CAMBRIDGE
INTERNATIONAL EXAMINATIONS

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

Question	Expected Answers	Marks
1 (a)	**M** between zygote and young seaweed / between young seaweed and adult;	1
(b)	each chromosome contains two chromatids; (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)	reduction division; gametes / sex cells / eggs and sperms, have half the chromosome number / haploid / n; zygote is diploid / has full number of chromosomes / 2n; chromosome number remains the same / does not increase with each generation;	3 max

[Total : 8]

Question	Expected Answers	Marks
2 (a)	all hydrogen peroxide broken down / no substrate left / substrate limiting;	1
(b)	Line below that at 20^0C may reach same plateau or heading towards it;	1
(c)	no reaction / very little oxygen / gas collected / no oxygen / gas collected; *(1 mark)* *max 2 for explanation* 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]

Question		Expected Answers	Marks
3 (a)	(i)	phospholipid;	1
	(ii)	glycerol; 2 fatty acid(s) / hydrocarbon(s) (tails / chains); phosphate;	3
	(iii)	phospholipids are, fluid / liquid / move about / diffuse within own monolayer; proteins (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]

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 smooth muscles qualified; narrow diameter of capillaries / arterioles / small arteries; resistance to flow;	**3 max**
(d)	nicotine causes constriction of blood vessels; nicotine raises, blood pressure / heart rate; nicotine causes blood platelets to become 'sticky' forming blockage / 'clot'; nicotine / carbon monoxide, damages artery lining / endothelium; increased risk of atherosclerosis / thrombus; atherosclerosis described (e.g. ref to deposition of fatty material / atheroma / fatty plaque / cholesterol); carbon monoxide reduces oxygen transport / levels;	**3 max**

[Total : 11]

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

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

Total mark for paper = 50