

Question Number	Answer	Additional Guidance	Mark
1(a)	<ol style="list-style-type: none"> 1. cellulose (molecule) is a { polymer / chain / eq } of β-glucose / eq ; 2. cellulose molecules held together { by hydrogen bonds / as microfibrils } ; 3. idea of arrangement of microfibrils in { parallel / net / mesh / criss cross / eq } ; 4. reference to { matrix / hemicelluloses /pectin / eq } ; 	<ol style="list-style-type: none"> 1. CCEPT many β-glucose 4. IGNORE lignin 	(3)

Question Number	Answer	Additional Guidance	Mark
1(b)(i)	<ol style="list-style-type: none"> 1. { group of / many / several / eq } cells ; 2. idea that the cells in a tissue { work together / eq } for a common function ; 		(2)

Question Number	Answer	Additional Guidance	Mark
1(b)(ii)	<ol style="list-style-type: none"> idea that lignin holds the { fibres / microfibrils } together ; lignin keeps { fibres / microfibrils } parallel / eq ; 		(2)

Question Number	Answer	Additional Guidance	Mark
1(c)(i)	<ol style="list-style-type: none"> { hollow / no cytoplasm / eq } ; idea that vessels { have no end walls / are open at the ends } ; vessels { have pits / are strong so that they do not collapse } ; lignin makes the walls waterproof / eq ; 	<ol style="list-style-type: none"> IGNORE dead, tube ACCEPT has a lumen ACCEPT strong to keep tube open 	(2)

Question Number	Answer	Additional Guidance	Mark
1(c)(ii)	<ol style="list-style-type: none"> nitrate for production of { amino acids / protein / DNA / nucleic acids / bases / eq } ; calcium for { pectate / pectin / middle lamella } ; magnesium for chlorophyll ; 	<ol style="list-style-type: none"> ACCEPT chlorophyll, enzymes 	(3)

Question Number	Answer	Additional guidance	Mark
2(a)	<ol style="list-style-type: none"> 1. presence of { membrane bound / named membrane bound } organelle in eukaryotic cells / eq ; 2. presence of { plasmids / slime capsule / pili / eq} in prokaryotic cells ; 3. size of ribosomes i.e. larger in eukaryotic cells / 70S in prokaryotes and 80S in eukaryotes / eq ; 4. DNA in a nucleus in eukaryotic cells /eq ; 5. { DNA / chromosome } linear in eukaryotic cells and circular in prokaryotic cells / eq ; 6. relevant comment regarding cell walls e.g. cell walls always present in prokaryotic cells, only in some eukaryotic cells; 	<p>ACCEPT converse where appropriate</p> <ol style="list-style-type: none"> 1. ACCEPT reference to a named organelle such as mitochondria or nucleus present in eukaryotic cells and NOT in prokaryotic cells 2. ACCEPT reference to mesosomes 6. cell walls in prokaryotic cells contain{ peptidoglycan / murein} and in eukaryotic cells they contain {cellulose /chitin } 	(3)

Question Number	Answer	Additional guidance	Mark
2(b)	1. idea of molecular { differences / similarities } ; 2. in { DNA / RNA } ; 3. in proteins / proteomics ; 4. idea of (evolutionary) relationships between organisms ;	2. ACCEPT base sequences 3. ACCEPT amino acid sequences 4. ACCEPT idea of closely related species	(3)

Question Number	Answer	Additional guidance	Mark
2(c)(i)	1. idea of cell membrane being different ; 2. idea of different number of protein molecules ;	1. ACCEPT description of difference e.g. ether bonds, branched hydrocarbons 2. ACCEPT NOT same number, they have 10 protein molecules	(2)

Question Number	Answer	Additional guidance	Mark
2(c)(ii)	1. number of protein molecules is closer to Eukaryota than to Bacteria / eq ; 2. no peptidoglycan in cell wall ;		(2)

Question Number	Answer	Additional guidance	Mark
3(a)(i)	<ol style="list-style-type: none"> 1. eukaryote cells have { membrane bound organelles / examples of membrane bound organelle } and prokaryotes do not ; 2. DNA within a nucleus in Eukaryota but not in Bacteria / linear chromosomes in Eukaryota circular in Bacteria ; 3. larger ribosomes in Eukaryota / 80S ribosomes in Eukaryota and 70S in Bacteria / eq ; 4. Bacteria contain { plasmids / pili / peptidoglycan cell wall /eq } and Eukaryota do not ; 	<ol style="list-style-type: none"> 1. e.g. nucleus 4. CCEPT mesosomes 	(2)

Question Number	Answer	Mark
3(a)(ii)	ribosomes ;	(1)

Question Number	Answer	Mark
3(b)(i)	rough endoplasmic reticulum / rER / RER ;	(1)

Question Number	Answer	Mark
3(b)(ii)	A – Golgi apparatus ;	(1)

Question Number	Answer	Additional guidance	Mark
3(b)(iii)	<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"> reference to involvement of <i>ribosomes</i> on the { rER / rough endoplasmic reticulum } ; <i>amino acids</i> {being joined by <i>peptide</i> bonds / forming <i>polypeptide</i> chains / forming <i>primary</i> structure of protein } ; <p>OR</p> <p>{folded into 3-D shape / <i>secondary</i> or <i>tertiary</i> structure} in rER ;</p> <ol style="list-style-type: none"> packaged into <i>vesicles</i> at the end of the rER / <i>vesicles</i> {move to / transported to / fuse with / eq} the <i>Golgi apparatus</i> ; idea that { <i>protein/ enzyme</i> } <i>modified</i> in <i>Golgi apparatus</i> ; (<i>modified protein / enzyme / eq</i>) packaged into (<i>secretory</i>) <i>vesicles</i> (by <i>Golgi apparatus</i>) / eq ; <i>exocytosis</i> by <i>secretory vesicles</i> / <i>fusion</i> of <i>vesicles</i> with cell (surface) <i>membrane</i> / eq ; 	<p>*QWC - Emphasis is spelling</p> <p>ACCEPT X, Y, Z where appropriate.</p>	(4)

Question Number	Answer	Additional guidance	Mark
3(c)	<ol style="list-style-type: none"> different shape molecule requires different enzymes / reference to active site having to have different shape ; cellulose is made of β glucose and starch is made of α glucose / eq ; 1,6 glycosidic bonds only in starch ; starch made of amylose and amylopectin ; cellulose is linear / starch is {branched / helical / eq} / eq ; 		(4)

Question Number	Answer	Additional Comments	Mark
4(a)	C ;		(1)

Question Number	Answer	Additional Comments	Mark
4(b)	D ;		(1)

Question Number	Answer	Additional Comments	Mark
4(c)	A ;		(1)

Question Number	Answer	Additional Comments	Mark
4(d)	D ;		(1)

Question Number	Answer	Additional Comments	Mark
4(e)	C ;		(1)

Question Number	Answer	Additional Comments	Mark
4(f)	D ;		(1)

Question Number	Answer	Additional Comments	Mark
4(g)	D ;		(1)

Question Number	Answer	Additional Comments	Mark
4(h)	C ;		(1)