



ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Mark scheme January 2003

GCE

Biology B

Unit BYB3/W

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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 3: Physiology and Transport

Question 1

- | | | |
|-------|--|-------|
| (a) | Carbon dioxide / CO_2 ; hydrogen / H^+ ; (<i>Accept: hydrogen carbonate / HCO_3^-</i>); medulla; intercostal; (<i>Ignore: external / internal</i>) | 4 |
| (b) | Detection of, <u>or</u> stimulated by, extension <u>or</u> inflation of lungs / bronchi / bronchioles; impulses to medulla / respiratory centre; resulting in inhibition of further inspiration / relaxation of muscles / breathing out; | 2 max |
| Total | | 6 |
-

Question 2

- | | | |
|---------|--|-------|
| (a) | X - Tissue / interstitial (fluid); Y – Plasma; | 2 |
| (b) | Less protein / higher proportion of water; (<i>Accept: no <u>or</u> smaller proteins; Reject: red cells</i>) | 1 |
| (c) (i) | Osmosis; (<i>accept: diffusion</i>) | 1 |
| (ii) | Lymph / lymphatic; | 1 |
| (d) | Faster diffusion (of oxygen) because more <u>surface</u> in contact with <u>wall</u> ; (<i>Accept either uptake or loss of oxygen; Reject: just 'surface area'</i>) cells have to touch walls; shorter diffusion pathway (to centre of red cell); rate of flow slowed (so more efficient exchange); | 1 max |
| Total | | 6 |
-

Question 3

| | | |
|---------|--|-------|
| (a) | ATP; | 1 |
| (b) (i) | Lactate / lactic acid; | 1 |
| | (ii) Oxidation / converted to pyruvate; (<i>Accept: reacts with oxygen, hydrogen removed</i>) broken down/used to release energy/ATP; resynthesis to glucose/glycogen; | 2 max |
| (c) (i) | (Almost) entirely anaerobic respiration (under 10s); no oxygen used in anaerobic respiration / needed from breathing; | 2 |
| | (ii) Low energy release from anaerobic respiration; oxygen / glucose not supplied fast enough for (fully) aerobic; | |
| | <u>Or</u> build-up of lactate / lactic acid; causing muscle fatigue / pain / stiffness / disruption of enzymes; | |
| | <u>Or</u> glycogen stores used up; no / slow supply of glucose to replace; | 2 max |
| | Total | 8 |

Question 4

| | | |
|---------|---|-------|
| (a) | Sucrose; | 1 |
| (b) | Perforated / gaps in sieve plates; for large molecules to pass through / unrestricted mass flow; (<i>not just: permeable. Allow 'sieve plates permit unrestricted flow' for 1 mark</i>) | |
| | Elongated (sieve tubes); fewer end walls / fewer sieve plates to restrict flow; | |
| | No or few organelles / no nucleus / little cytoplasm / large central vacuole; to allow rapid / unrestricted mass flow; (<i>max 2 features + 2 explanations</i>) | 4 max |
| (c) (i) | Lower / more negative; | 1 |
| | (ii) Water enters; Increased turgor / pressure forces movement; | 2 |
| | Total | 8 |

Question 5

- (a) Many vessels/capillaries, or branching, or vessels in all parts of wall give large surface area; (*not just: 'large surface area'*)
narrow or thin vessels/walls give short diffusion distance;
(several) vessels to remove blood (rapidly) maintains diffusion gradient; 2 max
- (b) Pressure, or muscle contraction, pushes flaps together;
so blood unable to flow backwards / upwards;
(*Accept for 1 mark: If blood flows back, valves close;*
Reject: 'valves close after blood passes through' as active process) 2
- (c) Forms oxyhaemoglobin / oxygen joins with haemoglobin;
high affinity (for oxygen) at high concentration;
low affinity/dissociates where oxygen concentration low;
enables more oxygen to be transported than water/plasma would; 2 max
- (d) Able to be saturated with oxygen in (very) low concentration;
related to low oxygen concentration in environment;
able to unload at only slightly lower concentration; 2 max
- Total 8
-

Section B**Question 6**

- (a) (i) Increased volume pumped per beat;
dilation of vessels (to muscle);
diversion of blood away from other organs/parts;
increased blood pressure;
muscle contraction squeezes veins; 2 max
- (ii) more oxygen for respiration/energy, or so less anaerobic respiration;
more glucose for respiration/energy;
carbon dioxide removed more rapidly;
heat removed more rapidly;
lactate removed; 2 max
- (b) Increase in carbon dioxide / hydrogen ions;
detection by / stimulation of chemoreceptors;
pressure receptors detect changes in blood pressure;
(receptors) in aorta / carotid arteries / medulla;
(cardio)acceleratory centre (in medulla) / cardiovascular centre;
impulses via sympathetic nerves/system;
to SAN;
change in rate of impulse production by SAN; 6 max
- (c) (i) Elastic fibres/tissue in arteries; (*muscle – neutral*)
recoil maintains pressure; 2
- (ii) (Left) ventricle contracts (more forcefully);
more muscle fibres involved / more complete contraction;
Stroke volume/volume pumped per beat increases;
(*Ignore references to rate*) 2
- (iii) Muscle fibres fully contracted / all fibres contracted; 1
- Total 15
-

Question 7

| | |
|---|-------|
| (a) (i) Osmosis; | 1 |
| (ii) Apoplast(ic); | 1 |
| (b) Casparian strip / waterproof walls; so water must go through cytoplasm / vacuole / symplast; | 2 |
| (c) In xylem; evaporation / transpiration from leaves; through stomata; cohesion of water molecules; leaf cells have more negative water potential, so water enters from xylem; water drawn up as column/continuous stream; adhesion of water to walls; capillarity due to narrow lumen of xylem (vessels); lignified walls keep xylem (vessels) open; root pressure forces (some) water up; | 6 max |
| (d) Description includes rise and fall, with max at midday; rise related to increasing temperature; fall related to stomatal closure; explanation in terms of rate of evaporation; explanation of factor affecting stomatal opening/closure, e.g. light; (<i>Accept all converses; references to photosynthesis neutral</i>) | 4 max |
| Total | 14 |

Quality of Written Communication 1