ASSESSMENT and QUALIFICATIONS ALLIANCE

Mark scheme June 2003

GCE

Biology B

Unit BYB1

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Question 1

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

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 *(reject if working spurious e.g. 80 - 35 = 45)*; evidence of 33-38 / 78 – 81;		2
		Total	5

Question 3

(a)	**A** ribosome (*RER neutral*);			1
	B vacuole;			1
	C <u>smooth</u> ER / SER;			1
(b)	(i)	support / strength / shape / prevents osmotic lysis; *(protection, permeability neutral)*		1
	(ii)	photosynthesis / light energy → chemical energy; *(makes food/sugar neutral)*		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

Question 4

(a)		<u>intercostal</u> 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 <u>diffusion</u> / faster <u>diffusion</u>;	2
		Total	6

Question 5

(a)	(i)	solution hypotonic / cell cytoplasm hypertonic /cell has more negative Ψ / 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 Ψ / same number of water molecules; no <u>net</u> 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_2 / H_2N (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 – enyme 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

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

QWC (See gudance) 1