1 Fig. 6.1 shows the alimentary canals of two mammals, an insect-eating bat, which is a carnivore, and a rabbit, which is a herbivore.

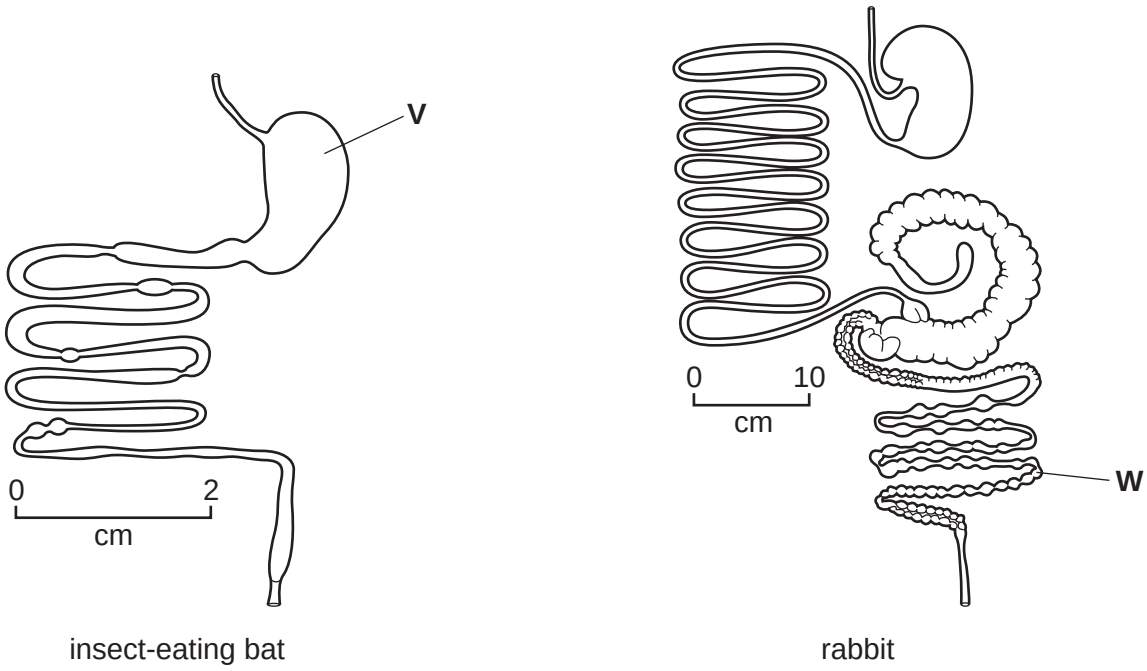

Fig. 6.1

(a) Name the organs labelled **V** and **W**.

V .....

W .....

[2]

(b) Explain the role of mechanical digestion.

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..... [3]

Scientists investigated digestion in different species of mammal. The mammals that they studied ranged in size from an elephant shrew, *Elephantulus edwardii*, with a mass of 50 g to an ox, *Bos taurus*, with a mass of 220 kg.

The scientists added indigestible particles to the animals' food and timed how long the particles stayed in the digestive system.

The results for 24 different mammal species are shown in Fig. 6.2.

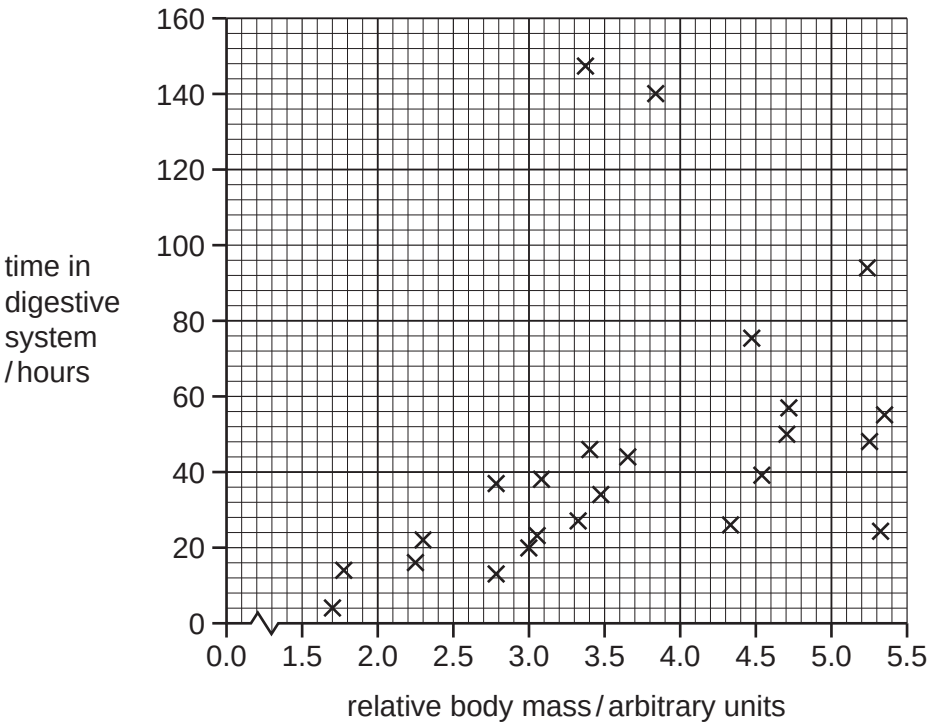

Fig. 6.2

(c) The scientists concluded that food stays longer in the digestive systems of larger mammals compared with smaller mammals.

Discuss the evidence from Fig. 6.2 for **and** against the statement that food stays longer in the digestive systems of larger mammals.

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..... [4]

[Total: 9]

2 Fig. 3.1 shows part of the thoracic and abdominal cavities of a human.

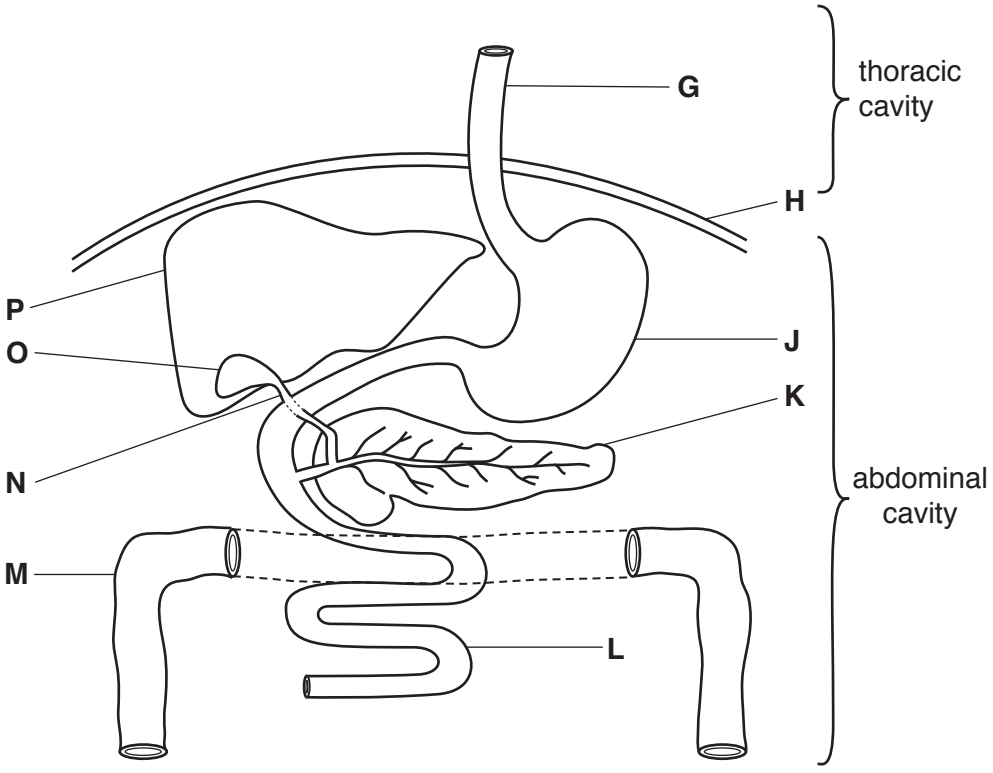

Fig. 3.1

(a) (i) Name the structures labelled **G**, **H** and **M**.

G .....

H .....

M .....

[3]

(ii) Table 3.1 shows five functions of organs in the abdominal cavity.

Complete the table by:

- naming the organ that carries out each function
- using the letters from Fig. 3.1 to identify the organ named.

One row has been completed for you.

Table 3.1

function	name	letter from Fig. 3.1
conversion of glucose to glycogen		
secretion of insulin and glucagon	pancreas	**K**
absorption of products of digestion		
storage of bile		
chemical digestion of protein in an acidic pH		

[4]

(b) Fat is particularly difficult to digest as it is not water soluble and forms spherical globules in the alimentary canal.

Fig. 3.2 is a diagram showing what happens to fat globules when mixed with bile.

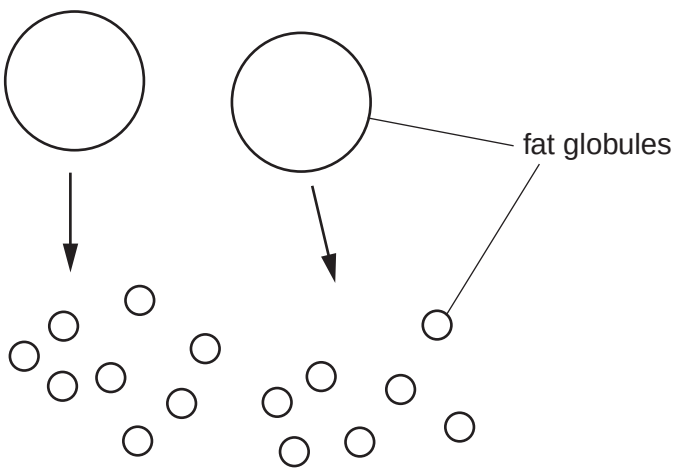

Fig. 3.2

(i) Name the process shown in Fig. 3.2.

.....[1]

(ii) Explain the advantage of the process shown in Fig. 3.2.

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.....[2]

(c) Insulin and glucagon are hormones secreted by the pancreas to control the concentration of glucose in the blood.

(i) Complete Table 3.2 to show how the uptake of glucose by cells and the concentration of glucose in the blood respond when the two hormones are secreted.

Use the words *increases*, *decreases* and *stays the same* to complete the table.

Table 3.2

hormone	uptake of glucose by cells	concentration of glucose in the blood
insulin		
glucagon		

[2]

(ii) State another hormone that influences the concentration of glucose in the blood.

.....[1]

(d) Explain why the control of the concentration of glucose in the blood is an example of negative feedback.

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.....[3]

[Total: 16]

3 **(a)** Describe how food is moved along the small intestine.

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..... [2]

(b) The small intestine is lined by many villi.

Fig. 5.1 shows a longitudinal section of a villus.

Fig. 5.2 shows a cross-section of the same villus at **V** – **W**.

The diagrams are not drawn to the same scale.

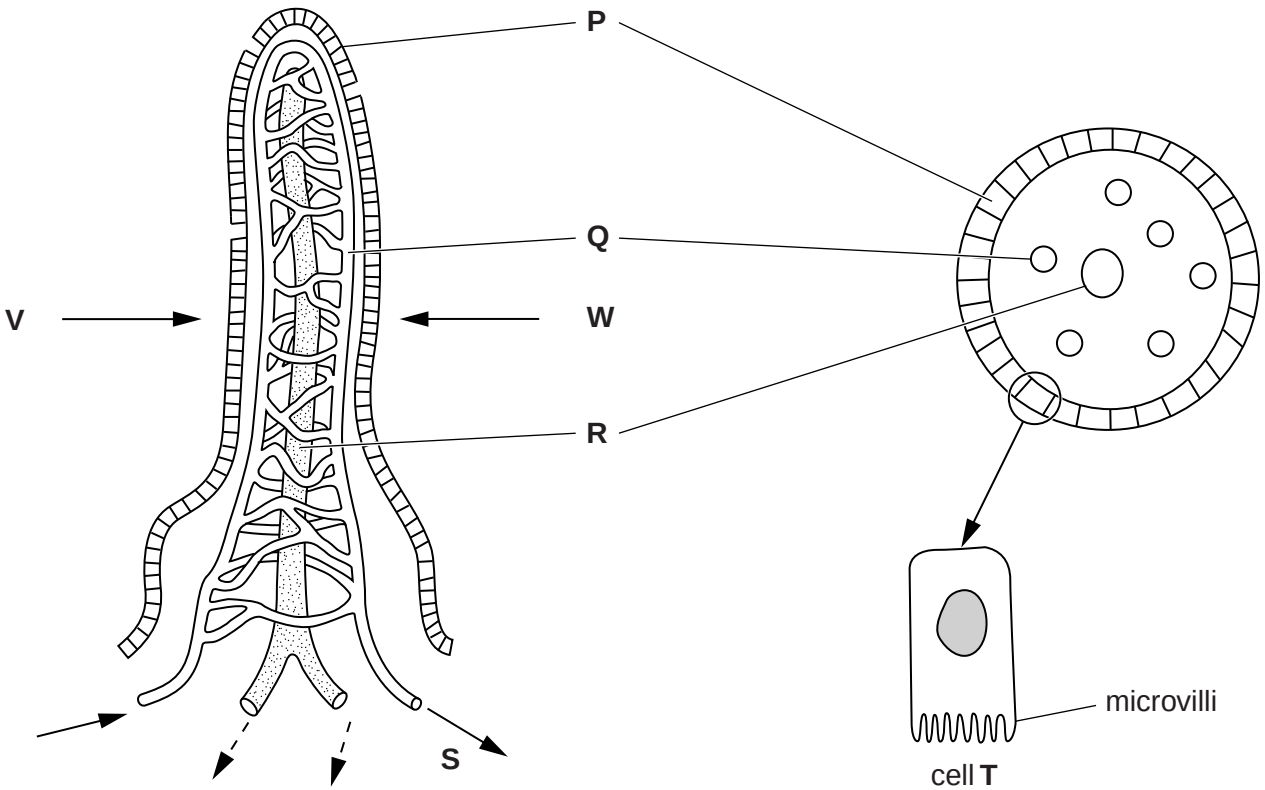

Fig. 5.1 **Fig. 5.2**

(i) Name structures **P**, **Q**, and **R**.

P .....

Q .....

R ..... [3]

(ii) The blood that flows from **S** enters a vein.

Name the vein that transports blood away from the small intestine.

..... [1]

(iii) Cell **T** is an example of the cells that form the surface of the villi.

Explain why there are many microvilli on cell **T**.

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..... [2]

(iv) Some of the cells on the surface of the villi secrete mucus for protection.

Suggest what the villi need to be protected against.

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..... [2]

[Total: 10]

4 The alimentary canal is adapted for chemical and mechanical digestion.

(a) Explain how chemical digestion differs from mechanical digestion.

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..... [3]

Fig. 5.1 is a diagram of the human alimentary canal.

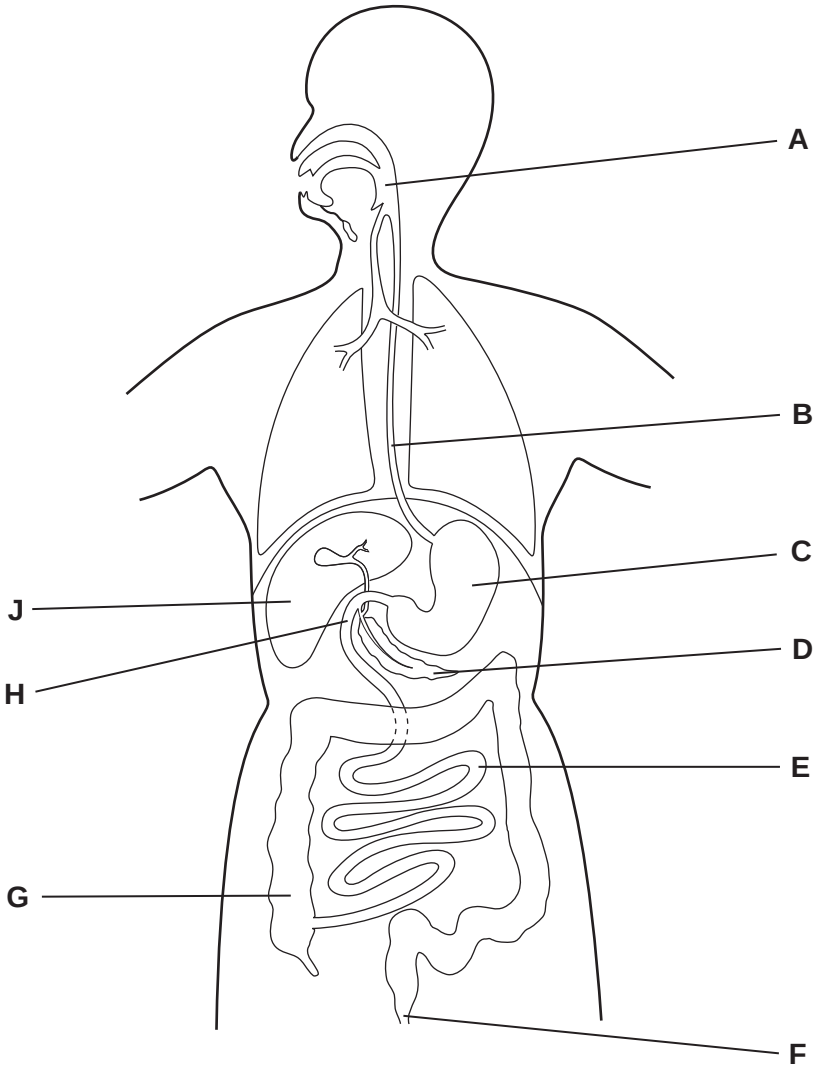

Fig. 5.1

(b) Table 5.1 shows four functions of the alimentary canal.

Complete the table by:

- naming the part of the system that carries out each of the functions;
- using the letters from Fig. 5.1 to identify the part of the system named.

One row has been completed for you.

Table 5.1

function	name of part	letter from Fig. 5.1
produces bile	liver	**J**
most soluble food is absorbed into the blood		
indigestible food is egested		
hydrochloric acid is produced		
protease, lipase and amylase are produced		

[4]

(c) Some people develop gallstones, made of cholesterol, that accumulate in the gall bladder and the bile duct. Gallstones block the flow of bile.

Explain how gallstones can affect the digestion of fat.

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..... [3]

(d) Cholesterol can also accumulate in the walls of the coronary arteries.

Explain the effects that this might have.

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..... [3]

[Total: 13]