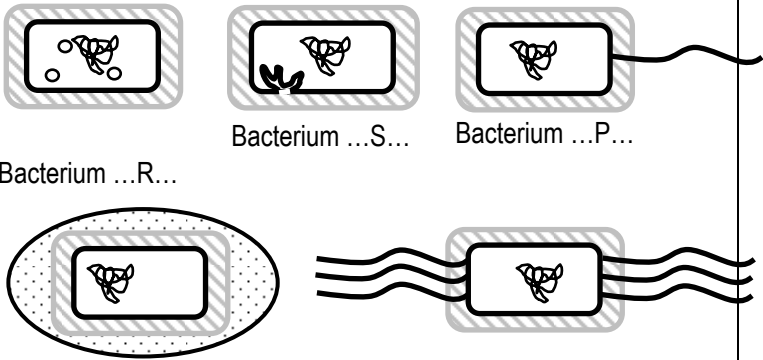


6BI02/01
Development, Plants & the Environment

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><tr><th>Features present in mitochondria</th><th>Feature also present (✓) or absent (✗) in chloroplasts</th></tr><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></table>	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	✗														
1 mark for any two correct ;;;																

Question Number	Answer	Mark
1(b)	 Bacterium ...R... Bacterium ...S... Bacterium ...P... Bacterium ...T... Bacterium ...Q...	(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><tr><th>Description of Organelle</th><th>Name of Organelle</th></tr><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></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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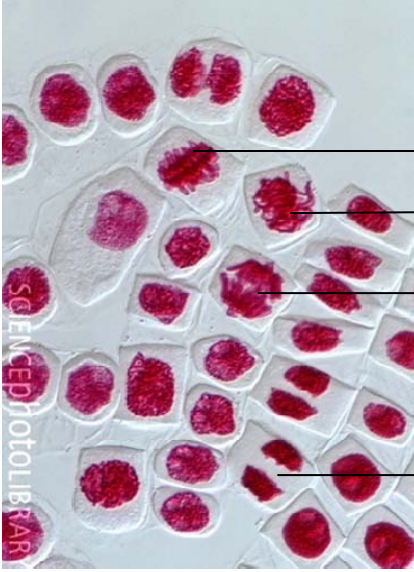
Question Number	Answer	Mark
2(c)	Drawing (max 2): 1. {double membrane / nuclear envelope} obvious ; 2. nuclear pores shown ; 3. (1 or more) nucleoli present ; Labels (max 2): 4. (nuclear) envelope / <u>double</u> membrane / {<u>inner</u> / <u>outer</u>} (nuclear) membrane ; 5. (nuclear) pore ; 6. nucleolus ; 7. correct reference to chromatin / nucleoplasm ;	max (4)

Question Number	Answer	Mark										
3(a)	<table><tr><th>Name of adaptations</th><th>Example</th></tr><tr><td>physiological ;</td><td>Some metabolic reactions become less efficient in cold weather so the organism generates more heat to keep warm</td></tr><tr><td>behavioural ;</td><td>Sheep learn to ignore sounds that have no importance to them</td></tr><tr><td>anatomical ;</td><td>The ears of African elephants are larger than those of Asian elephants, due to differences in the environment</td></tr><tr><td>physiological ;</td><td>Formation of a sun tan when human skin is exposed to sunlight</td></tr></table>	Name of adaptations	Example	physiological ;	Some metabolic reactions become less efficient in cold weather so the organism generates more heat to keep warm	behavioural ;	Sheep learn to ignore sounds that have no importance to them	anatomical ;	The ears of African elephants are larger than those of Asian elephants, due to differences in the environment	physiological ;	Formation of a sun tan when human skin is exposed to sunlight	(4)
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Question Number	Answer	Mark
3(b)	N.B. D = description; E = explanation Points to be paired i.e. cannot score three marks for three D points 1D {haploid / 23 chromosomes / half set of chromosomes in } nucleus ; 1E so that {{diploid / eq} number / full complement / 46 chromosomes} restored(at fertilisation) ; 2D lipid droplets / food store / eq ; 2E supplies {energy / nutrients} for division / eq ; 3D large (cell) {size / surface area / eq} ; 3E increased chance of fertilisation / eq ; 4D reference to {cortical granules / lysosomes / zona pellucida} (in cytoplasm) ; 4E to prevent {more sperm entry / polyspermy / eq} ; 5D reference to {release / eq} of a {chemical / eq} ; 5E to attract sperm / chemotaxis / eq ; 6D membrane with '(sperm) receptors' on surface / eq ; 6E to allow sperm to {bind / eq} ; 7D {much / eq} mRNA present ; 7E to allow early translation of transcription factors / eq ;	max (4)

Question Number	Answer	Mark
3(c)	1. {pine needles /extract / filter paper soaked in extract} placed on {agar plate / in wells / eq} ; 2. with bacterial {lawn / eq} ; 3. reference to sterile/aseptic approach e.g. appropriate reference to sealing ; 4. reference to an appropriate time (for incubation) e.g. 24 hours, 1 week ; 5. (incubate at) a sensible temperature suggested e.g. 25°C ; NOT 37°C / human body temp 6. (looking for) {clear area / inhibition zone / loss of cloudiness /reduced cell number/ eq} (around pine needles, extract / filter paper / wells) ; 7. (clear area) shows no bacteria / eq ; 8. reference to suitable control ;	max (5)

Question Number	Answer		Mark
4(a)	Statements about cell division	Meiosis is involved	(2)
	Required for both sexual and asexual reproduction		
	Produces gametes	✓ ;	
	Crossing over can occur	✓ ;	
	Occurs in mammals but not flowering plants		

Question Number	Answer	Mark
4(b)	 A - metaphase ; B - prophase ; C - anaphase ; D - telophase ;	(4)

Question Number	Answer	Mark
4(c)(i)	site of {cell division / mitosis / actively dividing cells / meristem / eq };	(1)

Question Number	Answer	Mark
4(c)(ii)	to {soften the material / macerate / break middle lamella / eq};	(1)

Question Number	Answer	Mark
4(c)(iii)	{(acetic) orcein / lacto-propionic orcein / toluidine (blue) / Schiffs / eq} ;	(1)

Question Number	Answer	Mark
4(c)(iv)	each mark is for the risk + appropriate precaution 1. cut and appropriate precaution ; 2. acid and appropriate precaution ; 3. heat and appropriate precaution ; 4. stain and appropriate precaution ; 5. coverslip and appropriate precaution ;	max (2)

Question Number	Answer	Mark
5(a)(i)	reference to {chemical / air / gravity / light / eq} ;	(1)

Question Number	Answer	Mark
5(a)(ii)	1. idea of {breakdown / digestion / eq} of style ; 2. (breaks down) protein / pectin / middle lamella ; 3. reference to hydrolysis / eq ; 4. easier for pollen tube to grow / reduced resistance / eq ; 5. supplies {nutrients / named nutrient / energy} for (pollen tube) growth / eq ;	max (3)

Question Number	Answer	Mark
5(b)	1. photosynthesis ; 2. {component / eq} of {cytoplasm / sap} ; 3. water as a solvent /eq ; 4. water as a transport medium /eq ; 5. involved in thermoregulation / eq ; 6. reference to role in structural support ; 7. reference to involvement in hydrolysis ; 8. reference to turgor changes ;	max (3)

Question Number	Answer	Mark
6(a)(i)	1. A ; then any two from: 2. height controlled by {many / eq} genes / polygenic inheritance / eq ; 3. reference to continuous variation ; 4. reference to normal distribution / eq ;	max (3)

Question Number	Answer	Mark
6(a)(ii)	1. water / humidity ; 2. light ; 3. minerals / soil type / pH ; 4. CO ₂ ; 5. temperature ; 6. altitude ;	max (2)

Question Number	Answer	Mark
6(b)(i)	height of bar must be at 50 i.e. 2 ½ little squares above 40 ;	(1)

Question Number	Answer	Mark
6(b)(ii)	1. height (of yarrow plant) decreases (as altitude increases) ; 2. non-linear /eq ; 3. correct manipulation of the data ;	max (2)

Question Number	Answer	Mark
6(c)(i)	{no change in / same} height of plants at 700m / reached their maximum height (of 50cm) / eq ;	(1)

Question Number	Answer	Mark
6(c)(ii)	{decrease in / lower / different} height of plants at 3000m / 25cm at 3000m and 50cm at 700m / eq ;	(1)

Question Number	Answer	Mark
6(c)(iii)	removal of genetic variation / they are all genetically identical / eq ;	(1)

Question Number	Answer	Mark
6(c)(iv)	to act as a control / to see if there is a difference at the other heights / as a comparison / to check that the clones grow the same as the parent plants / eq ;	(1)

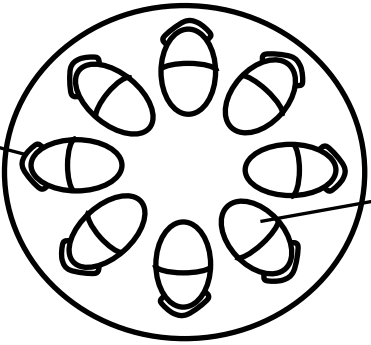
Question Number	Answer	Mark
7(a)	1. some people with (new) drug and some without (new) drug / eq ; 2. use placebo / description (e.g. sugar-coated dummy pill) / old drug ; 3. {doctors / eq} and {subjects / eq} do not know who is on (new) drug or who is not /eq ; 4. to see if new drug works better than {placebo / old drug}/eq ; 5. reduces bias /eq ;	max (3)

Question Number	Answer	Mark
7 (b)(i)	glycosidic ;	(1)

Question Number	Answer	Mark
7(b)(ii)	{ α / alpha} glucose ;	(1)

Question Number	Answer	Mark
7(b)(iii)	1. {bioplastic / starch} comes from {plants / eq} ; 2. {plants / starch} are renewable ; 3. oil-based plastic is from non-renewable resource / eq ;	max (2)

Question Number	Answer	Mark
7(b)(iv)	will not accumulate / not contribute to landfill / can be decomposed / eq ;	(1)

Question Number	Answer	Mark
7(c)	 The diagram shows a circular cross-section of a plant stem. In the center, there is a ring of eight xylem vessels, each represented by a circle with a horizontal line through its center. Surrounding this ring is a layer of sclerenchyma tissue, depicted as a ring of eight thick-walled, rectangular cells. Two labels with leader lines point to these structures: 'sclerenchyma ;' points to the outer ring of cells, and 'xylem ;' points to one of the central vessels.	(2)

Question Number	Answer	Mark
8(a)	1. protein release from ribosome /eq ; 2. enter the rER {lumen / eq} ; 3. becomes packaged into (rER) vesicles ; 4. (vesicles / proteins) move to Golgi (apparatus) / {vesicles fuse with / protein enters} Golgi ; 5. protein {modified / carbohydrate added / named carbohydrate added} / eq ; 6. then become packaged into (secretory) vesicles / eq ; 7. glycoprotein becomes part of (vesicle) membrane ; 8. vesicles {move towards / fuse with} the cell (surface) membrane ;	max (5)

Question Number	Answer	Mark
8(b)(i)	1. totipotent (stem cells) can give rise to {all / any / 216} cell types / eq ; 2. (stem cells) are {undifferentiated / unspecialised} / eq ; 3. can keep dividing / eq ;	max (2)

Question Number	Answer	Mark
8(b)(ii)	they can {give rise to / eq} white blood cells / eq ;	(1)

Question Number	Answer	Mark
8(b)(iii)	possible route to {infection / eq} / rejection by recipient / increased chance of becoming cancerous /eq ;	(1)

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