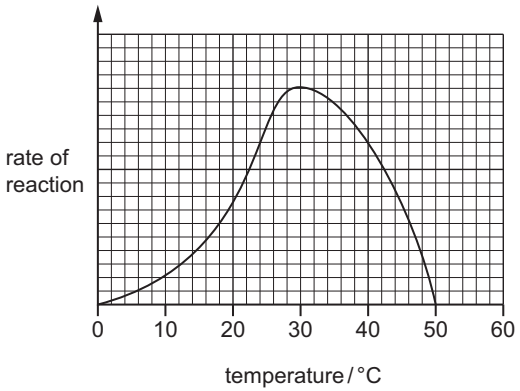
7 The graph shows the effect of temperature on an enzyme-controlled reaction.



Which statement describes the effect of temperature on this reaction?

A As the temperature increases to 25 °C, the reaction speeds up.

B Between 10 °C and 20 °C, the enzyme denatures.

C Between 35 °C and 45 °C, frequency of effective collisions increases.

D The optimum temperature for this reaction is 40 °C.

6 Which substance is an enzyme?

A fibrinogen

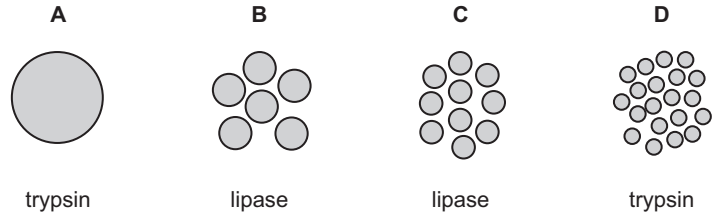
B mRNA

C pepsin

D saliva

7 The diagrams show the same mass of oil arranged in drops of different sizes at the same temperature.

In which combination of oil drop size and enzyme will the oil be digested the fastest?



3 Enzymes are biological catalysts.

(a) Describe what is meant by the term catalyst.

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.....

..... [2]

(b) A student investigated the effect of temperature on enzyme activity.

A starch suspension was kept at 0 °C.

Amylase solution was added to the starch suspension.

Samples of the starch and amylase mixture were tested with iodine solution at 1-minute intervals for 15 minutes.

The student recorded the time at which the starch and amylase mixture stopped turning a blue-black colour.

The student repeated this investigation at different temperatures.

Table 3.1 shows the results.

Table 3.1

temperature / °C	time at which the starch and amylase mixture stopped turning a blue-black colour / minutes
0	stayed blue-black
10	12
20	8
30	5
40	3
50	10
60	stayed blue-black

(i) Explain the results between 0 °C and **40 °C** in Table 3.1.

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..... [6]

(ii) This investigation was repeated with protease instead of amylase.

Explain why the samples from the mixture produced a blue-black colour at every temperature.

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..... [2]

(c) State **one** factor, other than temperature, that affects enzyme action.

..... [1]

[Total: 11]

1 Yeast cells produce an enzyme called invertase. Invertase catalyses the breakdown of sucrose into reducing sugars. Sucrose is **not** a reducing sugar.

A student investigated the effect of two different concentrations of invertase extract on a sucrose solution.

The student used this method:

Step 1 Label three test-tubes **A**, **B** and **W**.

Step 2 Use a syringe to put 2 cm^3 of sucrose solution into all three test-tubes.

Step 3 Use a clean syringe to put 2 cm^3 of 100% invertase extract into test-tube **A**.

Step 4 Use a clean syringe to put 2 cm^3 of 10% invertase extract into test-tube **B**.

Step 5 Use a clean syringe to put 2 cm^3 of distilled water into test-tube **W**.

Step 6 Put all three test-tubes in a warm water-bath at 40 °C for 15 minutes.

Step 7 Measure the temperature of the liquid in the test-tubes.

(a) State the name of the piece of equipment that is used to measure temperature.

..... [1]

Step 8 Use a clean syringe to add 4 cm^3 of Benedict's solution to all three test-tubes.

Step 9 Place all three test-tubes into a hot water-bath for five minutes.

Step 10 After five minutes, record the colour of the liquid in each test-tube.

Fig. 1.1 shows the notes the student made about their observations in step 10.

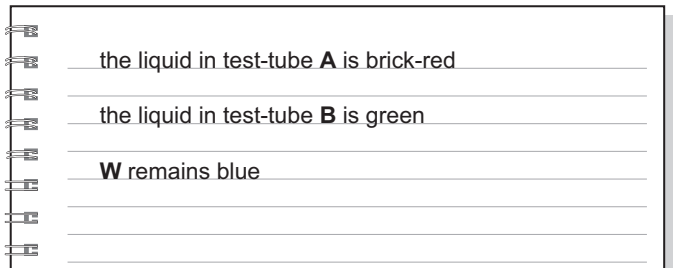

Fig. 1.1

(b) Prepare a table and record the results of this investigation using the information in Fig. 1.1.

[3]

(c) State a conclusion for the results shown in test-tube **A** and test-tube **B**.

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..... [1]

(d) Explain the purpose of test-tube **W**.

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..... [2]

(e) State the independent variable in this investigation.

..... [1]

(f) Explain why the test-tubes were placed in the warm water-bath in step 6.

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..... [1]

(g) Explain why a clean syringe was used in steps 3, 4 and 5.

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..... [1]

(h) Invertase is a protein.

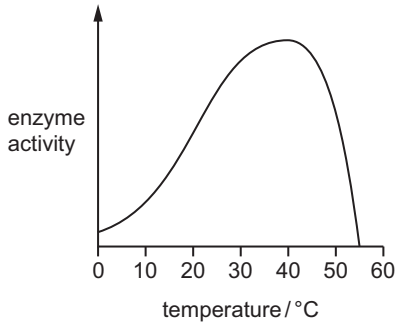
State the reagent used to test for the presence of protein.

..... [1]

[Total: 11]

IGCSE Biology: **s25 21**

7 The graph shows how enzyme activity is affected by temperature.



Why is enzyme activity lower at 55 °C than it is at 40 °C?

A Heat has killed the enzyme.

B The enzyme has been used up.

C The reactants are moving faster.

D The substrate is less likely to fit into the active site.

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8 What is the correct definition of enzymes?

A carbohydrates that act as biological catalysts

B carbohydrates that act as substrates

C proteins that act as biological catalysts

D proteins that act as substrates

6 A scientist investigated the effect of changes in pH on the activity of two different protease enzymes.

Each enzyme was placed in a hole in the centre of a jelly layer in a Petri dish. The jelly layer was made of protein. The investigation was carried out at a range of different pH values.

After 60 minutes, the area of the jelly layer that had been broken down by enzyme **L** or enzyme **M** was recorded at each pH value tested.

Fig. 6.1 is a diagram of the apparatus.

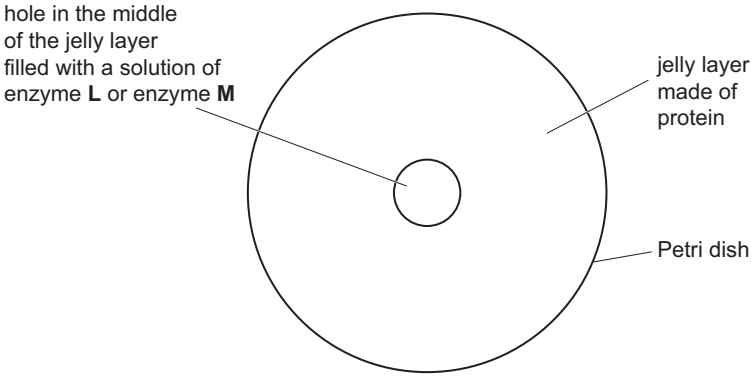

Fig. 6.1

Fig. 6.2 shows the results of the investigation.

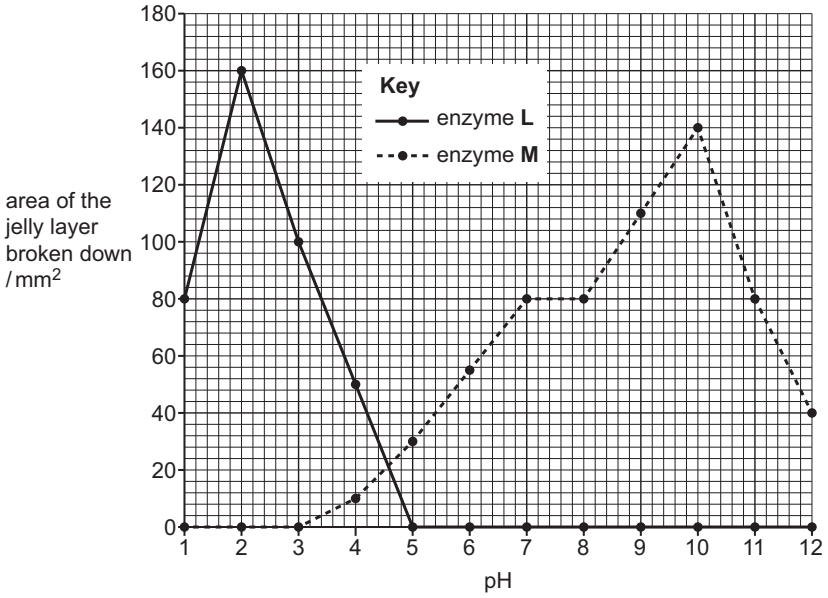

Fig. 6.2

(a) Using the information in Fig. 6.2, describe the results of this investigation.

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..... [5]

(b) Explain the result for enzyme **M** at pH 2 shown in Fig. 6.2.

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..... [3]

(c) Suggest the name of enzyme **L and** state its location in the human digestive system.

name of enzyme **L** .....

location .....

[2]

[Total: 10]