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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Education

Biology 5416

Specification B

BYB1 Core Principles

Mark Scheme

2008 examination - June series

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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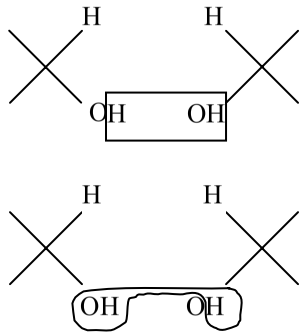
Registered address: AQA, Devas Street, Manchester M15 6EX *Dr Michael Cresswell Director General*

Question	Part	Sub Part	Marking Guidance	Mark	Comments
1	(a)	(i)	Box around OH and H of appropriate OH groups;	1	
1	(a)	(ii)	Condensation (reaction);	1	
1	(a)	(iii)	22;	1	
1	(b)		Heat with benedict's (solution); Red/orange/yellow/green colour (with maltose) / no change/remains blue (with sucrose);	1 1	If heated with acid withhold first marking point

Question	Part	Sub Part	Marking Guidance	Mark	Comments
2	(a)		A = capsule / slime/mucus (layer); B = flagellum;	1 1	
2	(b)		Ribosome;	1	
2	(c)		(Electrons have) shorter wavelength; Greater resolution / can distinguish between close objects;	1 1	Reference to magnification = neutral
2	(d)		Contains DNA; Ribosomes; Folded (inner) membrane / cristae / double membrane; Don't contain membrane-bound organelles/named example	1 1 1 1	2 max

<table>
<tr><th>Question</th><th>Part</th><th>Sub Part</th><th>Marking Guidance</th><th>Mark</th><th>Comments</th></tr>
<tr><td>3</td><td>(a)</td><td></td><td>
<table>
<tr><th>Enzyme</th><th>Site of production</th><th>Substrate</th><th>Product</th></tr>
<tr><td>Amylase</td><td>Salivary glands</td><td>Starch or Amylase</td><td>Maltose;</td></tr>
<tr><td>Endopeptidase</td><td>Stomach</td><td>Protein</td><td>Polypeptides or peptides;</td></tr>
<tr><td>Lipase</td><td>Pancreas</td><td>Lipid</td><td>Fatty acids and glycerol;</td></tr>
<tr><td>Maltase</td><td>Ileum</td><td>Maltose</td><td>Glucose;</td></tr>
</table>
</td><td>4</td><td>One mark for each correct row

Allow polypeptide as substrate with smaller polypeptides/peptides as product
Dipeptides = neutral
Reject = amino acids</td></tr>
<tr><td>3</td><td>(b)</td><td></td><td>Less fat in diet;

Bile emulsifies lipids / produces small droplets;

Increases surface area for (action of enzyme) <u>lipase</u>;</td><td>1

1

1</td><td>Reject no fat in diet</td></tr>
<tr><td>3</td><td>(c)</td><td></td><td>Protease / lipase digests (pancreatic tissue);</td><td>1</td><td>Reject amylase</td></tr>
</table>

Question	Part	Sub Part	Marking Guidance	Mark	Comments
4	(a)		Transport/diffusion/absorption of named substance/group of substances / transport in specified 'fluid'/structure / reactions occur in solution;	1	
4	(b)	(i)	Insulation effect / provides a habitat;	1	
4	(b)	(ii)	Cooling effect / helps maintain (body) temperature / retention of water (in warm conditions);	1	
4	(b)	(iii)	Requires large amount of heat/energy to increase in temperature/ requires loss of a large amount of heat/energy to reduce in temperature / reduces fluctuations in temperature; Maintains (optimum) temperature for enzymes / cellular /chemical processes / reactions;	1 1	

Question	Part	Sub Part	Marking Guidance	Mark	Comments
5	(a)		0.26 (mg dm^{-3} $minute^{-1}$);	1	
5	(b)	(i)	Low <u>kinetic</u> energy; Fewer collisions/enzyme substrate complexes;	1 1	
5	(b)	(ii)	Denaturation / alteration in tertiary/3D structure; Breaking of specifically named bonds; (not peptide bonds) Change in <u>active site</u>, substrate cannot bind;	1 1 1	3 max Disulphide bonds = neutral
5	(c)		Similar in structure/shape / similar (chemical) group; Attach to active site; <u>Competitive</u> inhibition; **OR** Differ in structure/shape; Attach away from active site; <u>Non-Competitive</u> inhibition;	1 1 1 1 1 1	3 max Reject same shape for competitive inhibitor Competes for active site = 2 marks Allow description of competing for active site

Question	Part	Sub Part	Marking Guidance	Mark	Comments
6	(a)		Contraction of intercostal muscles pulls ribs up and out/raises ribcage; Contraction of diaphragm muscles, flattens diaphragm; Increase in volume, decrease in pressure (of thorax air drawn inwards);	1 1 1	Reject internal intercostal muscles contract
6	(b)	(i)	500;	1	
6	(b)	(ii)	(135000 – 7500) x 100 divided by 7500; 1700;	1 1	Correct answer = 2 marks
6	(c)		Due to increase in percentage of water vapour (in expired air);	1	Reference to carbon dioxide = neutral

Question	Part	Sub Part	Marking Guidance	Mark	Comments
7	(a)		Large surface area to volume ratio / thin in centre / concave; Reference to diffusion;	1 1	
7	(b)	(i)	Same concentration / same water potential;	1	Allow answers based on no osmosis/diffusion
7	(b)	(ii)	Higher/less negative water potential of distilled water; Water moves into cells by diffusion / osmosis into cells; Cells burst;	1 1 1	Reject turgid for third marking point
7	(c)		Phospholipid bilayer; Allows movement of lipid soluble / non-polar molecules / water / gases / e.g. O_2 and CO_2 **OR** prevents movement of water soluble / (named) polar molecules; Carrier proteins; Channel proteins; Facilitated diffusion; (only awarded if linked to carrier/channel proteins) Active transport; (only awarded if linked to carrier protein) Reference to complementary/tertiary structure of protein; Saturated fatty acids decrease permeability/fluidity / converse for unsaturated fatty acids; Cholesterol decreases permeability/fluidity;	1 1 1 1 1 1 1 1 1	6 max Allow description of active transport which includes use of ATP/energy and movement against the concentration gradient

			Receptor protein linked to control of entry of named substance e.g. insulin and glucose;	1	
7	(c)	QWC		1	To be awarded on 7(c) only