Cambridge Assessment International Education

Investigating the use of biological washing powders that contain enzymes – Topic questions

The questions in this document have been compiled from a number of past papers, as indicated in the table below.

Use these questions to formatively assess your learners' understanding of this topic.

Question	Year	Series	Paper number
1	2017	March	32
6(a)	2017	March	42
6	2018	March	42
2(b)	2017	June	32
8	2018	June	31
1	2018	June	41

The mark scheme for each question is provided at the end of the document.

You can find the complete question papers and the complete mark schemes (with additional notes where available) on the School Support Hub at www.cambridgeinternational.org/support

1 The boxes on the left contain the names of glands which secrete enzymes.

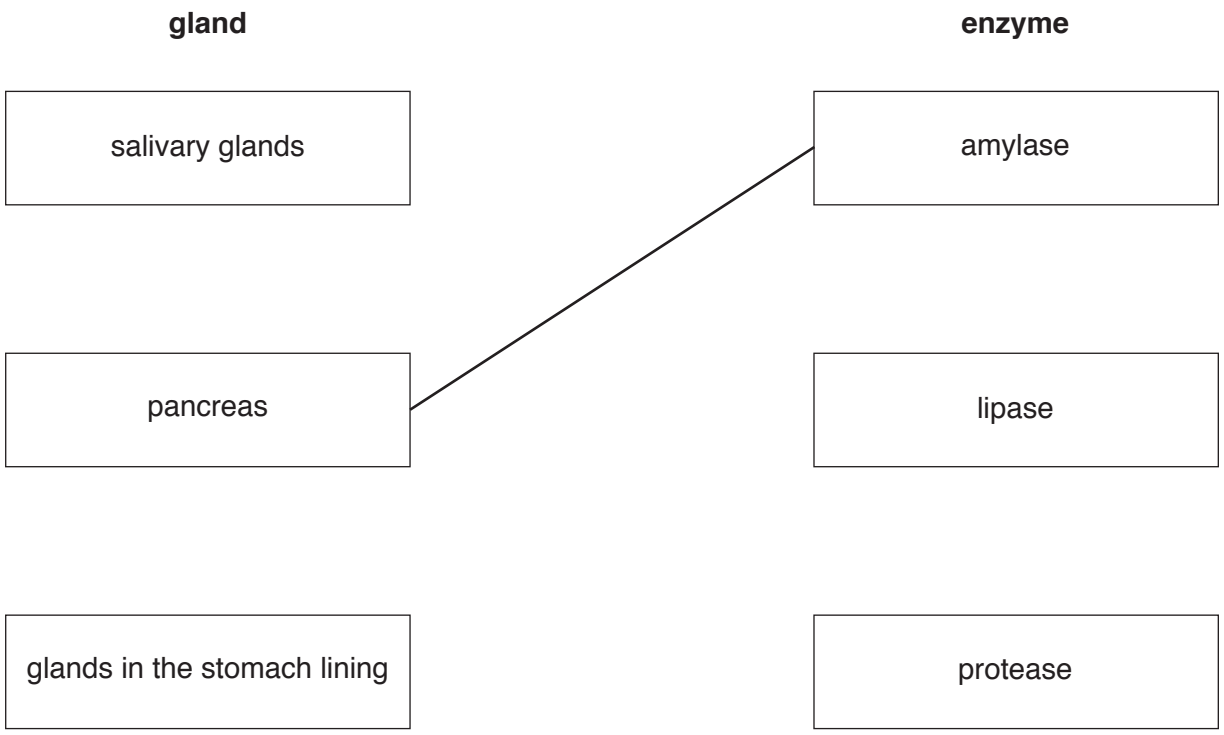
The boxes on the right contain the names of digestive enzymes.

Some glands produce more than one enzyme.

Draw lines to link each gland with the enzyme or enzymes it produces.

Draw **four** lines.

One has been drawn for you.



[4]

[Total: 4]

6 **(a)** Table 6.1 shows some of the enzymes, their substrates, products and where they are produced in the digestive system.

Complete Table 6.1.

Table 6.1

enzyme	substrate	product(s)	location of enzyme production
.....	starch	.....	salivary glands
maltase	maltose	.....	.....
.....	.....	amino acids	stomach wall
.....	.....	amino acids	pancreas and small intestinal wall
lipase	fats	.....	.....

[5]

6 **(a)** Define the term *chemical digestion*.

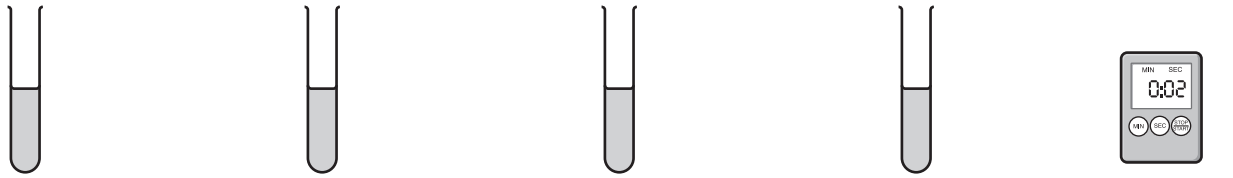
.....

.....

.....[2]

(b) A student investigated the activity of the digestive enzyme pepsin.

Fig. 6.1 shows the apparatus used in the investigation.



test-tube 1
egg white solution and pepsin

test-tube 2
egg white solution, pepsin and hydrochloric acid

test-tube 3
egg white solution, boiled pepsin and hydrochloric acid

test-tube 4
egg white solution and hydrochloric acid

stop-clock

Fig. 6.1

The appearance of the four test-tubes was recorded at 0 and 5 minutes.

The protein in the egg white solution gives the solution a cloudy appearance.

The cloudy appearance clears when the protein in the egg white solution breaks down.

Table 6.1 shows the results.

Table 6.1

test-tube	contents	appearance at 0 mins	appearance after 5 mins
1	egg white solution, pepsin	cloudy	less cloudy
2	egg white solution, pepsin, hydrochloric acid	cloudy	clear
3	egg white solution, boiled pepsin, hydrochloric acid	cloudy	cloudy
4	egg white solution, hydrochloric acid	cloudy	cloudy

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(i) Explain the results shown for test-tubes **1**, **2** and **3** in Table 6.1.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....[5]

(ii) Explain the purpose of test-tube **4**.

.....

.....

.....

.....

.....[2]

(iii) State the name of the organ in the body that produces pepsin.

.....[1]

(c) Maltase is another digestive enzyme.

Describe the action of maltase **and** state where it acts in the alimentary canal.

.....

.....

.....

.....

.....

.....

.....[3]

[Total: 13]

(b) Chemical digestion is the breakdown of large, insoluble molecules into smaller, soluble molecules. Digestive enzymes such as lipase are used in this process.

(i) Define the term *enzyme*.

.....

.....

.....[2]

(ii) The enzyme lipase breaks down fats.

State the end products of fat digestion.

1 .....

2 .....
[2]

(iii) List the **three** chemical elements that are found in fats.

.....[1]

(iv) Fat is an important component of a balanced diet.

Draw circles around **two** foods that are a good source of fat.

beans	**butter**	**pasta**
oranges	**rice**	**olive oil**

[2]

(v) State the names of **three** components of a balanced diet, other than fat.

1 .....

2 .....

3 .....
[3]

(vi) State **one** use in the body of fat.

.....

.....

.....[1]

8 During digestion enzymes act on different types of food to produce simpler substances that can be absorbed.

Complete Table 8.1 by inserting the missing information.

Table 8.1

food type	enzyme acting on the food type	simpler substances produced
protein	protease	
	amylase	
		fatty acids and glycerol

[5]

[Total: 5]

1 **(a)** The reactions of chemical digestion are catalysed by enzymes.

Fig. 1.1 shows the stages of an enzyme-catalysed reaction.

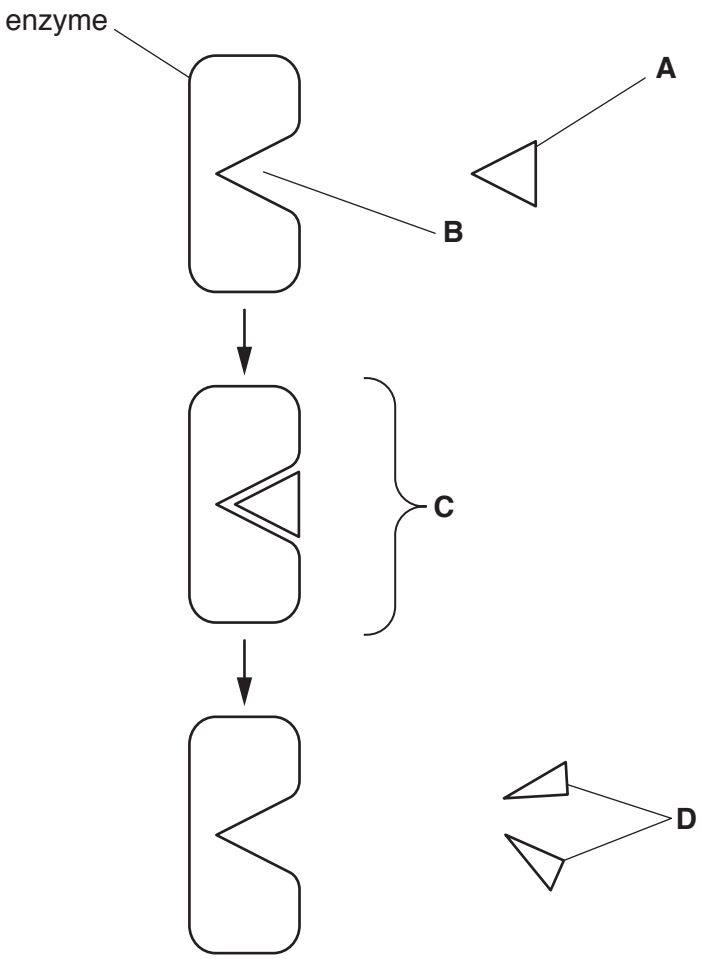


Fig. 1.1

State the names of **A** to **D** in Fig. 1.1.

A .....

B .....

C .....

D .....

[4]

(b) Explain the importance of chemical digestion.

.....

.....

.....

.....

.....

.....[2]

(c) Fig. 1.2 shows the human alimentary canal and associated organs.

The functions of some of these parts of the body are given in Table 1.1.

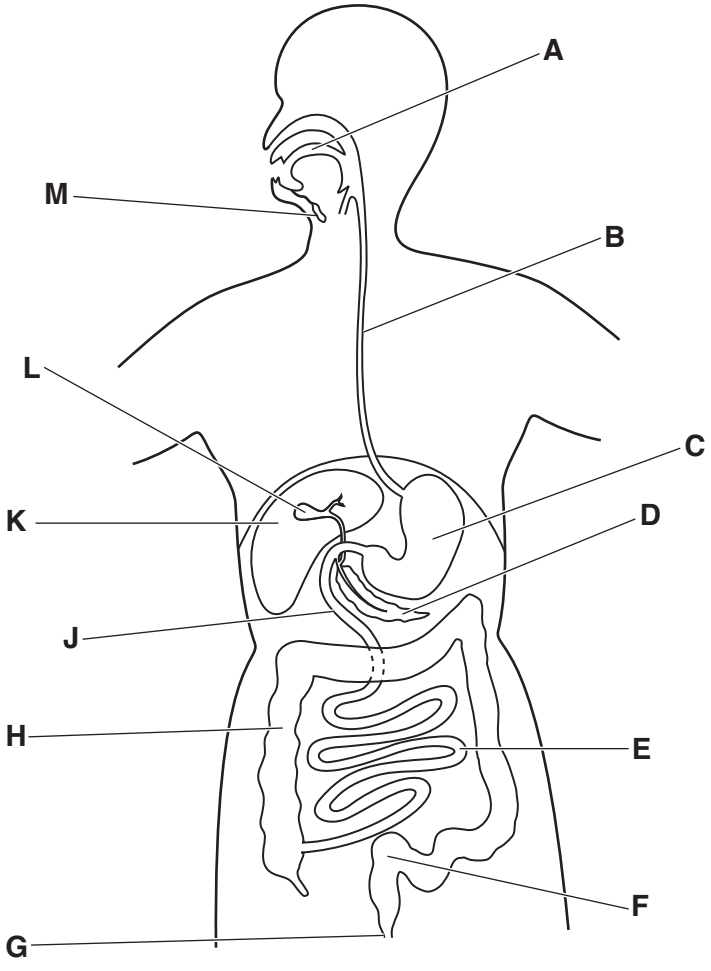


Fig. 1.2

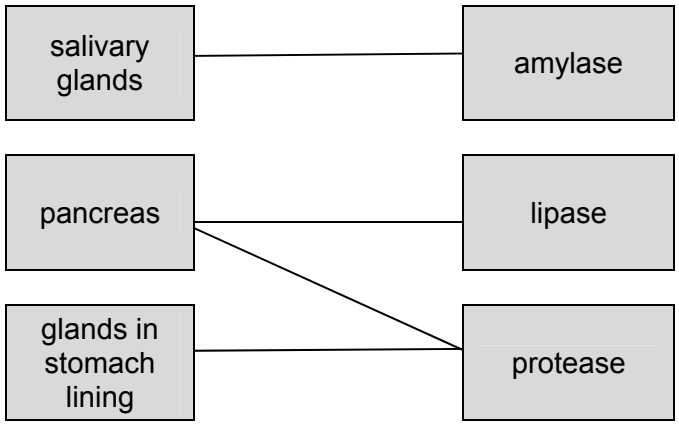
Complete Table 1.1. One row has been done for you.

Table 1.1

function	letter from Fig. 1.2	name of structure
site of starch digestion		
reabsorption of water		
secretion of pepsin		
site of maltose digestion		
secretion of bile		
storage of faeces	**F**	rectum
secretion of lipase and trypsin		

[6]

[Total: 12]

Question	Answer	Marks	Guidance
1	 ;;;;	**4**	one mark for each correct line deduct one mark for each extra line drawn
	Total:	**4**	

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>6(a)</td><td>
<table>
<tr><td>enzyme</td><td>substrate</td><td>product / s</td><td>location of enzyme production</td><td></td></tr>
<tr><td>(salivary) amylase</td><td>starch</td><td>maltose</td><td>salivary glands</td><td>;</td></tr>
<tr><td>maltase</td><td>maltose</td><td>glucose</td><td>small intestinal wall</td><td>;</td></tr>
<tr><td><u>pepsin</u></td><td>protein</td><td>amino acids</td><td>stomach (wall)</td><td>;</td></tr>
<tr><td><u>trypsin</u></td><td>protein</td><td>amino acids</td><td>small intestinal (wall)</td><td>;</td></tr>
<tr><td>lipase</td><td>fats</td><td>fatty acids and glycerol</td><td>pancreas / small intestinal wall</td><td>;</td></tr>
</table>
</td><td>5</td><td>A polypeptides for protein

A peptides for protein</td></tr>
</table>

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Question	Answer	Marks	Guidance
6(a)	breakdown of large to small molecules ; from insoluble to soluble ;	**2**	
6(b)(i)	*test-tube 1* **1** (less cloudy), slower break down of egg white solution / protein ; **2** (no HCl so) pH of the solution is too high ; **ora** **3** high pH denatures pepsin / enzyme ; *test-tube 2* **4** hydrochloric acid causes a low pH ; **5** pepsin works best in / optimal activity, low pH / acidic conditions ; *test-tube 3* **6** pepsin / enzyme, unable to break down, protein / egg white solution ; **7** boiling denatures, pepsin / enzyme ; **8** ref to enzyme-substrate complex / fewer successful collisions ; **9** high pH / boiling, changes shape of active site ;	**5**	
6(b)(ii)	as a control ; to show that pepsin is responsible for the protein digestion ; to show that hydrochloric acid does not digest the protein ;	**2**	
6(b)(iii)	stomach ;	**1**	
6(c)	maltose broken down ; to glucose ; on the membranes of the epithelial lining ; (acts) in the small intestine / duodenum ;	**3**	

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Question	Answer	Marks	Guidance
2(b)(i)	are protein(s) ; that function as biological catalysts ;	**2**	**I** speeds up reaction
2(b)(ii)	fatty acid(s) ; glycerol ;	**2**	either order
2(b)(iii)	carbon, hydrogen and oxygen ;	**1**	
2(b)(iv)	butter ; olive oil ;	**2**	
2(b)(v)	carbohydrate ; protein ; vitamins ; mineral salts ; fibre / roughage ; water ;	**3**	**I** fat **A** named vitamin once **A** named mineral once **I** examples of foods
2(b)(vi)	energy / respiration / metabolism ; insulation / thermal insulation / electrical insulation / myelin / maintains temperature ; storage of fat / vitamins ; making cell membranes ; protection (against mechanical damage) / cushions organs / shock absorber ; help body absorb vitamins / AW ; AVP ; e.g. hormones , buoyancy	**1**	**A** reduce heat loss / keeps body warm **R** insulin

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>8</td><td>
<table>
<tr><th>food type</th><th>enzyme acting on the food type</th><th>simpler chemicals produced</th></tr>
<tr><td>protein</td><td>protease</td><td>amino acids ;</td></tr>
<tr><td>starch ;</td><td>amylase</td><td>glucose / sugar ;</td></tr>
<tr><td>fats ;</td><td>lipase ;</td><td>fatty acids and glycerol</td></tr>
</table>
</td><td>5</td><td>A (poly)peptides
A maltose

A lipids / oils</td></tr>
</table>

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>1(a)</td><td>A substrate ;
B active site ;
C enzyme-substrate complex ;
D product(s) ;</td><td>4</td><td></td></tr>
<tr><td>1(b)</td><td>production of, small(er) / soluble / simple(r), <u>molecules</u> ;

(small molecules can be) absorbed / ref. to absorption ; ora

(moves through) cell membranes / wall of intestine / into blood / into cells ;</td><td>2</td><td></td></tr>
<tr><td>1(c)</td><td>
<table>
<tr><th>function</th><th>letter from Fig. 2.1</th><th>name of structure</th></tr>
<tr><td>site of starch digestion</td><td>A
J / E</td><td>mouth / buccal cavity
small intestine</td></tr>
<tr><td>reabsorption of water</td><td>J / E
H
F</td><td>small intestine
colon / large intestine
rectum</td></tr>
<tr><td>secretion of pepsin</td><td>C</td><td>stomach</td></tr>
<tr><td>site of maltose digestion</td><td>J / E</td><td>small intestine</td></tr>
<tr><td>secretion of bile</td><td>K
L</td><td>liver
gall bladder</td></tr>
<tr><td>storage of faeces</td><td>F</td><td>rectum</td></tr>
<tr><td>secretion of lipase and trypsin</td><td>D</td><td>pancreas</td></tr>
</table>
;;;;;;</td><td>6</td><td>one mark per row
the letter must agree with the name
if more than one letter or name mark first one only

A J/E small intestine</td></tr>
</table>

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