



ASSESSMENT and  
QUALIFICATIONS  
ALLIANCE

# Mark scheme

# June 2003

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## GCE

## Biology B

### Unit BYB1

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**Question 1**

(a)	<b>A</b> protein;	1
	<b>B</b> fat /oil / lipid / triglyceride;	1
	<b>C</b> reducing sugar / named;	1
(b)	heat with acid, then neutralise / hydrolyse using enzyme; (heat) with Benedict's (solution);	2
(c)	carbon, hydrogen, oxygen (ALL); <i>symbols neutral</i>	1
	Total	6

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**Question 2**

(a)	(draw) start line / origin; use pipette / glass rod / tube / pin; several drops on same spot; allow to dry between each application;	3 max
(b)	tyrosine ( <i>reject if working spurious e.g. 80 - 35 = 45</i> ); evidence of 33-38 / 78 – 81;	2
	Total	5

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**Question 3**

(a)	<b>A</b> ribosome ( <i>RER neutral</i> );	1
	<b>B</b> vacuole;	1
	<b>C</b> <u>smooth</u> ER / SER;	1
(b)	(i) support / strength / shape / prevents osmotic lysis; ( <i>protection, permeability neutral</i> )	1
	(ii) photosynthesis / light energy → chemical energy; ( <i>makes food/sugar neutral</i> )	1
(c)	0.2 – 0.24 gains 2 marks; ELSE evidence of observed measurement (5 – 6 mm / 0.5 – 0.6 cm) ÷ 25 000 gains one mark;	2
	Total	7

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**Question 4**

- (a) intercostal muscle; (*internal/external neutral*) 1
- (b) (i) contracts;  
pulling ribs upwards / outwards; (*ribcage expands neutral*)  
(*accept answers in terms of antagonistic role of internal intercostals*);  
lung / chest / thorax volume increased, *or* lung / chest / thorax pressure  
decreased; 3 max
- (ii) maintain / greater diffusion / concentration gradient;  
continuous diffusion / faster diffusion; 2
- Total 6
- 

**Question 5**

- (a) (i) solution hypotonic / cell cytoplasm hypertonic / cell has more negative  $\Psi$  /  
cell has fewer water molecules;  
(*references to strengths of solutions neutral*)  
entry of water / osmosis (causes cells to swell);  
(*max 1 mark if no reference to hypotonic / hypertonic*) 2
- (ii) solution isotonic / cell and solution have same  $\Psi$  /  
same number of water molecules;  
no net entry / loss of water;  
(*max 1 mark for if no reference to isotonic*) 2
- (b) (so much water entered that) cells burst; 1
- Total 5
-

**Question 6**

- (a) COOH / HOOC (either side); *(if bonds shown, must be correct)*  
 NH<sub>2</sub> / H<sub>2</sub>N (either side); *(if bonds shown, must be correct)* 2
- (b) (i) increases up to 20 - 29 units of urea / rate 20 – 21  
 since urea concentration limiting rate / more urea – enzyme collisions ONCE;  
 then (high) constant / levels off;  
 since active sites all (continually) occupied; (*saturated neutral*)  
 other named factor limiting e.g. enzyme concentration;  
*(max 3 marks for part (i))*
- (ii) increases up to 45 - 50 units / rate 17 - 19;  
 since urea concentration limiting rate / more urea – enzyme collisions ONCE;  
 NBPT reduces rate of reaction;  
 reduction greater at low concentration of urea than at high concentration;  
 NBPT competitive inhibitor / competes for active site;  
 since complementary shape / similar shape to substrate (NOT same shape);  
 at high concentrations urea competes more successfully for active site /  
 more enzyme – urea collisions; 6 max
- Total 8
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**Question 7**

- (a) thin;  
 therefore short diffusion distance (between air and blood); (*reject moist*) 2
- (b) 29.4 - 29.5 gains 2 marks  
 ELSE evidence of  $3.14 \times 1.25^2 \times 100 \times 0.06$  gains one mark 2
- (c) increase surface area / SA/V ratio;  
 more / faster / greater uptake of oxygen / gaseous exchange; 2
- Total 6
-

**Question 8**

- (a) bile;  
emulsifies triglycerides/increases surface area; (*pH neutral*)  
lipase;  
hydrolyses / breaks down triglycerides; (*digests neutral*)  
into fatty acids + glycerol;  
each glycerol remains attached to 1 fatty acid; 4 max

- (b) (*allow general points provided correct molecule/particle involved*)

diffusion

movement along / down concentration gradient;  
monoglycerides / micelles/fatty acids move into epithelial cells;  
monoglycerides move from epithelium into blood;  
chylomicrons move into lacteals / lymph;

facilitated diffusion

movement along / down concentration gradient;  
reference to carrier / channel proteins;  
monosaccharides or named / amino acids move into epithelial cells;

active transport

movement against concentration gradient;  
energy / ATP required;  
reference to carrier proteins;  
monosaccharides or named / amino acids moved into epithelial cells;  
reference to co-diffusion e.g. glucose and NaCl;  
monosaccharides or named / amino acids move into blood;  
(*maximum 5 marks if any one or 4 if any two processes completely omitted*) 6 max

Total 10

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