GCE 2004
June Series

ASSESSMENT and QUALIFICATIONS ALLIANCE

Mark Scheme

Biology B
BYB1

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.

BYB1

Question 1

(a) cells become specialised/change to carry out a particular function; 1

(b) (i) named organelle e.g. nucleus/nuclear envelope; vacuole;
chloroplast; RER; mitochondrion; no membrane bound organelles;
(*only award if no organelles named*)
(*reject ribosomes, cell membrane, cell wall)*
ref to large(r) size;
2 max

(ii) 94/95/96 × 10; principle (measured distance **Y**-**Z**)
44/45/46 length of scale bar
20.4 – 21.8 2
(*correct answer 2 marks)*

(iii) no cell wall (permanent) / (large) vacuole / chloroplasts / smaller;
(*accept microvilli)*
1 max

Total 6

Question 2

(a) (i) condensation; 1

(b) (i) **D**; 1

(ii) **C**; 1

(iii) **A**; 1

(c) absence of a double bond;
in the (hydrocarbon) chain;
unable to accept more hydrogen / saturated with hydrogen; 2 max

Total 6

Question 3

(a)	(i)	**A** = phospholipid **B** = protein; (*both correct)*	1
	(ii)	allows movement of lipid soluble/non-polar molecules/named e.g. water/gases; prevents movement of water soluble/polar molecules/named e.g. ions / amino acids; idea of selection / membrane partially/differentially permeable/ large molecules do not move through, small molecules do; (*accept semi-permeable*)	2 max
(b)	(i)	diffusion (*reject facilitated*)	1
	(ii)	higher rate of exchange/diffusion; prevents cooling of the blood / prevents increase in viscosity;	2
	(iii)	concentration gradient maintained / equilibrium never achieved; blood always meets fluid with lower concentration of urea; diffusion/exchange along the whole length of surface;	2 max
	(iv)	$0.2 \times 60 = 12$ dm^{3}h^{-1}; (*principle: volume per hour*) $12 \times 5 = 60$ dm^3; (*correct answer 2 marks)*	2
		Total	10

Question 4

(a)	exchange/diffusion across body surface/skin; short diffusion pathway/distance/large SA:V ratio;	2
(b)	large numbers of lamellae so large SA; lamellae thin so short (diffusion) pathway to blood/capillaries; high rate of oxygen uptake for respiration/energy release; (*accept more oxygen*)	3
	Total	5

Question 5

(a) specific 3D tertiary structure/shape;
substrate complementary shape; (*reject same shape)*
substrate (can bind) to <u>active site</u>/ can fit into each <u>active site</u>; 3

(b) (bacterial) active site/enzymes/proteins denatured / tertiary 3D structure disrupted/changed;
(ionic) bonds broken; (*reject peptide bonds) (ignore other bonds)*
no enzyme substrate complex formed / substrate no longer fits; 3

Total 6

Question 6

(a) (i) potato more negative water potential/hypertonic;
(*accept more concentrated*)
water enters by osmosis;
<u>cells</u> extend/are turgid; 2 max

(ii) little/no water remaining in potato/fully plasmolysed/all water has moved out;
cell wall prevents further shrinkage/sucrose solution moves in;

<u>or</u>, water potentials are equal/equilibrium/isotonic;
no <u>net</u> <u>movement</u> of water/no further osmosis; 2

(b) (i) faster rate (of decrease) in 0.8 mol dm^{-3} ; 1

(ii) bigger water potential gradient/greater difference in water potentials (between potato and surrounding solution); 1

(c) (i) water moved into the solution from the potato;
solution diluted/becomes less concentrated; 2

(ii) no net movement of water (in or out);
drops move up/less dense;

<u>or</u>, no net movement of water (in or out);
drop would not move/densities the same; 2

Total 10

Question 7

(a) endopeptidases;
break/hydrolyse bonds within the protein; *(reject if incorrect bond)*
named example (pepsin, trypsin, chymotrypsin) *or* location (stomach, pancreas, duodenum); (*if rennin, accept HCl*)
shorter/small chains/<u>smaller</u> polypeptides/peptides produced;
exopeptidases;
break/hydrolyse terminal bonds/ remove amino acids from ends of chains/ di/tripeptides formed;
intracellular/located on the membranes/in cytoplasm of epithelial cells/cells of the gut wall;
amino acids absorbed/end products/produced/released; 6 max

(b) very little fat in skimmed milk;
reduced/no bile secretion;
fat emulsification reduced/description;
(duodenum) remains acidic/not neutralised/no alkaline secretion;
<u>lipase</u> activity reduced/less efficient/less SA for lipase to work on; 4 max

Total 10

QWC (See guidance) 1