

Chapter 5

Enzymes

5.1 Enzymes

01. 0610_m22_qp_22 Q: 9

What controls the speed of chemical reactions in all living cells?

- A enzymes
 - B hormones
 - C ions
 - D vitamins
-

02. 0610_m22_qp_22 Q: 10

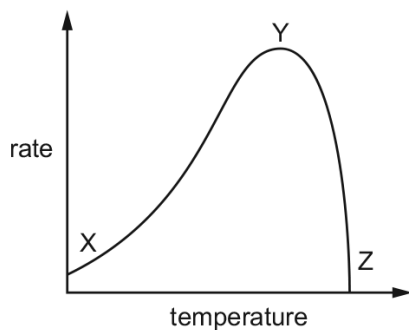
Enzymes have an optimum temperature at which they are most active.

Which row explains why enzyme activity decreases if the temperature is **not** optimum?

	below optimum temperature	above optimum temperature
A	enzymes denature	enzymes denature
B	enzymes denature	enzymes have less kinetic energy
C	enzymes have less kinetic energy	enzymes denature
D	enzymes have less kinetic energy	enzymes have less kinetic energy

03. 0610_m21_qp_22 Q: 10

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



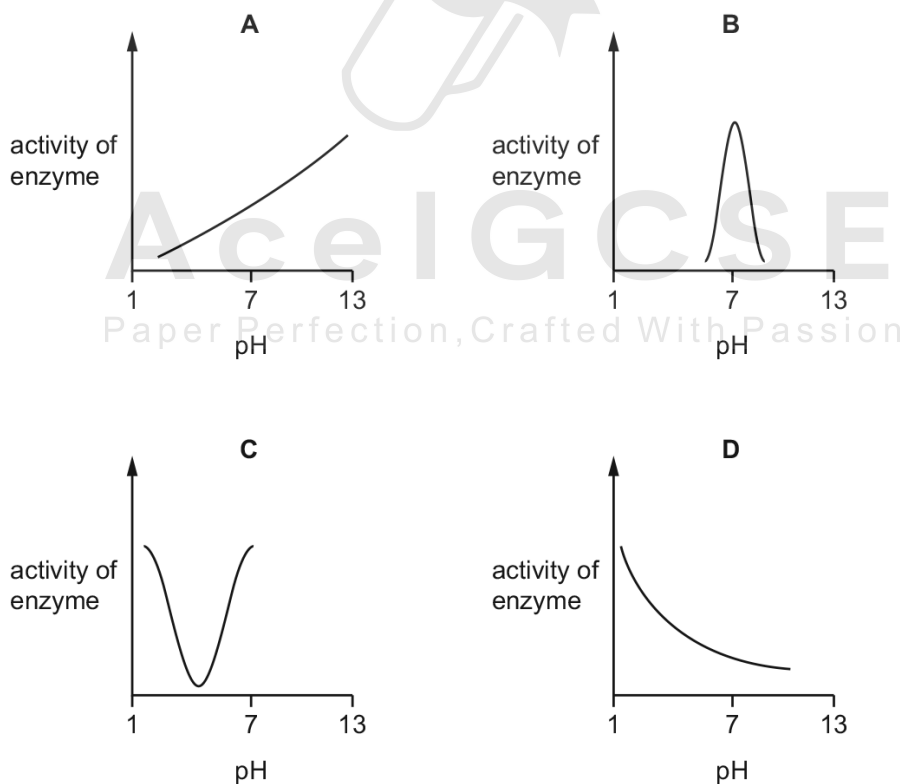
Which statements are correct?

- 1 The collision frequency between substrate and enzyme increases between X and Y.
- 2 The shape of the active site is altered between Y and Z.
- 3 The enzyme is denatured irreversibly at X and Z.

A 1, 2 and 3 **B** 1 and 2 only **C** 1 only **D** 2 and 3 only

04. 0610_m21_qp_22 Q: 11

Which graph represents the effect of pH on the activity of a digestive enzyme?



5.1. ENZYMES

05. 0610_s21_qp_21 Q: 11

Starch is digested by amylase in the mouth, but it is not digested in the stomach.

What is the reason for this?

- A** All starch digestion is completed in the mouth.
 - B** The pH in the stomach is not suitable for the amylase to work.
 - C** The starch does not stay in the stomach long enough to be digested.
 - D** The temperature in the stomach is not suitable for the amylase to work.
-

06. 0610_s21_qp_21 Q: 12

Which statement describes a catalyst?

- A** a substance that decreases the rate of a chemical reaction and is not changed by the reaction
 - B** a substance that decreases the rate of a chemical reaction and is changed by the reaction
 - C** a substance that increases the rate of a chemical reaction and is changed by the reaction
 - D** a substance that increases the rate of a chemical reaction and is not changed by the reaction
-

07. 0610_s21_qp_22 Q: 12

Which statement about an enzyme-controlled reaction is correct?

- A** During the reaction, the substrate changes into products.
 - B** The enzyme is gradually used up during the reaction.
 - C** The enzyme is slowly broken down during the reaction.
 - D** The higher the temperature, the slower the reaction.
-

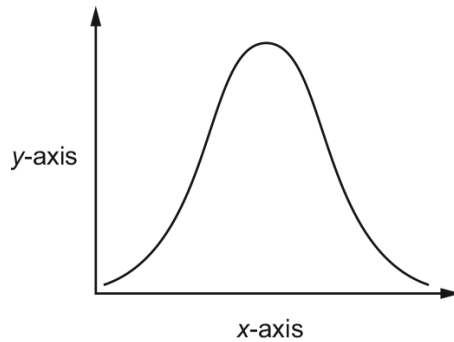
08. 0610_s21_qp_23 Q: 12

Which type of molecule are enzymes made of?

- A** carbohydrate
 - B** fat
 - C** protein
 - D** vitamin
-

09. 0610_w21_qp_21 Q: 10

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



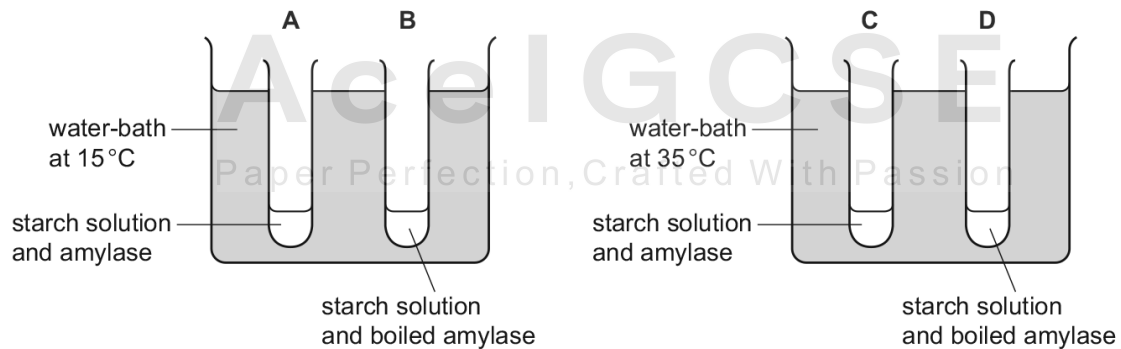
What are the labels for the x-axis and the y-axis?

	x-axis	y-axis
A	pH	rate of reaction
B	pH	time
C	rate of reaction	pH
D	time	pH

10. 0610_w21_qp_21 Q: 11

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

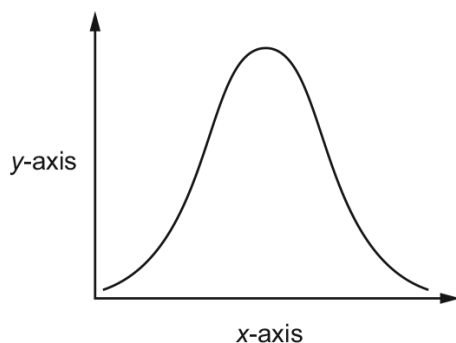
In which test-tube is the starch digested most quickly?



5.1. ENZYMES

11. 0610_w21_qp_23 Q: 10

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

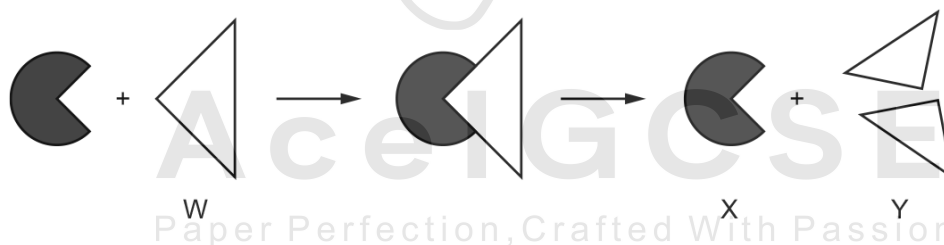


What are the labels for the x-axis and the y-axis?

	x-axis	y-axis
A	pH	rate of reaction
B	pH	time
C	rate of reaction	pH
D	time	pH

12. 0610_m20_qp_22 Q: 11

The diagram represents enzyme action.



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

	enzyme	product	substrate
A	W	X	Y
B	X	W	Y
C	X	Y	W
D	Y	W	X

13. 0610_s20_qp_21 Q: 9

What is the definition of an enzyme?

- A a carbohydrate that acts as a catalyst
 - B a DNA molecule that acts as a catalyst
 - C a fat that acts as a catalyst
 - D a protein that acts as a catalyst
-

14. 0610_s20_qp_22 Q: 10

Enzymes function best at their optimum temperature.

Which statement describes the effect on an enzyme of increasing the temperature to the enzyme's optimum temperature?

- A There are more frequent successful collisions.
 - B The kinetic energy of the enzymes decreases.
 - C The enzymes begin to lose their complementary shape.
 - D The rate at which enzyme-substrate complexes form is reduced.
-

15. 0610_s20_qp_23 Q: 9

Which statement about enzyme-controlled reactions is correct?

- A During the reaction, a substrate changes into a product.
 - B The enzyme is slowly broken down during the reaction.
 - C The higher the pH the faster the reaction.
 - D The product is gradually used up during the reaction.
-

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16. 0610_s20_qp_23 Q: 10

Increasing temperature above the optimum for the enzyme results in loss of enzyme activity.

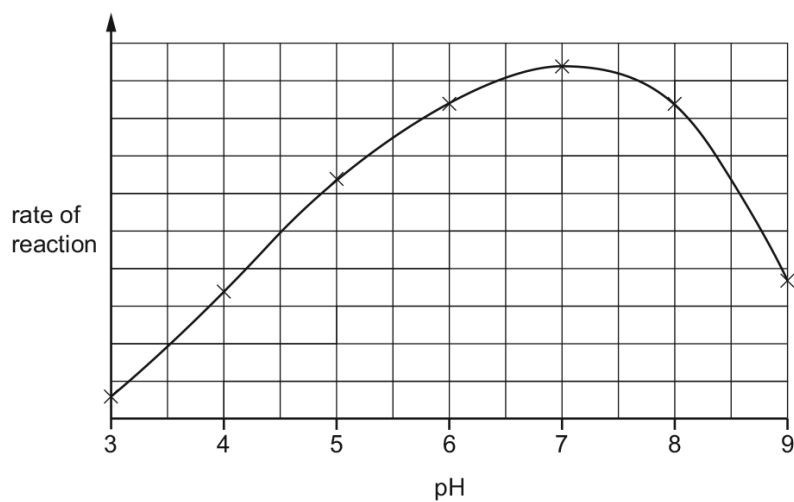
How is this explained?

- A less frequent collisions between the enzyme and the substrate
 - B reduced kinetic energy of the enzyme molecule
 - C substrate molecules move faster and effective collisions are less likely
 - D the shape of the active site is changed and the substrate will no longer fit into it
-

5.1. ENZYMES

17. 0610_w20_qp_21 Q: 9

The graph shows the effect of pH on the rate of reaction of an enzyme.

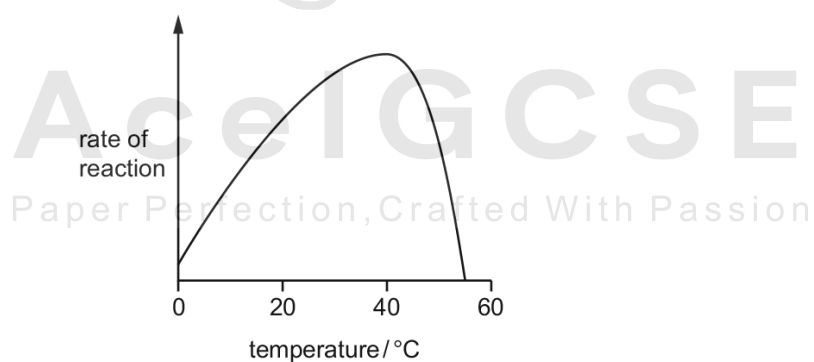


What does the graph show?

- A The enzyme is destroyed at pH 9.
- B The enzyme works best at pH 6.
- C The rate of reaction halves as the pH changes from pH 5 to pH 7.
- D The rate of reaction is the same at pH 5 and pH 8.5.

18. 0610_w20_qp_21 Q: 10

The graph shows how enzyme activity is affected by temperature.

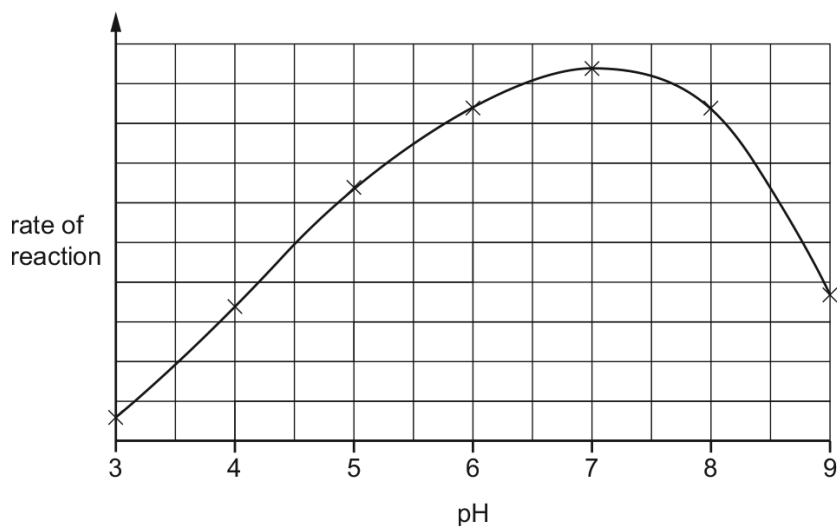


How can the change in activity between 40°C and 55°C be explained?

- 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.

19. 0610_w20_qp_23 Q: 9

The graph shows the effect of pH on the rate of reaction of an enzyme.

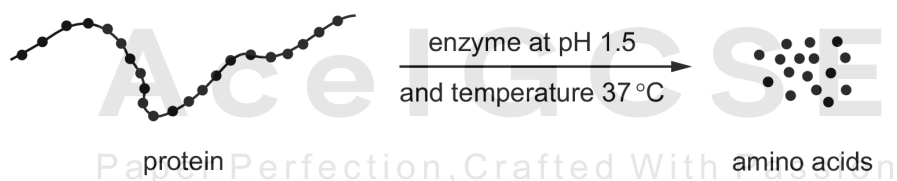


What does the graph show?

- A The enzyme is destroyed at pH 9.
- B The enzyme works best at pH 6.
- C The rate of reaction halves as the pH changes from pH 5 to pH 7.
- D The rate of reaction is the same at pH 5 and pH 8.5.

20. 0610_m19_qp_22 Q: 10

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

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

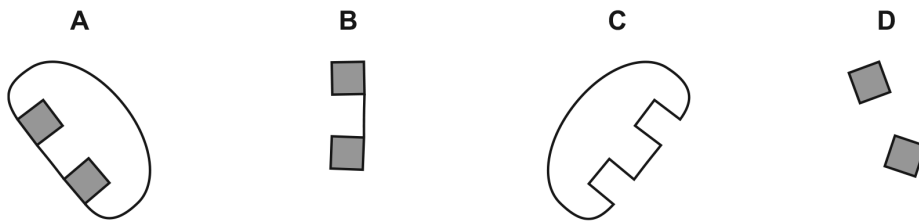
- A removing the amino acids as they are formed
- B increasing the amount of protein
- C raising the temperature to 37.1 °C
- D raising the pH to 7.5

5.1. ENZYMES

21. 0610_m19_qp_22 Q: 11

The diagrams show molecules involved in the action of a digestive enzyme such as maltase.

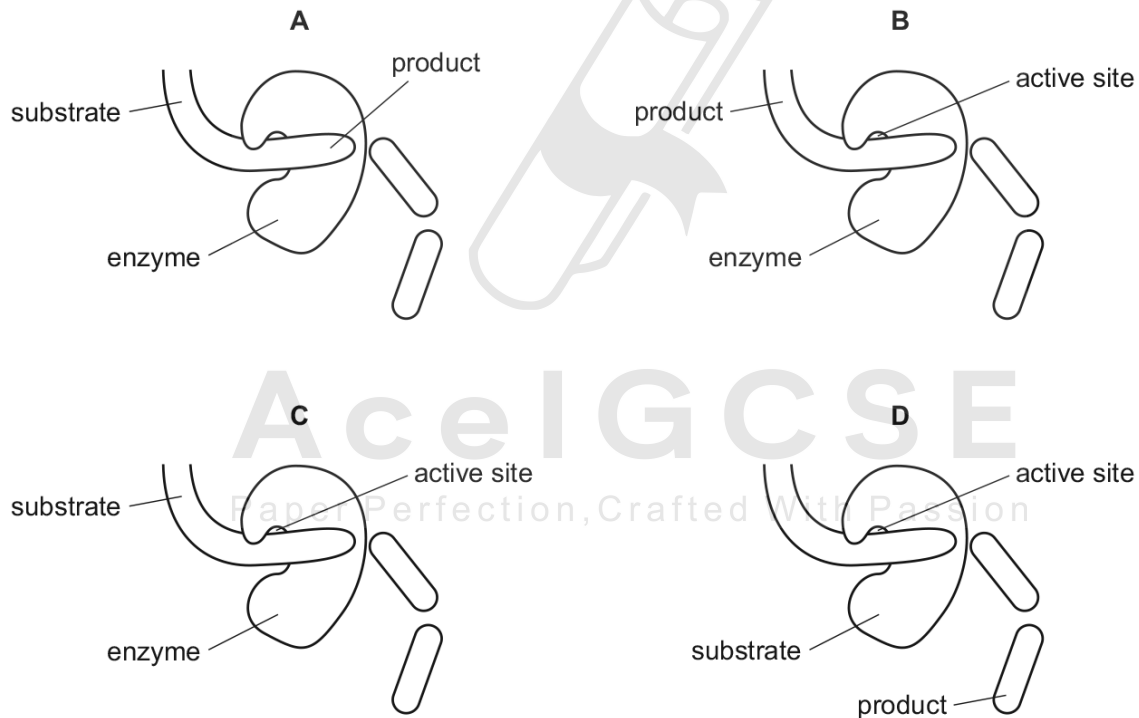
Which is the substrate?



22. 0610_s19_qp_21 Q: 10

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

Which diagram has three correct labels?



23. 0610_w19_qp_21 Q: 9

What is the correct definition of the term *enzyme*?

- 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
-

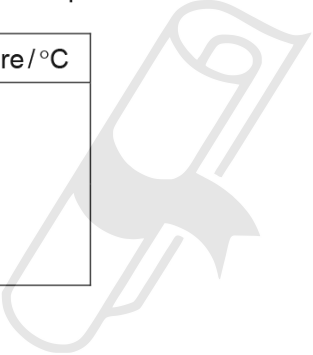
24. 0610_w19_qp_23 Q: 9

Enzyme X digests protein in the stomach.

Four test-tubes were set up, each contained the same amounts of protein and enzyme X. The test-tubes are kept at different levels of pH and temperature, as shown in the table.

In which test-tube will protein digestion be quickest?

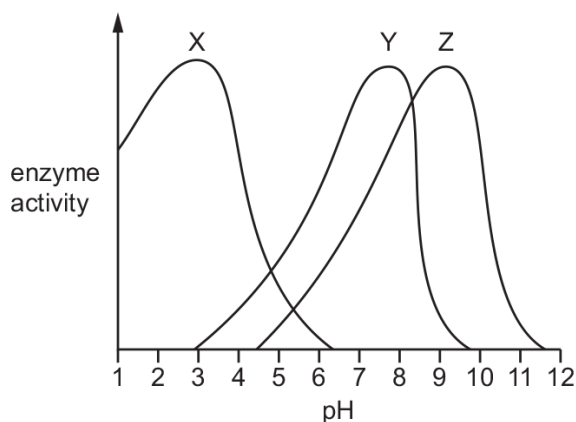
	pH	temperature / °C
A	2	20
B	2	35
C	7	20
D	7	35



5.1. ENZYMES

25. 0610_m18_qp_22 Q: 9

The graph shows the activity of three digestive enzymes at differing pH levels.

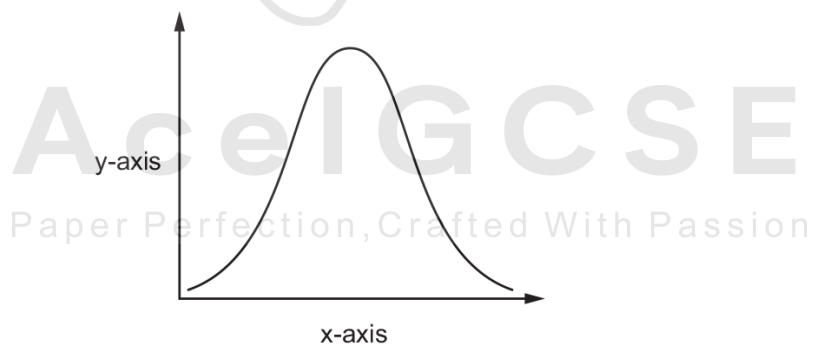


Which statement is correct?

- A Enzymes X and Y are both active at pH 7.
- B Enzymes X and Z are both active at pH 4.
- C Enzymes Y and Z are both active at pH 4.
- D Enzymes Y and Z are both active at pH 8.

26. 0610_s18_qp_21 Q: 10

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



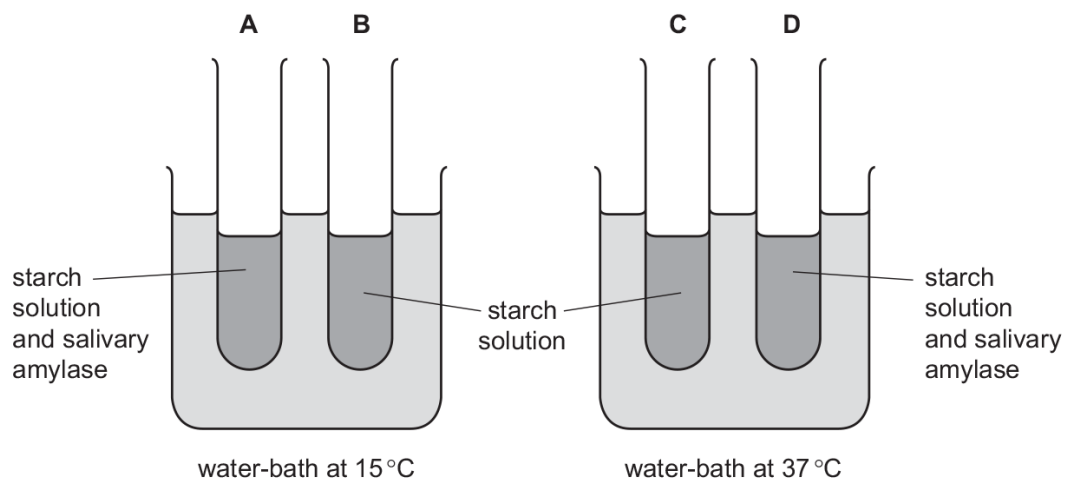
What are the labels for the x-axis and the y-axis?

	x-axis	y-axis
A	pH	rate of reaction
B	pH	time
C	rate of reaction	pH
D	time	pH

27. 0610_w18_qp_21 Q: 9

The apparatus shown is used for an experiment on starch digestion.

Which test-tube contains the most sugar after 20 minutes?



28. 0610_w18_qp_21 Q: 10

A student wrote some notes about enzymes.

She wrote:

'The1..... of the enzyme is2..... to an area on the substrate.

This area on the substrate can fit into it to form an3..... complex'.

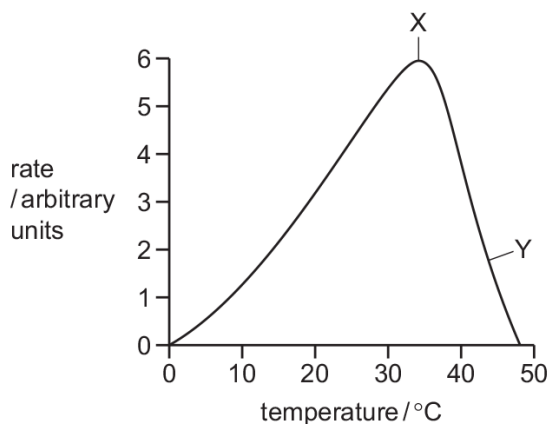
Which words correctly complete gaps 1, 2 and 3?

	1	2	3
A	active site	complementary	enzyme-substrate
B	active site	similar	enzyme-product
C	shape	complementary	enzyme-product
D	shape	similar	enzyme-substrate

5.1. ENZYMES

29. 0610_w18_qp_23 Q: 10

The graph shows how an enzyme-controlled reaction is affected by temperature.



Which statement explains the change in activity between X and Y?

- A There are more effective collisions.
 - B There is a change in the enzyme shape.
 - C There is more substrate present.
 - D The kinetic energy of the molecules has increased.
-

30. 0610_m17_qp_22 Q: 9

Many enzymes do not work at temperatures above 60 °C.

Which statement explains this?

- A Product molecules are not made because the active site has changed shape.
 - B Product molecules change shape so they do not fit the active site.
 - C Substrate molecules are moving too fast.
 - D Substrate molecules are moving too slowly.
-

31. 0610_s17_qp_22 Q: 7

An experiment was carried out to study the effect of temperature on the time taken for protein to be digested by an enzyme.

The table shows the results.

temperature / °C	observation
25	4 hours for complete digestion
35	2 hours for complete digestion
45	3 hours for complete digestion
55	no digestion takes place

For these results, at which temperature does the enzyme denature?

- A** 20 °C **B** 30 °C **C** 40 °C **D** 50 °C
-

32. 0610_s17_qp_23 Q: 7

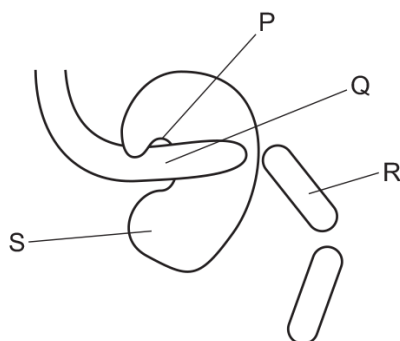
Which statement describes the effect of temperature on enzymes?

- A** High temperatures denature enzymes making it difficult for substrate molecules to fit into the active site.
- B** High temperatures denature enzymes making it easy for substrate molecules to fit into the active site.
- C** Low temperatures denature enzymes making it difficult for substrate molecules to fit into the active site.
- D** Low temperatures denature enzymes making it easy for substrate molecules to fit into the active site.
-

5.1. ENZYMES

33. 0610_w17_qp_21 Q: 7

The diagram shows a protease molecule catalysing the break down of a protein molecule.



What are the parts labelled P, Q, R and S?

	enzyme	product	substrate	active site
A	P	Q	R	S
B	R	S	P	Q
C	S	P	Q	R
D	S	R	Q	P

34. 0610_w17_qp_21 Q: 9

Which statement about enzymes is correct?

- A** Enzymes become part of the product.
- B** Lowering the pH always slows down the reaction rate.
- C** Raising the temperature always increases the reaction rate.
- D** The specificity of an enzyme depends on the shape of its active site.

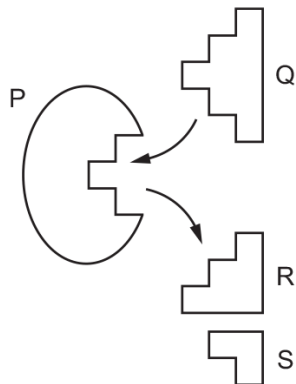
35. 0610_w17_qp_22 Q: 9

Why does excessive heat decrease enzyme activity?

- A** It changes the shape of the active site.
- B** It changes the shape of the substrate and product molecules.
- C** It increases the force of collisions between substrate and product molecules.
- D** It increases the kinetic energy of the substrate molecules.

36. 0610_w17_qp_23 Q: 10

The diagram shows an enzyme with its substrate and product molecules.



Which form an enzyme-substrate complex?

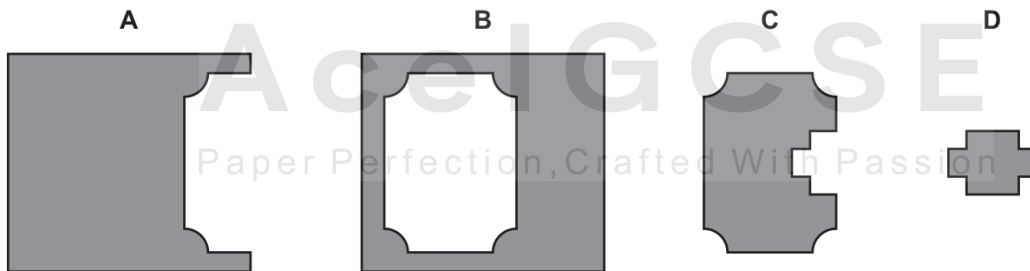
- A** P and Q **B** Q and R **C** R and S **D** S and P

37. 0610_m16_qp_22 Q: 10

The diagram represents the shape of an enzyme molecule.



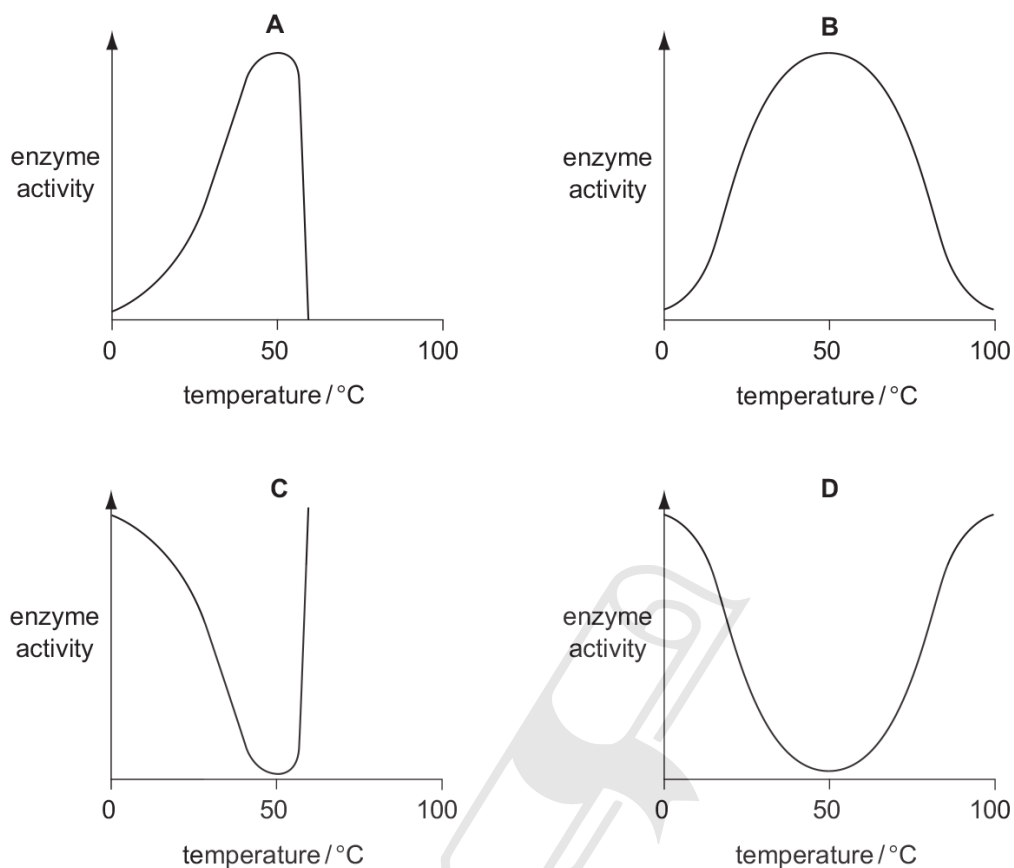
With which substrate would this enzyme most easily form an enzyme-substrate complex?



5.1. ENZYMES

38. 0610_s16_qp_21 Q: 10

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



39. 0610_w16_qp_21 Q: 7

Commercial fishermen use ice to store the fish that they catch.

How does the ice keep the fish fresh?

- A Cells denature.
- B Decomposer activity decreases.
- C Decomposer activity increases.
- D Proteins denature.

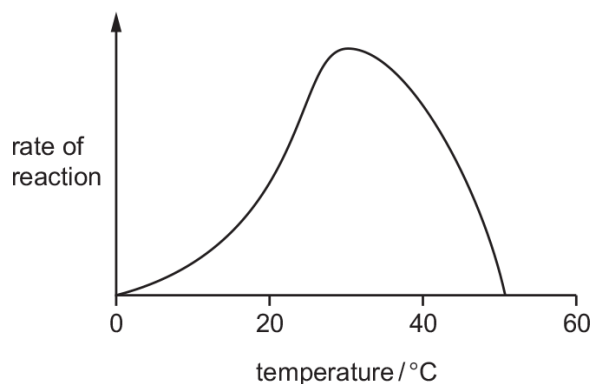
40. 0610_w16_qp_21 Q: 8

What controls the speed of chemical reactions in all living cells?

- A enzymes
- B hormones
- C ions
- D vitamins

41. 0610_w16_qp_22 Q: 8

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

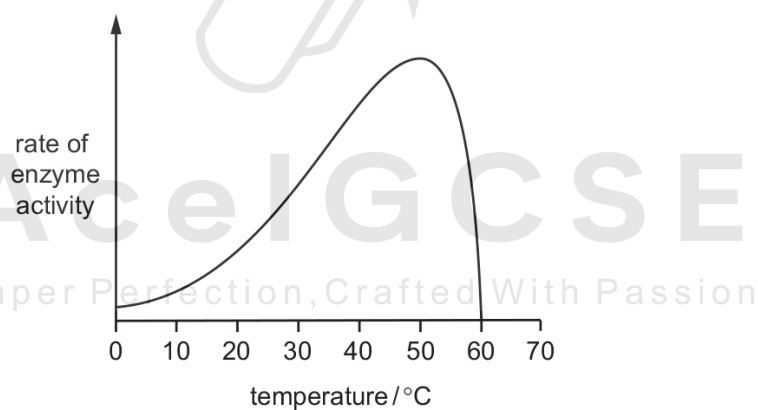


Which statement describes the effect of temperature on this reaction?

- A** As the temperature increases to 25 °C the reaction speeds up.
- B** Between 10 °C and 20 °C the enzyme stops working.
- C** Between 35 °C and 45 °C the enzyme stops working.
- D** The optimum temperature for this reaction is 40 °C.

42. 0610_w16_qp_23 Q: 8

The graph shows how the activity of an enzyme varies with temperature.



What is the best or optimum temperature for this enzyme and at what temperature is the enzyme not working?

	temperature / °C	
	best	not working
A	30	0
B	30	60
C	50	0
D	50	60

SN	Paper	Q. No.	Answer
01	0610_m22_qp_22	9	A
02	0610_m22_qp_22	10	C
03	0610_m21_qp_22	10	B
04	0610_m21_qp_22	11	B
05	0610_s21_qp_21	11	B
06	0610_s21_qp_21	12	D
07	0610_s21_qp_22	12	A
08	0610_s21_qp_23	12	C
09	0610_w21_qp_21	10	A
10	0610_w21_qp_21	11	C
11	0610_w21_qp_23	10	A
12	0610_m20_qp_22	11	C
13	0610_s20_qp_21	9	D
14	0610_s20_qp_22	10	A
15	0610_s20_qp_23	9	A
16	0610_s20_qp_23	10	D
17	0610_w20_qp_21	9	D
18	0610_w20_qp_21	10	D
19	0610_w20_qp_23	9	D
20	0610_m19_qp_22	10	D
21	0610_m19_qp_22	11	B
22	0610_s19_qp_21	10	C
23	0610_w19_qp_21	9	C
24	0610_w19_qp_23	9	B
25	0610_m18_qp_22	9	D
26	0610_s18_qp_21	10	A
27	0610_w18_qp_21	9	D
28	0610_w18_qp_21	10	A
29	0610_w18_qp_23	10	B
30	0610_m17_qp_22	9	A
31	0610_s17_qp_22	7	D
32	0610_s17_qp_23	7	A
33	0610_w17_qp_21	7	D
34	0610_w17_qp_21	9	D
35	0610_w17_qp_22	9	A
36	0610_w17_qp_23	10	A
37	0610_m16_qp_22	10	D
38	0610_s16_qp_21	10	A
39	0610_w16_qp_21	7	B
40	0610_w16_qp_21	8	A
41	0610_w16_qp_22	8	A
42	0610_w16_qp_23	8	D