AS UNIT BY2

Question		Answers/Explanatory Notes	Marks Available
1.	(a)	*Lugworm* segmented body; septa; fluid filled body cavity;	
		hydrostatic skeleton; primitive brain and nervous systems;	
		thin permeable skin; closed circulatory system; (not: coelom)	
		(Max 2)	[2]
		Frog Phylum Chordata / chordate, accept vertebrate;	[1]
		Class Amphibia;	[1]
		Locust Phylum Arthropoda / arthropod;	[1]
		class Insecta / insect;	[1]
		Features of phylum	
		a body divided into segments	
		a body further divided into head, thorax and abdomen/three sections	
		a well developed brain	
		a hard outer exoskeleton (made of chitin)	
		(paired) jointed legs (not: ref. 6)	
		an open circulatory system/haemocoel	
		a cavity which surrounds the body organs	
		(Max 2)	[2]
		Field mushroom Kingdom fungi;	[1]
	(b)	Schistocerca.	[1]
			[10 marks]

Question		Answers/Explanatory Notes	Marks Available
2.	(a)	(i) 4	[1]
		(ii) 4 (%)	[1]
	(b)	small drop of partial pressure/concentration of oxygen (not: low pp); large amount of oxygen supplied/dissociates more easily; tissues can respire aerobically; aerobic respiration far more efficient than anaerobic / prevents lactic acid production. (Max 2)	[2]
	(c)	(i) (respiring) muscles / liver/heart/placenta (not: lung tissue);	[1]
		(ii) more oxygen released/affinity of haemoglobin for oxygen falls; at same partial pressure/concentration of oxygen; aerobic respiration; (Max 2)	[2]
	(d)	(i) Greater/higher affinity for oxygen; absorbs oxygen from mother; becomes (fully) saturated at low pp oxygen; (Max 2)	[2]
		(ii) Lives in an environment with low partial pressures/oxygen deficient; allows haemoglobin to become (fully) saturated at these low partial pressures/quoted figures; accept reverse argument; /Haemoglobin has high affinity for oxygen	[2]

Question		Answers/Explanatory Notes	Marks Available
3.	(a)	A Xylem vessel (element / cell);	[1]
		Transport water / mineral ions or salts (allow: support); (not: nutrients)	[1]
		B Sieve tube (element / cell); (not: phloem)	[1]
		Transport of organic materials / sugars/ products of photosynthesis/ amino acids/sucrose (not: glucose)	[1]
		C Companion (cell);	[1]
		Makes proteins / ATP/ release energy (for sieve tube cell); (not: make/produce energy)	[1]
	(b)	Support/strengthen/ prevents vessel collapsing when water sucked along it; waterproofing stops water entering or leaving; adhesion of water/hydrophilic lining (not: impermeable unqual) aids movement of water upwards 2 linked marks	[2]
	(c)	Casparian strip; symplast; cohesion; adhesion; hydrophilic;	[5]

Question			Answers/Explanatory Notes	Marks Available
4.	(a)		Thin/short diffusion pathway; permeable; moist; has a conc. gradient; (Max 3)(not: porous/ref capillary network/ ref flat shape)	[3]
	(b)	(i)	label line touching end of tracheole where they touch muscle (not: just letter);	[1]
		(ii)	Fast (oxygen 200,000 x faster than blood, carbon dioxide 10,000 x); No respiratory pigment/haemoglobin required;reduced water loss; oxygen supplied directly to tissues/no transport system needed: (Max 2) (not: large surface area unqual)	[2]
		(iii)	$\frac{\text{Difference}}{\text{Original}} \times 100$	[1]
			Answer 50(%);	[1]
	(c)		Intercostal muscles contract; ribs upwards and outward; diaphragm contracts/flattens; volume increases; pressure decreases; Below atmospheric pressure (Max 4)	[4]
	(d)	(i)	Water contains <u>less</u> oxygen than air; pp oxygen varies with temperature; diffusion rates much slower; Dense/viscous medium more difficult to pump/move; (Max 2)	[2]
		(ii)	*Parallel flow,* water and blood in gills flow in same direction;	[1]
			Counter current, water and blood flow in opposite directions;	[1]
			Concentration gradient maintained over entire distance travelled by water over gills*;*	[1]

Question		Answers/Explanatory Notes	Marks Available
5.	(a)	***Advantages***	
		Variation/genetically different;	
		allows development of a resistant stage in life cycle;	
		seeds, spores, larvae allow dispersal	
		(Max 2)	[2]
		Disadvantages	
		Need two individuals/parents; a slow form of reproduction / asexual much faster;	
		some variations not as successful as parent type/mutations more common/inherit genetic disorder;	
		need to get gametes together; ref large numbers	
		(Max 2) (not: ref disease/complex/less successful unqual)	[2]
	(b)	Less gametes wasted/increased chance of fertilisation:	
		gametes become independent of water;	
		fertilised egg can be enclosed in a protective layer; allows fertilised egg to develop inside body of female (where it is nourished and protected);	
		gametes do not dehydrate;	
		(Max 2)	[2]
	(c)	Life cycle rapid; Food store in seed allows rapid growth of embryo; food store enables seed to survive for long periods of time/ref dormancy;	
		protection by testa/resistant outer layer;	
		leaf fall recycling of nutrients; no need for water for fertilisation; ref link with animals or wind for pollination; ref dispersal e.g. fruit; large numbers of seeds produced.	
		(Max 3) (not: ref reproduction asexual and sexual)	[3]

Question	Answers/Explanatory Notes	Marks Available

6. (a) *Darwin*

A. Darwin recognised that species did change/ put forward a theory as to how they changed;

B. mutation qualified;

C. Overproduction;

D. Numbers remain constant/high mortality rate/struggle for survival;

E. Variation e.g. beak size or shape/rats/moths;

F. competition (for limited food source);

G. Individuals with a beneficial variation survive / survival of fittest or converse;

H. pass on beneficial characteristic;

I. Repeats generation after generation; (not: over a long time)

J. details of beak adaptation, seed, insects, fruit etc;

K. Natural selection;

L. adaptive radiation qual;

M. morphologically similar and to mainland form/common ancestor;

N. similarities of proteins/enzymes;

O. similarities of DNA/genes;

P.+ Q AVP x2 e.g. Fossil evidence, living intermediate forms, pentadactyl limb;

(Any 10)

Question	Answers/Explanatory Notes	Marks Available

(b) *Adaptions to diet.*

A. Small flat top incisors / horny pad;

B. Canines absent / small indistinguishable front incisors;

C. Teeth continuously growing or reverse argument;

D. Carnivores, canines, large (and backward pointing, killing and holding prey);

E. Herbivore cheek teeth large surface area for grinding/ interlock, W M arrangement;

F. Carnassial qual;

G. Sharp cutting edges on teeth

H. Diastema qual, manipulation of food;

I. First three chambers in 'stomach' modified oesophagus/ 4 chambers; (not: 4 stomachs)

J. large volume/longer gut;

K. Symbiotic / commensal bacterial/mutualism;

L. Ref anaerobic conditions;

M. Ref reverse peristalsis/regurgitate / chewing cud, qual;

N. cellulose digestion/cellulose by bacteria;

O. + P AVP X2 e.g. ref jaw articulation Ref. urea in saliva to provide nitrogen, thick keratinized lining, ref protein digestion only in true stomach, bacteria used as food source.

(Any 10) (not: reverse arguments unless specified)