Question			Expected Answers	Marks	Additional Guidance
1	(a)		transport / synthesis / metabolism, of, fats / lipids / steroid (hormones) / carbohydrates **;** contain (hydrolysing) enzymes **OR** break down / digest, (named) organelles / cells / (named) pathogens **;** protein synthesis **;**	3	**Mark the first answer in each box.** If the answer is correct and a further answer is given that is incorrect or contradicts the correct answer then **= 0 marks** **CREDIT** 'processes' 'packages' **ACCEPT** 'processes toxins' **DO NOT CREDIT** 'are, hydrolysing / digestive enzymes' 'produce enzymes' **IGNORE** ref to 'harmful substances' 'waste materials' 'phagocytosis' 'secretes enzymes' **CREDIT** ref to translation
	(b)		✓ **;** ✓ **;** ✓ **;**	3	If four ticks given reduce mark by 1 If five ticks given reduce mark by 2 If six ticks given reduce mark by 3 For each mark reduction annotate with 'CON'
			Total	**6**	

Question			Answer	Mark	Guidance
2	(a)	(i)	cellulose / cell, wall ; chloroplast(s) ; starch grain(s) / amyloplast(s) ; large / permanent, vacuole ; tonoplast ; plasmodesma(ta) ;	2 max	**Mark the first answer on each prompt line.** If the answer is correct and a further answer is given that is incorrect or contradicts the correct answer then **= 0 marks** **DO NOT CREDIT** wall unqualified, **DO NOT CREDIT** if incorrect compound e.g peptidoglycan / chitin **IGNORE** plastid **IGNORE** vacuole alone – must be qualified as large or permanent
		(ii)	centriole **/** glycogen granule ;	1	**Mark the first answer.** If the answer is correct and a further answer is given that is incorrect or contradicts the correct answer then **= 0 marks** **ACCEPT** lysosomes, cilia, flagella
		(iii)	1 (whole) cell, support / stability / scaffolding / maintain shape ; 2 movement of, cilia / flagella / undulipodia OR use of cilia / flagellum / undulipodium to move cell ; 3 changing shape of cell / cytokinesis / pseudopodia / phagocytosis / endocytosis / exocytosis / muscle contraction ; 4 (named) organelles, moved / held in place ; 5 movement of, chromosomes / chromatids / (m)RNA ;	3 max	**IGNORE** 'movement of, cell / membrane' unqualified **IGNORE** strength / structure / rigid **IGNORE** make up cilia / flagella **ACCEPT** descriptions **ACCEPT** movement of vesicle **IGNORE** movement of substances / materials **ACCEPT** formation of spindle / centrioles

Question			Answer	Mark	Guidance
	(b)			4 max	Max 4 marks for content Look for name of organelle and its function / role **ACCEPT** enzyme / protease for protein **MAX 3** if answer refers to insulin or incorrect protein
			1 nucleus **,** contains gene (for protein) / site of **transcription** / produces mRNA **;**		**ACCEPT** DNA / genetic material / genetic information for 'gene' **IGNORE** 'mRNA leaves nucleus'
			2 **ribosomes** / **rough endoplasmic reticulum** / RER**,** site of, protein synthesis **/ translation ;**		**ACCEPT** description of assembling a *chain* of amino acids
			3 **vesicles** for transport (of protein) **;**		mp3 can be awarded either for transport between ER and Golgi or between Golgi and Plasma membrane
			4 **Golgi** (apparatus / body), processes / modifies / (re)packages, proteins **;**		E.G. tertiary folding / quaternary structure / carbohydrate added / converted to glycoprotein / placed in vesicles **IGNORE** ref to RER
			5 (vesicles) fuse to, **cell surface** / **plasma, membrane ;**		**IGNORE** binds / attach / joins **IGNORE** exocytosis **IGNORE** ref to vesicles leaving cell **ACCEPT** merges with / becomes part of
			QWC **;**	1	Any **two** technical terms from the list below used appropriately and spelled correctly : **ribosomes** **rough endoplasmic reticulum (NOT** RER for QWC**)** **transcription (and derivatives)** **translation (and derivatives)** **golgi** **vesicles** **plasma membrane / cell surface membrane**
			Total	**11**	

Question			answer	Marks	Guidance
3	(a)	(i)	**A** nucleus **;** **B** chloroplast **;**	**2**	**Mark the first answer on each prompt line.** If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = **0 marks** **DO NOT CREDIT** nuclear envelope / nucleolus **IGNORE** chlorophyll
		(ii)	**C** *mitochondrion* (aerobic) respiration / producing ATP / release energy **;** **D** *SER / smooth endoplasmic reticulum* transport / production / processing, of, fats / lipids / steroids / carbohydrates **;**	**2**	**Mark the first answer on each prompt line.** If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = **0 marks** **DO NOT CREDIT** Function of organelle if organelle identified / named incorrectly (as this would be an incorrect biological statement. **DO NOT CREDIT** makes / produces, energy **ACCEPT** produces ATP for respiration **IGNORE** ref to transport / modification of proteins **DO NOT CREDIT** ref production of proteins
	(b)		C / mitochondrion / cristae, too small ; resolution (of light microscope), not high (enough) OR *idea of* only, 0.2µm / 200nm **;** wavelength of light too long **;**	**max 2**	*idea of* too small / not big enough important **IGNORE** very small **ACCEPT** resolution low **IGNORE** ref to magnification for resolution accept any value in range 0.05 - 0.2 µm **IGNORE** ref to electron microscope

	(c)		makes visible / easier to see / see more detail **;** (staining) provides / increases, <u>contrast</u> **;** identify / recognise, cell types / organelles / parts of cell **;** identify / recognise, different (named), compounds / molecules **;**	**max 2**	**ACCEPT** distinguish, cells / organelles, (from background) **IGNORE** ref to clarity **IGNORE** substances
			Total	**8**	

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>4</td><td>(a)</td><td></td><td>
<table>
<tr><th></th><th colspan="3">cell type</th></tr>
<tr><th>feature</th><th>plant cell</th><th>animal cell</th><th>bacterial cell</th></tr>
<tr><td>mitochondria</td><td>✓</td><td>✓</td><td>×</td></tr>
<tr><td>chloroplasts</td><td>✓</td><td>×</td><td>×</td></tr>
<tr><td>cellulose cell wall</td><td>✓</td><td>×</td><td>×</td></tr>
<tr><td>centrioles</td><td>×</td><td>✓</td><td>×</td></tr>
<tr><td>ribosomes</td><td>✓</td><td>✓</td><td>✓</td></tr>
</table>
</td><td>4</td><td>Allow one mark for each correct row.
DO NOT CREDIT ‘hybrid’ ticks or crosses

NB each row must have 3 correctly completed boxes</td></tr>
<tr><td></td><td>(b)</td><td>(i)</td><td>1 ;
4 ;
2 ;
2 ;</td><td>4</td><td>Mark the first answer on each prompt line. If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = 0 marks</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>ribosome(s) ;</td><td>1</td><td>IGNORE ‘tube number’</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>9</td><td></td></tr>
</table>

Question			Answer	Marks	Guidance
5	(a)	(i)	**C** (secretory / Golgi) vesicle **;** **D** plasma membrane **or** cell <u>surface</u> membrane **;** **E** ribosome **;**	3	**Mark the first answer on each prompt line.** If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = **0 marks** **DO NOT CREDIT** lysosome **ACCEPT** cell plasma membrane **IGNORE** rough endoplasmic reticulum
		(ii)	enzyme / (peptide) hormone / glycoprotein **;**	1	**Mark the first answer.** If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = **0 marks** **ACCEPT** named example e.g. insulin, mucus, cytokine, antibodies, collagen **IGNORE** haemoglobin, histamine, steroid hormones e.g. testosterone
		(iii)	transport vesicles to, plasma / cell surface, membrane **;** fusing vesicle to membrane / <u>exo</u>cytosis **;**	1 max	**Mark the first answer.** If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = **0 marks** **CREDIT** greater detail of cytoskeleton activity e.g. role of protein motors / changing length of microtubules - 'transport' alone not enough **IGNORE** ref to membrane unqualified **ACCEPT** binding / merging **IGNORE** bonding
		(iv)	**1** receives proteins from the, (R)ER / ribosomes **;** **2** modify / process, proteins **or** make glycoproteins / add named molecule(s) / described **;** **3** (re)package / AW**,** into vesicles **;** **4** make lysosomes **;** **5** replenishes, plasma / cell surface, membrane **;** **6** lipid synthesis **;**	2 max	**IGNORE** SER eg add carbohydrate groups / sugars or fold protein modifies and packages proteins into vesicles = 2 marks **ACCEPT** make glycolipids

Question			Answer	Marks	Guidance
	(b)	(i)	nucleus **or** nuclear, envelope / pore / membrane **;** mitochondrion / mitochondria **;** (rough / smooth) endoplasmic reticulum / ER OR ribosomes attached to membrane **;** Golgi (body / apparatus) **;** (secretory) vesicle(s) **;**	2 max	**Mark the first two answers only.** **IGNORE** membrane bound organelles, lysosomes, free ribosomes, ref to ribosome size
		(ii)	(free / circular / naked) DNA / genetic material / nucleoid **;** <u>plasmid</u> **;** 18nm / 70S / smaller, ribosomes **;**		**Mark the first answer.** If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = **0 marks** **IGNORE** 'chromosomes', 'chromatin' **IGNORE** mesosome (as this is an infolding of plasma membrane and not <u>in</u> the cytoplasm)
			Total	**10**	

Question			Answer	Marks	Guidance
6	(a)	(i)			**CREDIT** mps 1-3 in context of either blood cell or plant cell Comparative statement must be made.
			1 cell (cytoplasm) has a lower **water potential** than (distilled) water / ORA **;**		**1 ACCEPT** Ψ **ACCEPT** more negative water potential
			2 water moves (into cells) **,** down water potential **gradient** / from high Ψ to low Ψ **;**		**2 IGNORE** 'along' or 'across' **IGNORE** definition of osmosis in isolation, must be in context of explaining observations
			3 (water) enters the cell by **osmosis ;**		**3 ACCEPT** 'water osmoses into cell' **IGNORE** ref to diffusion
			4 *idea of:* **cell surface / plasma, membrane** (of blood cell) weak so**,** bursts / cannot withstand pressure / **haemolyses ;**		
			5 *idea of:* (plant) cell wall **,** strong / provides support**,** so**,** does not burst / can withstand pressure **;**		**5 IGNORE** ref to rigid wall, wall acts as barrier
			6 (plant) cell becomes **turgid** / **turgidity** increases**,** which reduces water uptake **;** **4 max**		**6 IGNORE** ref to plasmolysis anywhere in response
			QWC – **two** technical terms used in context and spelt correctly **;** **1**		any **two** from: **gradient, water potential**, **osmosis**, **cell surface membrane / plasma membrane,** **turgid / turgidity, (derivatives of) haemolysed** (note: only allow turgid for plant cells)
				5 max	

Question			Answer	Marks	Guidance
		(ii)	use a**,** salt / sugar**,** solution **OR** add solute to water **;** use a solution with the, same / similar / lower, water potential as blood cells **;**	1 max	**ACCEPT** saline solution **ACCEPT** isotonic / hypertonic **ACCEPT** same solute concentration / potential **IGNORE** same water concentration **IGNORE** use less water / solution with low water potential
	(b)		<u>diffusion</u> **;**	1	**DO NOT CREDIT** facilitated diffusion
	(c)		**1** active, transport / uptake **;** ***plus any two from:*** **2** cells have, extensions / hairs **;** **3** thin cell wall **;** **4** large / increased, <u>surface area</u> **;** **5** many / more, mitochondria **;** **6** (many) carrier proteins in cell (surface) membrane **;**	3 max	**1 ACCEPT** facilitated diffusion **IGNORE** transport using ATP **DO NOT CREDIT** osmosis **Allow max two marks for specialised features** **2 ACCEPT** cells have root hairs **IGNORE** roots have root hair cells **4 ACCEPT** high, <u>surface area</u> to volume ratio / SA:vol credit in context on root hair cell or root having large surface area **6 ACCEPT** transport proteins / protein pumps **ACCEPT** channel protein in context of facilitated diffusion
			Total	**10**	