

Digestion & The Alimentary Canal

Question Paper

Level	O Level
Subject	Biology
Exam Board	Cambridge International Examinations
Topic	Animal Nutrition
Sub Topic	Digestion & The Alimentary Canal
Booklet	Question Paper

Time Allowed: 52 minutes

Score: /43

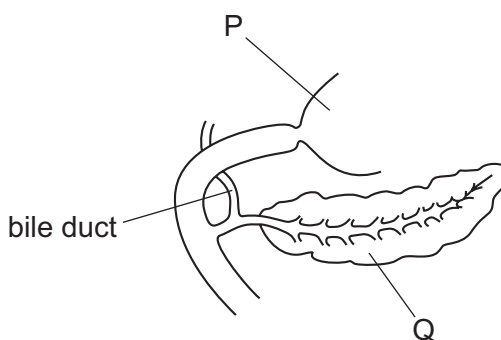
Percentage: /100

- 1 The small intestine of a person contains a lower concentration of glucose than is present in the blood.

The cells of the villi absorb glucose.

By which process is the glucose absorbed?

- A by active transport against the concentration gradient
 - B by active transport down the concentration gradient
 - C by diffusion against the concentration gradient
 - D by diffusion down the concentration gradient
- 2 The diagram shows part of the alimentary canal and associated structures.

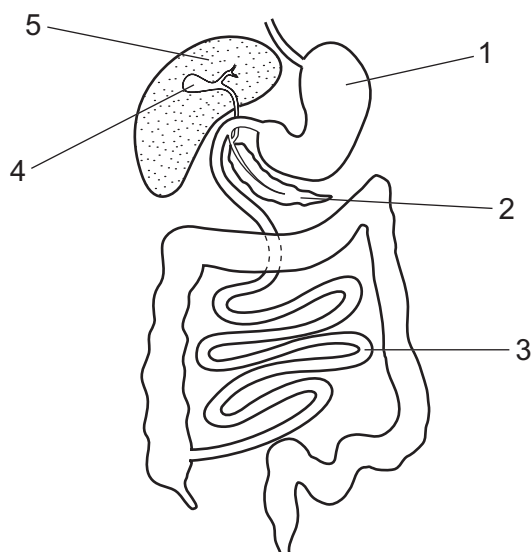


What are organs P and Q?

	P	Q
A	ileum	gall bladder
B	ileum	pancreas
C	stomach	gall bladder
D	stomach	pancreas

- 3 Which statement about chemical digestion in the human alimentary canal is correct?
- A Digestion of carbohydrates is completed in the colon.
 - B Enzymes are secreted to break down cellulose in the duodenum.
 - C Protein digestion is completed in the ileum.
 - D The stomach secretes enzymes to break down starch.

4 The diagram shows part of the alimentary canal and associated organs.



Which row correctly describes the functions of parts shown in the diagram?

	structure	function	structure	function
A	1	digestion of protein	3	absorption of the products of digestion
B	2	emulsifying fats	3	absorption of amino acids and glucose
C	4	production of bile	5	making digestive enzymes
D	4	storing digestive enzymes	2	making digestive enzymes

5 Which process involves the use of nutrients inside cells?

- A** absorption
- B** assimilation
- C** digestion
- D** ingestion

- 6 What is an example of assimilation?
- A absorption of glycerol into lacteals
 - B breakdown of alcohol in the liver
 - C building of proteins from amino acids
 - D release of a hormone from a gland

- 7 Which digestive processes take place in the mouth (buccal) cavity?

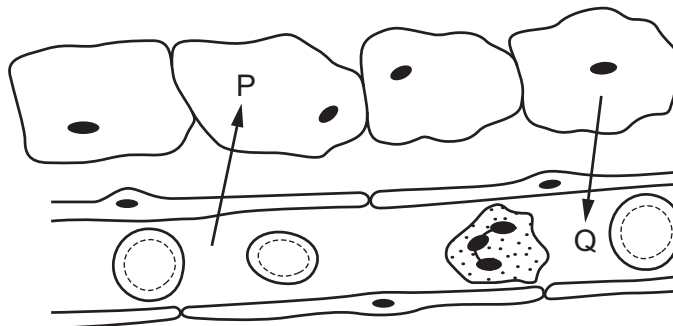
	chemical digestion	mechanical digestion	dissolving of nutrients
A	✓	✓	✓
B	✓	✓	x
C	✓	x	✓
D	x	✓	✓

- 8 Each part of the alimentary canal has the optimum pH for the enzymes that digest food there.

What is the optimum pH for an enzyme that works in the stomach?

- A 2.0
 - B 6.5 – 7.5
 - C 7.5 – 8.5
 - D 12.0
- 9 Which features make a villus well adapted for absorbing amino acids from the ileum?
- A large surface area, thin walls, lacteal
 - B large surface area : volume ratio, good blood supply, thin walls
 - C small surface area, good blood supply, lacteal
 - D small surface area : volume ratio, good blood supply, thin walls

10 The diagram shows chemicals being exchanged between some cells and a blood capillary.



What could be the identities of chemicals P and Q?

	P	Q
A	amino acids and oxygen	carbon dioxide and maltose
B	carbon dioxide and glucose	alcohol and oxygen
C	carbon dioxide and urea	oxygen and protein
D	glucose and oxygen	carbon dioxide and water

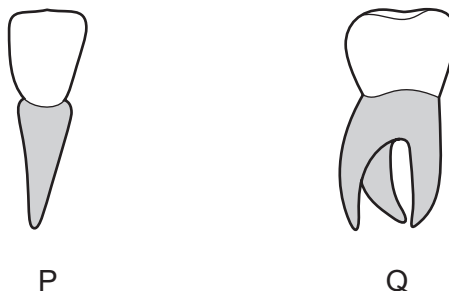
11 The table shows the rates of absorption of two different sugars, arabinose and glucose, in living and dead intestines. The concentrations of the sugars inside the intestines were the same in each case.

	rate of absorption (arbitrary units)	
	arabinose	glucose
living intestine	31	102
dead intestine	31	34

What are the main methods of absorption of arabinose and glucose in living intestine?

	arabinose	glucose
A	active transport	active transport
B	active transport	diffusion
C	diffusion	active transport
D	diffusion	diffusion

12 The diagram shows two different human teeth, P and Q, drawn from the front.



What are the functions of these teeth?

	P	Q
A	cutting	cutting
B	cutting	grinding
C	grinding	cutting
D	grinding	grinding

13 The table shows where different components of food are digested in the alimentary canal.

Which option states where **protein** is digested?

	mouth (buccal) cavity	stomach	duodenum	ileum
A	✓	x	✓	x
B	x	✓	✓	✓
C	x	x	✓	✓
D	x	✓	x	✓

key

✓ = substance is digested

x = substance is not digested

14 Four test tubes, each containing 2cm³ of amylase solution are treated as follows:

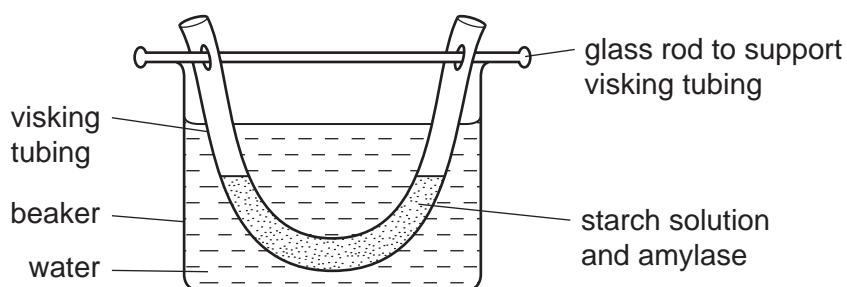
- 1 boiled, then cooled to 1 °C
- 2 boiled, then cooled to 25 °C
- 3 frozen, then warmed to 1 °C
- 4 frozen, then warmed to 25 °C

10 cm³ of starch solution were then added to each tube and after 5 minutes, 2 drops of iodine solution were added to each tube.

Which row shows the results?

	1	2	3	4
A	black	black	black	yellow
B	black	yellow	black	yellow
C	yellow	black	yellow	black
D	yellow	yellow	yellow	black

15 An investigation is carried out on digestion and absorption in the alimentary canal. The diagram shows the apparatus used. The visking tubing is permeable to small molecules such as glucose but not to large molecules such as starch.



After one hour, samples of water in **the beaker** are tested with Benedict's solution and with iodine solution.

Which colours are obtained?

	colour obtained after heating with Benedict's solution	colour obtained after adding iodine solution
A	blue	blue-black
B	blue	yellow-brown
C	red	blue-black
D	red	yellow-brown

16 What are the substrate and end-products of digestion by the enzyme lipase?

	substrate	end-product
A	carbohydrate	glucose
B	fat	amino acids
C	fat	fatty acids and glycerol
D	protein	fatty acids and glycerol

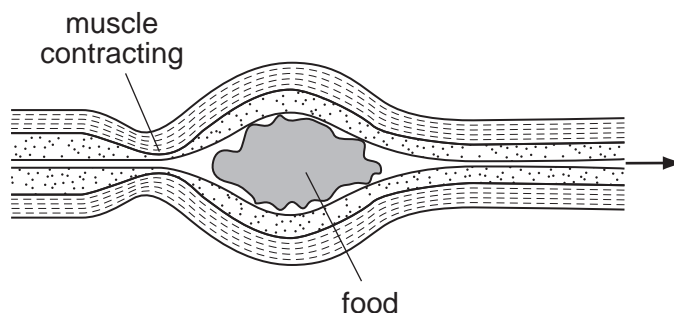
17 Food tests were carried out on four different substances.

Which substance contained both protein and reducing sugar?

substance	Benedict's test	biuret test	emulsion test	iodine test
A	✓	✓	x	x
B	✓	x	✓	✓
C	x	✓	✓	x
D	x	x	x	✓

key
 ✓ = positive
 x = negative

18 The diagram shows some food moving through the digestive system.



Which process is shown?

- A diffusion
- B digestion
- C ingestion
- D peristalsis

19 What are the substrate and end-products of digestion by the enzyme lipase?

	substrate	end product
A	carbohydrate	glucose
B	fat	amino acid
C	fat	fatty acids and glycerol
D	protein	fatty acids and glycerol

20 The products of digested food are present in the ileum.

Which substances enter a blood capillary and a lacteal in a villus?

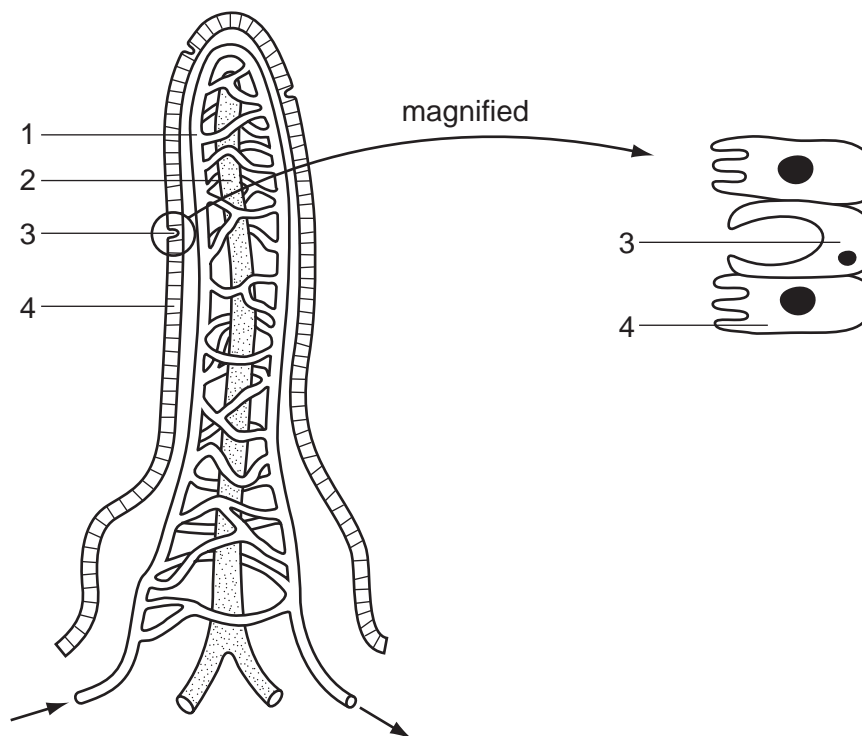
	blood capillary	lacteal
A	amino acids and glucose	fatty acids and glycerol
B	amino acids and glycerol	fatty acids and glucose
C	fatty acids and glucose	amino acids and glycerol
D	fatty acids and glycerol	amino acids and glucose

21 Starch is digested to maltose by the enzyme amylase.

According to the 'lock and key' hypothesis, which is the 'key' and which is the 'lock'?

	'key'	'lock'
A	amylase	maltose
B	amylase	starch
C	starch	amylase
D	starch	maltose

22 The diagram shows a section through a villus.



Which sequence correctly describes the functions of the numbered parts?

	1	2	3	4
A	transports digested fats	transports glucose	absorbs digested food	produces mucus
B	transports digested fats	transports glucose	produces mucus	absorbs digested food
C	transports glucose	transports digested fats	absorbs digested food	produces mucus
D	transports glucose	transports digested fats	produces mucus	absorbs digested food

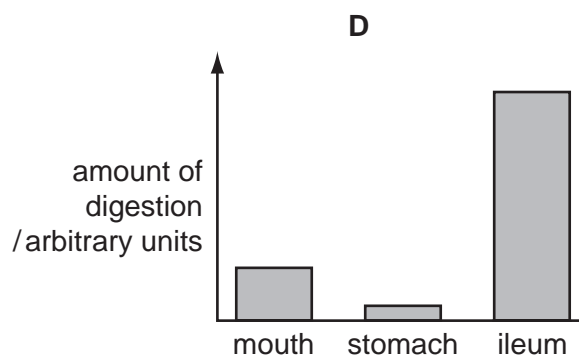
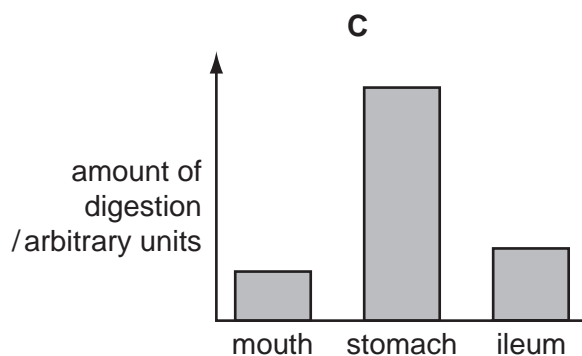
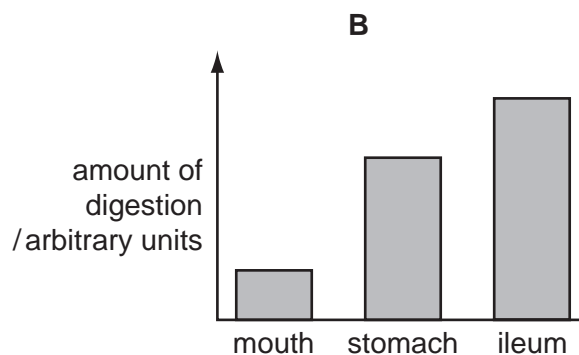
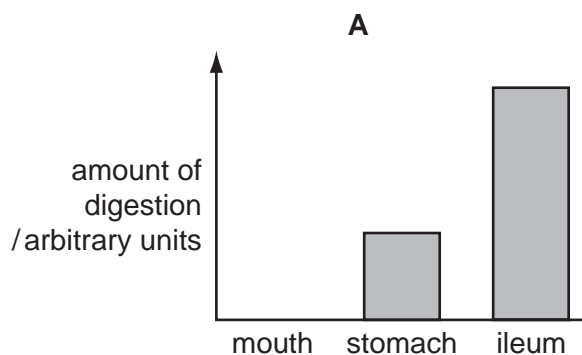
23 Which process is stimulated by adrenaline in the cells of the liver?

- A breakdown of glycogen, increasing the blood glucose level
- B breakdown of excess amino acids, forming urea
- C breakdown of proteins, releasing amino acids into the blood
- D conversion of excess blood glucose to glycogen

24 Which listed substances are **all** broken down by the liver?

- A alcohol, drugs and progesterone
- B drugs, adrenaline and urea
- C oestrogen, water and drugs
- D urea, alcohol and drugs

25 Which bar chart represents the amount of **starch** digested in the mouth, stomach and ileum of a human?



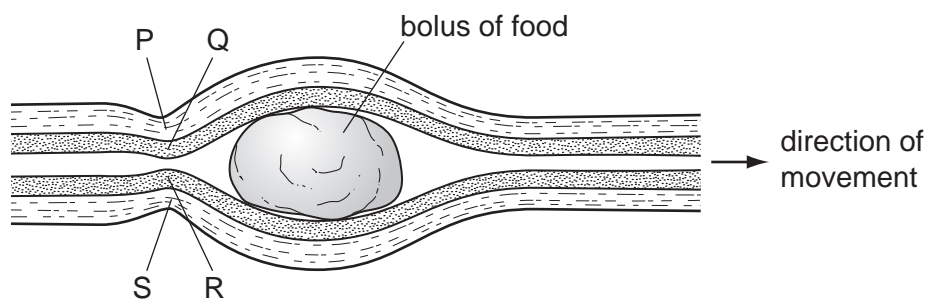
26 When a person eats some egg white, protein and water enter the stomach. Which substances are found leaving the stomach and leaving the small intestine?

	leaving the stomach	leaving the small intestine
A	amino acids and water	amino acids and water
B	fatty acids, glycerol and water	fatty acids, glycerol and water
C	protein and water	fatty acids and glycerol
D	protein, amino acids and water	water

27 What are the advantages of chewing food at the start of digestion?

	increasing surface area	lubricating food	making food soluble
A	✓	✓	✓
B	✓	✓	x
C	✓	x	✓
D	x	x	✓

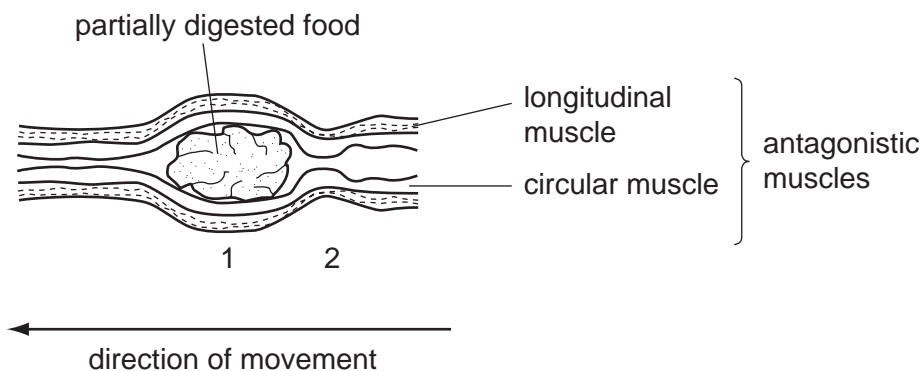
28 The diagram shows a bolus of food moving along the oesophagus.



Which row describes the condition of the muscles at P, Q, R and S?

	P	Q	R	S
A	contracted	relaxed	contracted	relaxed
B	contracted	relaxed	relaxed	contracted
C	relaxed	contracted	contracted	relaxed
D	relaxed	contracted	relaxed	contracted

29 The diagram shows a section of the small intestine in which partially digested food is being pushed along.



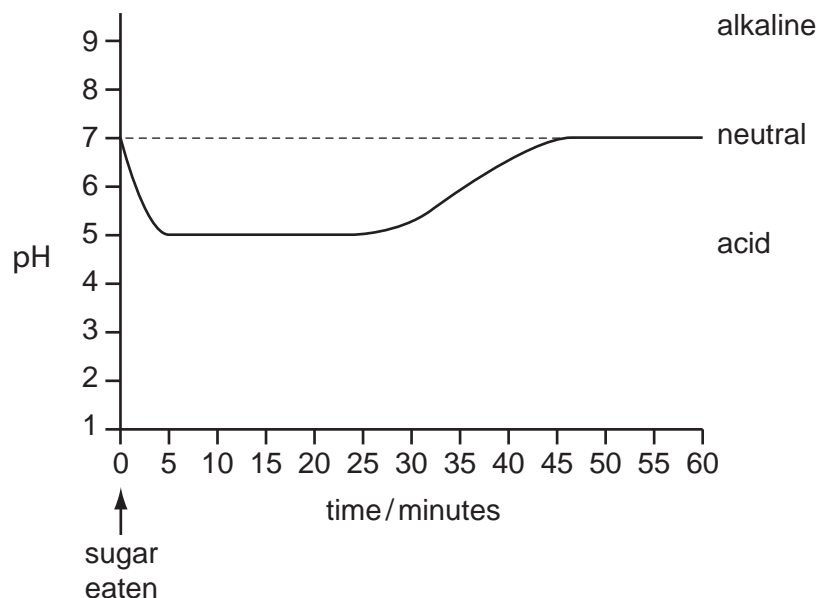
What is the state of the longitudinal muscles at 1 and 2?

	1	2
A	contracted	contracted
B	contracted	relaxed
C	relaxed	contracted
D	relaxed	relaxed

30 In which regions of the alimentary canal does amylase act?

- A mouth cavity and pancreas
- B mouth cavity and ileum
- C stomach and pancreas
- D stomach and ileum

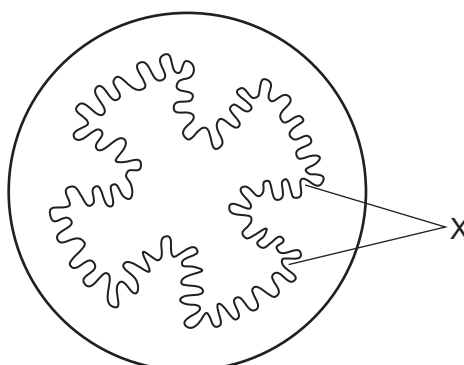
31 The graph shows the pH of the saliva in the mouth after eating sugar.



When are conditions in the mouth most likely to cause tooth decay?

- A 0-5 minutes
- B 5-25 minutes
- C 25-45 minutes
- D 45-60 minutes

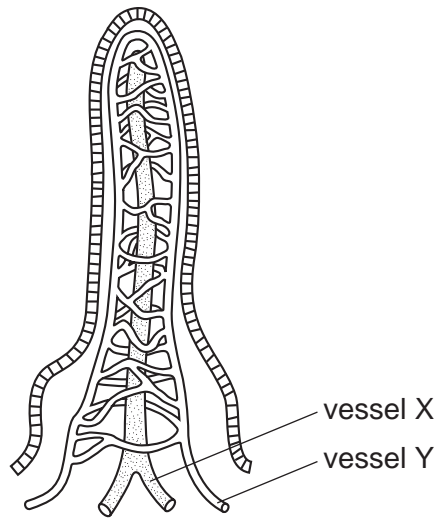
32 The diagram represents a section through the small intestine.



What is the role of the structures labelled X?

- A They help to move the food along.
- B They make a large surface area for absorption.
- C They protect against bacteria.
- D They move mucus over the surface.

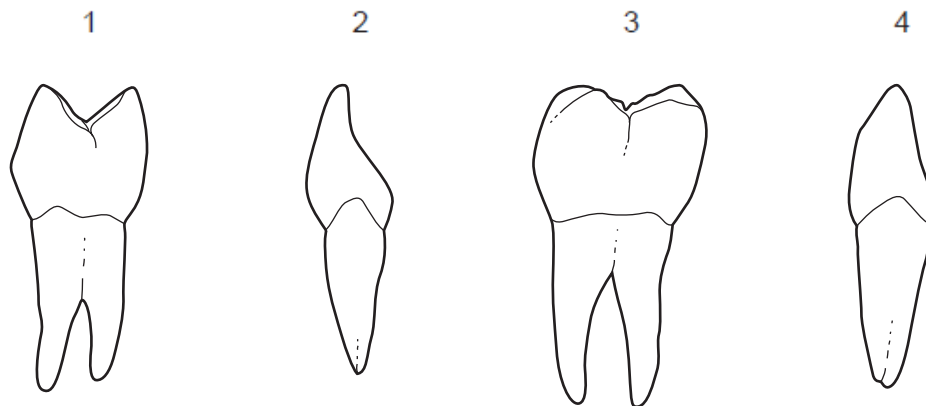
33 The diagram shows a villus.



After a meal containing starch and oil, which substances are absorbed mainly into vessel X and which substances are absorbed mainly into vessel Y?

	vessel X	vessel Y
A	amino acids	water
B	fatty acids and glycerol	glucose
C	glucose	amino acids
D	water	fatty acids and glycerol

34 Which of these human teeth are used for grinding?



A 1 and 3

B 1 and 4

C 2 and 3

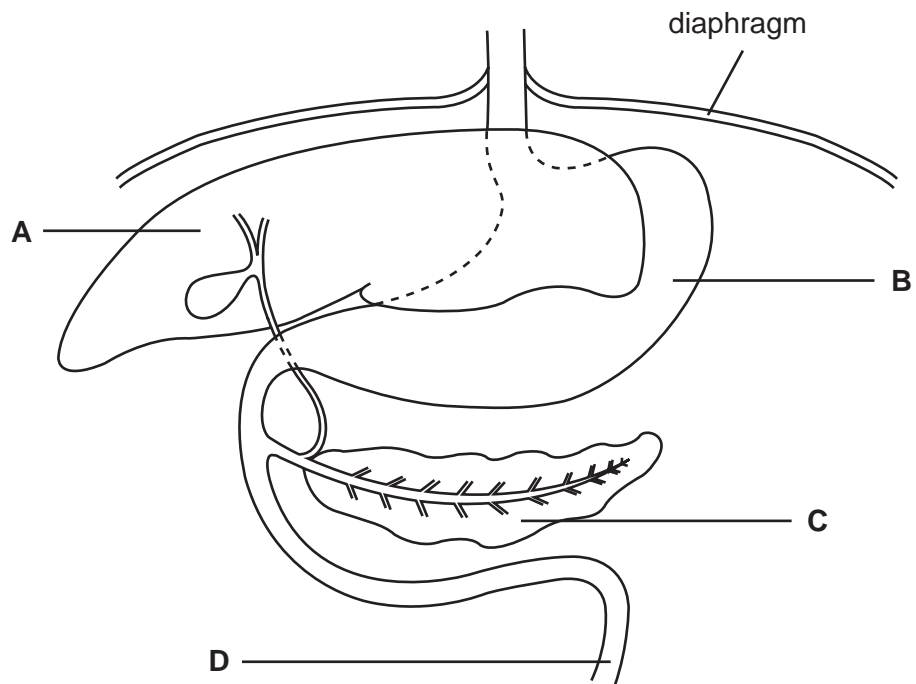
D 2 and 4

35 In which order do these events occur in human nutrition?

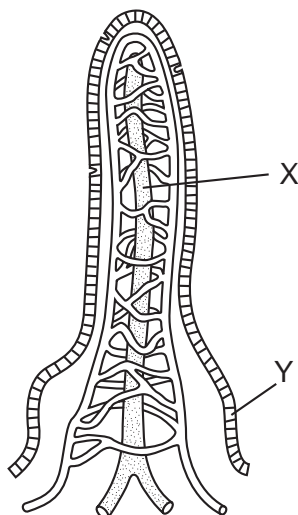
- A digestion → ingestion → absorption → assimilation
- B digestion → ingestion → assimilation → absorption
- C ingestion → digestion → absorption → assimilation
- D ingestion → digestion → assimilation → absorption

36 The diagram shows part of the human digestive system.

Which part secretes an acidic digestive juice containing a protease?



37 The diagram shows a section through a villus.



What is a function of structure X and of structure Y?

	X	Y
A	to absorb amino acids	to digest starch
B	to carry blood	to secrete mucus
C	to transport fats	to secrete enzymes
D	to transport glucose	to help peristalsis

38 The pH in the mouth decreases after eating.

Which statement explains the decrease in pH?

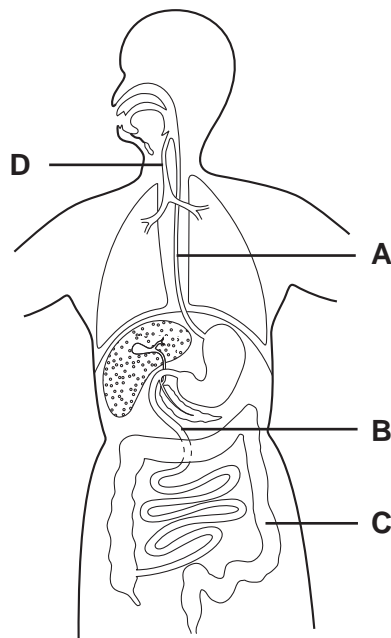
- A** Bacteria release acids when respiring food substances.
- B** Enzymes in saliva release acids during digestion.
- C** Food substances become alkaline when chewed.
- D** Salivary glands release an alkaline solution.

39 Large, insoluble molecules have to be digested before they can be

- A** absorbed.
- B** assimilated.
- C** egested.
- D** ingested.

40 The diagram shows some organs of the human body.

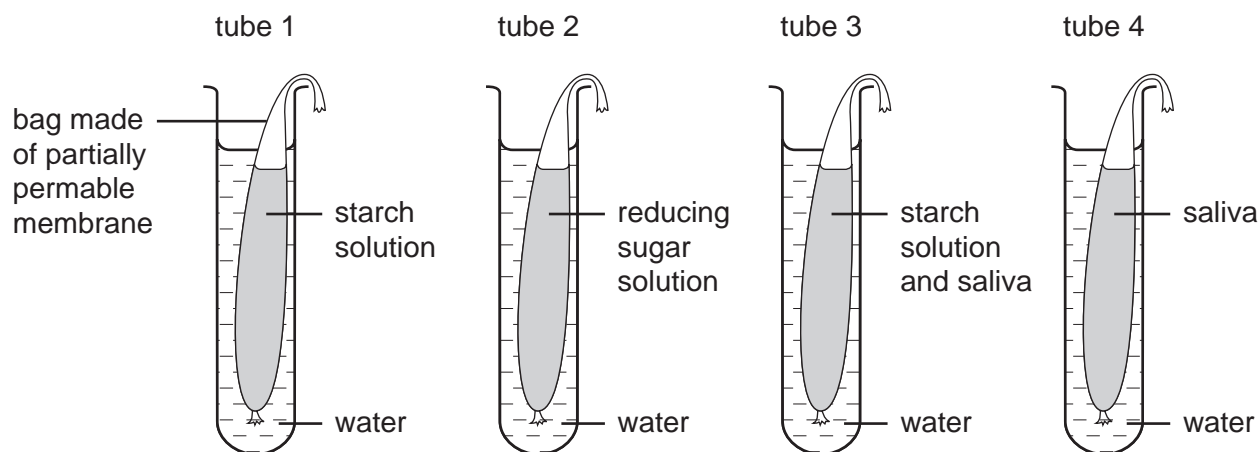
Which structure does **not** move its contents by peristalsis?



41 Which element in the molecule of urea shows that it is formed from amino acids and not from glucose?

- A carbon
- B hydrogen
- C nitrogen
- D oxygen

42 Four bags made of partially permeable membrane are placed in tubes as shown in the diagram.

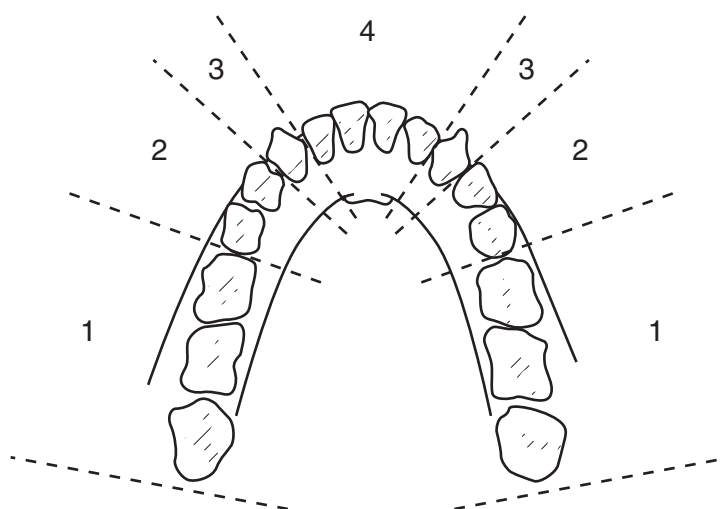
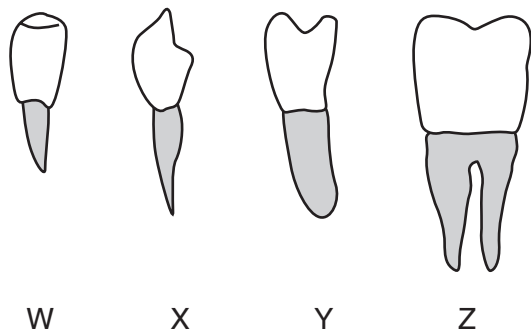


After 20 minutes at 35 °C a sample of water from each tube, outside the bag, is boiled with Benedict's solution.

What are the results?

	tube 1	tube 2	tube 3	tube 4
A	blue	orange	blue	orange
B	blue	orange	orange	blue
C	orange	blue	orange	blue
D	orange	orange	blue	orange

43 The diagram shows four types of teeth and a human jaw.



Which teeth are found in the numbered positions?

	1	2	3	4
A	Y	Z	W	X
B	Y	Z	X	W
C	Z	Y	W	X
D	Z	Y	X	W