

BY2

Question	Answer	Mark
1. (a)	Label parts A to E on the diagram.	all correct 1
	A mouth / buccal cavity	
	B oesophagus / gullet/ esophagus	
	C stomach	
	D small intestine / duodenum / ileum	
	E large intestine / colon	
(b) (i)	digestion A C D	1
(ii)	absorption D E	1
(c)	different parts carry out different functions / provide different conditions for enzymes/different food groups digested in different areas	1
(d) (i)	lives <u>in</u> or <u>on</u> another organism NOT lives off of obtains nourishment/ nutrients/ products of digestion from the host provides no benefit / causes harm to its host	max 2
(ii)	region D has high concentration of products of digestion / tapeworm can absorb nutrients/ nourishment from the digested food	1
(e)	peristalsis: hooks / suckers / scolex to attach to the gut wall NOT hookers digestive enzymes: (thick) cuticle / secretes mucus / secretes enzyme inhibitors NOT coating/covering / waxy cuticle	1
(f)	increases chance of (species) survival / infecting a new (intermediate) host/ many eggs will not survive	1

Question Total 10

Question	Answer	Mark
2. (a) (i)	Arthropoda	1
	(ii) jointed legs exoskeleton fluid-filled body cavity / haemocoel/ open circulatory system Segmentation/ segmented body NOT large brain	max 2
(b) (i)	a group of organisms that can interbreed / breed with each other to produce fertile offspring	1
	(ii) <u>Genus</u>	1
	(iii) DNA base sequencing / hybridisation/ sequencing analysis/ DNA electrophoresis Not DNA analysis/ analysis alone genetic fingerprinting or profiling/ amino acid sequencing of proteins / differences in protein structure (not: biochemical methods unqualified) NOT compare DNA/ genes	1
	(iv) high level of <u>similarity</u> shows that they are closely related / converse argument. Needs to relate to 2 a (iii)	1
Question Total		7

Question	Answer	Mark									
3. (a) (i)	Transpiration/ evapotranspiration	1									
(b)	Potometer NOT podometer	1									
(c) (i)	graph: Axes Correct and labelled. Using labels from table, axes correct. 1 Scale Appropriate with over half of paper used. (1) Plot All correct, +/- 1 small square (1) Curve/ Line Well drawn through points (1)	4									
(ii)	as wind speed increased distance travelled increased; NOT rate of transpiration wind removed water vapour from leaf surface / removes diffusion shells / removes water molecules from the leaf's microclimate/ increased diffusion gradient between inside and outside of leaf (not: blows water away)	2 max									
(iii)	water lost from leaves / by transpiration; causes tension on water molecules; cohesive force between water molecules ; adhesive forces between water molecules and <u>xylem/vessel</u> walls; water molecules pulled into / up <u>xylem/ vessel</u> NOT hydrostatic / root pressure	max 3									
(d) (i)	Pumped/ moved out of guard cells/ no longer pumped in	1									
(ii)	increased water potential , so water moves out	1									
(iii)	decreased water, so decreases volume of cell/ flaccid/ cause walls to move together	1									
(e)	<table border="1"> <thead> <tr> <th>Factor</th> <th>Effect on rate of water loss</th> <th>Explanation</th> </tr> </thead> <tbody> <tr> <td>increased Humidity</td> <td>Increase / <u>Decrease</u></td> <td>Reduces concentration/diffusion gradient/ water potential gradient between inside and outside leaf</td> </tr> <tr> <td>increased Temperature</td> <td><u>Increase</u> / Decrease</td> <td>Greater rate of evaporation from surface of leaf / increased KE (of water molecules)</td> </tr> </tbody> </table>	Factor	Effect on rate of water loss	Explanation	increased Humidity	Increase / <u>Decrease</u>	Reduces concentration/diffusion gradient/ water potential gradient between inside and outside leaf	increased Temperature	<u>Increase</u> / Decrease	Greater rate of evaporation from surface of leaf / increased KE (of water molecules)	
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increased Temperature	<u>Increase</u> / Decrease	Greater rate of evaporation from surface of leaf / increased KE (of water molecules)									

Question Total 18

Question	Answer	Mark
4. (a) (i)	Contraction of {left ventricle/ ventricular systole} causes a {surge / increase in blood pressure}; pressure drops when the {left ventricle relaxes/ ventricular diastole}; pressure in aorta does not fall to zero because of the closing of the {aortic / semi-lunar valve}; {elastic recoil/ elasticity} of the arteries maintains blood pressure.	3
(ii)	Friction/ resistance with vessel walls / increased cross-sectional / surface area of arterioles / blood vessels distance from heart increased causes progressive pressure drop/ Not reference to capillaries	1
(b) (i)	R; highest pO_2 / oxygen level OR lowest pCO_2 / carbon dioxide	2
(ii)	at arterial end: hydrostatic pressure (forcing liquid out of capillaries) greater than the osmotic pressure (drawing water in) at venous end: hydrostatic pressure has decreased; water potential gradient / high osmotic pressure in capillary or osmotic pressure greater than hydrostatic pressure causes an inward flow ORA; not all water (re)absorbed into capillary, reject all references to blood	max 3
(iii)	Drains/ removes (excess) tissue fluid from the tissues / prevents build up of tissue fluid / return (excess) tissue fluid to blood via lymphatic system NOT ref to waste products alone	1
Question Total		10

Question	Answer	Mark
5. (a)	1 mark each correct ROW	4

Statement	Fish	Amphibia	Reptiles	Birds	Mammals
1. Fertilisation is always internal			✓	✓	✓
2. Eggs are laid in an aquatic environment	✓	✓			
3. The embryo is surrounded by a membrane called the amnion			✓	✓	✓
4. Both fertilisation and embryo development are always internal					✓

- (b) (i) lowest supply of {nutrients / food}; max 2
 embryo cannot complete development inside egg/ {poorly/less} developed at hatching;
 embryo unable to care for itself after hatching / parents have to {feed / keep warm} (due to lack of feathers)/ cannot feed itself;
- (ii) more {time / energy/ resources} used to care for offspring/ more offspring would need too much {time / energy/ resources} to look after; 2
 increased chance of survival of offspring/ less competition between offspring;
- (c) (i) incomplete metamorphosis NOT stage metamorphosis 1
- (ii) nymphs / instars 1
- (iii) nymphs {go through a series of moults/ shed exoskeleton several times} (to become the adult); NOT skin/ outer layer 3
 exoskeleton is {hard/ limits growth};
 exoskeleton can only {be stretched/ grow} when newly formed/
 {length/ size} can only increase following a moult;
 rapid increase in length before exoskeleton hardens
- (d) Tracheae/ tracheoles; NOT trachea 1
 spiracles 1

Question Total 15

Question	Answer	Mark
6. (a)	Describe the uptake of water by plants from the soil into the xylem	7
	Explain the role of ions in this process.	3
A	water absorbed by the root hair cells	
B	(water can be) {absorbed into / moves through} cell walls	
C	moves (across cortex) via apoplast route	
D	(can also move) across plasma membrane / into cytoplasm by osmosis	
E	(water) moves from the cytoplasm of one cell to the next via plasmodesmata	
F	(called the) symplast route	
G	(water can also) move through cytoplasm <u>and</u> vacuoles via vacuolar route	
H	Casparian strip / band in walls of endodermal cells	
I	made of suberin / waterproof	
J	stops apoplast route / water forced into symplast route	Max 7
K	ions absorbed into root hair cells by active transport	
L	ions lowering water potential in root hair cells	
M	at the endodermis ions absorbed into cytoplasm by active transport/ uptake	
N	ions travel (through pericycle) into xylem	
O	lowers water potential in xylem	
P	ref to lower water potential in root hair cells or xylem increasing osmotic gradient between soil (solution) and cell contents / creates osmotic gradient across root	Max 3
Question Total		10

- (b) Explain why large, multi-cellular organisms have evolved specialised surfaces for gaseous exchange. 3
- Describe and explain how terrestrial mammals are adapted for gaseous exchange in air. 7
- A metabolic needs (approx) proportional to volume/ larger organisms need more oxygen
- B Larger organisms external surface insufficient for gas exchange
- C diffusion (of respiratory gases) proportional to surface area
- D surface area : volume ratio is too small/ larger animals have a smaller SA:vol ratio (to supply metabolic needs)
- E diffusion distances too large
- F not enough O₂ can diffuse / O₂ cannot diffuse fast enough (to the cells furthest from surface) (to meet metabolic needs)
- G {gas exchange surface folded/ large number of alveoli} - to increase surface area
- H internal lungs
- I (to) reduce water / heat loss NOT prevent
- J gaseous exchange takes place in the alveoli
- K thin walls - reduce diffusion distance
- L (layer of) moisture – for gases to dissolve in
- M blood supply/ capillaries – {maintain concentration / diffusion gradient (between alveolar air and blood)/ transport absorbed gases}
- N haemoglobin (in erythrocytes) – transport of oxygen
- O ventilation mechanism/ description of ventilation mechanism
- P (to) replace stale air with fresh air / enable continuous exchange of gases max 7

Question Total 10