

# Enzymes

## Question Paper 1

Level	IGCSE
Subject	Biology (0610/0970)
Exam Board	Cambridge International Examinations (CIE)
Topic	Enzymes
Sub-Topic	Enzymes
Booklet	Question Paper 1

**Time Allowed:** 48 minutes

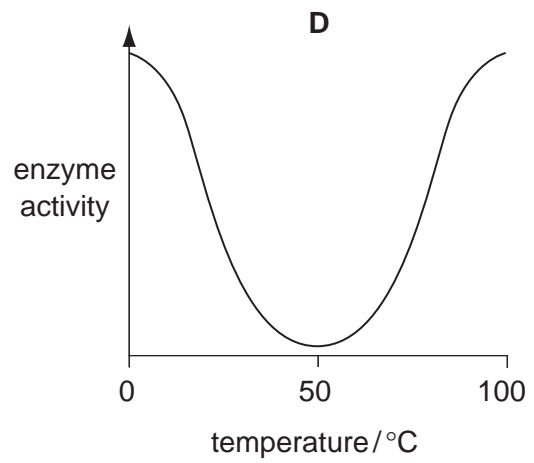
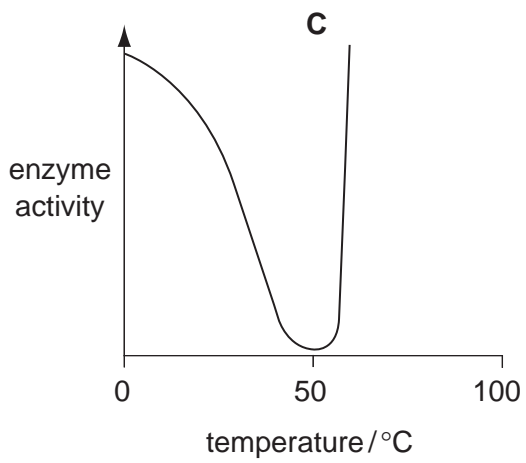
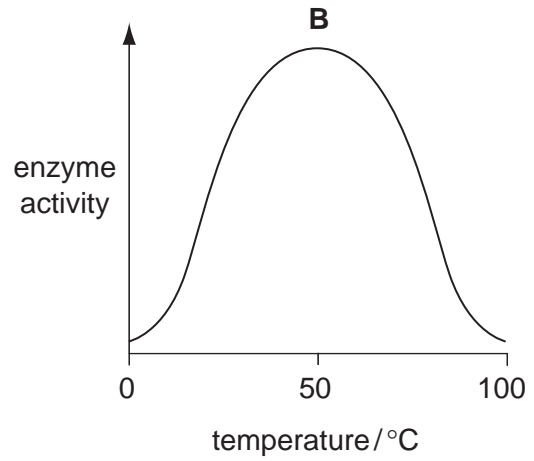
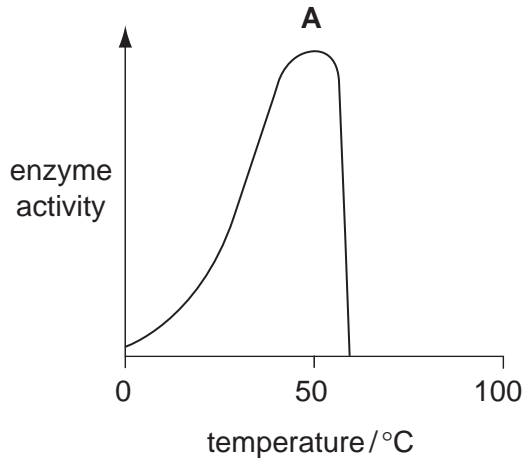
**Score:** /40

**Percentage:** /100

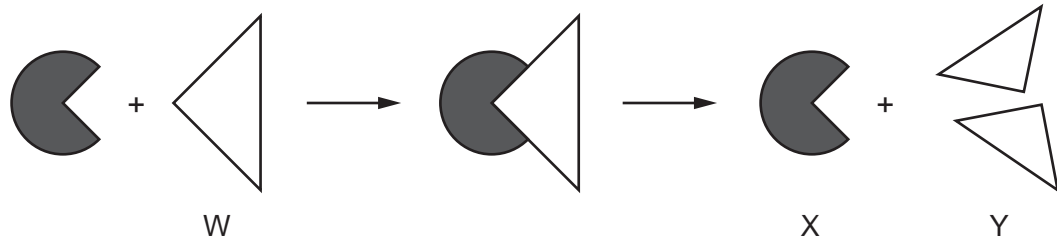
**Grade Boundaries:**

9	8	7	6	5	4	3	2	1
>85%	75%	68%	60%	53%	48%	40%	33%	<25%

1. Which graph shows the effect of temperature on the activity of an enzyme?



2. The diagram represents enzyme action.



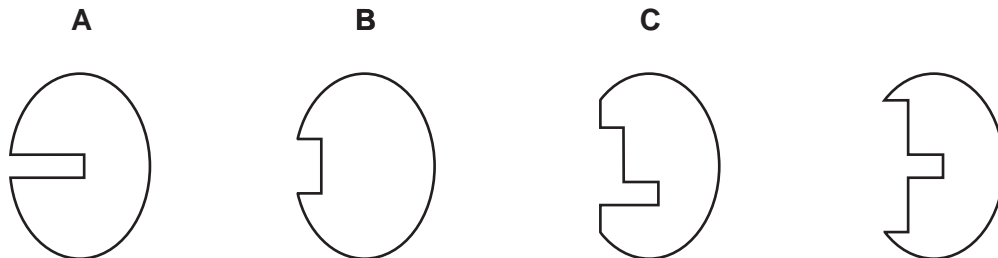
What are parts W, X and Y in this chemical reaction?

	enzyme	product	substrate
<b>A</b>	W	X	Y
<b>B</b>	X	W	Y
<b>C</b>	X	Y	W
<b>D</b>	Y	W	X

3. The diagram represents a chemical reaction.



Which diagram represents the enzyme for this reaction?



4. A food stain on a table cloth is where meat cooked in oil has been spilt.

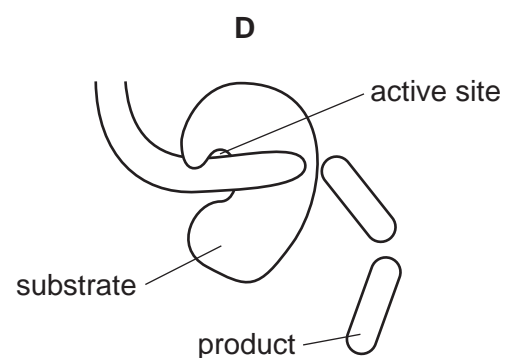
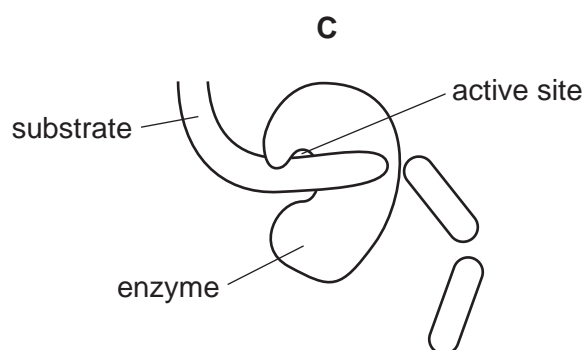
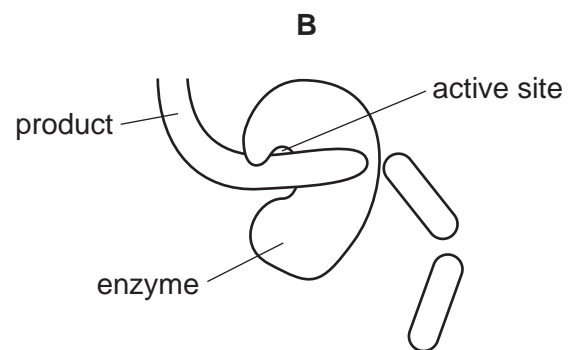
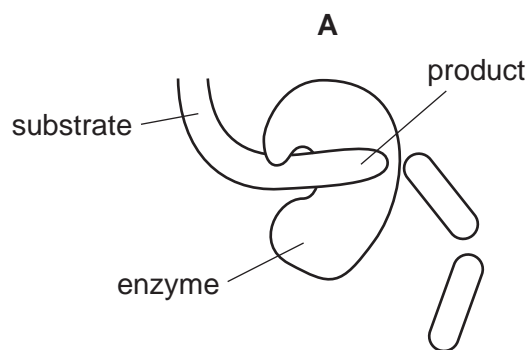
It is washed in a biological washing powder.

Which combination of enzymes should be in the washing powder to remove the stain?

- A amylase and lipase
- B lipase and protease
- C pectinase and amylase
- D protease and pectinase

5. The diagrams show a protease enzyme catalysing the breaking of part of a protein molecule into smaller pieces.

Which diagram has three correct labels?

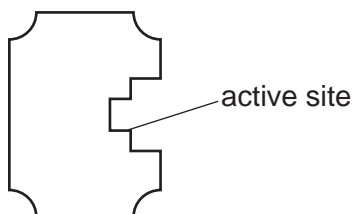


6. The table shows the conditions in four test-tubes containing equal amounts of starch and salivary amylase.

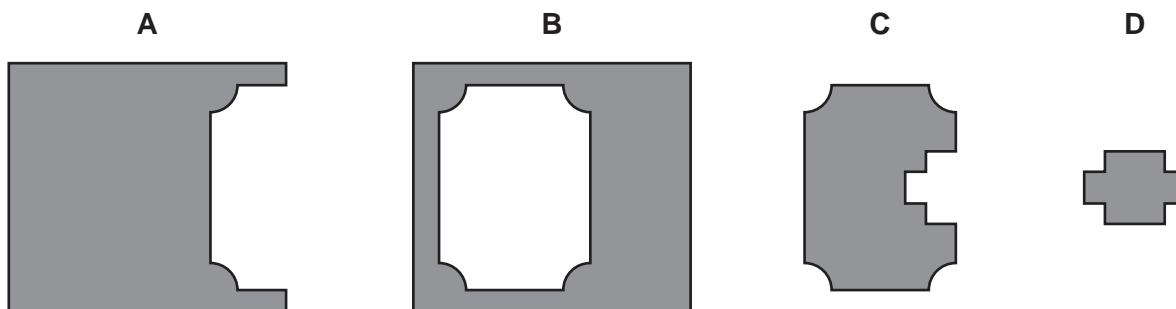
In which test-tube is the starch broken down fastest?

	pH	temperature / °C
<b>A</b>	2	27
<b>B</b>	2	37
<b>C</b>	7	27
<b>D</b>	7	37

7. The diagram represents the shape of an enzyme molecule.



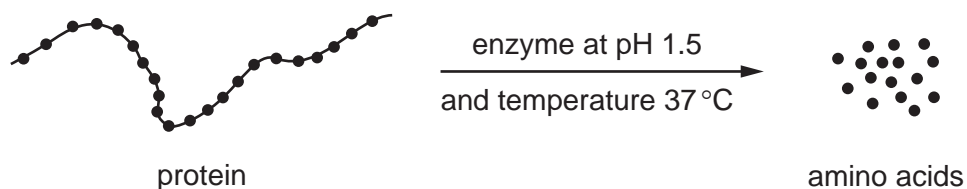
With which substrate would this enzyme most easily form an enzyme-substrate complex?



8. What is true of **all** enzymes?

	they are sugars	they are most effective at pH7
<b>A</b>	✓	✓
<b>B</b>	✓	✗
<b>C</b>	✗	✓
<b>D</b>	✗	✗

9. The diagram shows the effect of an enzyme working in the human digestive system.



What would **reduce** the rate of production of amino acids?

- A** removing the amino acids as they are formed
- B** increasing the amount of protein
- C** raising the temperature to 40 °C
- D** raising the pH to 7.5

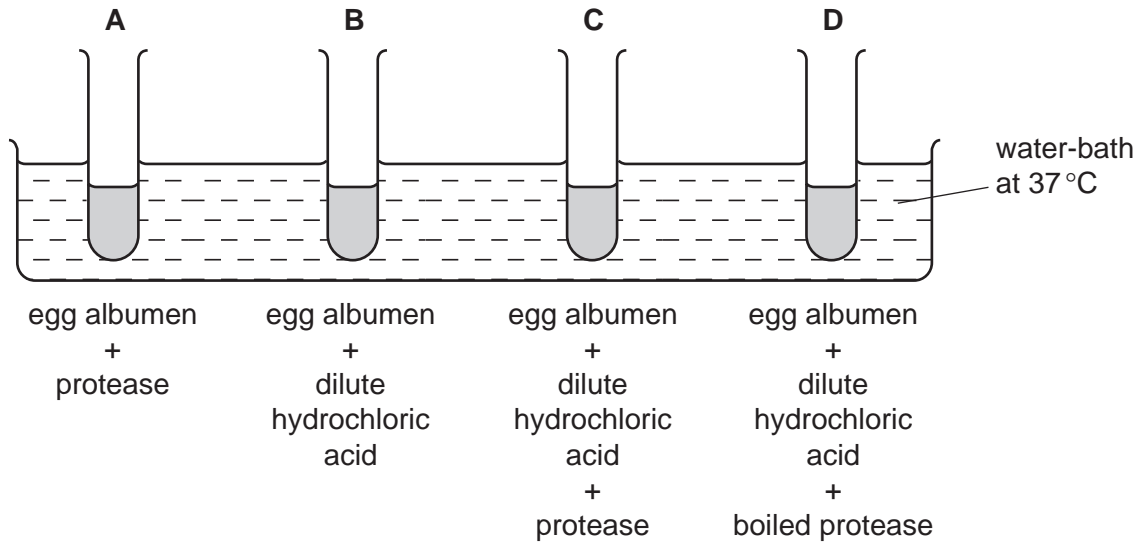
10. Which group of compounds ensures that metabolic reactions take place effectively?

- A** carbohydrates
- B** enzymes
- C** fatty acids
- D** hormones

11. The diagram shows an experiment on the digestion of the protein in egg albumen by protease.

The protease was taken from a human stomach.

In which test-tube will the protein be digested most quickly?



12. Which effect does a gradual decrease in pH from 13 to 1 have on the action of amylase?

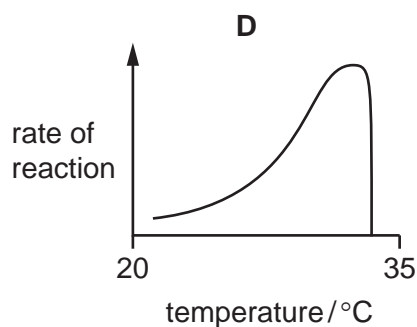
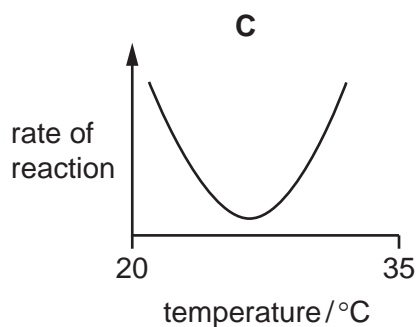
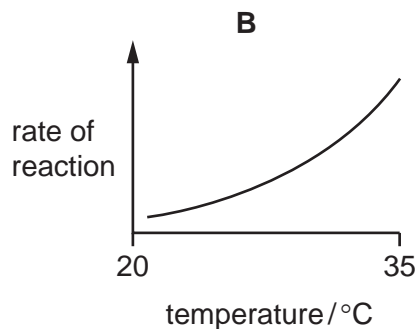
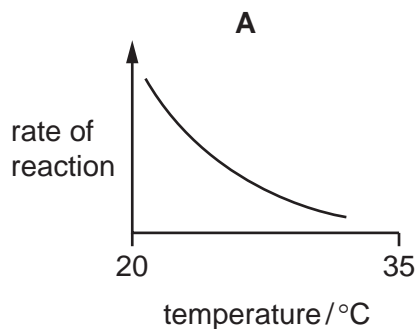
- A slows it down only
- B slows it down then speeds it up
- C speeds it up only
- D speeds it up then slows it down

13. An enzyme in potato cells causes oxygen to be produced from hydrogen peroxide. Cubes of potato were incubated with hydrogen peroxide at different temperatures. The numbers of bubbles of oxygen released per minute were counted at each temperature. The table shows the results.

temperature / °C	15	25	35	45	55
number of bubbles / bubbles per minute	96	98	82	36	1

The results suggest the optimum temperature for the enzyme is between which two values?

- A 15 °C and 35 °C
  - B 35 °C and 45 °C
  - C 35 °C and 55 °C
  - D 45 °C and 55 °C
14. Which graph shows the effect of temperature between 20 °C and 35 °C on the activity of a human digestive enzyme?



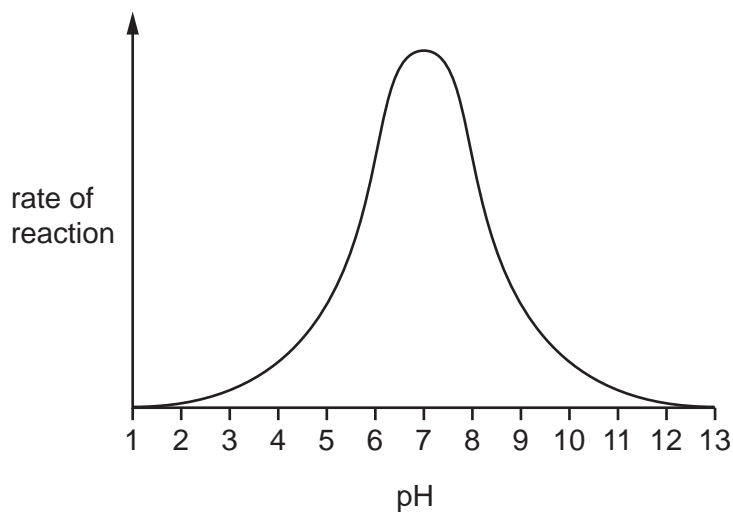


15. Lactase is a human enzyme that catalyses the breakdown of lactose in milk.

At which temperature does lactase work fastest?

- A** 0 °C                      **B** 18 °C                      **C** 37 °C                      **D** 100 °C

16. The graph shows the effect of pH on a particular enzyme-controlled reaction.



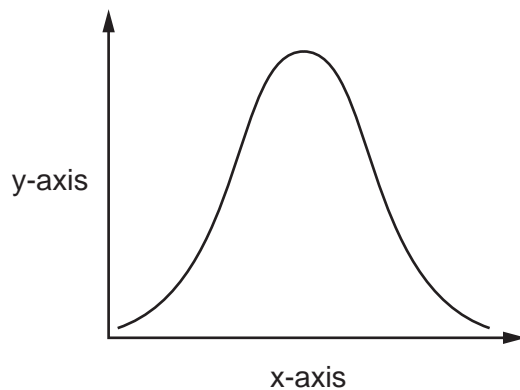
When is the enzyme **not** active?

- A** at pH 1 and pH 13  
**B** at pH 3 and pH 11  
**C** at pH 5 and pH 9  
**D** at pH 7

17. What happens to most enzymes above 60 °C?

- A They are denatured.
- B They are destroyed by white blood cells.
- C They are digested.
- D They are made more active.

18. An experiment was carried out to investigate the effect of pH on enzyme action. The graph shows the results.

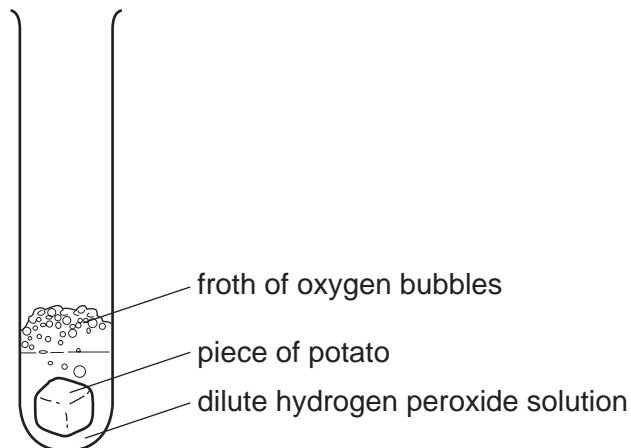


What are the labels for the x-axis and the y-axis?

	x-axis	y-axis
<b>A</b>	pH	rate of reaction
<b>B</b>	pH	time
<b>C</b>	rate of reaction	pH
<b>D</b>	time	pH

19. The enzyme catalase, found in potato, speeds up the breakdown of hydrogen peroxide. The reaction releases a froth of oxygen bubbles.

The diagram shows an experiment to find the effect of changes in pH on the rate of this reaction.



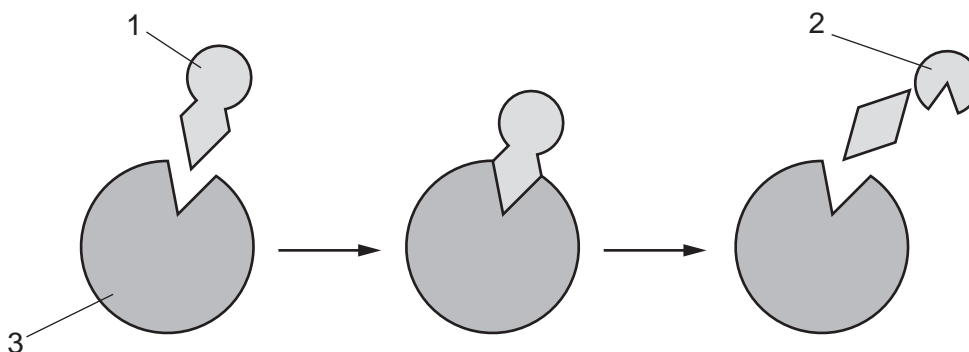
The table shows the time taken for the froth of bubbles to reach the top of the test-tube at different pH values.

pH	minutes
4	4
5	3
6	1
7	2

Which pH is nearest to the optimum (best) for this enzyme?

- A** pH 4      **B** pH 5      **C** pH 6      **D** pH 7
20. What is a characteristic of all catalysts?
- A** They are broken down in the reaction.  
**B** They are made of protein.  
**C** They are not changed by the reaction.  
**D** They do not change the rate of the reaction.

21. The diagram shows the lock and key model of enzyme action.



Which is the enzyme and which is the substrate?

	enzyme	substrate
<b>A</b>	1	2
<b>B</b>	1	3
<b>C</b>	3	1
<b>D</b>	3	2

22. The table shows the temperature and pH at which four different enzymes are most active.

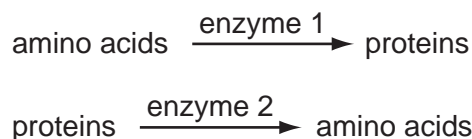
Which enzyme is a protease from the stomach?

	optimum temperature /°C	optimum pH
<b>A</b>	25	10
<b>B</b>	37	7
<b>C</b>	40	2
<b>D</b>	50	5

23. Which statement is correct for **all** catalysts?

- A They are enzymes.
- B They are proteins.
- C They speed up chemical reactions.
- D They work in living organisms.

24. Two enzyme-controlled reactions are shown.



From these reactions, what deduction can be made about enzymes?

- A Enzyme 1 has been changed to enzyme 2.
  - B Enzyme 2 slows down the production of amino acids.
  - C Enzymes can build up large molecules.
  - D Enzymes only break down large molecules.
25. The temperature of an enzyme-controlled reaction is increased by 10°C.  
How does this affect the rate of reaction?
- A It always increases the rate.
  - B It always decreases the rate.
  - C It may increase or decrease the rate.
  - D It has no effect on the rate.

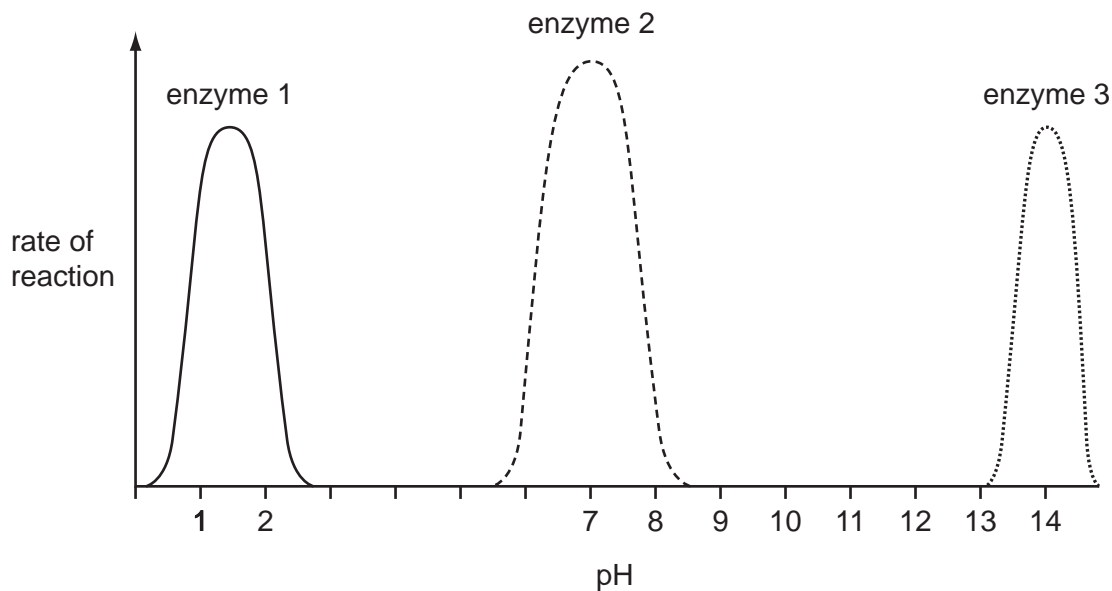
26. In an experiment, the effect of temperature on the action of amylase is investigated.

Six different test-tubes are set up, each containing a mixture of amylase and starch solution.

Which condition should **not** be kept the same in each of the six test-tubes?

- A concentration of amylase
- B pH
- C temperature
- D volume of starch solution

27. The graph shows the effect of pH on the rate of reaction of three different enzymes.



What does the graph show?

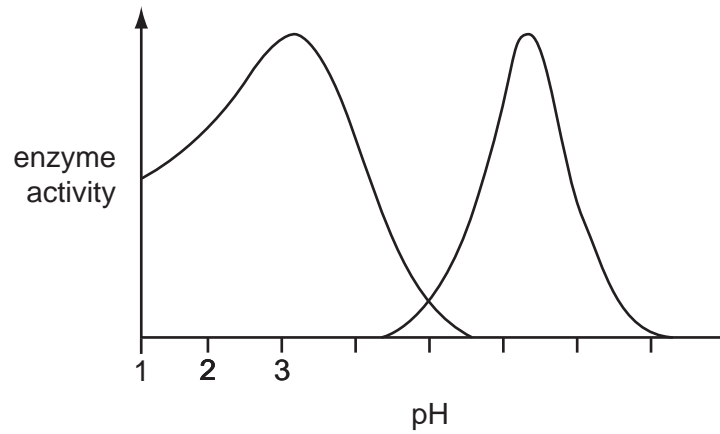
- A Each enzyme works best at a different pH.
- B Each enzyme works best over a narrow temperature range.
- C Enzymes work best in acid conditions.
- D Enzymes work best in alkaline conditions.

28. Some plants digest insects and use the nutrients for growth.

What must these plants produce to digest the insects?

- A acids
- B alkalis
- C enzymes
- D hormones

29. The graph shows the effect of pH on the activity of two enzymes.

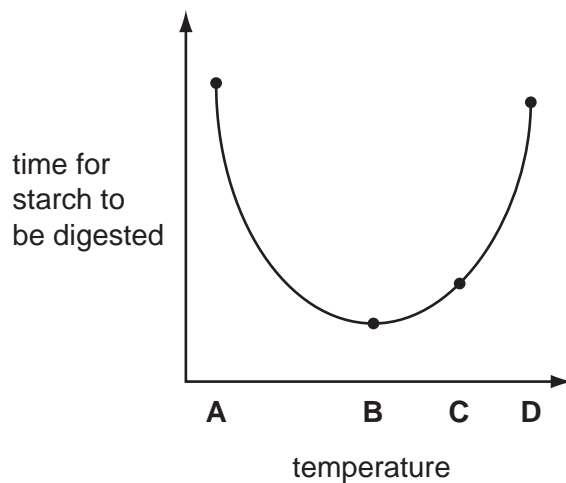


At which pH is the activity of both enzymes the same?

- A 1
- B 3
- C 5
- D 8

30. Four identical mixtures of starch and amylase were kept at different temperatures. The graph shows the time taken for the starch to be completely digested at each temperature.

At which temperature is the rate of reaction quickest?



31. Equal quantities of a protein-digesting enzyme were added to  $5\text{cm}^3$  of protein solutions of different pH. Each tube was kept at  $37^\circ\text{C}$ . The amount of amino acid in each tube was measured after 3 minutes. The results are shown in the table.

pH	amount of amino acid / arbitrary units
1	10
2	9
3	7
4	2
5	1
6	1
7	1
8	0

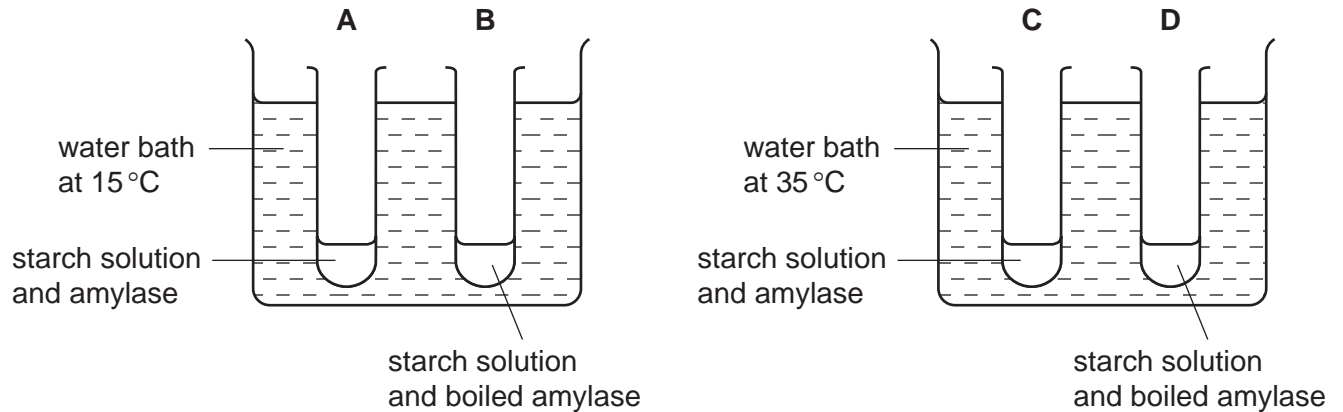
At which pH was the enzyme most active?

- A** 1                      **B** 7                      **C** 8                      **D** 10



32. Four test-tubes were set up as shown in the diagram.

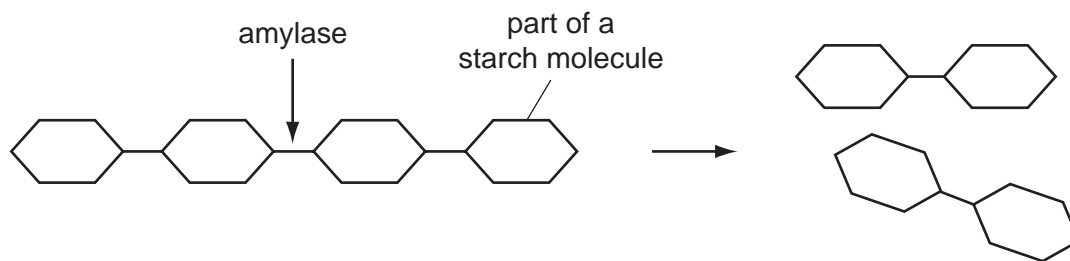
In which tube is the starch digested most quickly?



33. A human digestive enzyme breaks down its substrate at a fast rate at 35 °C.  
What would occur if the enzyme and substrate were kept at 75 °C?

- A** The enzyme would stop working and be denatured.
- B** The reaction would continue at the same rate.
- C** The reaction would take place more quickly.
- D** The reaction would take place more slowly.

34. The diagram shows the action of amylase.



What is the function of the enzyme amylase?

- A breaks down the substrate into amino acids
- B changes the product into the substrate
- C increases the rate of starch breaking down into glucose
- D increases the rate of starch breaking down into maltose

35. What are enzymes made of?

- A carbohydrates
- B DNA
- C fats
- D proteins

36. At which temperature do most enzymes from the human body become completely denatured?

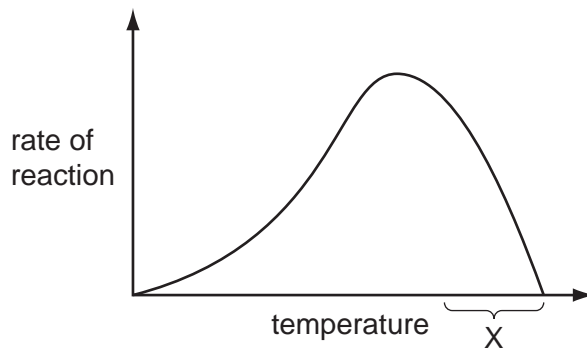
- A 0°C
- B 27°C
- C 40°C
- D 65°C

37. Six test-tubes were set up at different temperatures. Each contained identical solutions containing starch and amylase mixtures. The table shows the time taken for the reactions to finish in each test-tube.

temperature / °C	15	25	35	45	55	65
time / seconds	35	22	13	5	35	66

At which temperature does the amylase work best?

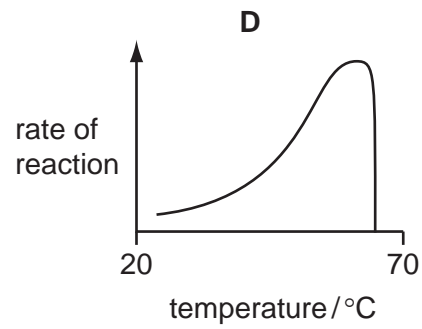
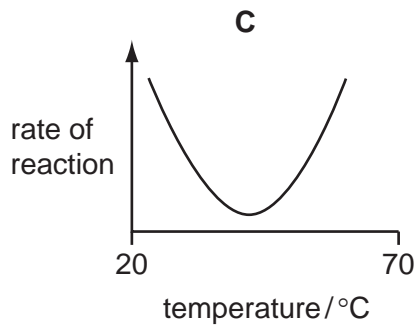
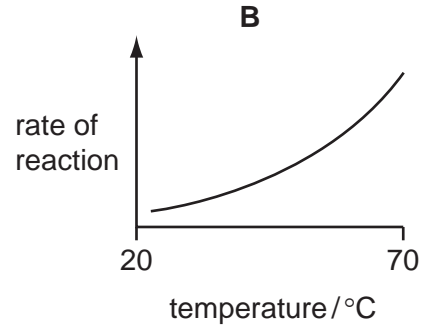
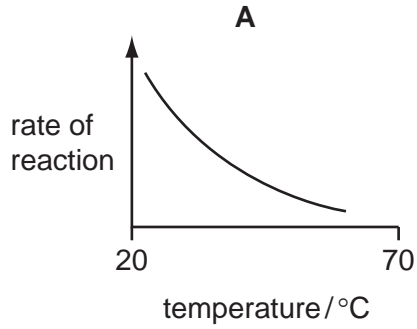
- A** 15 °C                      **B** 35 °C                      **C** 45 °C                      **D** 65 °C
38. The graph shows how the rate of an enzyme-controlled reaction changes with temperature.



What is happening within the temperature range marked X?

- A** The enzyme is becoming denatured.  
**B** The enzyme is being used up.  
**C** The reaction is occurring at body temperature.  
**D** The reaction is occurring at the optimum temperature.

39. Which graph shows the effect of temperature on the activity of a human digestive enzyme?



40. Which substance is an enzyme?

- A** bile
- B** fibrinogen
- C** lipase
- D** maltose