

Biology BY2

- Q.1**
- (a) apoplast [1]
- (b) surface area:volume [1]
- (c) autotroph [1]
- (d) move ribs/enlarge thorax [1]
- (e) reduces heat loss;
reduces water loss;
protection (by ribs)
(any 2) [2]

Q.2

	Mouth	Stomach	Duodenum	Ileum	Large Intestine
Villi present			*	*	
Site of mechanical breakdown of food	*	*			
Connects with bile duct			*		
Microorganisms secrete vitamins					*
Carbohydrate digestion takes place	*		*	*	
pH 2-3		*			
Brunner's glands secrete alkaline fluid			*		
Main region of water absorption					*
Protein digestion begins		*			

1 mark for each correct line

[Total 9 marks]

- Q.3** (a) Segmented body [1]
 Jointed limbs [1]
- (b) Water proof – terrestrial adaptation [1]
 Limits growth / necessitates moulting [1]
- (c) Class [1]

[Total 5 marks]

- Q.4** (a) Haemoglobin line is S-shaped;
 Actual line rises much more steeply between 2kPa and 7kPa/is steeper in the middle;
 Theoretical line shows no flattening at top;
 Haemoglobin shows higher saturation throughout.
 (Any two) [2]
- (b) (i) Only haemoglobin is fully saturated at pp in lung [1]
- (ii) Haemoglobin carries much more oxygen for the muscle than the theoretical situation. [1]
- (iii) Compared with theoretical, haemoglobin gives up its oxygen much more readily as oxygen pp falls. [1]
- (c) Accumulation of carbon dioxide / carbonic acid. [1]
 causes fall in pH / increased acidity. [1]
 which releases oxygen from oxyhaemoglobin. [1]
- (d) Myoglobin is saturated/has high affinity for oxygen at very low pp [1]
 acts as an oxygen store [1]
 used when muscle is exercising heavily/working hard [1]

[Total 11 marks]

- Q.5** (a) An organism that lives on, in or off a host [1]
The host is harmed. [1]
- (b) Possession of hooks / suckers/ thick cuticle (any 2) [2]
- (c) (i) Digestive system (allow: circulatory/respiratory system) [1]
- (ii) Absorption of host nutrients [1]
over the parasite's body surface [1]
- (d) (i) 1. Large number of embryos [1]
2. Male and female organs present (hermaphrodite) [1]
- (ii) 1. High offspring mortality/difficult to reach new host. [1]
2. Fertilises its own eggs/mating impossible. [1]

[Total 11 marks]

- Q.6** (a) Time to travel 63 cm = $5 - 2 \frac{1}{2} = 2 \frac{1}{2}$ hours or 150 minutes [1]
Rate = $63 \times \frac{2}{5}$ or $63/150$ [1]
= 25.2 cm/hr or 0.42 cm/min [1]
(Correct answer showing no working =3, units missing or incorrect= -1)
- (b) (i) Source – region where photosynthate/sugar/carbohydrate is produced [1]
and exported. [1]
Sink – region where photosynthate is used/stored. [1]
- (ii) Source – leaves [1]
Sink – roots (accept aphid colony) [1]
- (c) (i) Sucrose [1]
- (ii) Translocation [1]
- (d) Phloem and sieve tubes (allow: mesophyll and palisade cells) [2]

[Total 11 marks]

- Q.7** (a) Thoracic spiracles open first / just before abdominal spiracles
Abdominal spiracles open as thoracic spiracles close.
Abdominal spiracles close just after the thoracic spiracles.
Abdominal spiracles open for the same length of time as thoracic spiracles
(Any 2) [2]
- (b) (i) Thoracic spiracles open when the abdomen expands [1]
Abdomen is compressed before abdominal spiracles open [1]
- (ii) Acting as a pump to draw air in via the thoracic spiracles, [1]
through the system and forces it out via the abdominal spiracles. [1]
- (c) Excessive water loss prevented / rapid dehydration if spiracles left
open. [1]

[Total 7 marks]

- Q.8** (a) A. Double circulation / left and right sides of heart completely separated. [1]
- B. RHS atrium connected to ventricle through tricuspid valve. [1]
- C. LHS atrium connected through bicuspid or mitral valve. [1]
- D. Vena cava brings deoxygenated blood from body to right atrium. [1]
- E. Pulmonary artery carries blood from right ventricle to lungs. [1]
- F. Pulmonary vein brings blood from lungs to left atrium. [1]
- G. Aorta carries blood from left ventricle to general body circulation. [1]
- H. Backflow is prevented by semi lunar valves [1]
- I. Heart is a pump driven by muscle which is thickest in left ventricle. [1]
- J. The coronary artery, supplies the heart muscle. [1]
- K. Aorta then branches into arteries and smaller arterioles supplying all body tissues. [1]
- L. Arteries - small lumen; thick layer of elastic tissue/muscle; endothelial lining. [1]
- M. Veins - wide lumen; little elastic tissue/thin muscle layer; endothelial lining; [1]
- N. Veins have (pocket) valves along their length. [1]
- O. Capillaries – endothelium only/ one cell thick; connection between arteries and veins. [1]

[Ten marks can be awarded from the fifteen available]

- (b)
- A. Leaf is flat and thin / large surface to volume ratio. [1]
 - B. Large surface area for light trapping. [1]
 - C. Thin to give short diffusion distance into leaf. [1]
 - D. Transparent epidermal layer. [1]
 - E. Covered by cuticle. [1]
 - F. Prevents water loss. [1]
 - G. Palisade mesophyll - vertically arranged packed cells or contain abundant chloroplasts. [1]
 - H. Arrangements gives maximum light absorption. [1]
 - I. Spongy mesophyll with large intercellular spaces. [1]
 - J. Allows room for movement of respiratory gases and water vapour. [1]
 - K. Diffusion of gases in and out of leaf through stomata. [1]
 - L. Stomatal pore surrounded by two guard cells. [1]
 - M. Change in water potential / pressure bends guard cells to open stomata. [1]
 - N. This change is related to photosynthetic activity so gas exchange only occurs when it is required. [1]
 - O. Closure at other times prevents water loss. [1]

[Ten marks can be awarded from the fifteen available]