

## **NOVEMBER 2002**

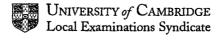
## **GCE Advanced Subsidiary Level**

## MARK SCHEME

**MAXIMUM MARK: 60** 

SYLLABUS/COMPONENT:9700/2

BIOLOGY (STRUCTURED QUESTIONS (AS))



Page 1	Mark Scheme	Syllabus	Paper
	AS Level Examinations – November 2002	9700	2

Question	Expected Answers	Marks
1 (a)	correct measurement of scale bar used as basis for finding magnification with appropriate working; A. 1.7 - 1.9 cm for length of scale bar	
	e.g. <u>xx mm x 1 000</u> 10	* .
	= X xxxx; A. any fig. between x 1700 - 1900	2
	N.B. award one mark if correct answer given without any working shown	
(b)	movement of air / oxygen into alveoli; concentration gradient (between alveolar air and blood) / AW (for either oxygen or carbon dioxide); oxygen dissolves in film of liquid / surfactant fluid; diffusion; oxygen and carbon dioxide exchanged (idea of); squamous / alveolar / pavement epithelium; } A. alveolar/capendothelium (of capillary); } wall once red blood cell; ref to short diffusion distance into capillary / one cell thick / 2-3 µm; R. thin wall	illary 4 max
(c)	B lymphocyte / B cell / plasma cell;	1
(d)	secretion of mucus by, goblet cells / glands; fluid leaks from capillaries; R. capillaries permeable contraction of (smooth) muscle / muscle spasm; congestion / blocking / narrowing / AW, of airways / bronchioles;	
	increased resistance to air flow / air flow restricted;	3 max
	[Tota	l: 10]

Page 2	Mark Scheme	Syllabus	Paper
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Question		Expected Answers	Marks
2 (a)	(i)	A glycerol; B fatty acid;	<b>2</b> 2
. (	(ii)	condensation / esterification / ester bond formation;	1 -
(b) (c)		more energy released / stored per gram / unit / given mass; R. per mole 37 kJ v 17 kJ; A. (37-40 kJ) v (15-17 kJ) A. equivalent calorific values if calculated fats are highly reduced; more hydrogens / fewer oxygens / higher carbon to hydrogen ratio / more CH bonds; release / yield more energy when respired / oxidised;  20% or more above the recommended weight / mass for height / BMI / Body Mass Index / mass kg greater than 30;	2 max
		/ BMI / Body Mass Index / mass kg greater than 30; (height in m) <sup>2</sup> A. within range (30-40)	1
(d)		diabetes; coronary heart disease / atherosclerosis / cardiovascular disease stroke / AW; hypertension / high blood pressure; cancer; arthritis / joint problems; hernia; varicose veins; gallstones;	e/
e e e		increased risk during surgical operations;	2 max

[Total: 8]

Page 3	Mark Scheme	Syllabus	Paper
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Questio	n i	Expected Answers	Marks
3 (a)	)	stomata (are open) for gas exchange / CO <sub>2</sub> / O <sub>2</sub> uptake / release	-
		(for photosynthesis and respiration);	
		large surface area / many cell surfaces;	
		in spongy mesophyll;	
		(so) evaporation from (damp) walls (into air spaces);	
		(and) diffusion / loss down a conc. gradient, of water vapour;	3 max
		to air / atmosphere via stomata;	э шах
(b	· · · · ·	ref cohesion / tension ( in context of xylem);	
(D	,	hydrogen bonds;	
		through (freely permeable) cell wall / apoplast pathway;	
		through partially permeable membrane / AW (in context of	
		cell B);	
		osmosis;	
		down water potential gradient / high / less negative to low /	
		more negative water potential / AW;	3 max
(c)	(i)	B to A and C;	
		A to C;	2
	(ii)	from cell surfaces through air through stomata;	1
(d)		small leaves / small surface area / reduction of leaf surfaces / needle shaped leaves; R. spines	
	,	rolled / curled leaves; R. folded	
		shed leaves;	
•		sunken stomata / stomata in pits / crypts / grooves;	
		stomata surrounded by hairs / hairy leaves;	
		waxy / impermeable / thick, <u>cuticle</u> / thick leaves qualified;	2 max
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[Total: 11]

Page 4	Mark Scheme	Syllabus	Paper
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Question		Expected Answers	Marks
4 (a)		active site;  specific shape / configuration / conformation (in ref to active site);  complementary to substrate / exact / perfect fit (between substrate and active site);  combine to form enzyme-substrate / ES complex;  mould around substrate / substrate alters shape of active site (induced fit); R. induced fit unqualified	
		ref to temporary bonds / named bond;	3 max
(b)	(i)	EcoR1;	,1
	(ii)	sticky ends;	1
(c)		plasmid DNA cut with <u>same</u> restriction enzyme / endonuclease; DNA and plasmid mixed together / AW; R. inserted ref <u>complementary</u> / <u>base pairing</u> / C and G on sticky ends pair up; ref to hydrogen bonding; ligase forms bonds between <u>sugar</u> and <u>phosphate</u> / phosphodiester bonds;	3 max
		[Tota	l: 8]

Page 5	Mark Scheme	Syllabus	Paper
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Question	Expected Answers	Marks
5 (a)	female, Anopheles, mosquito sucks blood from (infected) person; R. bites parasites / plasmodia / pathogens reproduce / multiply / form gametes (in mosquito);	
:	injects / inserts / pumps in / (saliva) with <u>parasites</u> / transmits / transfers <u>parasite</u> as feeds / in saliva (into uninfected person);	2 max
<b>(b)</b>	malarial parasite has nucleus / nuclear membrane / nuclear envelope; mitochondria;	•
	membranous organelles; R. ribosomes R. nucleolus	2 max
(c)	fewer red blood cells / number of r.b.cs. reduced; due to bursting / rupturing of r.b.c. / parasite destroys r.b.cs.; less haemoglobin; less oxygen transported / reduced ability to carry oxygen; waste excreted / toxins released (by parasite); symptom; A. one from - anaemia / fatigue / tiredness / muscu pain / headaches / nausea / fever / high temp. and sweating	
	inability to control temp. / shivering	3 max
	[Tot:	al: 7]
Question	Expected Answers	Marks
6 (a)	anaerobic; R. inaerobic, R. unaerobic lactate / lactic acid;	
	liver;	
	debt; R. deficit aerobic;	
	resting;	6

Total mark for paper = 50

[Total: 6]