
with same / particular / specific / single /  
one **function** or **job** or **process**; 2

Total 6

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**Question 4**

- (a) the larger the organism the smaller the SA : V ratio; 1

(b) 

has small SA : V ratio;  <b>so</b> low <u>rate</u> of heat loss / less heat loss in relation to volume or mass;
--

limbs small;  <b>so</b> reduced <u>area</u> for heat loss;
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**OR**

limbs small in relation to body size;  <b>so</b> low <u>rate</u> of heat loss / reduced <u>area</u> for heat loss / less heat loss in relation to body size;
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<b>OR</b> <i>accept</i> large amount of fat / blubber;  <b>So</b> <u>insulation</u> effect / low <u>rate</u> of heat loss; <i>(keeps warm neutral)</i>
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4 max

Total 5

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**Question 5**

- (a) increased / large difference in concentration / high concentration gradient / large or steep diffusion gradient;  
increased / high temperature;  
increased / high pressure;  
increased / large surface area;  
short diffusion path / decreased membrane width; 3 max
- (b) the larger (the diameter) of the hole the greater the volume / amount / rate of gas diffusing;  
the smaller the hole the greater the volume / amount / rate of gas diffusing per cm<sup>2</sup> of hole / unit area; 2
- (c) stomata / guard cells/ pores for entry or exit of gases;  
mesophyll cells collectively give large surface area (for exchange);  
intercellular spaces allow diffusion / movement (to all cells);  
(*moist neutral*) 2 max
- Total 7
- 

**Question 6**

- (a) diffusion / movement of water;  
through a partially-permeable membrane;  
(from less negative  $\psi$ ) to more negative  $\psi$  / (from higher  $\psi$ ) to lower  $\psi$ ; 3
- (b)(i) 5.55 cm gains 2 marks; (*allow 5.5 or 5.6 only if supported by correct working*)  
else evidence of  $5.0 \div 0.9$  gains 1 mark 2
- (ii) T anywhere to left of 0.3 M; 1  
W at 0.3 M; 1
- Total 7
-

## Section B

## Question 7

- (a) (i) *Mark 7(a) as a whole if points for (ii) are stated in (i)*  
 condensation reaction / condensation reaction described;  
 enzyme involved / glycosidic bonds formed; 2
- (ii) long / unbranched / straight chain;  
 makes it insoluble / allows it to link with other cellulose molecules / allows it to  
 form microfibrils or fibrils or fibres; 2
- (b) (i) movement (to find wood particles) / creates current to draw wood particles  
 to cell / produces feeding current ; (*attachment neutral*) 1
- (ii) *similarities*  
 both have membranes;  
 both have ribosomes;  
*differences – Trichonympha / it (allow prokaryotic cell has not)*  
 has nucleus;  
 has mitochondria;  
 has ER;  
 has Golgi;  
*ELSE accept 'no membrane-bound organelles' if no membranous organelle given;*  
 has linear chromosome / linear DNA;  
 has no cell wall;  
 has no mesosome;  
 has flagella with different structure;  
 has ribosome with different size; **max 4 differences** 5
- (c) cellulose fits into *Trichonympha* enzyme / does not fit into termite enzyme;  
 idea of complementary shape of substrate; (*reject same shape*)  
 reference to active site of enzyme; 3
- (d) food already broken down / digested;  
 food contains *Trichonympha* (which can begin cellulose digestion in young);  
 food contains sugar (for growth); 2 max
- Total 15
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**Question 8**

- (a) lowers activation energy;  
 relevant mechanism *e.g. brings molecules close together / reaction in smaller steps / change in charge distribution / proton donation or acceptance / induced fit ensuring substrates brought in correct sequence;*  
 including relevant reference to active site; 3
- (b) (i) add iodine (solution);  
 blue / black colour; 2
- (ii) heat with Benedict's (solution);  
 brick red / brown / orange / green / yellow colour;  
*(max 1 mark if non-reducing sugar test described)* 2
- (c) (i) 48 56–58 51–54 (**all correct**); 1
- (ii) *description*  
 increase up to 48 / optimum *allow ECF from (i)*;  
 decrease above 48 / optimum *allow ECF from (i)*;  
*explanation of increase*  
 increased KE / move faster;  
 therefore more collisions / more enzyme-substrate complexes formed;  
 with active site;
- explanation of decrease*  
 denaturation / 3D structure changed / tertiary structure changed;  
 detail *e.g. breaking of hydrogen / sulphur bonds; (reject peptide bonds)*  
shape of active site changed;  
 substrate no longer fits; 6 max
- Total 14

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Quality of Written Communication 1