

# 2.4 Enzymes

## Question Paper

Course	DP IB Biology
Section	2. Molecular Biology
Topic	2.4 Enzymes
Difficulty	Easy

**Time allowed:** 10  
**Score:** /5  
**Percentage:** /100

### Question 1

Which of the following statements apply to enzymes?

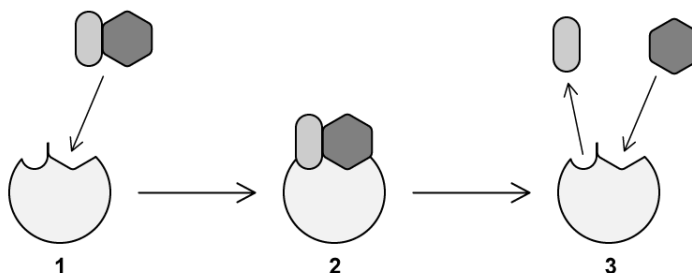
- I. They speed up the rate of chemical reactions in the body
- II. They are fibrous proteins
- III. The active site is where the substrate binds
- IV. The shape of the active site is complementary to the shape of the substrate molecule

- A. I, III and IV
- B. I, II and III
- C. I and IV
- D. II and III

[1 mark]

### Question 2

The following diagram shows the three stages involved in enzyme catalysis.



Which of the following provides the most accurate description of the events occurring at each stage?

	1	2	3
A.	The substrate collides with the enzyme	New bonds are forming within the substrate molecule	Chemical substances are released from the enzyme
B.	The substrate collides with the active site of the enzyme	The substrate is bound to the active site of the enzyme	The products are released from the active site
C.	The substrate binds to the enzyme	New chemical substances are formed while attached to the enzyme	These substances are released from the enzyme
D.	The substrate collides with the active site of the enzyme	The substrate changes into different chemical substances	The products are released from the active site

[1 mark]

### Question 3

An enzyme catalysed reaction is heated to a temperature of 65 °C.

Which of the following best explains the effect this temperature increase would have on the enzymes?

- A. The enzyme and substrate molecules will gain kinetic energy and collide more frequently
- B. The bonds in the enzyme will vibrate more and break, which will cause a permanent change in the shape of the active site
- C. The bonds in the enzyme will vibrate more and break, causing a temporary change in the shape of the active site
- D. The active site of the enzyme will permanently change shape due to the increased speed of collisions between the substrate molecule and the active site

[1 mark]

### Question 4

Lactase is an enzyme that is often immobilised and used in the food industry to produce lactose-free milk.

Which of the following would **not** be an advantage of using lactase?

- A. Increases the sweetness of many dairy products, such as yoghurt and milk shakes
- B. It may increase the rate of crystallisation of frozen dairy products, such as ice cream
- C. It may increase the fermentation rate of products such as yoghurt and cheese
- D. Lactase is able to function closer to its optimum conditions in a controlled factory environment

[1 mark]

### Question 5

Students investigated the effect of pH on catalase activity. Each experiment was repeated at a different pH value (pH = 2, 4, 7, 9, 11) and was set up as follows:

- Five potato cubes of similar dimensions were used as a source of catalase
- This was added to 50 cm<sup>3</sup> of hydrogen peroxide
- The volume of oxygen released from this reaction was collected in a measuring cylinder
- This was used to calculate the initial rate of the reaction in dm<sup>3</sup>min<sup>-1</sup>

Which of the rows in the following table correctly identifies the variables in this experiment?

	Independent variable	Dependent variable	Control variable
A.	pH	Initial reaction rate	Volume of oxygen released
B.	Initial reaction rate	pH	Volume of hydrogen peroxide
C.	pH	Initial reaction rate	Volume of hydrogen peroxide
D.	Volume of oxygen released	pH	Initial reaction rate

[1 mark]