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— **TUITION** —

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# BIOLOGY

## ORGANISMS EXCHANGE SUBSTANCES

Level & Board	AQA (A-LEVEL)
TOPIC:	DIGESTION & ABSORPTION
PAPER TYPE:	QUESTION PAPER - 1
TOTAL QUESTIONS	6
TOTAL MARKS	41

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## Digestion and Absorption - 1

1.

(a) Explain the procedures by which lipid molecules that have been digested are absorbed and transported from the ileum into lymph vessels. (5)



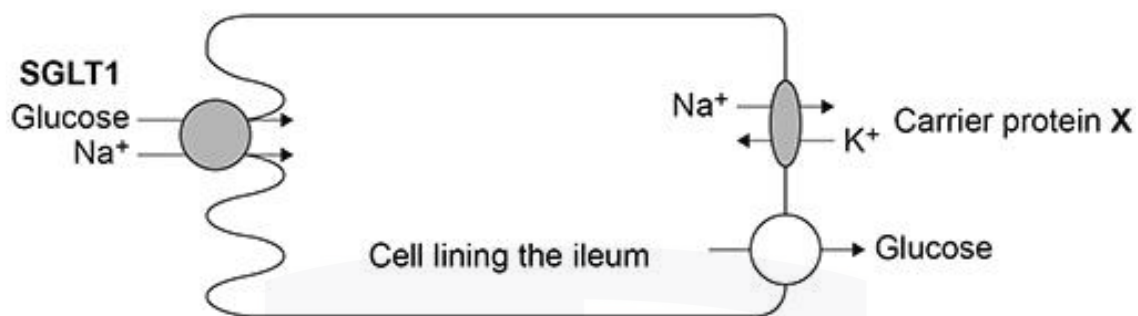
2.

A cell from the ileum lining that is specialized for absorbing digestive products is seen in Figure 1.

This cell surface membrane contains the carrier protein SGLT1, which brings sodium ions ( $\text{Na}^+$ ) and glucose inside the cell.

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Figure 1



(a) An ATP hydrolase enzyme that is confined to a membrane is connected to the activity of the carrier protein X in Figure 1.

Describe the role that this ATP hydrolase plays. (2)

(b) Glucose can enter the cell lining the ileum through the migration of Na<sup>+</sup> out of the cell.

Describe how. (2)

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**3.**

A scientist inserted a tube into the stomach of a 20-year-old man in good health to investigate the digestion of fats. The tube's end went through the stomach but stopped short of the ileum.

Through the tube, the scientist gave the man a meal that contained triglycerides.

After the meal, the scientist continued to take samples from the man's stomach using the same tube.

The type of lipid present in the samples was measured by the scientist. A selection of her findings are included in the table below.

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

**(a)** Make use of your understanding of lipid digestion to explain why the results for samples A and B in the preceding table differ.

It is reasonable to presume that there had been no absorption. **(3)**

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**(b)** The scientist promptly heated the samples for ten minutes at 70 °C after gathering them.

Describe why? **(2)**

**(c)** Explain the function of micelles in the ileum's lining cells' absorption of lipids. **(3)**

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4.

(a) Explain the function of enzymes in a mammal's protein digestion process.

(4)



Researchers looked at the effects of rabbit diets on protein absorption and digestion. The amount of food that the scientists gave the rabbits was the same in bulk, but the proportion of protein varied.

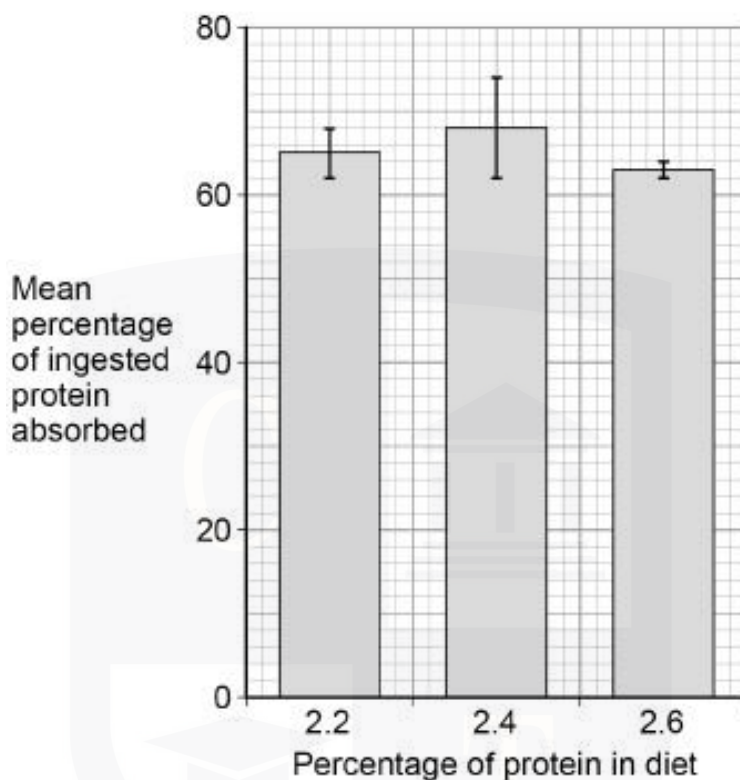
The researchers calculated the mean mass of absorbed protein in the rabbit diet and presented the result as a percentage.

Figure 1 displays the results of the scientists.

Two standard deviations are displayed by the error bars.

95% of the data is covered by  $\pm 2$  standard deviations.

**Figure 1**



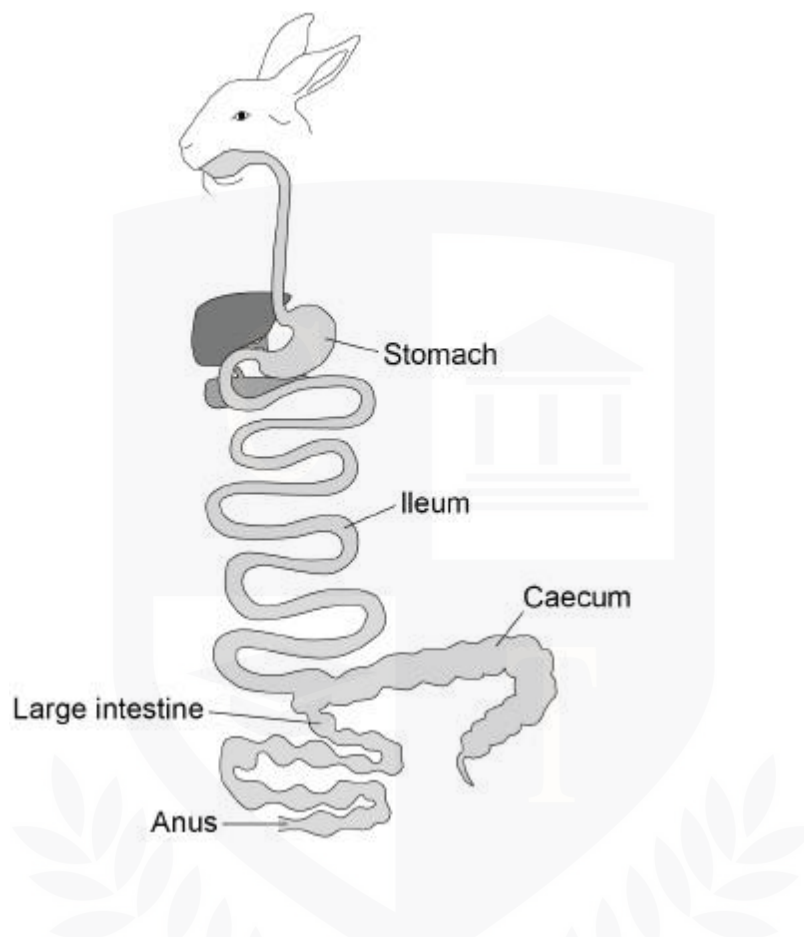
**(b)** Based on the increasing proportion of protein in the rabbits' diet, what conclusions can you draw regarding the absorption of the digested protein products? **(3)**

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**Figure 2** depicts a rabbit's digestive system.

**Figure 2**



**(c)** Microorganisms in a rabbit's caecum mostly break down the food it eats. A segment of the intestine that is joined between the ileum and the large intestine is called the caecum. The resultant semi-digested substance excretes as soft caecal droppings from the rabbit's anus. The rabbit subsequently consumes these feces.

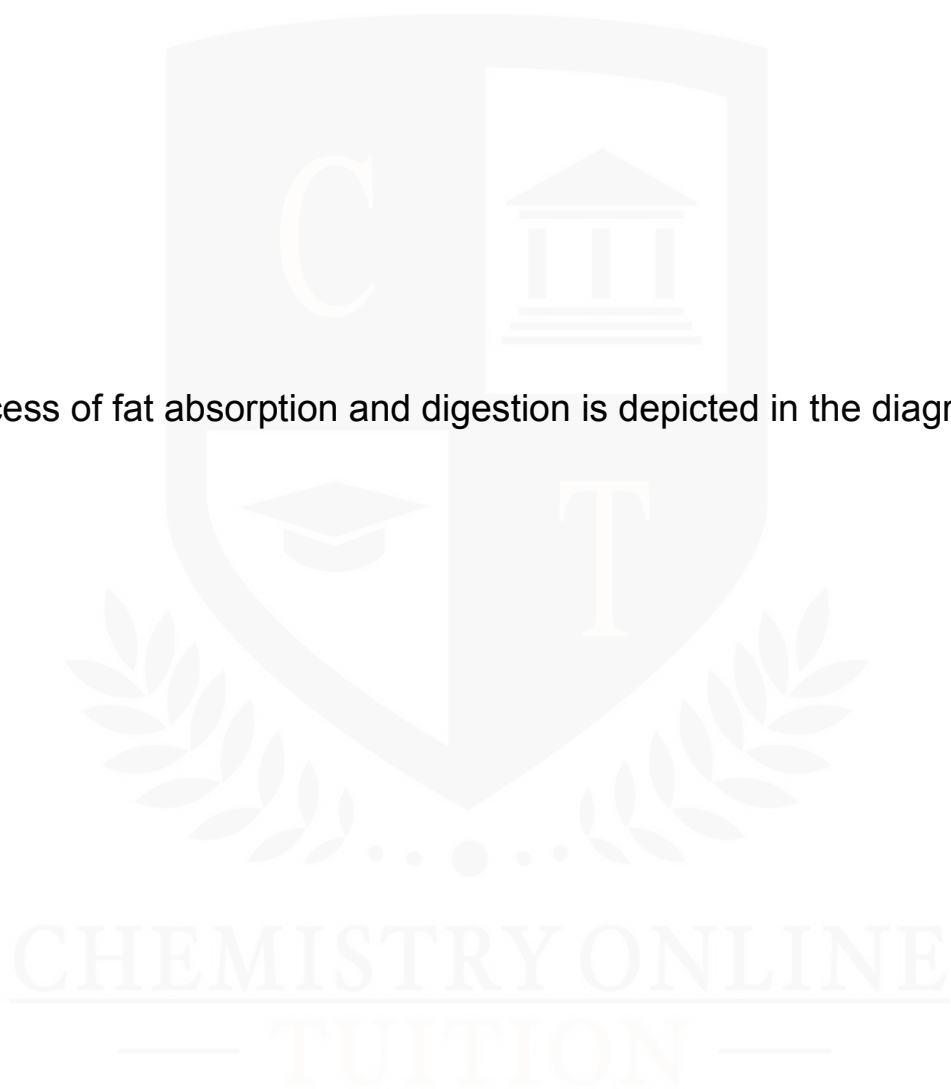
Explain how a rabbit's digestion and absorption of food protein can be aided by consuming its own caecal droppings, using the information provided here and Figure 2. **(3)**

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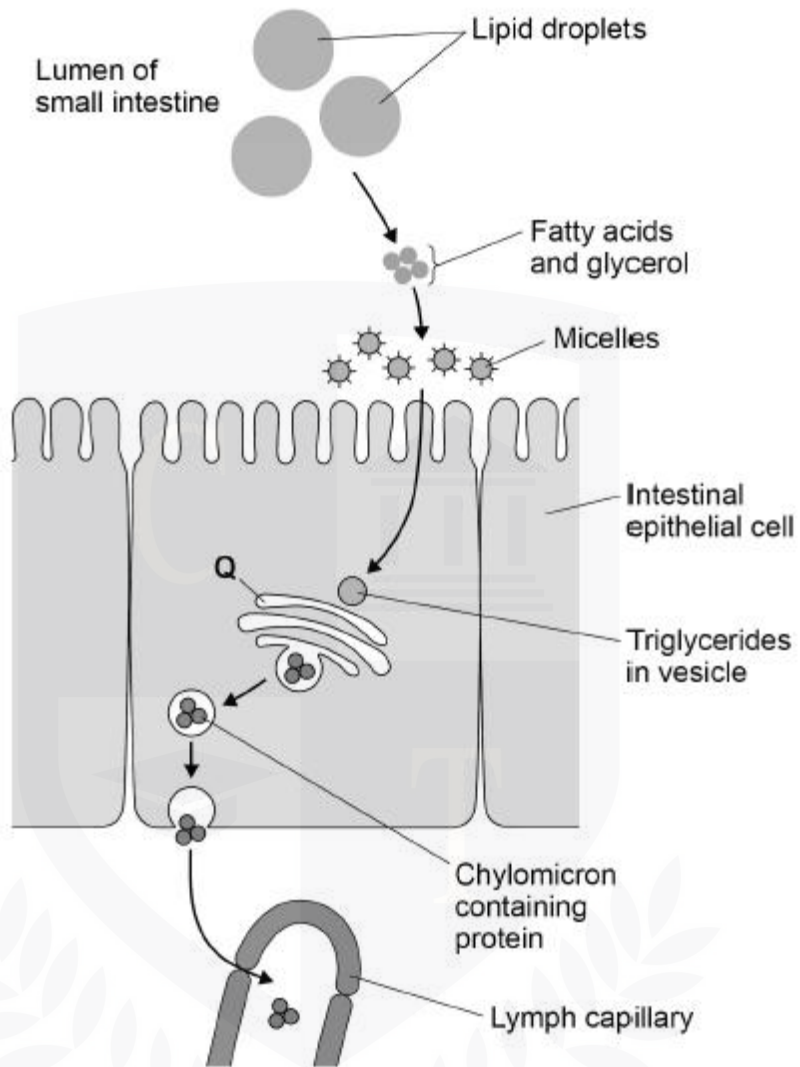


**5.**

The process of fat absorption and digestion is depicted in the diagram.



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**(a)** Mark (✓) the box corresponding to the mechanism via which glycerol and fatty acids penetrate intestinal epithelial cells. **(1)**

Active transport

Diffusion

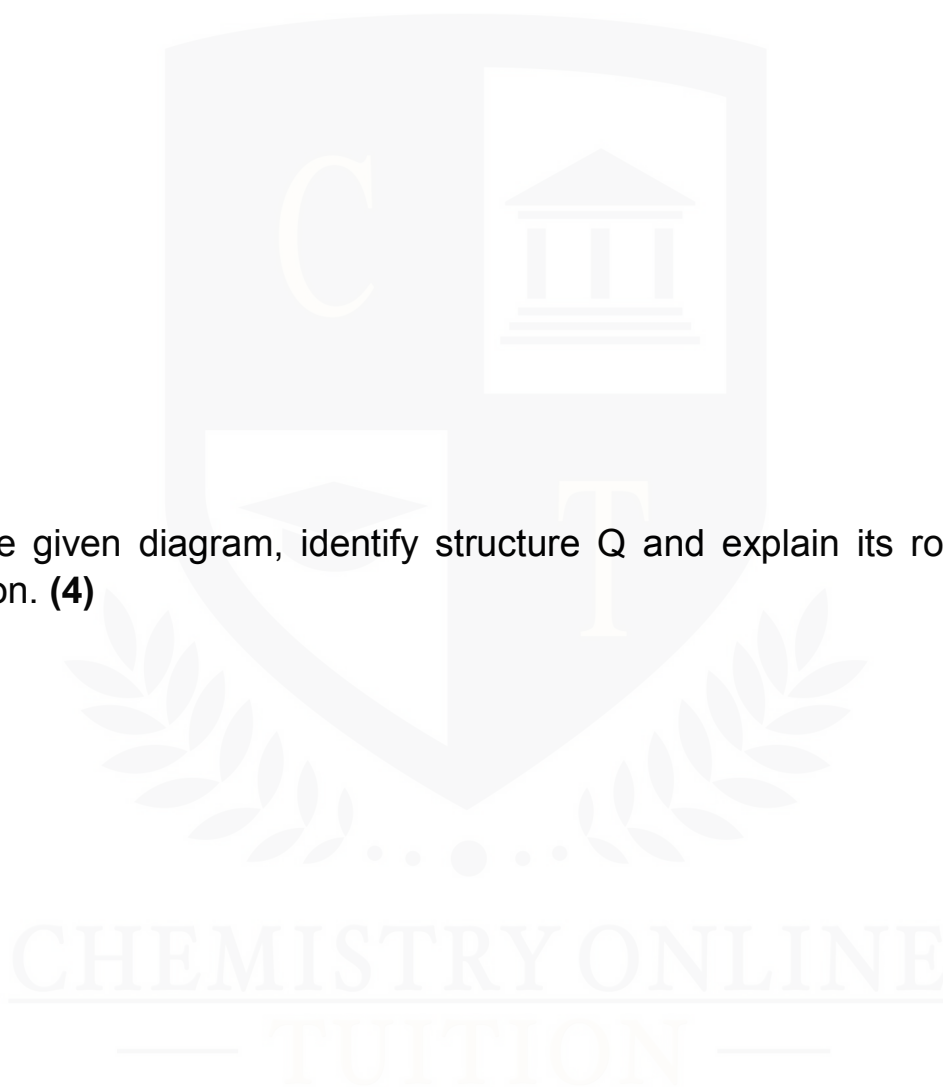
Endocytosis

Osmosis



**(b)** Describe the benefits of micelle and lipid droplet production. **(3)**

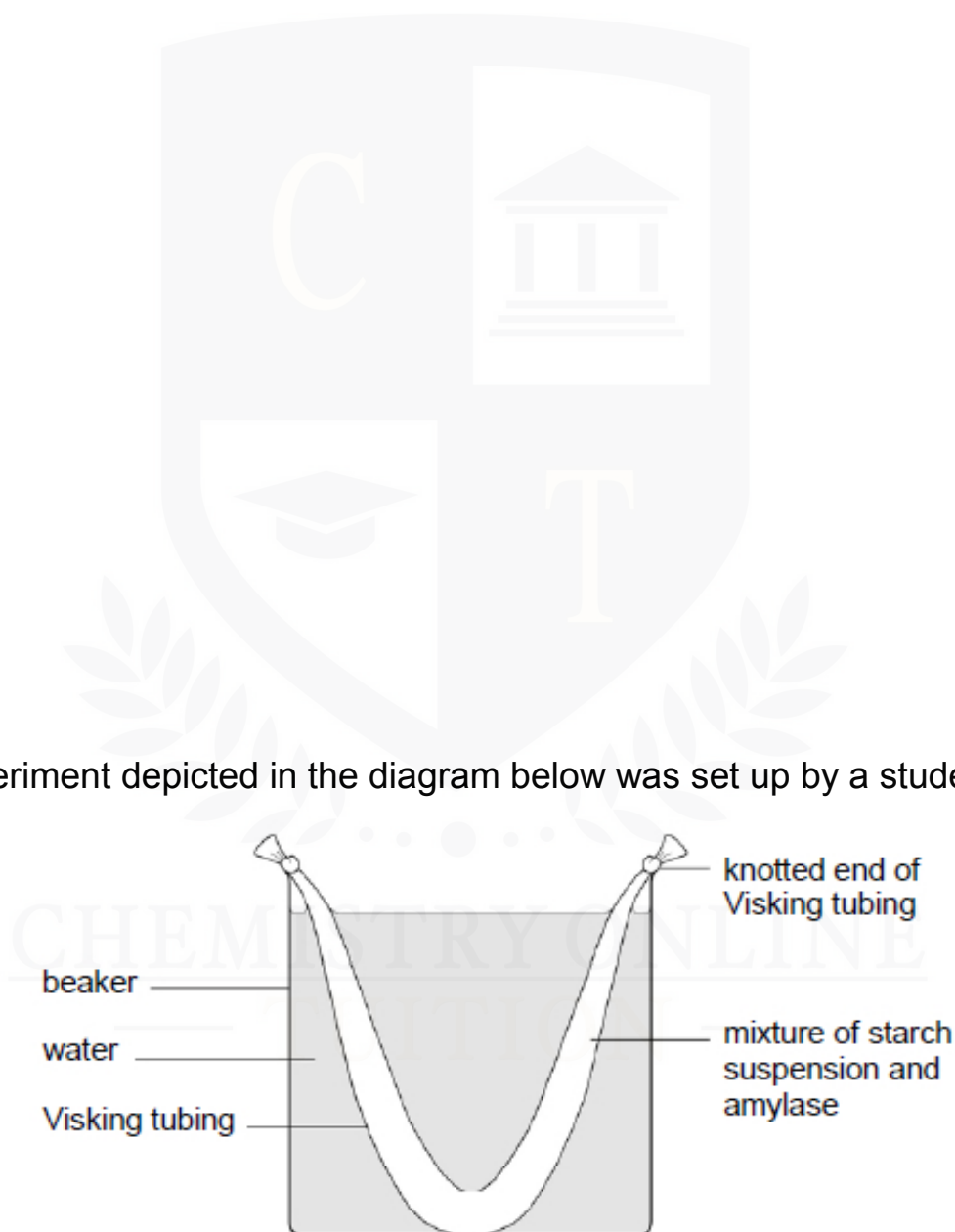
**(c)** In the given diagram, identify structure Q and explain its role in lipid absorption. **(4)**



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6.

(a) Mammal ileal cells take up glucose, a monosaccharide, via co-transporting it with sodium ions. Describe how. (3)



The experiment depicted in the diagram below was set up by a student.

Visking tubing is formed of a partially permeable substance.

The student took samples out of the liquid in the beaker and the liquid within the Visking tubing after 15 minutes. She used these samples for biochemical testing. She recorded her findings by drawing the table below.

(b) Put a checkmark (✓) in every box in the table that you believe will have produced a favorable outcome. (3)

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

(c) Explain your responses to part (b). (3)

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