

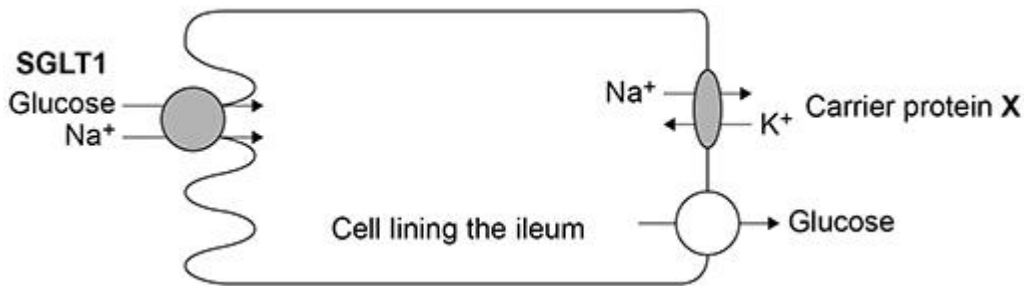


**Q2.**

**Figure 1** shows a cell from the lining of the ileum specialised for absorption of products of digestion.

SGLT1 is a carrier protein found in the cell-surface membrane of this cell, it transports glucose and sodium ions ( $\text{Na}^+$ ) into the cell.

**Figure 1**



- (a) The action of the carrier protein **X** in **Figure 1** is linked to a membrane-bound ATP hydrolase enzyme.

Explain the function of this ATP hydrolase.

---



---



---



---



---

(2)

- (b) The movement of  $\text{Na}^+$  **out** of the cell allows the absorption of glucose **into** the cell lining the ileum.

Explain how.

---



---



---



---



---

(2)

**Q3.**

To study lipid digestion, a scientist placed a tube into the gut of a healthy 20-year-old man. The end of the tube passed through the stomach but did not reach as far as the ileum.

The scientist fed the man a meal containing triglycerides through the tube. The scientist also used the tube to remove samples from the man's gut at intervals after the meal.

The scientist measured the type of lipid found in the samples. Some of her results are shown in the table below.

Sample	Time of collection after meal / min	Concentration of fatty acids / mg cm <sup>-3</sup>	Concentration of triglycerides / mg cm <sup>-3</sup>
<b>A</b>	45	2.7	0.6
<b>B</b>	75	3.3	0.0

- (a) Use your knowledge of lipid digestion to explain the differences in the results for samples **A** and **B** shown in the table above.

You should assume that **no** absorption had occurred.

---

---

---

---

---

---

---

---

---

---

(3)

- (b) After collecting the samples, the scientist immediately heated them to 70 °C for 10 minutes.

Explain why.

---

---

---

---

---

(2)

- (c) Describe the role of micelles in the absorption of fats into the cells lining the ileum.

---

---

---

---

---

---

---

---

---

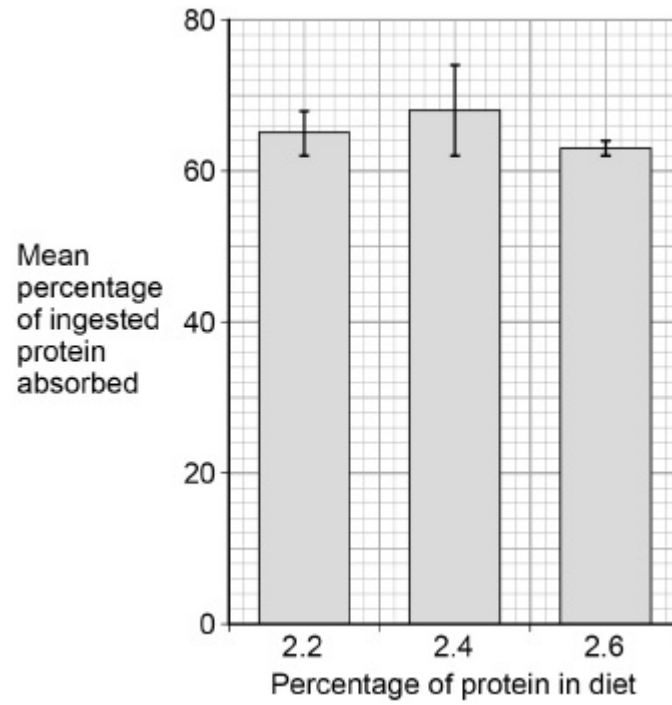
---

(3)

(Total 8 marks)



Figure 1



(b) What can you conclude about the absorption of the products of protein digestion as the percentage of protein increased in the rabbits' food?

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

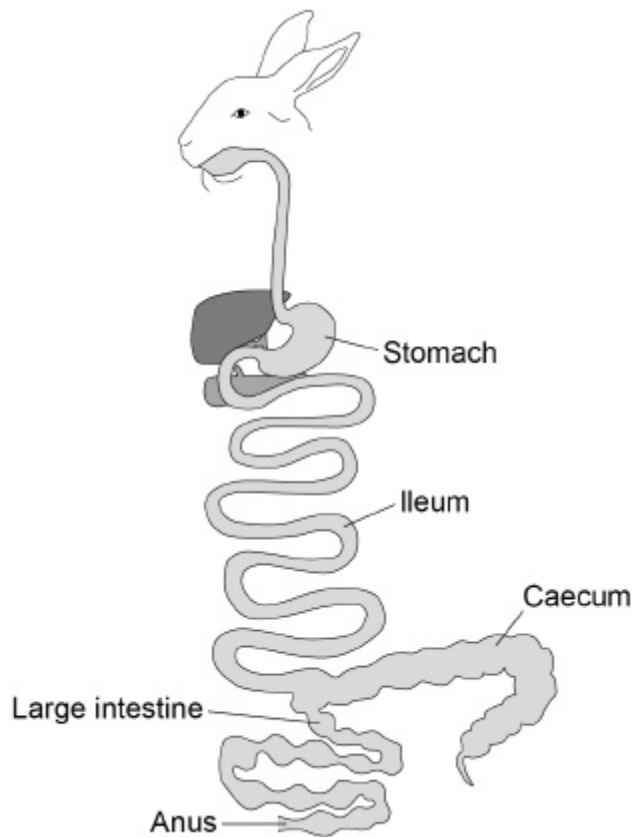
---

---

(3)

The digestive system of a rabbit is shown in **Figure 2**.

**Figure 2**



- (b) The food eaten by a rabbit is digested mainly by microorganisms in its caecum. The caecum is a section of intestine attached between the ileum and the large intestine. The resulting semi-digested material leaves the anus of a rabbit as soft, caecal droppings. The rabbit then eats these caecal droppings.

Use this information and **Figure 2** to suggest how eating its own caecal droppings helps a rabbit's digestion and absorption of dietary protein.

---



---



---



---



---



---



---



---



---

---



---



---

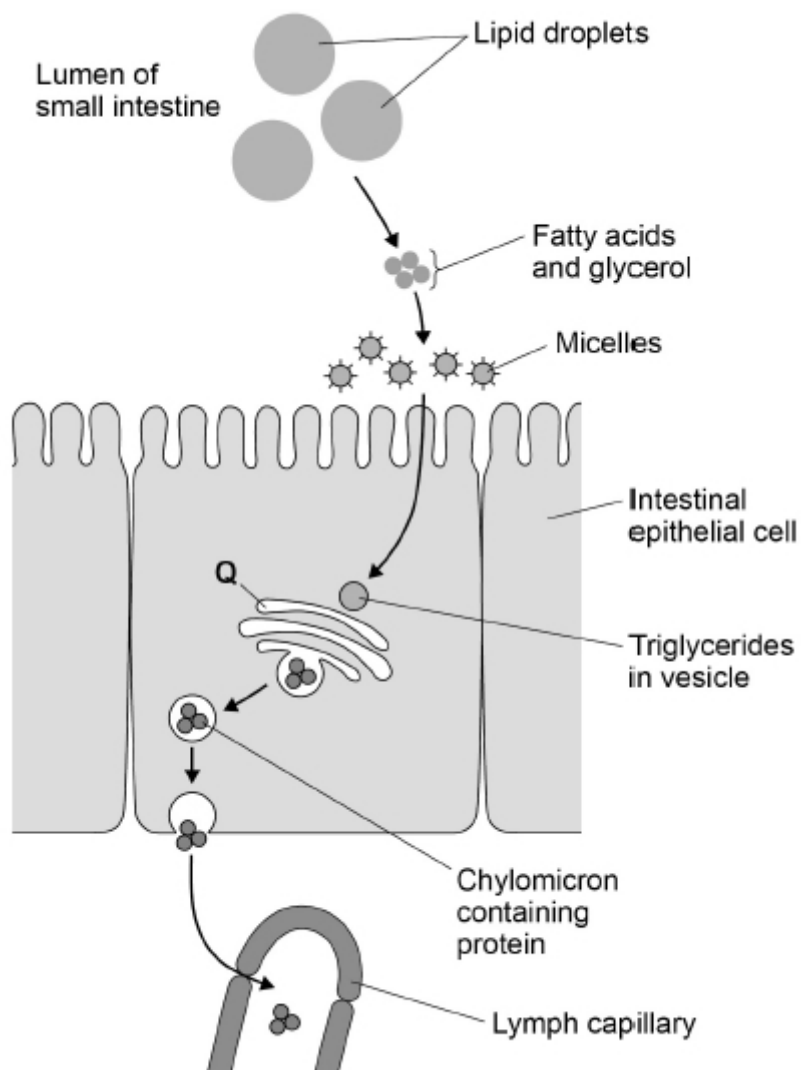


---

(3)  
(Total 10 marks)

**Q5.**

The diagram outlines the digestion and absorption of lipids.





- (a) Tick (✓) the box by the name of the process by which fatty acids and glycerol enter the intestinal epithelial cell.

Active transport	<input type="checkbox"/>
Diffusion	<input type="checkbox"/>
Endocytosis	<input type="checkbox"/>
Osmosis	<input type="checkbox"/>

(1)

- (b) Explain the advantages of lipid droplet and micelle formation.

---



---



---



---



---



---



---



---

(3)

- (c) Name structure **Q** in the diagram above and suggest how it is involved in the absorption of lipids.

Name \_\_\_\_\_

How it is involved \_\_\_\_\_

---



---



---



---



---

(4)

(Total 8 marks)

**Q6.**

- (a) Cells lining the ileum of mammals absorb the monosaccharide glucose by co-transport with sodium ions. Explain how.

---



---



---



---



---



---



---



---



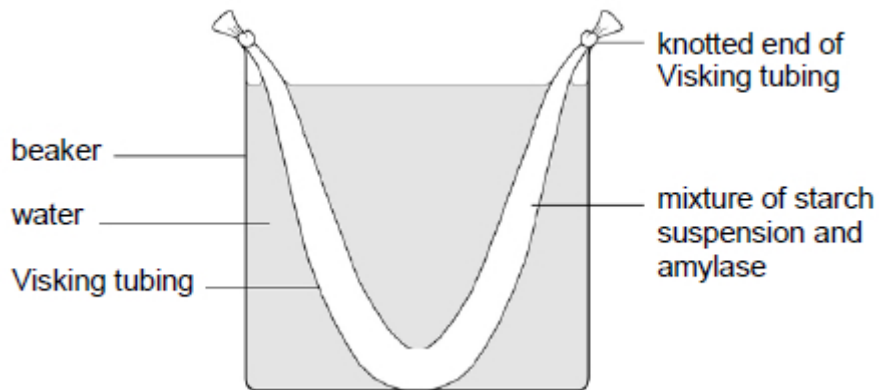
---



---

(3)

A student set up the experiment shown in the diagram below.



The material from which Visking tubing is made is partially permeable.

After 15 minutes, the student removed samples from the liquid in the beaker and from the liquid inside the Visking tubing. She carried out biochemical tests on these samples. She drew the table below to record her results.

- (b) Complete the table by placing a tick (✓) in each box that you expect to have shown a positive result.

Biochemical test	Liquid from beaker	Liquid inside Visking tubing
Biuret reagent		
Iodine in potassium iodide		
Benedict's solution		

(3)

- (c) Justify your answers to part (b).

---

---

---

---

---

---

---

---

---

---

(3)

(Total 9 marks)

