

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

Protease

Removes grease stains from clothes

Lipase

Pre-digests protein in some baby foods

Isomerase

Breaks down DNA in genetic fingerprinting

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.

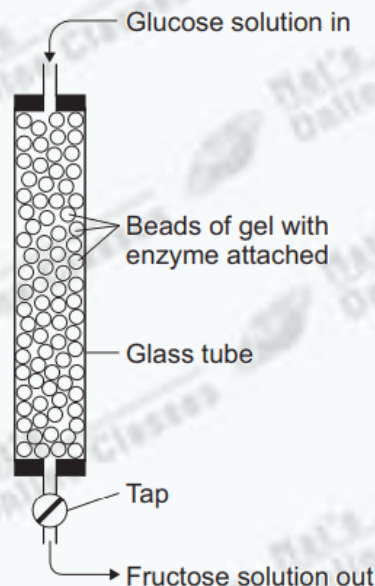
3 (c) (i) Why is it an advantage to use fructose instead of glucose in **slimming** foods?

[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.

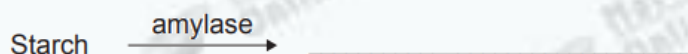
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Question: 2

8 Amylase is an enzyme that breaks down starch.

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

[1 mark]



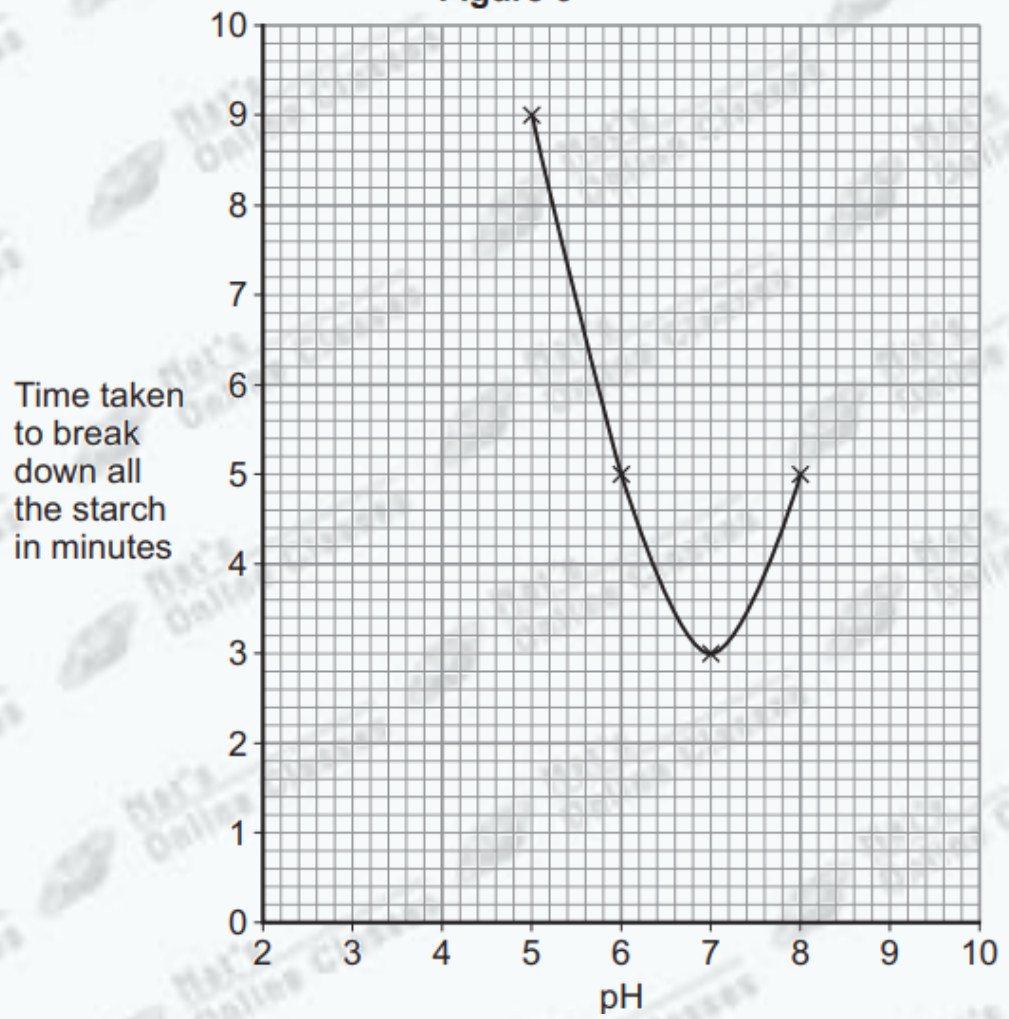
8 (b) Some students investigated the effect of pH on the activity of amylase.

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.

Figure 9



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]
