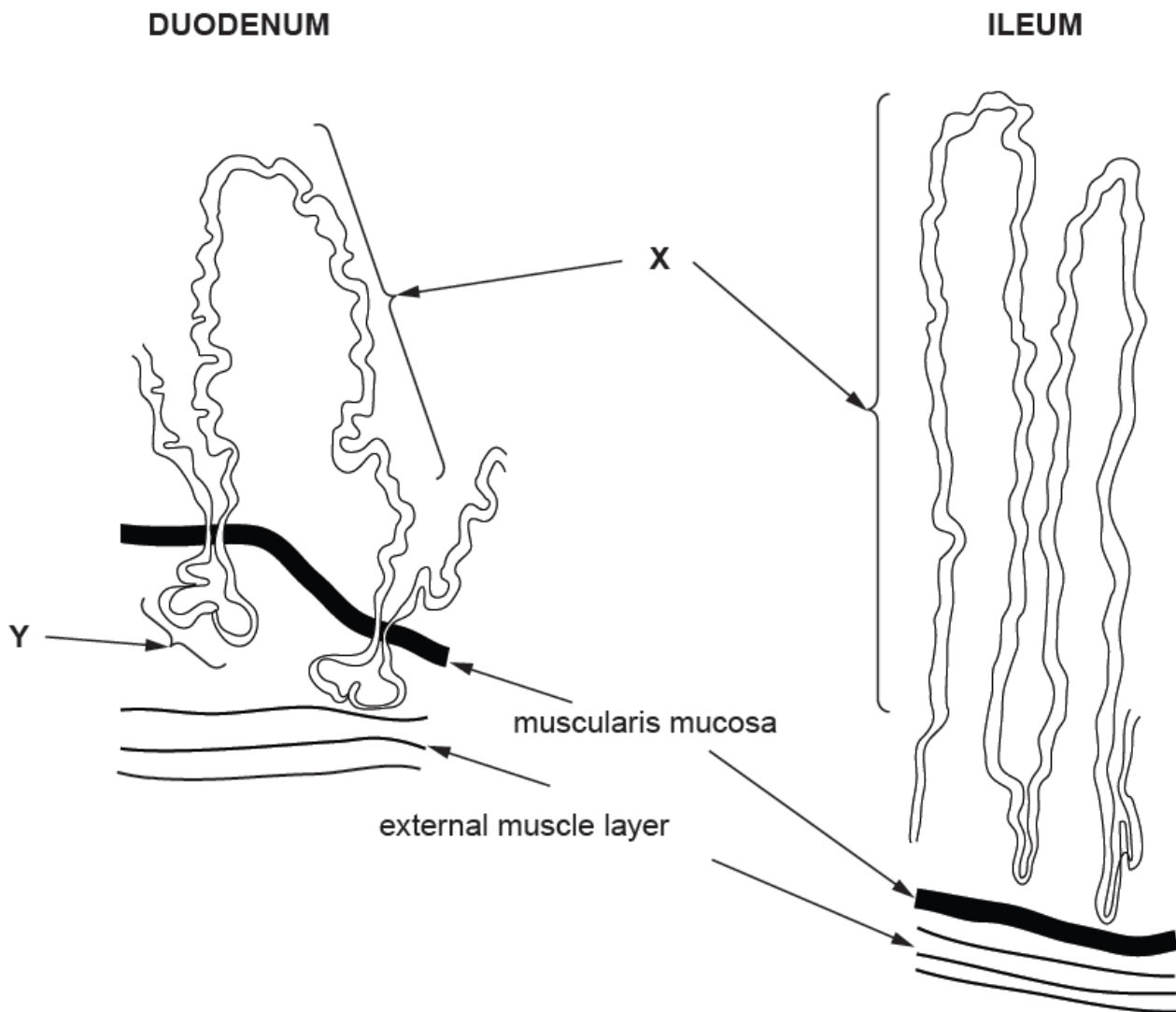


My Question Paper

1. The diagrams below show sections through the duodenum and ileum at the same magnification



(a) Name the structure labelled X in each diagram.

[1]

.....

(b) What is the **main** function of the regions of the alimentary canal shown in these diagrams?

[2]

DUODENUM

ILEUM

The duodenum receives food mixed with hydrochloric acid from the stomach.

(c) (i) Suggest how secretions from structure **Y** affect the pH of the duodenum contents.

[1]

.....
(ii) What effect would this have on the activity of the enzymes that pass into the duodenum from the stomach?

[1]

.....
(d) (i) Suggest how the increased size of structure **X** in the ileum reflects its main function.

[1]

.....
(ii) Describe **two** other adaptations of the ileum, **not** shown in the diagram, that increase the efficiency of this function.

[2]

.....
(e) Describe the appearance of structure **X** in a person suffering from coeliac disease and explain how this can lead to weight-loss and fatigue.

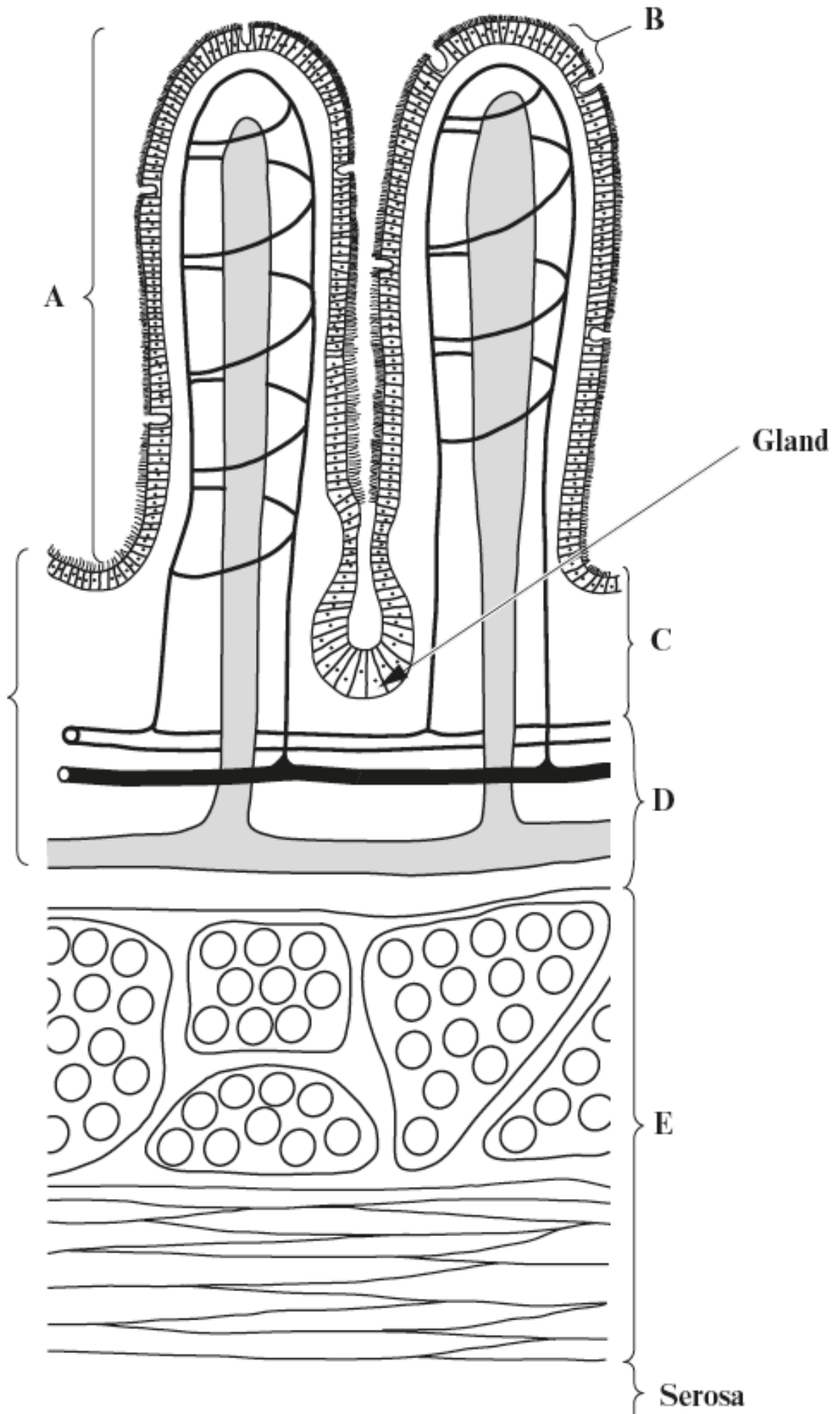
[3]

2. Complete the following paragraph by inserting the correct terms in the spaces.

[5]

Carbohydrates (polysaccharides) are broken down first of all in the mouth. The polysaccharide, starch is broken down by the enzyme into the disaccharide. The disaccharide is further broken down by the enzyme. into In both cases the type of reaction used for the breakdown is a reaction.

3. (a) The diagram shows a longitudinal section through a part of the alimentary canal.



(i) Name the part of the alimentary canal where structures A would be found.

[1]

(ii) Name the blood vessel that transports amino acids to the liver.

[1]

(iii) Use the diagram opposite to complete the following table.

[4]

Letter	Name	Function
B		increases surface area
C		contains glands that release secretions
D		contains vessels to transport products of digestion
E	muscle layer	

(b) Coeliac disease is a disease that affects the small intestine.
Suggest why symptoms often include diarrhoea and fatigue.

[3]

4.

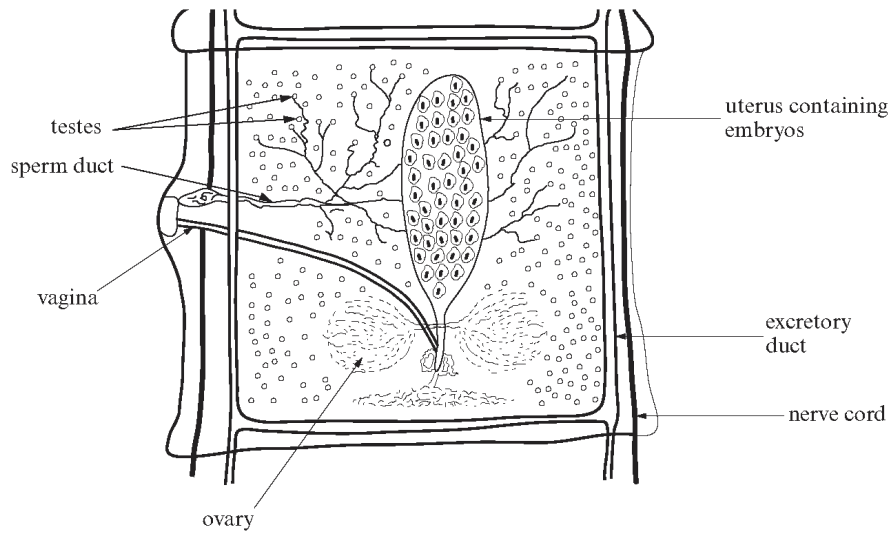
(a) Define the term *parasite*. [2]

.....
.....

(b) Name **two** characteristics of tapeworms which are adaptations to their parasitic life. [2]

.....
.....
.....

The diagram below shows one segment of a tapeworm found in the human gut. All segments in the body are identical.



(c) (i) One organ system found in almost all animals is absent from the tapeworm. By reference to the diagram, name this system. [1]

.....

(ii) How does the animal survive without this system? [2]

.....
.....
.....

(d) (i) Name **two** features of the worm's reproductive system, shown in the diagram, which are adaptations to its parasitic existence. [2]

1.

2.

(ii) Explain the importance of each of these features in the worm. [2]

1.

.....

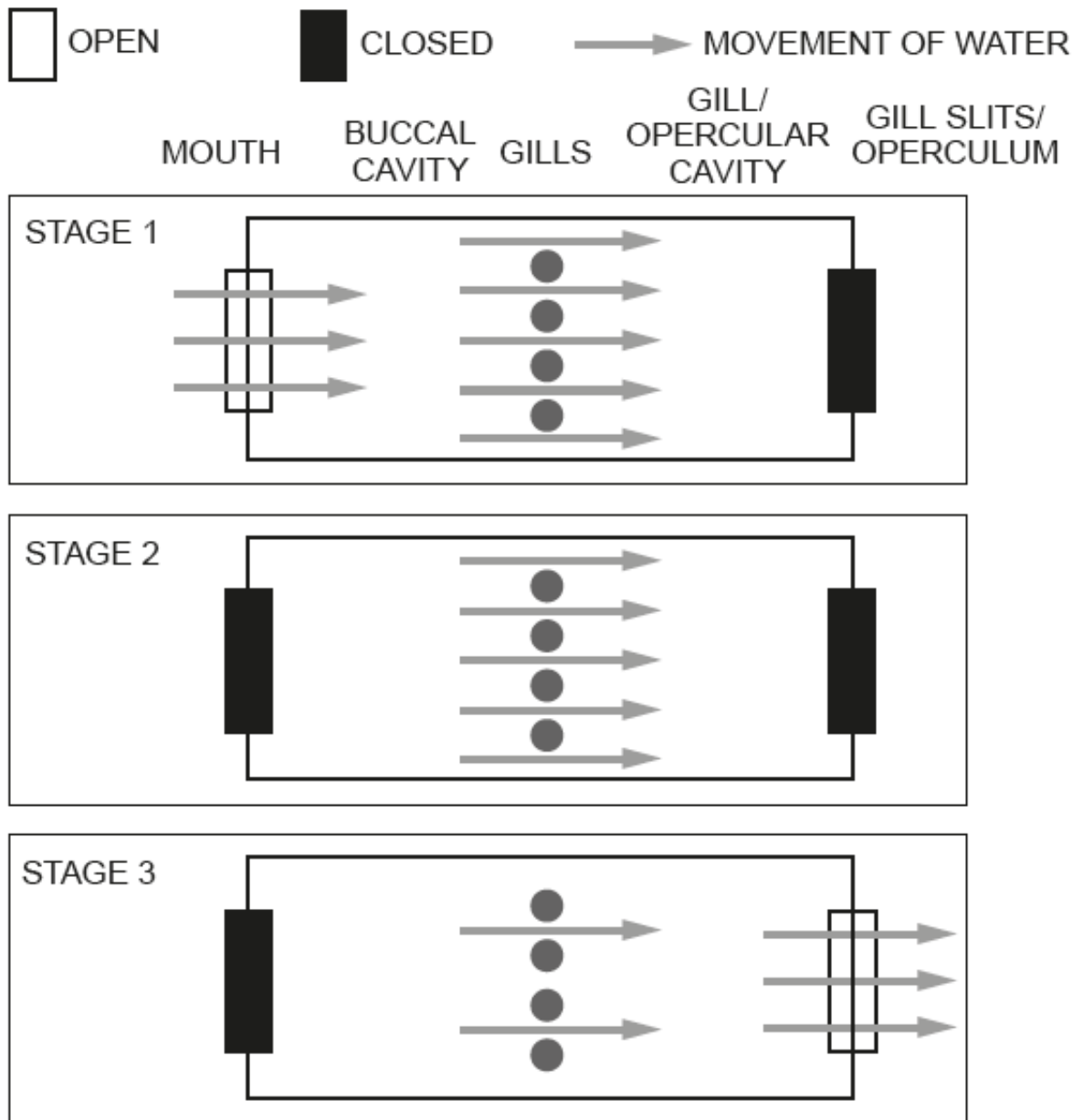
2.

.....

(Total 11 marks)

(b) The system of ventilation in a bony fish enables water to be passed continuously over its gills whilst the fish is at rest.

The diagrams below show three stages in the process of ventilation.



(i) Ventilation of the gills is achieved by pressure changes in the buccal and gill/ opercular cavities. Using information from the diagram opposite and your own knowledge describe the process of ventilation in a bony fish.

[4]

.....

.....

.....

.....

.....

.....

(ii) In order to further increase the efficiency of gas exchange, bony fish use a counter current flow. State what is meant by counter current flow and explain how this increases the efficiency of gas exchange in the bony fish.

[3]

.....

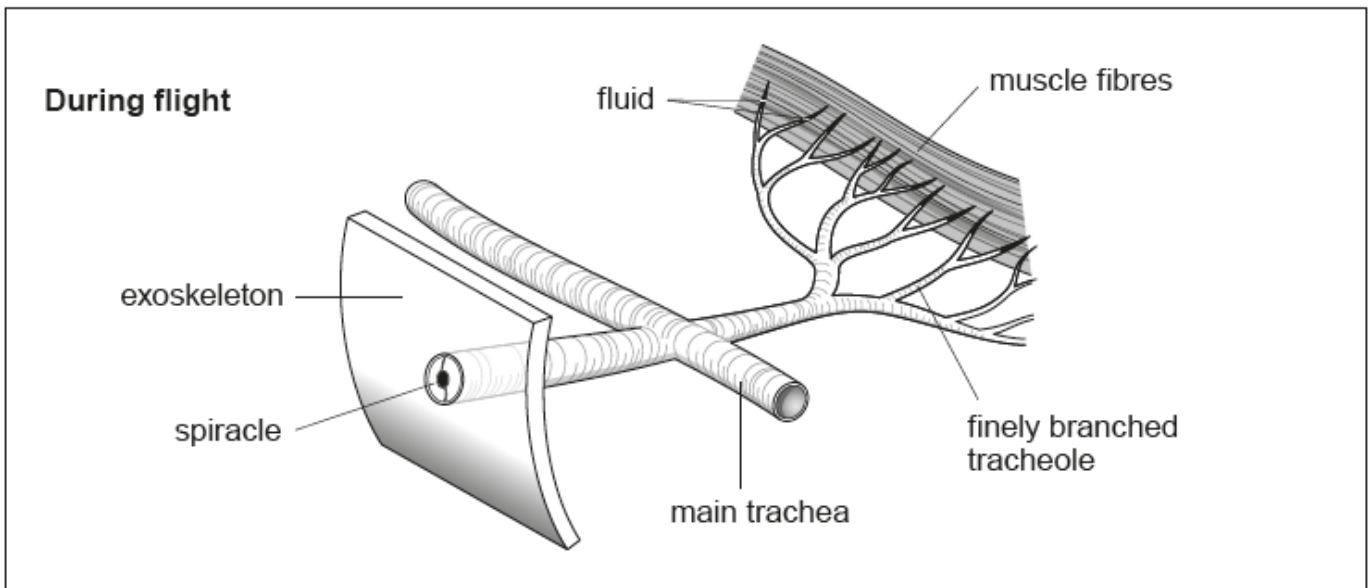
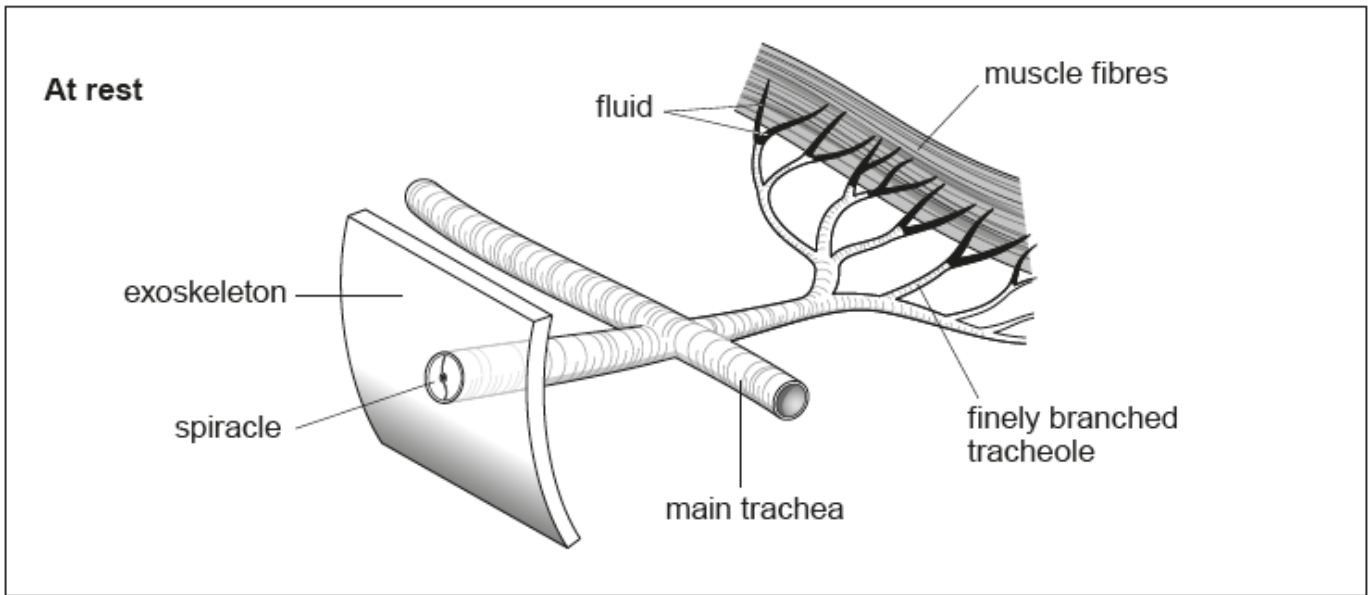
.....

.....

.....

.....

(c) The diagrams below show insect tracheoles supplying muscle fibres at rest and during flight.



(i) The tracheoles are found on the outside of the muscle fibres. Suggest why the maximum diameter of a muscle fibre never exceeds 20 μm in diameter.

[2]

.....

.....

.....

.....

(ii) Describe the change in fluid level in the tracheoles during flight. Suggest how this change benefits gaseous exchange during flight.

[2]

Marking Scheme

1.	Question	Marking details	Marks Available
	4 (a)	Villus/ villi;	1
	(b)	Duodenum digestion; Ileum absorption;	2
	(c)	(i) secretions neutralise stomach {acid / contents} / raise pH to alkaline / suitable pH above 7;	1
		(ii) inactivated / denatured/ not optimum conditions;	1
	(d)	(i) Increased / larger surface area for absorption;	1
		(ii) wall of ileum folded + to increase surface area; microvilli (on epithelial cells) + to increase surface area; ileum is long + increase time for absorption; (extensive) capillary network + remove absorbed substances; lacteals + remove absorbed substances; large number of mitochondria in epithelial cells + for active transport;	max 2
	(e)	(villi would be){ shorter / smaller}/{less surface area/ flattened}; NOT short/ small fewer nutrients absorbed / less food digested; (weight loss) body uses stored carbohydrate / fats; (fatigue) lack of{carbohydrates / fats} for {energy/ respiration};	max 3
		Question 4 Total	[11]

2. 1.
 (a) [5]
 Amylase;
 Maltose;
 Maltase;
 Glucose;
 Hydrolysis / hydrolytic;

3.

Question		Marking details	Marks Available															
3	(a)	(i) ileum	1															
		(ii) <u>Hepatic portal vein</u> ;	1															
		(iii)	4															
		<table border="1"> <thead> <tr> <th>Letter</th> <th>Name</th> <th>Role in digestion</th> </tr> </thead> <tbody> <tr> <td>B</td> <td>Microvilli;</td> <td>Increases surface area</td> </tr> <tr> <td>C</td> <td>Mucosa;</td> <td>Contains glands that release secretions</td> </tr> <tr> <td>D</td> <td>Submucosa;</td> <td>Contains vessels to transport products of digestion</td> </tr> <tr> <td>E</td> <td>Muscle layer</td> <td>Peristalsis/ or description;</td> </tr> </tbody> </table>	Letter	Name	Role in digestion	B	Microvilli;	Increases surface area	C	Mucosa;	Contains glands that release secretions	D	Submucosa;	Contains vessels to transport products of digestion	E	Muscle layer	Peristalsis/ or description;	
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	(b)	<p>(coeliac disease results in) {flattening/truncating/blunting/damage} to villi;</p> <p>reduced surface area for <u>absorption</u>; NOT uptake</p> <p>(fatigue due to) <u>less</u> nutrients <u>absorbed</u>/less glucose for respiration; NOT less food absorbed</p> <p>(diarrhoea due to) less water absorbed;</p> <p>Question 3 Total</p>	<p>Max 3</p> <p>[9]</p>															

4. (a) (i) Source – region where photosynthate is produced and exported. [1]
 Sink – region where photosynthate is used. [1]
- (ii) Source – leaves [1]
 Sink – roots (accept aphid colony) [1]
- (b) Time to travel 63 cm – $5 \cdot 2 \frac{1}{2} = 2 \frac{1}{2}$ hours [1]
 Rate = $63 \times \frac{2}{5} = 25.2$ [1]
cm/hr [1]
- (c) (i) Sucrose [1]
 (ii) Translocation [1]
- (d) Phloem and sieve tubes. [2]

[Total 11 marks]

5.

- (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 and 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 2

controls / creates osmotic gradient across root

max

3

Question Total 10

6.	Question	Marking details	Marks Available
4	(a)	Increases surface area; <u>Diffusion</u> takes place (over whole area);	2
	(b)	(i) Mouth opens/floor of buccal cavity lowered; Volume of {buccal cavity/inside the mouth} increases/pressure lowered inside {buccal cavity/mouth}; Water {pulled in from outside/ enters due to pressure difference}; Mouth closes and {buccal cavity then contracts/ floor of buccal cavity raises}; Water forced {across/through} gills (into gill cavity); Pressure in gill cavity increases; Forces open the operculum / gill slits;	Max 4
		(ii) Blood flows across (gills/ filaments/ lamellae/ gill plates) in <u>opposite</u> direction to water; Blood always meets water containing a <u>higher</u> oxygen concentration/{diffusion/ concentration} gradient maintained/ equilibrium is never reached; Across entire {gill/ gas exchange surface}; <u>Higher</u> saturation of blood with oxygen achieved;	Max 3
	(c)	(i) Diffusion pathway would be too long/ ensures a short diffusion pathway; Speed of diffusion too slow; To supply sufficient oxygen;	Max 2
		(ii) Less fluid/ fluid moves into muscle fibres/ fluid level decreases; More area for gaseous exchange/ shorter diffusion pathway;	2
Question 4 Total			[13]

Examiner's Comments

1. A surprising number of candidates were unable to recognise a villus or recall the main functions of the duodenum and ileum.

Many candidates proceeded to suggest that structure Y (Brunner's glands) secrete hydrochloric acid to lower the pH and provide optimum conditions for stomach enzymes.

As in previous questions, a lack of detail in answers cost many candidates marks. For example, at AS level it is expected that reference to microvilli would be accompanied by their function of increasing surface area.

This comment originally referred to question 4 on paper 1072/02 (14/01/2014)

2. Although this was intended to be a relatively simple introduction to the paper, many candidates had problems, particularly with the type of reaction involved with many describing it as a condensation reaction. It was pleasing to see that the majority of candidates ensured that they clearly wrote maltose or maltase, as appropriate and left no grounds for confusion.

This comment originally referred to question 1 on paper 1072/02 (05/09/2013)

3. Part (a) was basic structural recall. Where candidates had learnt the structure of the small intestine this was well answered. Part (b) elicited some good responses with most candidates correctly describing the effects of coeliac disease on the villi. However, explanations of the symptoms were less well answered. Many failed to explain the link of less water absorbed to diarrhoea or less nutrients absorbed to fatigue. At this level, examiners do expect candidates to refer to absorption rather than just uptake.

This comment originally referred to question 3 on paper 1072/02 (03/06/2013)

4. Some of the poorer definitions of a parasite would have equally applied to a predator and 'feeding off another animal' is not adequate. The rest of the question was generally answered quite well. A choice of organ systems was allowed for in (c). In (d), markers frequently came across the statement that the worms are hermaphrodite and therefore reproduce asexually!

This comment originally referred to question 5 on paper 1072/01 (18/01/2011)

5. Essay (a) on the uptake of water by plants was usually well answered with many candidates gaining high marks. Marks were lost mainly due to a lack of detail in explaining the role of ions in the process and, in some cases, the continued use of differences in water concentration rather than water potential to explain the movement of water.

Most candidates answered essay (b); the general standard of their responses, however, was poor and demonstrated a lack of understanding of several basic biological principles.

A large number of candidates could not explain the link between increased volume and increased metabolism or the link between surface area and absorption of gases.

Many candidates described a list of adaptations of terrestrial mammals to gaseous exchange in air as large surface area, moist, rich blood supply, internal etc., without explaining how or why these adaptations are important. A significant number also described gaseous exchange in fish, insects, birds, reptiles and amphibia and gained no marks for their efforts.

This comment originally referred to question 6 on paper 1072/01 (18/01/2012)

6. Most candidates gave a satisfactory evaluation of the role of gill filaments.

The ventilation of gills was often well answered with detailed comments, however, in a significant number of cases there were vague references to an increase in volume or a decrease in pressure without any direct reference to where these changes occurred.

The counter current mechanism is well understood and many candidates gave a very full description of the process, though a minority did confuse it with parallel flow.

The processes in the operation of insect tracheoles were not as well understood. Whilst many candidates recognised that an increase the diameter of the muscle fibre would lead to insufficient oxygen reaching the muscles, few could relate this to a longer diffusion pathway or speed of diffusion.

Whilst most candidates recognised that the level of fluid would decrease during flight, (though a minority did say that it would increase) few could extend their answers by correct references to surface area or short diffusion pathways.

This comment originally referred to question 4 on paper 1072/01 (02/06/2014)