Question	Answer	Marks	AO Element	Notes	Guidance
1	excretion ticked ; growth ticked ;	**2**		**R** each additional tick	
2	movement ; respiration ; sensitivity ; growth ; reproduction ; excretion ; nutrition ;	**4**			
3	*any three from:* muscle contraction ; protein synthesis ; cell division ; active transport ; growth ; passage of nerve impulses ;	**3**			
4	(vertebrates) have a backbone / don't have an exoskeleton ;	**1**			

Question	Answer	Marks	AO Element	Notes	Guidance
5	*any two from:* adapted to a different pH ; moist / permeable, skin ; large surface to volume ratio ; may have gills which are, fragile / thin / AW ; lays (unshelled) eggs in water ; part of the life cycle / larval stages, only exist in water ;	**2**			
6	fungus ; protoctist ;	**2**			
7	*any two from:* two body parts ; eight legs / four pairs of legs ; AVP ;	**2**			
8	*any two from:* many (body) segments ; head and, body (segments) / AW ; many legs / many pairs of legs; elongated bodies ;	**2**			

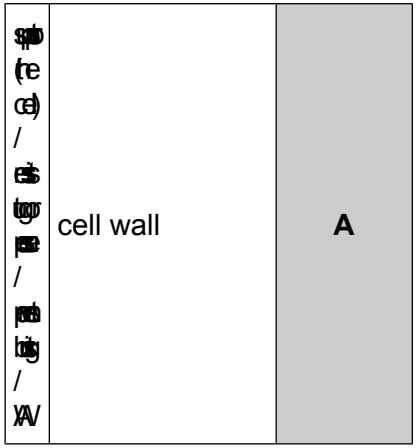
<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>AO Element</th><th>Notes</th><th>Guidance</th></tr>
<tr><td>9</td><td>E, A, D,
F, C, B
;;;;;</td><td>5</td><td></td><td>6 correct = 5 marks
4 or 5 correct = 4 marks
3 correct = 3 marks
2 correct = 2 marks
1 correct = 1 mark

R any additional letters</td><td></td></tr>
<tr><td>10</td><td>
<table>
<tr><th>name of the bird in the diagram</th><th>letter of the bird in the key</th></tr>
<tr><td>Ammodramus bairdii</td><td>E</td></tr>
<tr><td>Buceros rhinoceros</td><td>B</td></tr>
<tr><td>Pandion haliaetus</td><td>F</td></tr>
<tr><td>Haliaeetus leucocephalus</td><td>D</td></tr>
<tr><td>Rynchops niger</td><td>A</td></tr>
<tr><td>Recurvirostra avosetta</td><td>C</td></tr>
</table>
;;;;;</td><td>5</td><td></td><td>6 correct = 5 marks
4 or 5 correct = 4 marks
3 correct = 3 marks
2 correct = 2 marks
1 correct = 1 mark</td><td></td></tr>
<tr><td colspan="6"></td></tr>
</table>

Question	Answer	Marks	AO Element	Notes	Guidance
11	*Ilex* *Quercus* *Syringa* *Sorbus* *Aesculus* *Plumeria* ;;;;;	**5**		must be in this order 6 correct = 5 marks 4 or 5 correct = 4 marks 3 correct = 3 marks 2 correct = 2 marks 1 correct = 1 mark	
12	palisade mesophyll cell labelled correctly ; vacuole labelled correctly ;	**2**			

Question	Answer	Marks	AO Element	Notes	Guidance
13	(see table below)	**5**		*one mark per correct row*	

function	structure	letter in diagram
storage of DNA / controls (chemical) activity of cell / produces RNA / makes ribosomes	nucleus	**C**
photosynthesis / absorbs light / [illegible]	chloroplast	**E**
aerobic respiration	mitochondrion / mitochondria	**D**
contains cell sap and stores water	vacuole	**B**

Question	Answer	Marks	AO Element	Notes	Guidance
	 cell wall **A** ;;;;;				
14	*label:* nucleus ; label line drawn that ends on the nucleus in the photomicrograph ;	**2**			

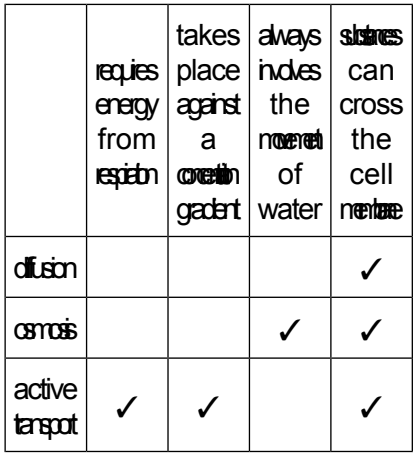
Question	Answer	Marks	AO Element	Notes	Guidance
15	<table><tr><th>cell function</th><th>cell structure</th><th>letter from diagram</th></tr><tr><td>storage of genes</td><td>nucleus</td><td>G</td></tr><tr><td>aerobic respiration</td><td>mitochondria</td><td>E</td></tr><tr><td>amino acids are assembled to make protein</td><td>ribosome(s) OR (rough) endoplasmic reticulum / (R)ER</td><td>H / F F</td></tr></table> ;;;	**3**		one mark per row	

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>AO Element</th><th>Notes</th><th>Guidance</th></tr>
<tr><td>16</td><td>
total of six from:

similarities, max four from:
single cell / unicellular / AW ;
(cell) wall / A ;
cytoplasm / D ;
ribosomes / H ;
cell membrane / B ;
DNA / genetic material ;

differences, max four from: ;;;;
<table>
<tr><td>(bacteria have)</td><td>(yeast have)</td></tr>
<tr><td>no nucleus / no G / has nucleoid</td><td>nucleus / G</td></tr>
<tr><td>loop / coil / AW, of DNA</td><td>linear DNA / chromosome</td></tr>
<tr><td>no, (rough) endoplasmic reticulum / ER</td><td>(rough) endoplasmic reticulum</td></tr>
<tr><td>no mitochondria / no E</td><td>mitochondria / E</td></tr>
<tr><td>no (large / permanent) vacuole / no C</td><td>(large / permanent) vacuole / C</td></tr>
<tr><td>plasmid(s)</td><td>no plasmids</td></tr>
<tr><td></td><td>membrane-bound, cell structures / organelles</td></tr>
</table>
</td><td>6</td><td></td><td></td><td></td></tr>
</table>

Question	Answer	Marks	AO Element	Notes	Guidance
	no membrane-bound, cell structures / organelles				
17	10 (µm) ;	**1**			
18(a)(i)	length of **JK** = 14 (mm); (measurement)	**1**			
18(a)(ii)	(length of stomata) ÷ (magnification) = 14 ÷ 400 ; (formula); = 0.035 (mm); (calculation)	**2**		**A** ecf for calculations from an incorrect measurement in part (i) Rounded of figures must be correct — '5' rounds up	
19(a)	1.8/ 1.83/ 1.825, mm;	**1**	AO2		
19(b)	nitrogen fixation; convert nitrogen into, ammonia/ NH_3/ ammonium ions/ NH_4^+ ; convert ammonia into amino acids;	**2**	AO1	max [2]	

Question	Answer	Marks	AO Element	Notes	Guidance
19(c)(i)	photosynthesis; carbon dioxide + water/ CO_2 + H_2O; use of, light (energy)/ sunlight;	**2**	AO1	max [2]	
19(c)(ii)	translocation/ mass flow; phloem; as sucrose; from source, leaf; then from phloem to root nodule by diffusion;	**2**	AO1	max [2]	
20	 ;;;;	**4**		one mark for each correct column	

Question	Answer	Marks	AO Element	Notes	Guidance
21	*any two from:* low (kinetic) energy ; for enzymes ; low rate of (effective) collisions / AW ; slow diffusion (of oxygen) ;	**2**			
22	*any three from:* wilting ; lack of turgor pressure (at the end of the week) ; ora no longer a push against cell wall / AW ; ora (mesophyll) cells not providing support / cell collapses / AW ; (lack of water means cells become) flaccid / plasmolyse ;	**3**			
23	*drawing with:* arrow showing water movement into cell ; *max. two from:* no space between cell membrane and cell wall ; cell wall, slightly bent outwards / straight ; vacuole larger in proportion than in the diagram ;	**3**			

Question	Answer	Marks	AO Element	Notes	Guidance
24	(movement of particles) through a cell membrane ; from a region of lower concentration to a region of higher concentration / against a concentration gradient ; using <u>energy</u> (from respiration) ;	**3**		**A** ATP	
25	*any three from:* protein synthesis ; transport in the phloem ; cell division / mitosis / meiosis ; active transport / absorption of ions (from the soil) ; growth ; movement / muscular contraction ; sensitivity ; nerve impulses ; AVP ;;;	**3**			

Question	Answer	Marks	AO Element	Notes	Guidance
26	*any three from:* involves, proteins / carriers / pumps (in neurone membrane) ; (named) ion(s) bind to, proteins / carriers / pumps, to move ions / AW ; move ions, against concentration gradient / from low to high concentration ; using energy ; AVP ; e.g. change in shape of carrier (protein)	**3**			
27	*any four from:* (by) active transport ; from a low to a high concentration / AW ; (through cell) membrane ; *ref. to* proteins (pumps / channels / AW) ; uses energy ; from respiration ;	**4**			
28	starch ; cellulose ;	**2**			

Question	Answer	Marks	AO Element	Notes	Guidance
29	ref. to specificity ; (shape of) active site and substrate must be <u>complementary</u> ; to enable, enzyme and substrate to bind / enzyme-substrate complexes to be formed ;	**3**			
30	carbon **and** oxygen **and** hydrogen ; nitrogen ;	**2**			
31	*any three from:* ref. to making new cells after fertilisation ; making membranes ; (protein for) making enzymes ; making new, (named) cell structures / cytoplasm ; (fat / protein) provide / source of, energy ; energy for, cell division / mitosis / growth (of cell) / metabolism / AW ;	**3**			
32	<u>helix</u> ; one / the same / equal / identical / maintained / constant ; <u>identical</u> ;	**3**			

Question	Answer	Marks	AO Element	Notes	Guidance
33	T A A T A T T A G C C G G C T A G C	**1**			
					[Total: 101]