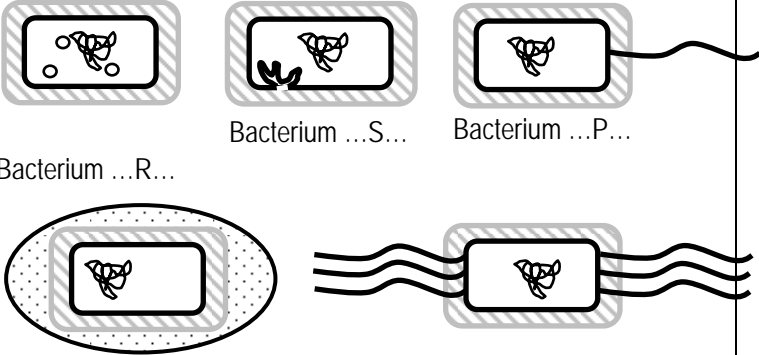


Question Number	Answer	Mark
1(a)(i)	1. circular DNA box ; 2. small / 70s ribosomes box;	(2)

Question Number	Answer	Mark														
1(a)(ii)	<table border="1"> <thead> <tr> <th>Features present in mitochondria</th> <th>Feature also present (✓) or absent (✗) in chloroplasts</th> </tr> </thead> <tbody> <tr> <td>Surrounded by a double membrane</td> <td>✓</td> </tr> <tr> <td>Crista present</td> <td>✗</td> </tr> <tr> <td>Circular DNA</td> <td>✓</td> </tr> <tr> <td>Matrix</td> <td>✗</td> </tr> <tr> <td>Glycogen granule</td> <td>✗</td> </tr> <tr> <td>Stalked particles</td> <td>✗</td> </tr> </tbody> </table> <p>1 mark for any two correct ;;;</p>	Features present in mitochondria	Feature also present (✓) or absent (✗) in chloroplasts	Surrounded by a double membrane	✓	Crista present	✗	Circular DNA	✓	Matrix	✗	Glycogen granule	✗	Stalked particles	✗	(3)
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Stalked particles	✗															

Question Number	Answer	Mark
1(b)	 <p>Bacterium ...R... Bacterium ...S... Bacterium ...P...</p> <p>Bacterium ...T... Bacterium ...Q...</p>	(4)

Question Number	Answer	Mark
2(a)(i)	organ has {many / eq} functions, tissue has {one / fewer / eq}, organ has {many / several / eq} {cell types / tissues}, tissue has {one / fewer / eq} ;	(1)

Question Number	Answer	Mark
2(a)(ii)	both have cells {working together / for the same function / eq} ;	(1)

Question Number	Answer	Mark								
2(b)	<table border="1"> <thead> <tr> <th>Description of Organelle</th> <th>Name of Organelle</th> </tr> </thead> <tbody> <tr> <td>Several curved membrane-bound sacs of decreasing size</td> <td>golgi (apparatus / body) ;</td> </tr> <tr> <td>A pair of cylinders arranged at right-angles to each other</td> <td>{centrioles / centrosome / eq} ;</td> </tr> <tr> <td>Small spheres with a single membrane that are filled with hydrolytic enzymes</td> <td>lysosome(s) ;</td> </tr> </tbody> </table>	Description of Organelle	Name of Organelle	Several curved membrane-bound sacs of decreasing size	golgi (apparatus / body) ;	A pair of cylinders arranged at right-angles to each other	{centrioles / centrosome / eq} ;	Small spheres with a single membrane that are filled with hydrolytic enzymes	lysosome(s) ;	(3)
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Small spheres with a single membrane that are filled with hydrolytic enzymes	lysosome(s) ;									

Question Number	Answer	Mark
2(c)	<p>Drawing (max 2):</p> <ol style="list-style-type: none"> 1. {double membrane / nuclear envelope} obvious ; 2. nuclear pores shown ; 3. (1 or more) nucleoli present ; <p>Labels (max 2):</p> <ol style="list-style-type: none"> 4. (nuclear) envelope / <u>double</u> membrane / {<u>inner</u> / <u>outer</u>} (nuclear) membrane ; 5. (nuclear) pore ; 6. nucleolus ; 7. correct reference to chromatin / nucleoplasm ; 	<p style="text-align: right;">max (4)</p>

Question Number	Answer	Additional Guidance	Mark
3(a)(ii)	1. DNA replicated / (identical) copies of DNA produced / eq ; 2. idea that { quantity of DNA / number of chromosomes } is doubled / cell is 4n ;	1. IGNORE DNA synthesis 2. ACCEPT two sets of DNA	(2)

Question Number	Answer	Additional Guidance	Mark
3(b)(i)	C 64 ;		(1)

Question Number	Answer	Additional Guidance	Mark
3(b)(ii)	1. time in G1 or G2 phase / usually a cell spends { several hours / more time / 14 hours } in G1 and G2 phase ; 2. less protein synthesis / fewer organelles ; 3. idea of { cytoplasm / organelles / cell membrane } { shared / divided / halved } with each cell division ;	2. ACCEPT less cytoplasm or cell membranes produced ACCEPT no organelles produced	(2)

Question Number	Answer	Additional Guidance	Mark
3(c)	1. genes would be { activated / deactivated } / eq ; 2. active genes transcribed / mRNA produced ; 3. translation (of mRNA) to produce proteins / eq ; 4. idea that proteins { modify cell / determine function of cell } / structure of cell altered permanently ;	1. ACCEPT switching on or off of genes, NOT turned on or off DO NOT ACCEPT translation of proteins	(4)

Question Number	Answer	Additional Guidance	Mark
3(d)	1. tissues made of cells and organs made of tissues / eq ; 2. tissues made of { one type / similar types } of cells AND organs made of different tissues / eq ; 3. organs have more functions than tissues ;	Piece together the answer if necessary	(2)

Question Number	Answer	Additional Guidance	Mark
4(a)	1. {antigen / bacteria / virus / pathogen} {binds / eq} to B cell ; 2. {antigen / bacteria / virus / pathogen} {binds / eq} to MHC (antigen) ; 3. T helper {lymphocytes / cells} {bind / eq} (to B cell) ; 4. reference to cytokines (from T helper cells) ;	1 ACCEPT B cell is an antigen-presenting cell 3 ACCEPT CD4 cells	(3)

Question Number	Answer	Mark
4(b)(i)	mitosis ;	(1)

Question Number	Answer	Additional Guidance	Mark
4(b)(ii)	1. idea of sample of B cells from lymph nodes ; 2. reference to named stain e.g. (acetic) orcein ; 3. credit correct details of method for B cells e.g. heating / add { HCl / acid } ; 4. idea of looking for mitotic features ;	1 ACCEPT from blood 2 ACCEPT acetocarmine, Feulgen's, Schiff's, toluidine blue 3 ACCEPT squashing of lymph node 4 ACCEPT stages of mitosis	(3)

Question Number	Answer	Mark
4(c)(i)	mitochondrion ;	(1)

Question Number	Answer	Mark
4(c)(ii)	nucleus ;	(1)

Question Number	Answer	Additional Guidance	Mark
4(c)(iii)	endoplasmic reticulum / ER ;	IGNORE smooth , rough ACCEPT RER / SER / ribosome	(1)

Question Number	Answer	Additional Guidance	Mark
4(c)(iv)	<p>IF RER / SER HAS BEEN GIVEN AS ANSWER IN (iii):</p> <ol style="list-style-type: none"> 1. {protein synthesis / translation / eq} occurs ; 2. on the ribosomes ; 3. idea that {polypeptide / protein} {moves into / transported into} the ER ; 4. to the Golgi apparatus / through the cytoplasm / eq ; <p>IF GOLGI HAS BEEN GIVEN AS ANSWER IN (iii):</p> <ol style="list-style-type: none"> 5. it modifies the protein / eq ; 6. credit example of modification e.g. addition of carbohydrate group ; 	<p>IF CYTOPLASM HAS BEEN GIVEN AS ANSWER IN (iii): apply either the RER OR Golgi Mps</p> <p>1 ACCEPT description of translation</p> <p>4 ACCEPT idea of folding into {secondary / tertiary} structure</p>	
	<ol style="list-style-type: none"> 7. idea that antibody moved into vesicles ; 8. exocytosis / eq ; <p>IF RIBOSOME HAS BEEN GIVEN AS ANSWER IN (iii):</p> <ol style="list-style-type: none"> 9. {protein synthesis / translation / eq} occurs ; 10. ribosome holds mRNA / eq ; 11. ribosome holds two tRNA / eqs ; 12. so that peptide bonds can form between (adjacent) amino acids ; 		(3)