

Mark Scheme January 2009

GCE

GCE Biology (8BI01)

GENERAL INFORMATION

The following symbols are used in the mark schemes for all questions:

Symbol	Meaning of symbol
; semi colon	Indicates the end of a marking point
eq	Indicates that credit should be given for other correct alternatives to a word or statement, as discussed in the Standardisation meeting
/ oblique	Words or phrases separated by an oblique are alternatives to each other
{ } curly brackets	Indicate the beginning and end of a list of alternatives (separated by obliques) where necessary to avoid confusion
() round brackets	Words inside round brackets are to aid understanding of the marking point but are not required to award the point
[] square brackets	Words inside square brackets are instructions or guidance for examiners
[CE] or [TE]	Consecutive error / transferred error

Crossed out work

If a candidate has crossed out an answer and written new text, the crossed out work can be ignored. If the candidate has crossed out work but written no new text, the crossed out work for that question or part question should be marked, as far as it is possible to do so.

Spelling and clarity

In general, an error made in an early part of a question is penalised when it occurs but not subsequently. The candidate is penalised once only and can gain credit in later parts of the question by correct reasoning from the earlier incorrect answer.

No marks are awarded specifically for quality of language in the written papers, except for the essays in the synoptic paper. Use of English is however taken into account as follows:

- the spelling of technical terms must be sufficiently correct for the answer to be unambiguous
e.g. for amylase, 'ammalase' is acceptable whereas 'amylose' is not
e.g. for glycogen, 'glicojen' is acceptable whereas 'glucagen' is not
e.g. for ileum, 'illeum' is acceptable whereas 'ilium' is not
e.g. for mitosis, 'mytosis' is acceptable whereas 'meitosis' is not
- candidates must make their meaning clear to the examiner to gain the mark.
- a correct statement that is contradicted by an incorrect statement in the same part of an answer gains no mark - irrelevant material should be ignored

Unit 1 6BI01

Question Number	Answer	Mark
1	<ol style="list-style-type: none">1. platelets / thrombocytes ;2. prothrombin ;3. enzyme ;4. fibrinogen ;5. fibrin ;6. cells / erythrocytes / platelets / thrombocytes ;	(6)

Question Number	Answer	Mark
2(a)	1. translation ; 2. transcription ; 3. translation ; 4. translation ; 5. transcription ;	(5)

Question Number	Answer	Mark
2(b)(i)	glutamine ;	(1)

Question Number	Answer	Mark
2(b)(ii)	cysteine glutamine cysteine arginine proline proline ;	(1)

Question Number	Answer	Mark
2(b)(iii)	ATC ;	(1)

Question Number	Answer	Mark
2(b)(iv)	U G U G A A U G U C G G C C A C C C ;	(1)

Question Number	Answer	Mark
2(b)(v)	The polypeptide chain would be no more than 89 amino acids long ;	(1)

Question Number	Answer	Mark
3(a)(i)	1. two glucose molecules correctly drawn ; 2. indication that water is formed ; 3. glycosidic bond correctly drawn ;	(3)

Question Number	Answer	Mark
3(a)(ii)	glycosidic (bond) ;	(1)

Question Number	Answer	Mark
3(b)	1. reference to amylose and amylopectin ; 2. credit details of amylose e.g. straight chain, spiraled, 1-4 links ; 3. credit details of {amylopectin / starch} e.g. branched, (1-4 and) 1-6 links ; 4. idea that it is easily hydrolysed ; 5. idea of compact structure ; 6. (leading to) more glucose in a smaller space (in a cell) ; 7. idea of being {insoluble / large} ; 8. (leading to) it {not diffusing out of cells / having {little / no} osmotic effect} / eq ; NB maximum of 3 marks for structural points (pts 1, 2, 3, 5 and 7)	max (4)

Question Number	Answer	Mark
4(a)	<ol style="list-style-type: none"> 1. {fatty acids / tails} are {hydrophobic / non-polar} ; 2. so orientate themselves away from {water / polar environment} /eq ; 3. {phosphate / heads} are {hydrophilic / polar} ; 4. so can interact with {water / polar environment} / eq ; 5. reference to {cytoplasm / tissue fluid / eq} as the polar environment ; 	max (3)

Question Number	Answer	Mark
4(b)(i)	<p>Any two from:</p> <p>temperature, surface area / volume (of beetroot), part, age, variety, storage, source, volume of ethanol, same {wavelength / filter} ;;</p>	max (2)

Question Number	Answer	Mark
4(b)(ii)	<ol style="list-style-type: none"> 1. {cells / membranes / eq} damaged (by cutting up of pieces) / eq ; 2. (as a result pigment) could leak out of {vacuoles / cells} ; 	(2)

Question Number	Answer	Mark
4(b)(iii)	rinse pieces (thoroughly) /dab pieces dry / eq ;	(1)

Question Number	Answer	Mark
4(c)(i)	increased ethanol concentrations, increases intensity / eq ;	(1)

Question Number	Answer	Mark
4(c)(ii)	<ol style="list-style-type: none">1. reference to {disruption / eq} of membrane ;2. ethanol is a (non-polar / organic) <u>solvent</u> ;3. idea that {lipids / eq} dissolve (in alcohol) ;4. idea that increase in ethanol causes solution to be less polar ;5. idea that orientation of phospholipids depends on water around it ;	max (2)

Question Number	Answer	Mark
5(a)	<ol style="list-style-type: none"> 1. thick wall drawn ; 2. {two / three / four} layers indicated ; <p>Max two from the following correctly labelled:</p> <ol style="list-style-type: none"> 3. lumen ; 4. {endothelium / epithelium / endothelial layer / epithelial layer / tunica intima} ; 5. { (smooth) muscle / elastic fibres / elastin / tunica media } ; 6. {connective tissue / tunica adventitia} ; 	max (3)

Question Number	Answer	Mark
5(b)	<ol style="list-style-type: none"> 1. idea of {wide wall / eq} (to withstand) blood under high pressure ; 2. reference to narrow lumen to maintain high pressure ; 3. reference to presence of {elastic fibres / eq} to allow vessel to stretch ; 4. recoil {maintains pressure / squeezes blood} ; 5. reference to (smooth) muscle contracts to {squeeze / eq} blood along} ; 6. idea that {smooth lining / eq} reduces friction ; 7. {folded lining / eq} to allow artery to stretch / eq ; 	max (2)

Question Number	Answer	Mark
5(c)	<ol style="list-style-type: none">1. (walls of) veins more than one layer of cells and capillaries one layer /eq ;2. (walls of) veins contain {connective tissue /(smooth) muscle / collagen / elastic tissue}, capillaries do not / eq ;3. veins have valves in them and capillaries do not / eq ;4. veins do not have pores but capillaries do /eq ;5. veins have wide lumen, capillaries have narrow lumen /eq ;	max (2)

Question Number	Answer	Mark
6(a)(i)	<ol style="list-style-type: none"> 1. A has a {greater / eq} effect than B / eq ; 2. A lowers total cholesterol more than B / eq ; 3. A lowers LDL more than B / eq ; 4. A raises HDL more than B / eq ; 5. manipulation of figures to quantify mp 2 or 3 or 4 ; 	max (3)

Question Number	Answer	Mark
6(a)(ii)	<ol style="list-style-type: none"> 1. drug A ; 2. the {total cholesterol / LDL} levels are lower ; 3. statins inhibit cholesterol synthesis ; 4. statins result in more LDL receptors on liver cells ; 5. so more LDL will be {cleared /eq} from the blood /eq ; 	max (3)

Question Number	Answer	Mark
6(b)	<p>Any two from:</p> <p>gastrointestinal {problems / cancer} e.g. constipation, bowel complaints, {joint / muscle} problems e.g. cramps, myositis, pain, myopathy, muscle breakdown, liver problems, kidney problems, mental health problems e.g. depression, reduced vitamin uptake, respiratory cancer ; ;</p>	max (2)

Question Number	Answer	Mark
6(c)(i)	<ol style="list-style-type: none"> 1. reference to the (general) increase in heart disease with age ; 2. more 18-44 year old females develop heart disease than males / eq ; 3. in all other age groups more males have heart disease than females / eq ; 4. greatest difference between females and males in the group 65 - 74 ; 5. credit manipulation of figures ; 	max (3)

Question Number	Answer	Mark
6(c)(ii)	<ol style="list-style-type: none"> 1. {420 / 425} - {30 / 35} / 390 / 385 / 395 ; 2. 11 - 13 ; 	(2)

Question Number	Answer	Mark
7(a)	<ol style="list-style-type: none"> 1. overall increase in number of deaths / eq ; 2. 1920 - 1924: no change / eq ; 3. {slight / eq} increase between 1924 and {1936 / 1937} ; 4. {sharp / eq} increase between {1936 / 1937} and {1955 / 1960 / 1969} ; 5. drop after 1969 / eq ; 6. correct manipulation of figures to quantify any of mps ; 	max (3)

Question Number	Answer	Mark
7(b)(i)	when one variable changes there is also a change in an accompanying variable / eq ;	(1)

Question Number	Answer	Mark
7(b)(ii)	<ol style="list-style-type: none"> 1. {the shape of the two graphs is similar / eq} / change in number of deaths from lung cancer similar to change in number of cigarettes smoked / eq ; 2. idea that the changes in number of deaths is approximately the same number of years after the changes in cigarette smoking ; 	(2)

Question Number	Answer	Mark
7(b)(iii)	<p>Any two from:</p> <p>number of people in survey, where the survey was carried out, information about their occupation, their family medical history, age, did they smoke, information on lifestyle ;;</p>	max (2)

Question Number	Answer	Mark
7(c)	<ol style="list-style-type: none"> 1. credit a reference to reduced <u>diffusion</u> (of gases) ; 2. this results in {less / slower} exchange of {gases / oxygen / carbon dioxide} / eq ; 3. reference to decrease in surface area of {alveoli / gas exchange surface} ; 4. (destruction of capillaries results in) less surface area of capillaries / eq ; 5. (also) less blood flow / eq ; 6. less oxygen carried by blood / eq ; 7. suitable reference to effect on concentration gradient ; 	max (4)

Question Number	Answer	Mark
8(a)(i)	<ol style="list-style-type: none"> (central) C shown with H atom and three other groups attached ; {COOH / COO⁻} and {NH₂ / NH₃⁺} shown ; phenylalanine's R group drawn, attached to a C atom ; 	(3)

Question Number	Answer	Mark
8(a)(ii)	<ol style="list-style-type: none"> reference to formation of enzyme - substrate complex / eq ; idea that the {phenylalanine / R group / substrate} {binds / fits} with active site (of enzyme) ; reference to {bonds being broken / bonds made / induced fit / lowers activation energy / eq} ; adding the OH group (to the phenylalanine R group) / eq ; idea that {tyrosine / product} released from (enzyme / active site) ; as {tyrosine / R group / product} no longer binds to active site / eq ; 	max (4)

Question Number	Answer	Mark
8(b)(i)	<ol style="list-style-type: none"> drop in blood levels of phenylalanine in first {7 / 21} days / eq ; idea that it {levels out / stays low / fluctuates a little / eq} (for the rest of the time period) ; 	(2)

Question Number	Answer	Mark
8(b)(ii)	<ol style="list-style-type: none"> 1. reference to use of normal {alleles / gene} ; 2. coding for {phenylalanine hydroxylase / enzyme} ; 3. reference to introduction of {allele / DNA / gene} into (target) cells ; 4. into {DNA / chromosome / nucleus} ; 5. reference to use of vector (to introduce gene into cells) ; 6. named vector e.g. virus, liposomes ; 7. credit reference to mode of delivery of vector e.g. nebuliser, spray , injection ; 	max (3)

Question Number	Answer	Mark
8(b)(iii)	water / saline / virus (only) / (empty) liposomes / vector (only) / use of placebo / eq ;	(1)