Question Number	Answer	Additional Guidance	Mark
1(a)	sclerenchyma – B ; xylem - D ;	**Allow** lower case b and d	**(2)**

Question Number	Answer	Additional Guidance	Mark
1(b)			**(4)**

Statement	True	False
Both tissues have a structural function	☒	
Both tissues have a transport function		☒
End plates are missing in xylem vessels	☒	
Xylem vessels have tapered ends		☒

Question Number	Answer	Additional Guidance	Mark
1*(c)	**(QWC – Spelling of technical terms must be correct and the answer must be organised in a logical sequence)** 1. idea of *cellulose* (molecules) { in bundles / as *microfibrils* / held together by *hydrogen* bonds } ; 2. layers of *microfibrils* (in the primary cell wall) / mesh of *microfibrils* (in secondary cell wall) ; 3. reference to presence of *lignin* in the cell wall ; 4. distribution of *lignin* described ; 5. presence of (bordered) pits ; 6. resence of { *pectin* / *hemicellulose* } in the cell wall ;	**QWC emphasis is on correct spelling of biological terms** (Note – only penalise once for an incorrect spelling) 2. ACCE net or criss-cross arrangement instead of mesh 3. ACCE *lignified* or *lignification* 4. e.g. r gs / spirals / annular / helical 5. IG RE pores and plasmodesmata 6. IG RE middle lamella	**(4)**

Question Number	Answer	Additional Guidance	Mark
2(a)	1. membrane bound sacs / cisternae } ; 2. i a of { sacs/ cisternae } { in stacks / of different sizes / eq } ; 3. (ciste ae) curved / flattened ; 4. mooth membranes / no ribosomes ;		(3)

Question Number	Answer	Additional Guidance	Mark
2(b)	1. (Golgi apparatus) { modifies / processes } protein ; 2. details of modification e.g addition of carbohydrate chains, trimming of carbohydrate / reference to glycoprotein ; 3. (Golgi apparatus) packages proteins in (secretory) vesicles ; 4. for (export from cells by) exocytosis / eq ; 5. reference to lysosomes ;	2. ACCE glycoside 3. ACCE idea of protein being pinched off in a vesicle	(4)

Question Number	Answer	Additional Guidance	Mark
3(a)	1. idea that cellulose is a {polymer / polysaccharide} of β glucose ; 2. reference to 1-4 glycosidic {bonds / eq} ; 3. idea that every other glucose is inverted ; 4. idea of cellulose molecules arranged {parallel /as microfibrils} ; 5. joined by hydrogen bonds / eq ;	**1 ACCEPT** made of β glucose monomers **3 ACCEPT** 180° angle between each glucose	**(4)**

Question Number	Answer	Additional Guidance	Mark
3(b)	1. idea of {lack of / very slow} decomposition ; 2. due to lack of {microorganisms / bacteria / fungi / named decomposer} (involved in decomposition) / eq ; 3. as a result there are fewer enzymes / eq ; 4. low pH {reduces enzyme activity / kills microorganisms /eq} ; 5. low oxygen affects respiration (of microorganisms) / eq ; 6. idea that bacteria cannot produce enzymes to breakdown sporopollenin ;	**1 ACCEPT** breakdown, decay **2 ACCEPT** cannot survive **4 ACCEPT** acidic	**(4)**

Question Number	Answer	Additional Guidance	Mark
3(c)	1. reference to double fertilisation ; 2. idea that one (haploid) male {gamete / nucleus } fuses with (haploid) {egg cell / egg nucleus / female gamete / female nucleus} ; 3. to produce a {diploid / 2n} {zygote / embryo} ; 4. idea that one (haploid) male {gamete / nucleus} fuses with { polar nuclei / diploid endosperm nucleus / fusion nucleus} ; 5. to produce a {triploid / 3n} endosperm (nucleus) ;	**2 ACCEPT** sperm nucleus **NOT** generative nucleus **IGNORE** ovum / egg unqualified **4 NOT** generative nucleus / polar bodies	**(4)**

Question Number	Answer	Additional Guidance	Mark
4(a)	<table><tr><th>Organelles</th><th>Prokaryotic cell</th><th>Eukaryotic cell</th></tr><tr><td>centrioles</td><td>x</td><td>✓</td></tr><tr><td>flagella</td><td>✓</td><td>✓</td></tr><tr><td>Golgi apparatus</td><td>x</td><td>✓</td></tr><tr><td>ribosomes</td><td>✓</td><td>✓</td></tr></table> 1 mark for any two correctly completed boxes ;	Blanks are incorrect Composite tick and cross are incorrect unless clearly replaced	**(4)**

Question Number	Answer	Mark
4(b) (i)	D mitochondria, rough endoplasmic reticulum and smooth endoplasmic reticulum;	**(1)**

Question Number	Answer	Mark
4(b) (ii)	B plasmodesmata ;	**(1)**

Question Number	Answer	Mark
4(b) (iii)	D a cell wall and ribosomes ;	**(1)**

Question Number	Answer	Mark
4(b) (iv)	B molecular phylogeny ;	**(1)**

Question Number	Answer	Mark
4(b) (v)	B Archaea and Bacteria ;	**(1)**

Question Number	Answer	Additional Guidance	Mark
5(a)	**(QWC - Take into account quality of written communication when awarding the following points)** 1. Idea that in the rER insulin is folded e.g. forms {3-D shape, secondary / tertiary structure } ; 2. idea of insulin being packaged into (transport) vesicles by the rER ; 3. vesicles { move to / fuse with / eq } the Golgi apparatus / vesicles (fuse to) form the Golgi apparatus ; 4. idea of insulin being changed in Golgi apparatus ; 5. idea of insulin being transferred in (secretory) vesicles from the Golgi apparatus to the cell (surface) membrane ; 6. vesicles (containing insulin) fuse with cell (surface) membrane / exocytosis ;	**QWC emphasis on logical sequence** ACCEPT Golgi and protein instead of insulin 4.IGNORE folded, processed ACCEPT modified, described change e.g. add / remove sugars, glycosides, carbohydrate	**(4)**

Question Number	Answer	Mark
5(b)(i)	C unspecialised cells that can differentiate to give rise to almost any type of cell in the body, excluding totipotent cells ;	**(1)**

Question Number	Answer	Additional Guidance	Mark
5(b)(ii)	1. idea of stimulus e.g. chemical ; 2. idea that some genes are { active / switched on / expressed } ; 3. idea of { transcription / mRNA produced } at active genes ; 4. mRNA is {translated / used} to produce protein ; 5. idea that this protein modifies cell OR idea that this protein determines { cell structure / function } ;	2. IGNORE genes being 'turned on'	**(4)**