



EXAM PAPERS PRACTICE

Lifestyle, Health and Risk Part -1

Name: _____

Class: _____

Date: _____

Time:

Total Marks Available:

Total Marks Archived:

Level: Edexcel A level Biology

Subject: Biology

Exam Board: Pearson Edexcel Level 3 GCE AS and A level Biology A (Salters-Nuffield) and also Pearsons Edexcel AS and A Level Biology B (9BI0) - Is however suitable for use by AS and A level Biology Students of other Boards

Topic: Lifestyle, Health and Risk Part -1

Type: Mark Scheme

To be used by all students preparing for Edexcel AS and A level Biology A and Biology B - Students of other Boards may also find this useful



Mark Scheme

Q1.

Question Number	Answer	Additional guidance	Mark
	<p>An answer that makes reference to the following:</p> <ul style="list-style-type: none">percentage incidence (of VTE) higher in {older people /people older than 70 } (1)in younger people larger percentage (of VTE patients) have the factor V mutation (1)(therefore) genotype has a greater influence on incidence (of VTE) in younger people (1)(therefore) greater incidence (of VTE) in older people probably a result of environmental factors (1)	<p>ALLOW converse – incidence of VTE lower in {younger people/ people under 20}</p> <p>ALLOW converse - lower percentage of older people have the factor V mutation</p> <p>ALLOW converse – genotype has less influence on incidence of VTE in older people</p>	<p>(4)</p>



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Q2.

Question Number	Answer	Additional Guidance	Mark
(i)	<p>A description that makes reference to two of the following:</p> <ul style="list-style-type: none">carrier protein (in cell surface membrane)(glucose moves from) high to low concentrationglucose binds to (carrier) protein / (carrier) protein changes shape to move glucose (across the membrane) (1)	<p>IGNORE channel protein</p> <p>ALLOW 'down a concentration gradient'</p>	(2)

Question Number	Answer	Additional Guidance	Mark
(ii)	<p>An explanation that makes reference to three of the following:</p> <ul style="list-style-type: none">polymer of glucoseto provide glucose for respiration{branched / contains 1,6-glycosidic bonds / has many terminal ends} for rapid hydrolysiscompact to allow large amount (of glucose / energy) to be stored in a small space / insoluble therefore no osmotic effect on cells	<p>ALLOW polysaccharide / made of many glucose monomers DO NOT ALLOW β- glucose</p> <p>IGNORE 'easy to hydrolyse' ALLOW break down instead of hydrolyse</p>	(3)



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Q3.

Question Number	Answer	Additional Guidance	Mark
(i)	<p>A description that makes reference to the following:</p> <ul style="list-style-type: none">• (LDL / lipoproteins carry) cholesterol in the blood• (cholesterol) is deposited to form atheroma (1)• in the endothelium of an artery	<p>ALLOW LDLs increase blood cholesterol</p> <p>ALLOW plaque formation</p> <p>ALLOW artery wall</p>	(3)

Question Number	Answer	Additional Guidance	Mark
(ii)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none">• narrowing of (lumen of) coronary arteries• which reduces {blood flow / oxygen} to the cardiac muscle• which reduces aerobic respiration	<p>ALLOW coronary arteries blocked</p> <p>ALLOW heart muscle</p> <p>ALLOW more anaerobic respiration / build- up of lactic acid</p>	(3)



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Q4.

Question Number	Answer	Additional guidance	Mark
(i)	<p>A description that makes reference to the following:</p> <ul style="list-style-type: none">• thrombin is an enzyme (1)• (which catalyses) the conversion of fibrinogen into fibrin (1)• a mesh of fibrin traps { platelets / red blood cells } to form a clot (1)	IGNORE 'platelet plug'	(3)

Question Number	Answer	Additional guidance	Mark
(ii)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none">• (mutation in the gene) changes the sequence of the amino acids (in the factor V molecule) (1)• (overactive factor V will) increase the production of thrombin (1)• increases blood clotting (1)	<p>ALLOW the mutation results in a change to the {primary structure/ polypeptide chain}</p> <p>ALLOW increased risk of blood clotting</p>	(3)



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Q5.

Question Number	Answer	Additional Guidance	Mark
	<p>An answer that makes reference to three of the following:</p> <ul style="list-style-type: none">• the water has an uneven distribution of charge (making it a dipole) (1)• so water forms hydrogen bonds with other water molecules (1)• (and) it requires a lot of { heat / thermal } energy to break these bonds (1)• and allow water to evaporate (taking the heat energy with it) / high latent heat of evaporation (1)	<p>ALLOW description of dipole</p> <p>ALLOW – a lot of heat energy is required to evaporate water</p>	<p>(3)</p>

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Q6.

Question number	Answer	Additional guidance	Mark
(i)	<p>A description that makes reference to the following:</p> <ul style="list-style-type: none">condensation (1)involving OH groups (on both molecules) / water is formed (1)		(2)

Question number	Answer	Additional guidance	Mark
(ii)	<p>An answer that makes reference to the following:</p> <ul style="list-style-type: none">both are formed from two molecules of (α)glucose / both contain a glycosidic bond (1)maltose has (α-)1,4 linkage and trehalose has (α-)1,1 linkage / in trehalose one of the glucose monomers is inverted (1)	<p>ALLOW both are disaccharides of glucose DO NOT ALLOW β - glucose</p>	(2)



Q7.

Question Number	Answer	Additional Guidance	Mark
(i)	<ul style="list-style-type: none"> correct values taken from the graph (1) correct answer with correct units (1) 	<p><u>Example of calculation</u> $0.12 \div 2 =$ $= 0.06 \mu\text{mol dm}^{-3} \text{ min}^{-1}$ $= 0.06 \mu\text{mol per dm}^3 \text{ per minute}$ or $= 0.001 \mu\text{mol dm}^{-3} \text{ s}^{-1}$ $= 0.001 \mu\text{mol per dm}^3 \text{ per second}$</p> <p>Correct answer with no units gains one mark</p> <p>Correct answer with correct units but no working gains full marks</p>	2

Question Number	Answer	Additional Guidance	Mark
(ii)	<ul style="list-style-type: none"> curve that is less steep but reaches the same plateau (1) 	<p>e.g.</p>	1

Question Number	Answer	Additional Guidance	Mark
(iii)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none"> the slower the initial rate of reaction the longer it will take for a clot to form (1) because fibrin will be produced more slowly (1) 	Allow converse arguments	2



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Q8.

Question Number	Acceptable Answer	Additional guidance	Mark
(a)	Measurement in 5.5 cm / 55 mm correct (1) $55 \div 60 = 0.92$ mm (1)	need to measure on paper	(2)

Question Number	Acceptable Answer	Additional guidance	Mark
(b)(i)	An explanation that makes reference to the following: <ul style="list-style-type: none">• very high heart rate makes it difficult to count (1)• so greater chance of error (1)		(2)

Question Number	Acceptable Answer	Additional guidance	Mark
(b)(ii)	Calculation of mean = 55 (1) Answer = $55 \div 20.2 = 2.72$ (1)		(2)

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Question Number	Acceptable Answer	Additional guidance	Mark
(b)(iii)	<p>An explanation that makes reference to three of the following:</p> <ul style="list-style-type: none">• control of variables (1)• returning fleas to ambient temperature for specified time (1)• acclimatisation (1)• use smaller intervals (1)		(3)

Question Number	Acceptable Answer	Additional guidance	Mark
(c)	<p>An answer that makes reference to the following:</p> <ul style="list-style-type: none">• undeveloped nervous system so don't feel pain and there aren't ethical issues (1)• unethical to use any living organism in an experimental procedure (1)• relativism would state that it is acceptable under certain circumstances to use invertebrates (i.e. if there is potential benefit to human health) (1)• absolutism promotes use of invertebrates under any circumstance or under no circumstance (1)		(4)



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Q9.

Question Number	Answer	Additional Guidance	Mark
	An answer that makes reference to the following: <ul style="list-style-type: none">simpler nervous system / does not feel pain (1)	ALLOW – feels less pain	(1)

Q10.

Question Number	Acceptable Answer	Additional Guidance	Mark
(a)	pyruvate and { reduced coenzyme / reduced NAD }		(1)

Question Number	Acceptable Answer	Additional Guidance	Mark
(b)(i)	A description that makes reference to the following: <ul style="list-style-type: none">Final electron acceptor		(1)



Question Number	Acceptable Answer	Additional Guidance	Mark
(b)(ii)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none">• carbon monoxide binds to cytochrome oxidase (1)• prevents oxygen binding to the enzyme (1)• blocks the electron transport chain / prevents oxidation of reduced electron carriers (1)		(3)



Question Number	Acceptable Answer	Additional Guidance	Mark
(c)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none">• NO binds to cytochrome oxidase in endothelium (of blood vessels) (1)• diverts oxygen to smooth muscle cells (1)• contraction of muscle cells causes vasoconstriction in arterioles (1)		(3)



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Question Number	Acceptable Answer	Additional Guidance	Mark
(d)	<p>An answer that makes reference to three of the following:</p> <ul style="list-style-type: none">• free radicals interact with transcription factors (1)• activation of gene for P53 (1)• production of mRNA from activated gene (1)		

Question Number	Acceptable Answer	Additional Guidance	Mark
	<ul style="list-style-type: none">• translation of mRNA resulting in synthesis of P53 on ribosomes (1)		(3)



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Question Number	Acceptable Answer	Additional Guidance	Mark
(e)	<p>A description that makes reference to three of the following:</p> <ul style="list-style-type: none">• inner membrane { is folded / has a larger surface area / has cristae } (1)• outer membrane is impermeable to H⁺ ions (1)• only inner membrane contains { ETC (proteins) / ATP synthase / stalked particles } (1)• only inner membrane contains H⁺ pump (1)		(3)



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Question Number	Acceptable Answer	Additional Guidance	Mark
(f)	<p>An answer that makes reference to the following:</p> <ul style="list-style-type: none">• myocardial infarction causes cell death in the heart (1)• due to lack of oxygenated blood reaching cardiac muscle cells (1)• NIR affects cytochrome oxidase involved in aerobic respiration (1)• diversion of oxygen to cardiac muscle cells would reduce death of these cells (1)		(4)



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Question Number	Acceptable Answer	Additional Guidance	Mark
(g)(i)	<p>A description that makes reference to the following:</p> <ul style="list-style-type: none">• restriction endonuclease enzyme (1)• extraction of gene that codes for light-sensitive protein (1)• use of a suitable vector (1)• insertion of gene into the { genome / DNA } in the nucleus of the neurone (1)		(4)

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Question Number	Acceptable Answer	Additional Guidance	Mark
(g)(ii)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none">• { depolarisation / action potential } occurs (1)• (nerve) impulse reaches { synapse / presynaptic membrane } (1)• calcium ion channels open causing calcium ions to enter presynaptic neurone (1)• vesicles containing neurotransmitter fuses with presynaptic membrane (1)• neurotransmitter released (1)		(5)



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Question Number	Acceptable Answer	Additional Guidance	Mark
(h)	<p>An explanation that makes reference to three of the following:</p> <ul style="list-style-type: none">• fMRI detects changes in blood flow in the brain (1)• MRI signal reflects state of haemoglobin / magnetic fields repelled by oxygen rich blood / deoxygenated haemoglobin more magnetic than oxygenated haemoglobin (1)• allows areas of greater brain activity to be detected as an image created by magnetic resonance (1)• areas of the brain that are involved in an auditory memory task { were using more oxygen / had an increased flow of blood } (1)		(3)



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Q11.

Question Number	Answer	Additional Guidance	Mark
(i)	<p>An explanation that makes reference to following:</p> <ul style="list-style-type: none">the use of nandrolone reduces the (mean maximum percentage) recoil of the { aorta / artery } (1) <p>and two from:</p> <ul style="list-style-type: none">increased risk of damage to the endothelium of arteries (1)inflammatory response / white blood cells accumulate (1)build-up of { cholesterol / calcium salts / fibrous tissue } leads to formation of { atheroma / plaque } (1)		(3)
Question Number	Answer	Additional Guidance	Mark
(ii)	<p>An answer that makes reference to three of the following:</p> <ul style="list-style-type: none">nandrolone reduces the production of (both) proteins when exercise is allowed (1)these proteins are involved in { ATP production / oxidative phosphorylation } (1)nandrolone has no effect on ATP production if there is no exercise (1)nandrolone reduces ATP production if exercise takes place (1)	ALLOW nandrolone has no effect on the production of the proteins in absence of exercise	(3)



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Question Number	Answer	Additional Guidance	Mark
(iii)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none">without exercise the values for mRNA for Tfam overlap for groups with and without nandrolone (1)as when exercise is carried out and nandrolone taken, the values for mRNA for Tfam overlap with no exercise and no nandrolone (1)	<p>ALLOW overlap between groups P and Q</p> <p>ALLOW overlap between groups P and S</p>	(2)



Q12.

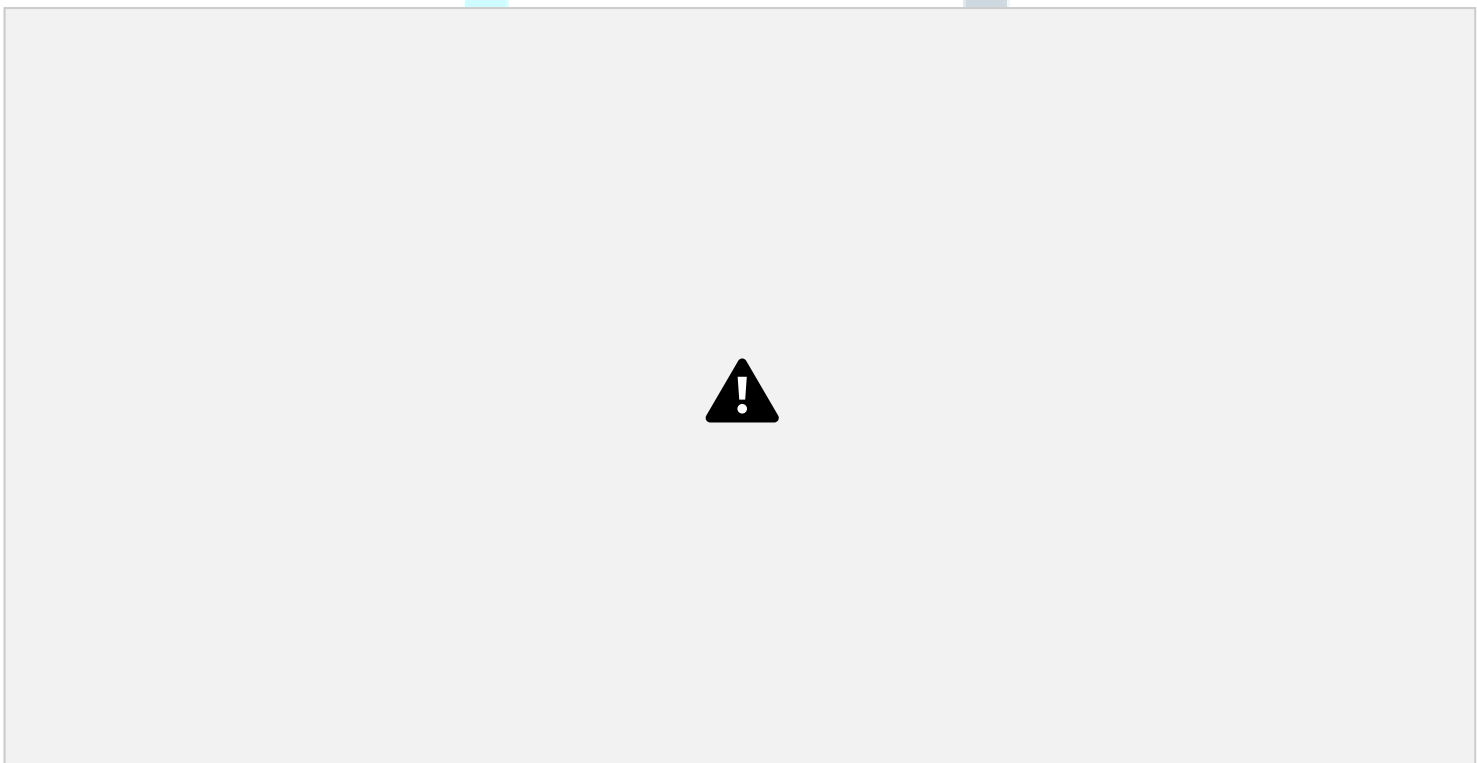
Question Number	Answer	Additional Guidance	Mark
	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none">{control / placebo} (1)to allow a comparison with {A and B / the other groups} (1)		(2)



Q13.

Question Number	Answer	Additional Guidance	Mark
	<p>An explanation that makes reference to two of the following:</p> <ul style="list-style-type: none">• lumen of capillaries blocked• preventing supply of {oxygen / glucose} (to tissues or cells)• therefore respiration stops (and tissues die) / anaerobic respiration causes build-up of lactic acid	<p>ALLOW build-up of carbon dioxide</p>	<p>(2)</p>

Q14.





Q15.

Question Number	Answer	Additional Guidance	Mark
	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none">• fibrin forms a mesh that collects {platelets / red blood cells}• (tranexamic acid) { prevents plasmin digesting fibrin / stops the breakdown of fibrin }• allowing clots to remain in place	ALLOW fibrin is involved in forming blood clots	(3)

Q16.

Question Number	Answer	Additional Guidance	Mark
(i)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none">• fibrinogen concentration is higher in individuals with CVD (1)• compare an individual's fibrinogen concentration with values in the table (1)• no overlap between fibrinogen concentrations for those with CVD compared with those without CVD (1)	<p>ALLOW females above 321 and males above 324 or females above 328 and males above 329 are identified as being at risk</p> <p>ALLOW values above mean without CVD + SD or mean with CVD -SD identified as at risk</p>	3



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Question Number	Acceptable answer	Additional Guidance	Mark
(ii)	An explanation that makes reference to the following: <ul style="list-style-type: none">• increased concentrations of fibrinogen leading to increased fibrin (1)• increase the risk of blood clotting / more frequent and extensive clotting (1)• blocking lumen of {arteries / capillaries} (1)		3

Q17.

Question Number	Acceptable Answer	Additional Guidance	Mark
(i)	An answer that makes reference to the following: <ul style="list-style-type: none">• water (1)• glycosidic bond drawn correctly (1)		(2)

Question Number	Acceptable Answer	Additional Guidance	Mark
(ii)	maltose		(1)



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Q18.

Question Number	Answer	Additional guidance	Mark
	<p>An answer the makes reference to four of the following:</p> <ul style="list-style-type: none">• both have same volume (1)• animal A has a larger surface area (1)• animal A has a larger surface area to volume ratio (1)• so sufficient (surface area in animal A) for diffusion (1)• distance to cells in centre of A is shorter than for B allowing {quicker/sufficient} diffusion / shorter diffusion distance (in A) (1)	<p>ALLOW both have a volume of 64 mm^3</p> <p>ALLOW converse ALLOW figures given (e.g. 168 mm^2 v 96 mm^2) or difference given as 72 mm^2</p> <p>ALLOW {168:64 / 2.6:1} compared to {96:64 / 1.5:1}</p> <p>ALLOW converse</p> <p>ALLOW converse</p>	<p>(4)</p>



Q19.

Question Number	Acceptable Answer	Additional Guidance	Mark
(a)(i)	<p>A description that makes reference to the following:</p> <ul style="list-style-type: none">• gene is a length of DNA that codes for a { polypeptide / protein } (1)• genome is a complete set of { DNA / introns and exons } (1)		(2)

Question Number	Acceptable Answer	Additional Guidance	Mark
(a)(ii)	ligase / integrase		(1)

Question Number	Acceptable Answer	Additional Guidance	Mark
(a)(iii)	plasmid / virus		(1)



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Question Number	Acceptable Answer	Additional Guidance	Mark
(a)(iv)	<p>A description that makes reference to the following:</p> <ul style="list-style-type: none">transcription of DNA to mRNA (1){ translation of mRNA / protein synthesis } on ribosomes (1)		(2)

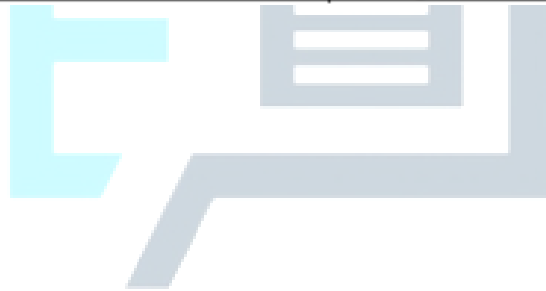
Question Number	Acceptable Answer	Additional Guidance	Mark
(b)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none">no prothrombin activated so thrombin not produced (1)thrombin needed to convert fibrinogen to fibrin (1)fibrin needed to trap { platelets / blood cells } to form the (blood) clot (1)		(3)



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Q20.

Question Number	Answer	Additional Guidance	Mark
	<ul style="list-style-type: none">two obesity-related conditions given (1)	<p>e.g. diabetes / wear and tear on joints / sleep apnoea / increased risk of cancer / {increased blood pressure /hypertension} / {CVD / CHD} / atherosclerosis / stroke / {heart attack / myocardial infarction }</p> <p>ALLOW one obesity-related condition and a relevant idea of a negative effect on the NHS</p>	(1)



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Q21.

Question Number	Acceptable Answer	Additional Guidance	Mark
(i)	An explanation that makes reference to the following: <ul style="list-style-type: none">• low blood glucose levels (1)• less glucose for respiration (1)• less { energy / ATP } in muscle tissue (1)		(3)

Question Number	Acceptable Answer	Additional Guidance	Mark
(ii)	An answer that makes reference to the following: <ul style="list-style-type: none">• range of enzyme concentration (1)• control of other named variables (1)• measurement of rate of glucose production (1)	e.g. temperature, pH, concentration of substrate	(3)



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Q22.

Question number	Answer	Mark
(i)	<p>The only correct answer is D – hydrolysis</p> <p><i>A is not correct because anabolism is associated with forming more complex molecules</i></p> <p><i>B is not correct because catalysis is a general term for enzyme controlled reactions</i></p> <p><i>C is not correct because glycolysis is a sequence of reactions in respiration</i></p>	(1)



Question number	Answer	Additional guidance	Mark
(ii)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none">• glucose used in respiration to provide { energy / ATP } (1)• glycogen is a polymer of glucose (1)• glycogen has lots of { branches / terminal ends } so it can release glucose rapidly (1)• breakdown of trehalose { makes two molecules of glucose available / provides a more immediate source of glucose } (1)	<p>ALLOW glycogen contains lots of glucose</p> <p>ALLOW quickly hydrolysed</p>	(4)



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Q23.

Question Number	Answer	Additional Guidance	Mark
(a)	<ol style="list-style-type: none">1. proteins consist of amino acids joined together by peptide bonds;2. credit reference to named bonds (between R groups) involved in holding {3D structure / eq} ;3. carbohydrates consist of {monsaccharides / glucose / eq} ;4. reference to glycosidic {bonds / eq} between (adjacent) {glucose / eq} molecules ;		(3)

Question Number	Answer	Additional Guidance	Mark
(b)	<ol style="list-style-type: none">1. idea that the drugs could {bind to / alter shape of} {glycoproteins / gp120} ;2. idea that drugs bind to {receptors / antigens} on membrane / eq ;3. called CD4 (antigen / molecules) ;4. preventing virus attaching to T (helper / CD4⁺) cells / eq ;		(3)



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Question Number	Answer	Additional Guidance	Mark
* (c)	<p>(QWC – spelling of technical terms must be correct and the answer must be organised in a logical sequence)</p> <ol style="list-style-type: none">1. reference to reverse transcriptase ;2. idea of formation of (viral) DNA ;3. from (viral) RNA ;4. reference to integrase ;5. idea of integration of (viral) DNA into (host) DNA ;6. idea that {T helper cells / eq} would be {destroyed / killed / burst / eq} (by virus particles leaving cell) ;7. idea that more T (helper) cells would become infected ;	<p>QWC focussing on clarity of expression</p> <p>2. reject idea that RNA is {turned into / converted into} DNA</p> <p>5. ACCEPT idea of {latency / formation of provirus / eq}</p>	(5)

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Q24.

Question number	Answer	Additional guidance	Mark
	<p>A description that makes reference to the following:</p> <ul style="list-style-type: none">• starch can be {broken down / hydrolysed} into glucose (1)• by hydrolysis of the glycosidic bonds (1)• glycogen is formed by condensation reaction forming glycosidic bonds (between glucose molecules) (1)		Expert (3)



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Q25.

Question Number	Answer	Additional Guidance	Mark
(i)	B (hydrolysis)		(1)

Question Number	Answer	Additional Guidance	Mark
(ii)	B (C - O - C)		(1)



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