edexcel
advancing learning, changing lives

Mark Scheme January 2009

GCE

GCE Biology (8BI01)

Edexcel Limited. Registered in England and Wales No. 4496750
Registered Office: One90 High Holborn, London WC1V 7BH

A PEARSON COMPANY

Unit 1 6BI01

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

Question Number	Answer	Mark
4(b)(ii)	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)	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)	1. thick wall drawn ; 2. {two / three / four} layers indicated ; **Max two from the following correctly labelled:** 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)	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)	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)	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)	1. drug A ; 2. the {<u>total</u> 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)	Any **two** from: 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 ;;	**max (2)**

Question Number	Answer	Mark
6(c)(i)	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)	1. {420 / 425} – {30 / 35} / 390 / 385 / 395 ; 2. 11 – 13 ;	**(2)**

Question Number	Answer	Mark
7(a)	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)	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)	Any **two** from: 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 ;;	**max (2)**

Question Number	Answer	Mark
7(c)	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)	1. (central) C shown with H atom and three other groups attached ; 2. {COOH / COO^-} and {NH_2 / NH_3^+} shown ; 3. phenylalanine's R group drawn, attached to a C atom ;	**(3)**

Question Number	Answer	Mark
8(a)(ii)	1. reference to formation of enzyme – substrate complex / eq ; 2. idea that the {phenylalanine / R group / substrate} {binds / fits} with active site (of enzyme) ; 3. reference to {bonds being broken / bonds made / induced fit / lowers activation energy / eq} ; 4. adding the OH group (to the phenylalanine R group) / eq ; 5. idea that {tyrosine / product} released from (enzyme / active site) ; 6. as {tyrosine / R group / product} no longer binds to active site / eq ;	**max (4)**

Question Number	Answer	Mark
8(b)(i)	1. drop in blood levels of phenylalanine in first {7 / 21} days / eq ; 2. 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)	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)**