

JUNE 2002

GCE Advanced Subsidiary Level

MARK SCHEME

MAXIMUM MARK : 60

SYLLABUS/COMPONENT : 9700 /2

**BIOLOGY
(STRUCTURED QUESTIONS (AS))**



UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

Page 1	Mark Scheme	Syllabus	Paper
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Question	Expected Answers	Marks
1 (a)	M between zygote and young seaweed / between young seaweed and adult;	1
(b)	each chromosome contains two <u>chromatids</u> ; (genetically) identical / exact replica; daughter cells receive a copy of, each chromosome / DNA molecule / same genetic material / AW;	2 max
(c)	each strand / polynucleotides, acts as a template / sense strand; for complementary, strand / polynucleotides / nucleotides / base pairing; new DNA contains half old, half new;	2 max
(d)	<u>reduction division</u> ; gametes / sex cells / eggs and sperms, have half the chromosome number / haploid / n; <u>zygote</u> is diploid / has full number of chromosomes / 2n; chromosome number remains the same / does not increase with each generation;	3 max

{Total : 8}

Page 2	Mark Scheme	Syllabus	Paper
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Question	Expected Answers	Marks
2 (a)	all hydrogen peroxide broken down / no substrate left / substrate limiting;	1
(b)	Line below that at 20°C may reach same plateau or heading towards it;	1
(c)	no reaction / very little oxygen / gas collected / no oxygen / gas collected; <i>(1 mark)</i>	
	<i>max 2 for explanation</i>	
	catalase / enzyme, denatured; loss of tertiary structure / conformation / folding / shape / active site changes; breakage of bonds; named bonds (hydrogen, ionic); substrate no longer fits active site / no enzyme substrate complex formed;	3 max
(d)	repeat using different concentrations of hydrogen peroxide / substrate; ref to (suitable) range / details of concentrations; fresh solution of catalase / enzyme each time; same concentration of catalase / enzyme; same temperature / same pH; repeat readings / replicates; calculate <u>initial</u> rate; method (e.g. volume in 15 seconds / gradient);	4 max

[Total : 9]

Page 3	Mark Scheme	Syllabus	Paper
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Question	Expected Answers	Marks
3 (a) (i)	phospholipid;	1
(ii)	glycerol; 2 fatty acid(s) / hydrocarbon(s) (tails / chains); phosphate;	3
(iii)	<u>phospholipids</u> are, fluid / liquid / move about / diffuse within own monolayer; <u>proteins</u> (are separate pieces) 'floating' / moving about in liquid / AW; ref to pattern / arrangement of proteins;	2 max
(b)	variable region / AW; different / particular, sequences of amino acids / primary structure; different, (3D) shapes / conformation / folding / tertiary structure; ref to R groups / side chains; complementary to / matches shape of antigen(s);	3 max

[Total : 9]

Page 4	Mark Scheme	Syllabus	Paper
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Question	Expected Answers	Marks
4 (a)	ventricle contracts / ventricular systole; blood forced through semi-lunar valve; into aorta; atrio-ventricular / bicuspid / mitral valve closed;	2 max
(b)	ref to unidirectional valves / valves prevent backflow; blood pressure greater on one side of valve than the other; atrial systole / contraction forces open atrio-ventricular / bicuspid / mitral valve; ventricular systole / contraction closes atrio-ventricular / bicuspid / mitral valve; semi-lunar valve opens (in context of ventricular systole); semi-lunar valve closes (after ventricular systole); ref to role of tendons; ref to role of papillary muscles;	3 max
(c)	(pressure falls to zero because) all blood expelled from ventricle / ventricle completely empties / AW; (blood pressure falls to 10kPa) because elastic fibres qualified / elasticity of arteries / elastic recoil; ref to <u>smooth</u> muscles qualified; narrow diameter of capillaries / arterioles / <u>small</u> arteries; resistance to flow;	3 max
(d)	<u>nicotine</u> causes constriction of blood vessels; <u>nicotine</u> raises, blood pressure / heart rate; <u>nicotine</u> causes blood platelets to become 'sticky' forming blockage / 'clot'; <u>nicotine</u> / <u>carbon monoxide</u> , damages artery <u>lining</u> / endothelium; increased risk of atherosclerosis / thrombus; atherosclerosis described (e.g. ref to deposition of fatty material / atheroma / fatty plaque / cholesterol); <u>carbon monoxide</u> reduces oxygen transport / levels;	3 max

[Total : 11]

Page 5	Mark Scheme	Syllabus	Paper
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Question	Expected Answers	Marks
5 (a)	<p>decrease in response to drug / effects of drug become less intense;</p> <p>more drug taken to achieve same effect;</p> <p>increased rate of metabolism of drug;</p> <p>decrease in sensitivity of receptors / more receptors made;</p> <p>body cannot function without drug / drug becomes part of metabolism;</p> <p>ref <u>withdrawal</u> symptoms / abstinence syndrome;</p>	3 max
(b)	<p>fatty liver / fat accumulates;</p> <p>hepatitis, inflammation (of liver);</p> <p>cells die;</p> <p>fibrous tissue / collagen (accumulates);</p> <p><u>nodules</u>, described (e.g. hard / no blood supply / disrupt arrangement of cells);</p> <p>cirrhosis;</p> <p>liver cancer;</p>	4 max
		[Total: 7]

Question	Expected Answers	Marks
6 (a) (i)	<p>A nitrogen fixation;</p> <p>B nitrification;</p> <p>C denitrification;</p>	3
(ii)	<p>legumes / green manure / compost / organic matter / humus / manure / AW ploughed into soil;</p> <p>decay / decomposition to release ammonium / (ions)</p> <p>ammonification / form nitrates;</p> <p>grow legumes for nitrogen fixation;</p> <p>crop rotation / intercropping / alley cropping;</p> <p>improve aeration / drainage (in context of favouring nitrification / reducing denitrification);</p>	3 max
		[Total: 6]

Total mark for paper = 50