

Mark Scheme

January 2010

Question			Expected Answers	Marks	Additional Guidance
1	(a)	(i)	collection / group, of cells (of one or more types) ;	2 max	IGNORE ref similar cells
			(cells), working together OR with, common / same, function ;		ACCEPT a group of cells with a function = 2 marks
			specialised (cells) ;		DO NOT CREDIT differentiated
1	(a)	(ii)	squamous / ciliated ;	1	ACCEPT endothelium / columnar DO NOT ACCEPT cilia, goblet cell, ciliated <i>cells</i>
1	(b)		(organ is) a collection of tissues / named tissues ;	2	Look for idea of more than one tissue ACCEPT two or more correctly named tissues from: epithelium, elastic, glandular, smooth muscle, blood, nervous, cartilage, connective
			(working together) to enable gas exchange / AW ;		DO NOT ACCEPT perform a function unqualified – we want to know <i>what</i> function (can be named or described) DO NOT ACCEPT respiration IGNORE breathing

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1	(c)	(i)	<i>(release of energy)</i> mitochondria ;	1	
		(ii)	<i>(movement of cilia)</i> cytoskeleton ;	1	ACCEPT mitochondria if not used in (i)
		(iii)	<i>(secretion of mucus)</i> Golgi (vesicle) ;	1	ACCEPT cytoskeleton if not used in (ii) ACCEPT Golgi body / apparatus DO NOT ACCEPT Golgi vessel

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2	(a)	partially / selectively ; (facilitated) diffusion OR osmosis ; plasma ; phospholipids ; cholesterol ;	5	DO NOT ACCEPT semi ACCEPT differentially ACCEPT plasma cell

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2	(b)	<p>1 (acting as) antigens ;</p> <p>2 identification / recognition, (of cells) as, self / non-self / AW ;</p> <p>3 cell signalling / described ;</p> <p>4 receptor / binding site, for, hormone / (chemical) signal / (medicinal / named) drugs ;</p> <p>5 ref. to receptor / binding site / trigger, on transport proteins / AW ;</p> <p>6 cell adhesion / to hold cells together (in a tissue) ;</p> <p>7 attach to water molecules (to stabilise membrane / cell) ;</p> <p style="text-align: center;">4 max for description</p>		<p>Look for <u>description</u> not list of functions</p> <p><i>Do not credit repetition of same point</i></p> <p>ACCEPT foreign for non-self</p> <p>ACCEPT description e.g. communication <i>between</i> cells / cell responds to, chemical / signal, <i>from another cell</i></p> <p>ACCEPT description of <i>attachment process</i> for receptor / binding site</p> <p>DO NOT ACCEPT molecule unqualified</p> <p>ACCEPT binding site for foreign antigen</p> <p>ACCEPT ref to receptors on ion channels</p> <p>ACCEPT bind to other cells for cell adhesion</p>
		<p>QWC:</p> <p>three technical terms used and spelt correctly ;</p>	5 max	<p>Any three from:</p> <p>receptor, antigen, hormone, <u>cell</u> signal(ling), adhesion, recognition, <u>facilitated</u> diffusion, <u>active</u> transport</p>

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3	(a)	timer OR scale / ruler ;	1	
3	(b)			<i>Mark the first three suggestions irrespective of numbered points</i> <i>IGNORE reasons – just mark steps in the process</i>
		shoot is healthy ;		ACCEPT shoot not wilted
		assemble apparatus / cut shoot, under water ;		
		cut last 2-3 cm off cut end / cut at an angle ;		ACCEPT cut end off shoot
		check there are no air bubbles in apparatus ;		ACCEPT make sure cut end of shoot is in contact with water once apparatus assembled
		apparatus, water tight / air tight / has no leaks ;		ACCEPT screw clip tight DO NOT ACCEPT use Vaseline unqualified
		leaves dry ;		
			3 max	DO NOT CREDIT allow time for acclimatisation, equilibration

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3	(c)	(i)	<u>25.3</u> ;	1	IGNORE any units
3	(c)	(ii)	to make results (more) <u>reliable</u> ;	2	<p>DO NOT ACCEPT accurate and reliable (use of both terms) anywhere in the answer</p> <p>Look for idea of spotting the anomaly e.g. spot, notice, recognise, show, detect.</p> <p>DO NOT CREDIT prevents / take out / remove / accounts for, anomalies</p> <p>DO NOT CREDIT 'ensure there is no anomaly' unless qualified</p> <p>ACCEPT outliers for anomalies</p> <p>ACCEPT to identify other factors / (uncontrolled) variables that may be having an effect</p>
			to help identify anomalies ;		
3	(c)	(iii)	<p><i>in afternoon:</i></p> <p>plant dying / less healthy / wilting ;</p> <p>ref to stomatal closure ;</p> <p>more humid / <u>higher</u> water (vapour) potential in air ;</p> <p>less air movement / wind / draughts ;</p>	2 max	<p><i>Mark first response in each numbered section (1-2). If not all sections are used, return to the first section and mark further suggestions</i></p> <p>Assume answer is for different conditions in the afternoon</p> <p>ACCEPT ORA if stated 'in morning...'</p> <p>IGNORE ref to light / dark</p> <p>Look for comparative statements – <u>higher</u>, <u>greater</u> etc</p> <p>DO NOT CREDIT more moisture in air</p>

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Question			Expected Answers	Mark	Additional Guidance
3	(c)	(iv)	(potometer) measures (water) uptake ;	2 max	
			not all water (taken up) is lost ;		<p>ACCEPT ref to figs e.g. 99% water <i>taken up</i> is lost</p> <p>ACCEPT the assumption that water loss is equal to water uptake is incorrect</p>
			some water used (in photosynthesis / making cells turgid) ;		

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4	(a)	(i)	L ; M ; J ;	3	If 2 nd letter given, no mark
4	(a)	(ii)	<p>1 peptide bond ;</p> <p>2 between, amine / J group (of one amino acid) and carboxyl / L group (of another) ;</p> <p>3 H (from amine group) combines with OH (from carboxyl group) ;</p> <p>4 condensation reaction OR water, lost / eliminated / produced / created / AW ;</p> <p>5 covalent ;</p>	3 max	<p>CREDIT answers from clearly drawn diagrams with bonds labelled</p> <p>1 ACCEPT peptide link</p>
4	(b)		<p>1 some R groups, attract / repel ;</p> <p>2 <u>disulfide</u>, bridges / bond ;</p> <p>3 between, cysteine / SH / S (atoms) ;</p> <p>4 hydrogen / H, bonds ;</p> <p>5 ionic bonds between, oppositely charged / + and -, R groups ;</p> <p>6 hydrophilic R groups, on outside of molecule / in contact with water (molecules) ;</p> <p>7 hydrophobic R groups, on inside of molecule / shielded from water (molecules) ;</p>	4 max	4 DO NOT CREDIT in context of secondary structure

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4 (c) (i)	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 15%;"></th> <th style="width: 35%;">glycogen</th> <th style="width: 35%;">collagen</th> <th style="width: 15%;"></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>carbohydrate / polysaccharide</td> <td>protein / polypeptide</td> <td>;</td> </tr> <tr> <td>2</td> <td>(alpha) glucose (units)</td> <td>amino acid (units)</td> <td>;</td> </tr> <tr> <td>3</td> <td>identical units</td> <td>different amino acid units</td> <td>;</td> </tr> <tr> <td>4</td> <td>glycosidic, bonds / links</td> <td>peptide, bonds / links</td> <td>;</td> </tr> <tr> <td>5</td> <td>branched</td> <td>unbranched / linear</td> <td>;</td> </tr> <tr> <td>6</td> <td>non-helical</td> <td>helical</td> <td>;</td> </tr> <tr> <td>7</td> <td>one chain (per molecule)</td> <td>three chains (per molecule)</td> <td>;</td> </tr> <tr> <td>8</td> <td>no cross links</td> <td>cross links (between chains)</td> <td>;</td> </tr> <tr> <td>9</td> <td>contains C H O</td> <td>contains C H O N</td> <td>;</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		glycogen	collagen		1	carbohydrate / polysaccharide	protein / polypeptide	;	2	(alpha) glucose (units)	amino acid (units)	;	3	identical units	different amino acid units	;	4	glycosidic, bonds / links	peptide, bonds / links	;	5	branched	unbranched / linear	;	6	non-helical	helical	;	7	one chain (per molecule)	three chains (per molecule)	;	8	no cross links	cross links (between chains)	;	9	contains C H O	contains C H O N	;					3 max	<p>AWARD 1 mark per correct row Comparative statements must be made in a row</p> <p>2 DO NOT CREDIT beta</p> <p>5 ALLOW straight</p> <p>7 DO NOT CREDIT strands</p> <p>9 IGNORE S (for collagen)</p>
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4 (c) (ii)	<p>(high tensile) strength / strong ; does not stretch / is not elastic ; insoluble ; flexible ;</p>	2 max	<p>Mark the 1st answer on each numbered line IGNORE fibrous / tough</p>																																												

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5	(a)	(i)	<p><u>deoxyribose</u> (sugar) ; phosphate (group) ;</p> <p>(nitrogenous / purine or pyrimidine) base / one correctly named base ;</p>	3	<p>DO NOT CREDIT dioxyribose DO NOT CREDIT phosphate head or phosphate backbone</p> <p>DO NOT CREDIT letter instead of named base DO NOT CREDIT uracil DO NOT CREDIT incorrect spelling of thymine with 'a'</p>
5	(a)	(ii)	<p>has ribose ; uracil / U, instead of, thymine / T ; single stranded ; 3 forms / AW ;</p>	2 max	<p>assume answer refers to RNA unless otherwise stated</p> <p>DO NOT CREDIT incorrect spelling of thymine with 'a'</p>

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Question		Expected Answers		Marks	Additional Guidance
5	(b)	1	untwist / unwind ;	6 max	1 DO NOT CREDIT unravel
		S 2	unzip / described ;		2 DO NOT CREDIT strands separating without qualification
S 3	H bond breaks ;				
4	both strands act as template ;				
N 5	(aligning of) free (DNA) <u>nucleotides</u> ;	5 DO NOT CREDIT bases			
N 6	<u>complementary</u> , base / nucleotide, pairing ;	6 & 7 Do not consider for QWC if mark awarded in the context of breaking apart or DNA structure only, rather than forming new double helix			
N 7	C to G and T to A / purine to pyrimidine ;				
R 8	hydrogen bonds reform ;				
R 9	sugar-phosphate back bone forms ;				
R 10	(using) covalent / phosphodiester, bond ;				
11	<u>semi-conservative</u> replication ;				
12	DNA polymerase ;	12 CREDIT at any stage in the process			
13	AVP ;	13 e.g. ligase / helicase / gyrase used in correct context C – G 3 H bonds / T – A 2 H bonds activation of free nucleotides (with 2 phosphates) synthesis in the 5' to 3' direction Okazaki fragments on lagging strand			
		QWC - correct sequence – 1 S mark, then 1 N mark, then 1 R mark ;	1	It should be clear that candidate realises that the sequence is S, then N then R – even if not written in that order DO NOT CREDIT if any ref to transcription / translation	

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Question			Expected Answers	Marks	Additional Guidance
5	(c)	(i)	polypeptide / protein / primary structure / a sequence of amino acids ;	1	DO NOT CREDIT 'codes for an amino acid' IGNORE enzyme / named protein
5	(c)	(ii)	different, sequence of amino acids / primary structure / AW ; different protein / protein folds up differently / different tertiary structure ; (product) no longer functions / different function ;	2 max	DO NOT CREDIT 'product' or incorrect biochemical (e.g. carbohydrate) ACCEPT suitable example, e.g. active site of enzyme no longer complimentary to substrate