

Enzymes

Total Mark - 16

Question: 1

3 (a) What is an enzyme?

[2 marks]

3 (b) Enzymes are sometimes used in the home and in industry.

Draw **one** line from each enzyme to the correct use of that enzyme.

[3 marks]

Enzyme

Use of enzyme

Removes grease stains from clothes

Protease

Pre-digests protein in some baby foods

Lipase

Breaks down DNA in genetic fingerprinting

Isomerase

Changes glucose syrup into fructose syrup

3 (c) Fructose and glucose are two types of sugar.

Fructose tastes much sweeter than glucose. This means that a smaller amount of fructose can be used to give the same sweetness.

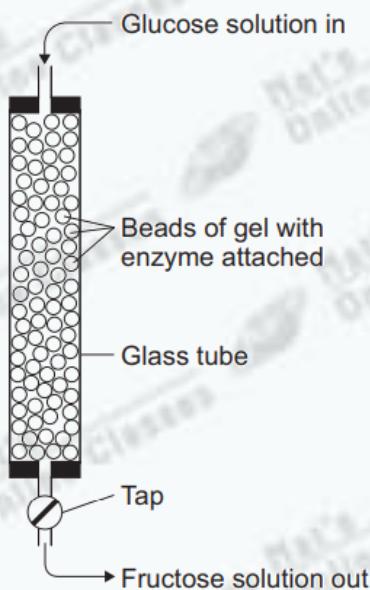
3 (c) (i) Why is it an advantage to use fructose instead of glucose in **slimming** foods?

[1 mark]

3 (c) (ii) **Figure 3** shows how an enzyme can be used to change glucose into fructose.

The enzyme molecules are firmly attached to beads of gel in a glass tube.

Figure 3



Give **two** advantages of attaching the enzyme to beads of gel.

[2 marks]

Tick (✓) **two** boxes.

Tick (✓) two boxes.

The enzyme can be used for more than one type of reaction.

The enzyme can easily be used again.

The enzyme would be denatured.

The fructose solution produced does not have any enzyme in it.

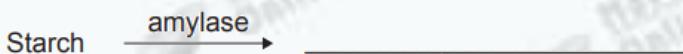
There is less contact between the enzyme and the glucose.

Question: 2

8 Amylase is an enzyme that breaks down starch.

8 (a) Complete the equation to show the breakdown of starch.

[1 mark]

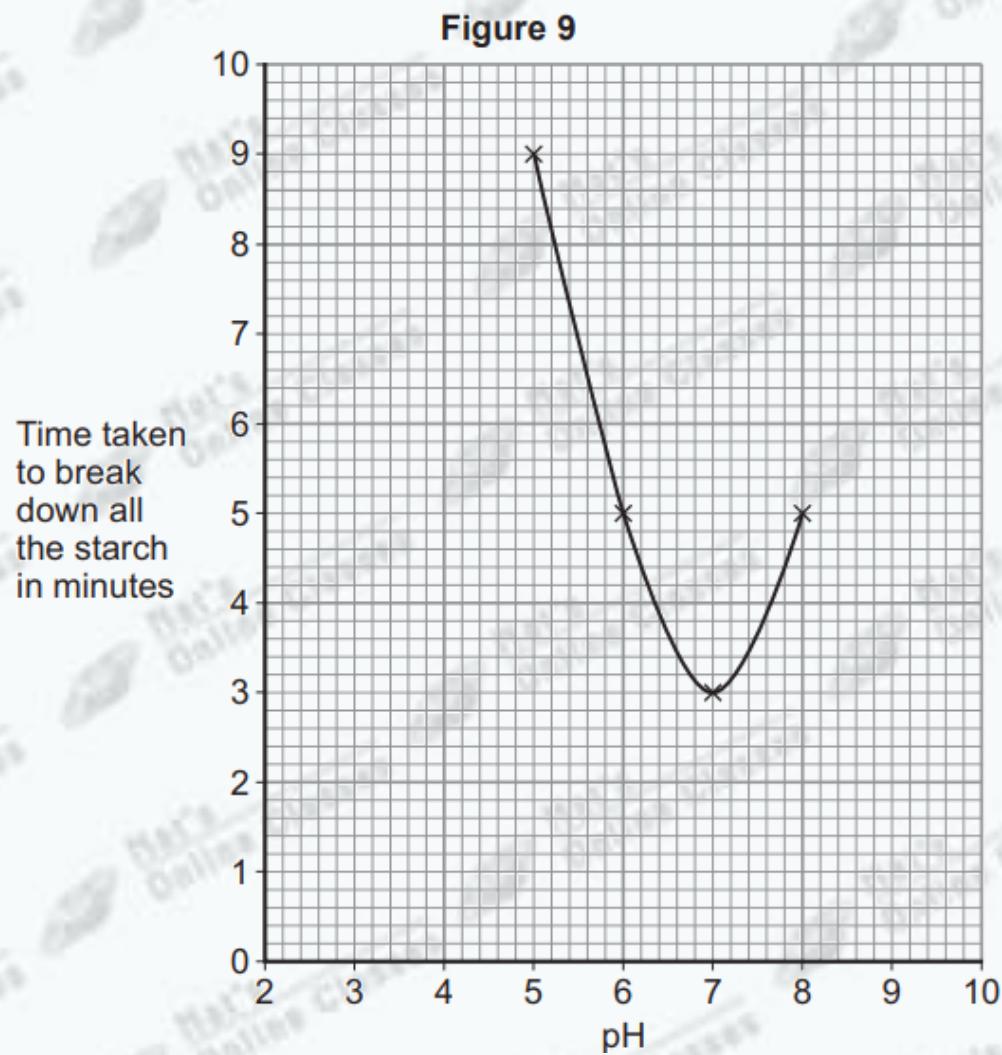


8 (b) Some students investigated the effect of pH on the activity of amylase.

The students:

- put 5 cm³ of pH5 solution + 1 cm³ of amylase solution into a test tube
- put 4 cm³ of starch suspension into a second test tube
- left both test tubes at room temperature for 5 minutes
- mixed the contents of the two test tubes
- removed a small sample of the mixture at 1-minute intervals
- tested each sample for starch
- timed how long it took to break down all the starch
- repeated each of the above steps at pH6, pH7 and pH8.

Figure 9 shows the students' results.



8 (b) (i) Give **two** variables which were controlled in this investigation.

[2 marks]

1 _____

2 _____

8 (b) (ii) The students tested samples of the reaction mixture for starch.

In each test, they added one drop of the reaction mixture to one drop of iodine solution on a white tile.

- Iodine solution = light brown colour
- Iodine solution + starch = dark blue colour

Predict the colour seen in the iodine test on the samples of the pH6 reaction mixture at 4 minutes and at 6 minutes.

[1 mark]

4 minutes _____

6 minutes _____

8 (b) (iii) The students concluded that amylase works best at pH7.

This may **not** be a valid conclusion.

Suggest **two** improvements to the investigation that would increase the validity of the students' conclusion.

[2 marks]

1 _____

2 _____

8 (b) (iv) The students repeated the investigation at pH3.

What result would you expect at pH3?

Give a reason for your answer.

[2 marks]
