3.2 Factors that Affect Enzyme Action

Question Paper

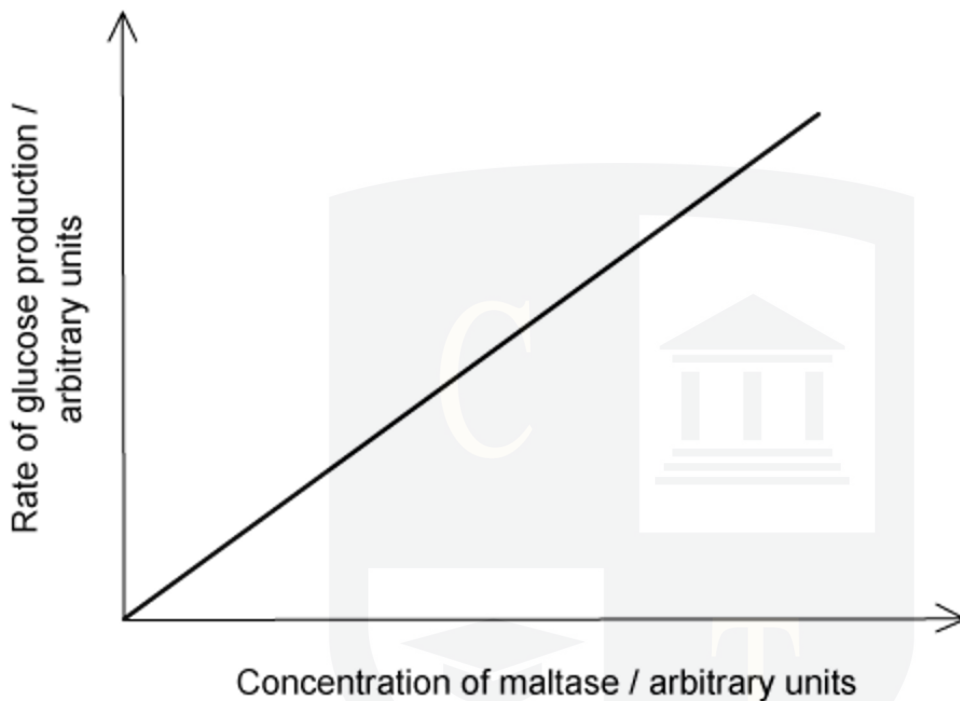|	
Course	CIE A Level Biology (9700) exams from 2022
Section	3. Enzymes
Topic	3.2 Factors that Affect Enzyme Action
Difficulty	Medium

Time allowed: 10

Score: /10

Percentage: /100

Question 1

The graph shows the rate of glucose production with increasing concentration of maltase.

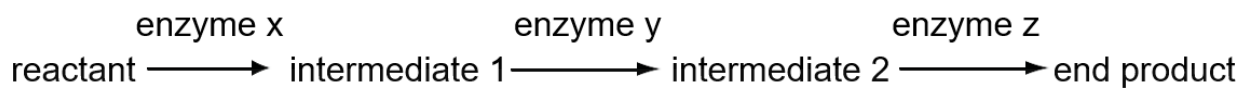Concentration of maltase / arbitrary units

To get a graph with a linear correlation like this which procedure would not be necessary?

    A   ensure temperature remained constant

    B   ensure there is sufficient maltose availability

    C   ensure pH remained constant

    D   ensure there is sufficient glucose availability

[1 mark]

Question 2

This diagram shows a metabolic pathway.

$$\text{reactant} \xrightarrow{\text{enzyme x}} \text{intermediate 1} \xrightarrow{\text{enzyme y}} \text{intermediate 2} \xrightarrow{\text{enzyme z}} \text{end product}$$

What would be the effect of adding a competitive inhibitor of enzyme z?
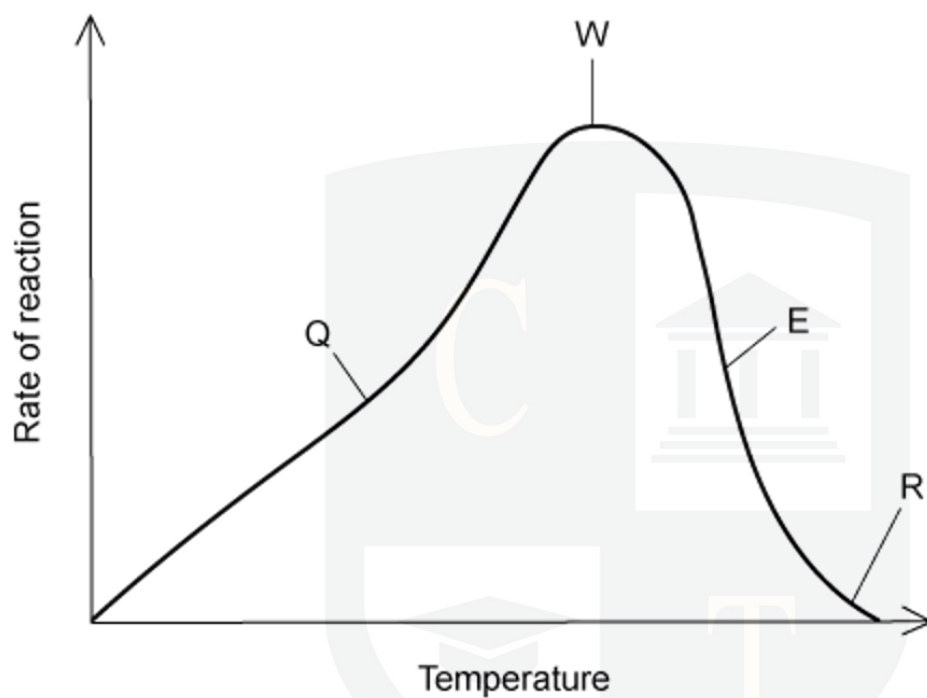
    A   intermediate 2 would increase in concentration

    B   enzyme z would be denatured

    C   no more end product would be made

    D   rate of reaction of enzyme x would slow

[1 mark]
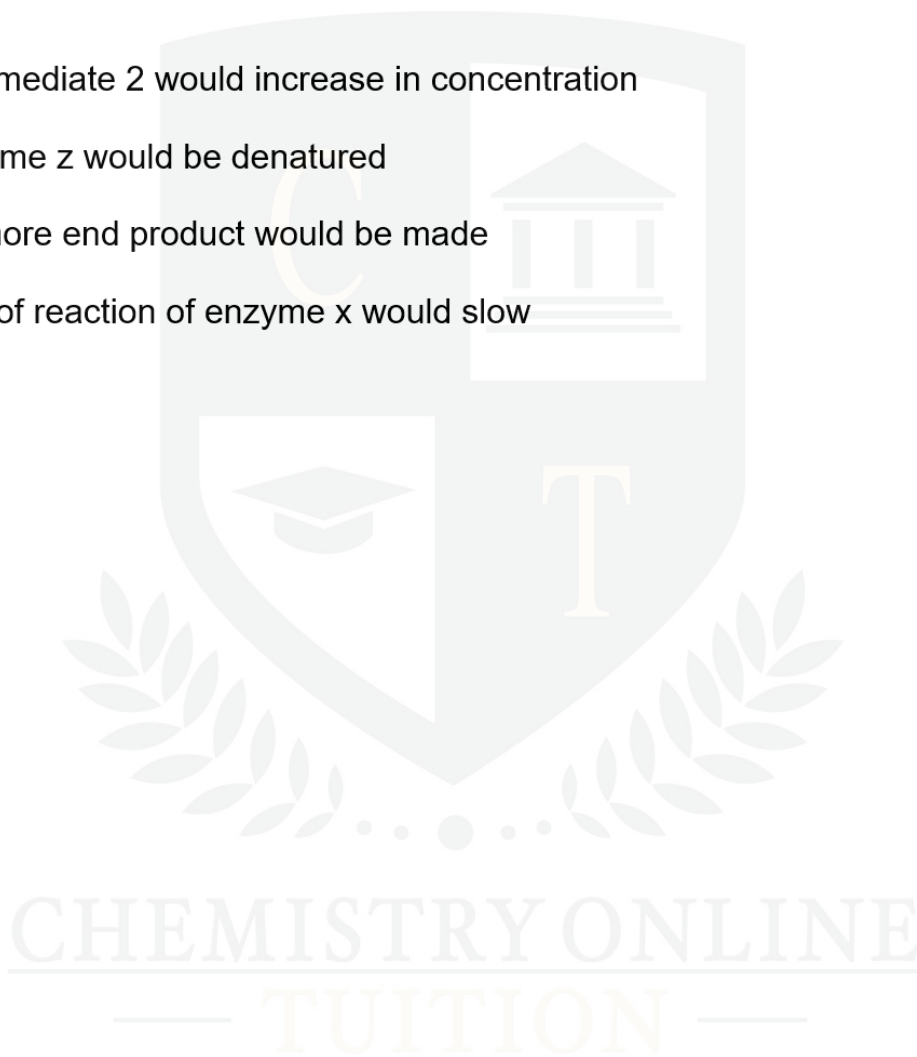
Question 3

This graph shows the effect of temperature on enzyme activity
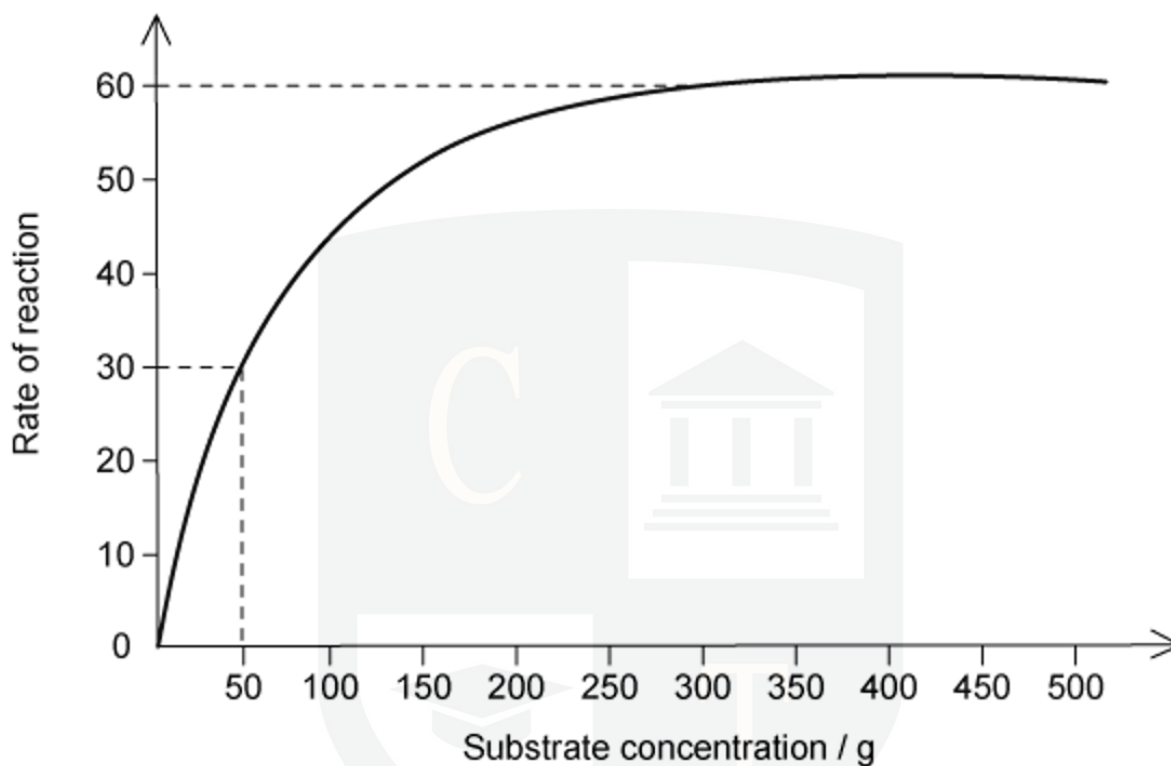

Which statement is not true?

    A   At W the kinetic energy of the substrate is highest

    B   At R the enzyme is completely denatured

    C   At W the rate of enzyme/substrate formation is the highest

    D   At E bonds in the enzyme have started to break

[1 mark]

Question 4

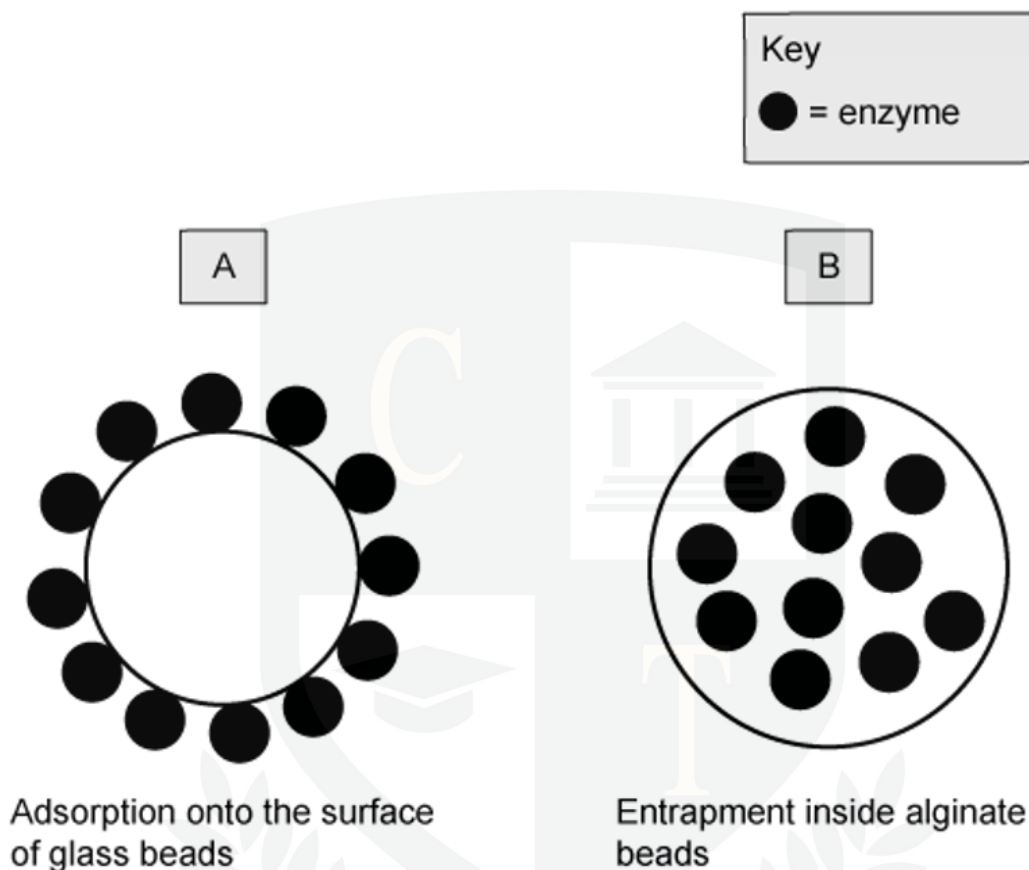This graph shows the effect of increasing substrate on enzyme activity

What is the K_m value?

    A   50g

    B   250g

    C   350g

    D   500g

[1 mark]

Question 5

Enzymes can be immobilised in various ways. The diagram below shows two different ways of immobilisation

Immobilised lactase enzymes are used to make milk digestible for lactose intolerant people. A student carried out an investigation to compare the activity of the enzyme lactase that had been immobilised in the two different ways shown.

A solution containing 50 mg cm^{-3} of lactose was poured through a column containing the immobilised enzyme. The solution containing the products was collected and the concentration of glucose measured.

What is the independent variable for this experiment?

   A   The amount of lactose in the solution before pouring through the column.

   B   The amount of glucose in the milk after pouring through the column.

   C   The type of enzyme immobilization.

   D   The temperature of the solution.

Question 6

In the graph, **Z** represents the rate of an enzyme reaction under optimal conditions and without an inhibitor.
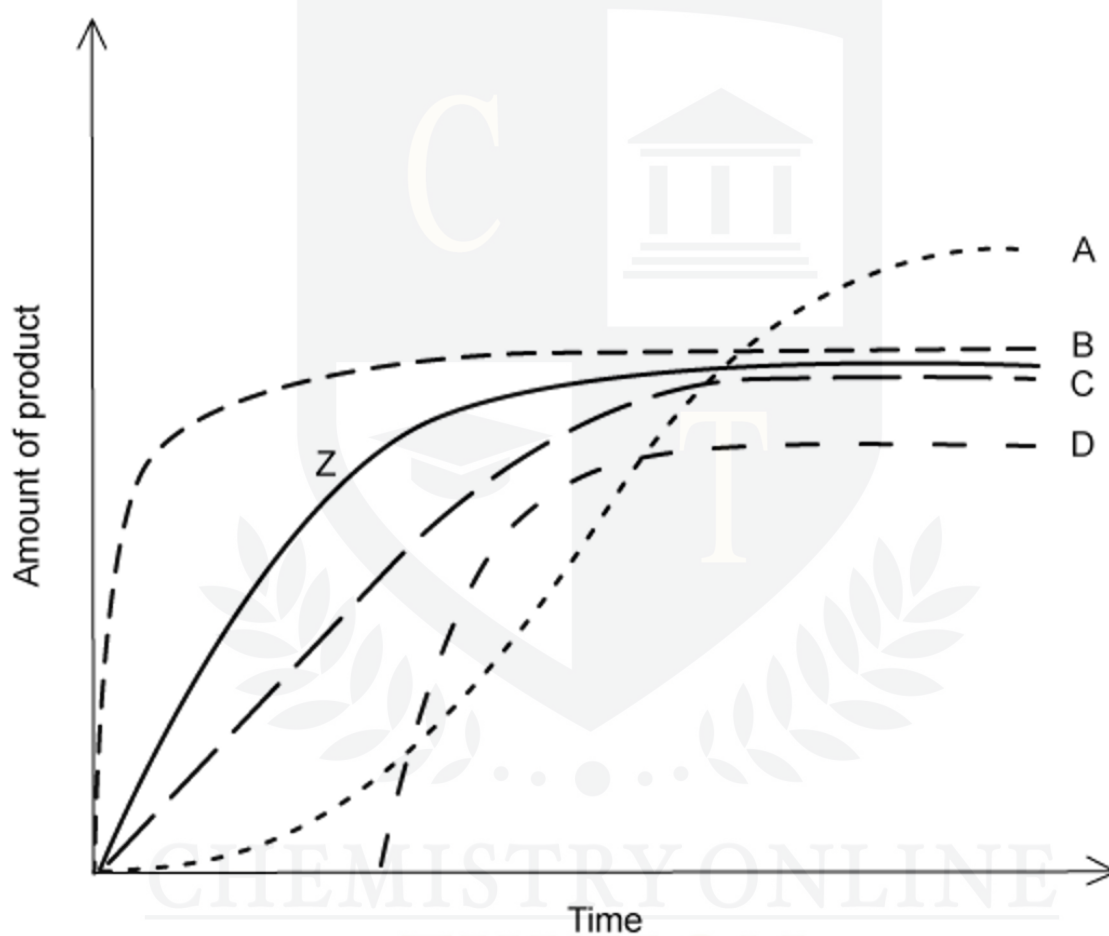
Which curve would represent the same experiment carried out in the presence of a low concentration of competitive inhibitor?

Question 7

The graph shows the effect of enzyme concentration on the rate of an enzyme-controlled reaction. The substrate concentration is constant.


Enzyme concentration
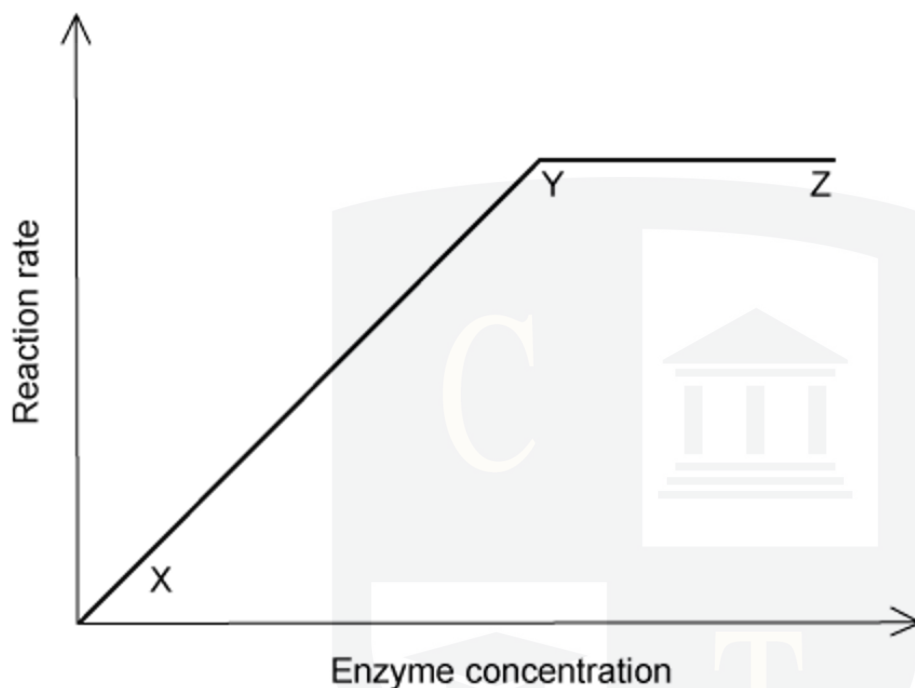
Which statement about the graph is correct?

A   Between **X** and **Z** the number of enzyme molecules is limiting

B   Between **Y** and **Z**, the number of enzyme molecules is limiting

C   Between **X** and **Z**, the number of substrate molecules is limiting

D   Between **Y** and **Z**, the number of substrate molecules is limiting

[1 mark]

Question 8

The graph shows the effect of pH on the rate on three different enzyme-controlled reactions. The enzyme concentration is constant.
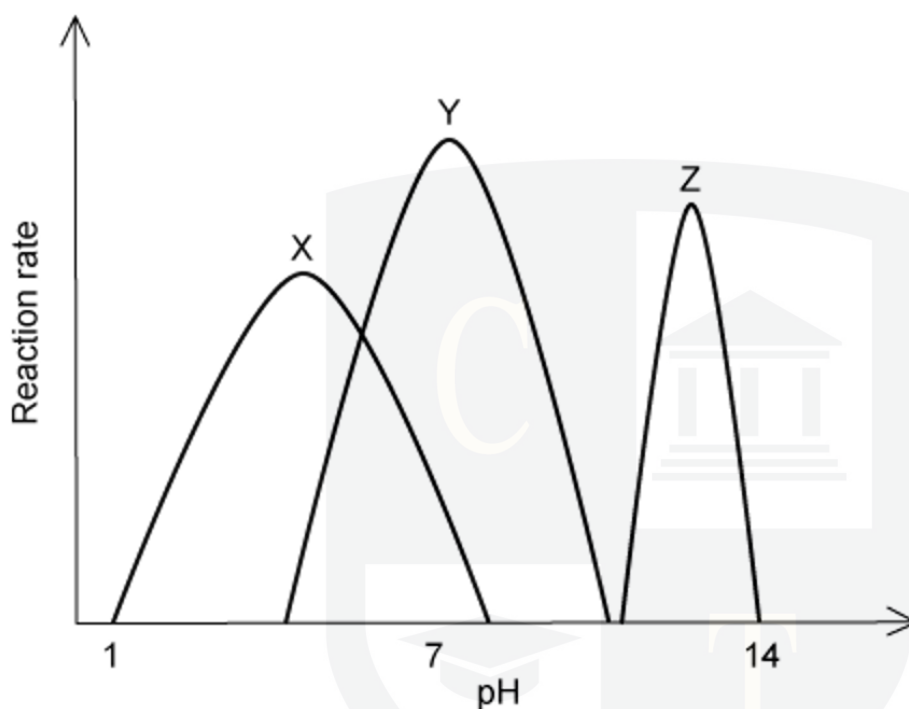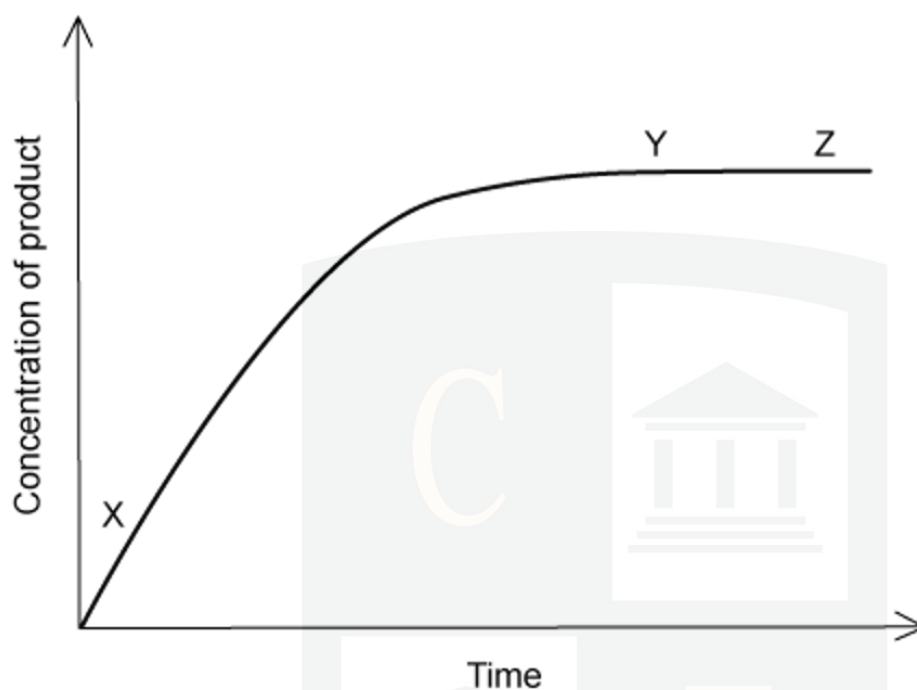

Which statement about the graph is correct?

A At its optimum pH, enzyme **Z** has the fastest rate

B There is no pH in which both **X** and **Y** have a functional active site

C Enzyme **X** has a functional active site across the widest range of pH's

D Enzyme **Y** has a functional active site across the narrowest range of pH's

[1 mark]

Question 9

The graph shows the course of an enzyme-catalysed reaction at 25°C.
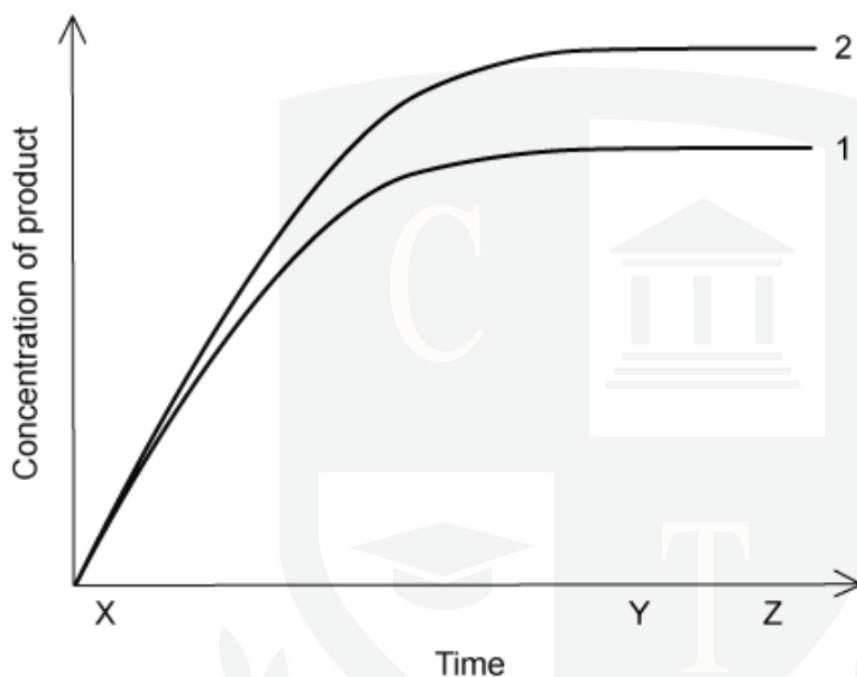

Which statement about the graph is incorrect?

    A   At **X** the number of available substrate molecules is high

    B   At **X** the number of enzyme/substrate complexes is the same as **Y**

    C   At **Z** the number of available substrate molecules is low

    D   At **Y** the number of enzyme/substrate complexes is the same as **Z**

[1 mark]

Question 10

The graph shows the course of two enzyme-catalysed reaction at 30 °C. The only thing that was changed between experiment 1 and 2 was some additional substrate was added at the beginning of experiment 2

Which statement about the experiment is not true?

A   At **X** the number of enzyme/substrate complexes is the same in both 1 and 2

B   At **X** the limiting factor in both experiment 1 and 2 is enzyme availability

C   At **Z** there are still enzyme/substrate complexes forming in experiment 2

D   At **Y** there are no more enzyme/substrate complex forming in experiment 1

[1 mark]