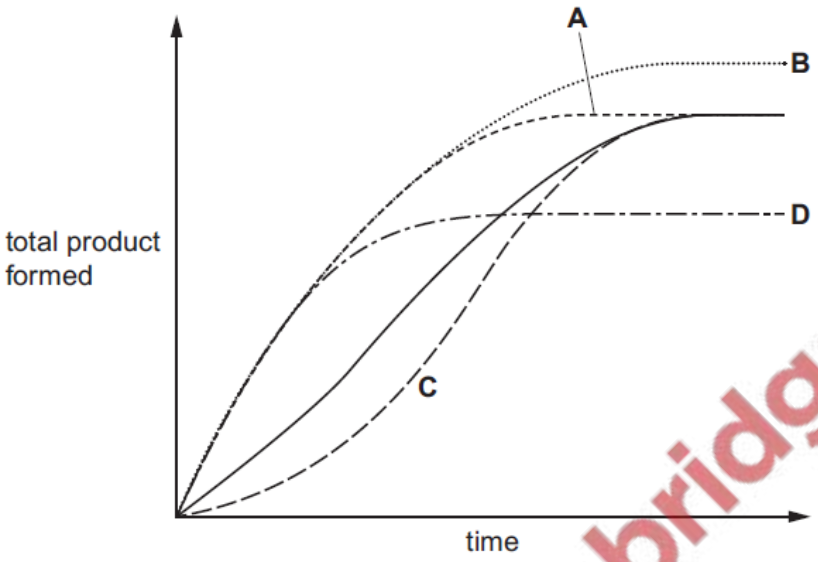
Enzymes – AS 9700 November 2023

1. Nov/2023/Paper_ 9700/11/No.13

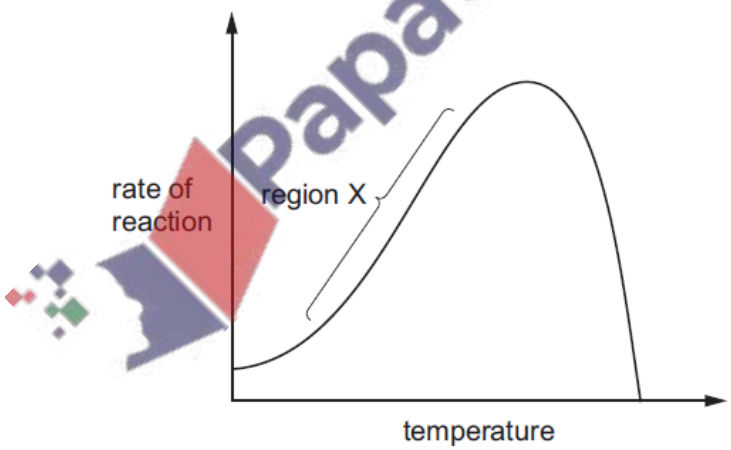
The solid line on the graph represents the product formed over time for a reaction in a cell.

Which other line represents the effect of adding the enzyme for this reaction?



2. Nov/2023/Paper_ 9700/11/No.14

The graph shows how the rate of an enzyme-controlled reaction is affected by the change in temperature. All other variables were standardised.



What is the factor limiting the rate in region X?

A substrate concentration

B enzyme concentration

C temperature

D number of empty active sites

3. Nov/2023/Paper_ 9700/11/No.15

How will the removal of a reversible non-competitive enzyme inhibitor affect an enzyme-catalysed reaction?

A The K_m will decrease and the V_{max} will increase.

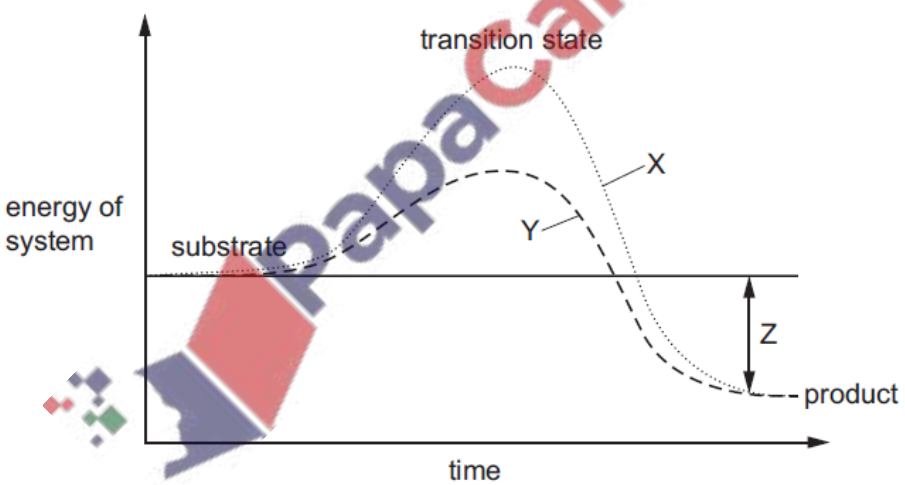
B The K_m will increase and the V_{max} will not change.

C The K_m will not change and the V_{max} will increase.

D The K_m will not change and the V_{max} will not change.

4. Nov/2023/Paper_ 9700/12/No.12

The graph shows the effect of an enzyme on a reaction.



Which row identifies X, Y and Z?

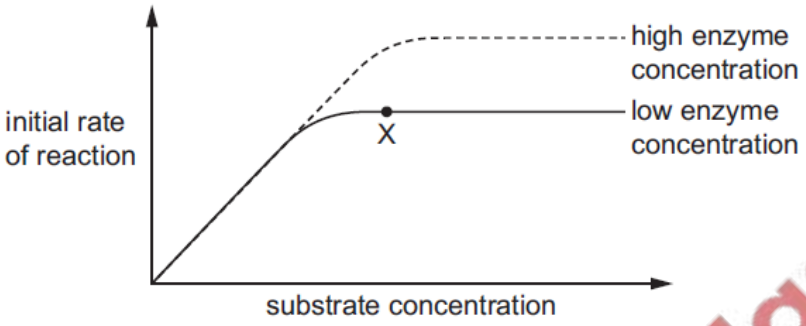
	X	Y	Z
A	catalysed reaction	uncatalysed reaction	energy lost by product
B	catalysed reaction	uncatalysed reaction	overall energy lost during reaction
C	uncatalysed reaction	catalysed reaction	energy gained by product
D	uncatalysed reaction	catalysed reaction	overall energy released during reaction

5. Nov/2023/Paper_ 9700/12/No.13

The graph shows the results of two experiments on the effect of increasing substrate concentration on the rate of an enzyme-catalysed reaction.

One experiment was at a high concentration of enzyme and the second was at a low concentration of enzyme.

All other variables were standardised.



What would limit the initial rate of reaction at point X?

A enzyme concentration

B pH

C substrate concentration

D temperature

6. Nov/2023/Paper_ 9700/12/No.14

Which statements about the Michaelis–Menten constant (K_m) of an enzyme are correct?

1 At the K_m value, half the active sites of the enzyme should be occupied by the substrate.

2 K_m represents the substrate concentration at which the enzyme is working at half its maximum rate.

3 The lower the K_m value, the lower the affinity of the enzyme to its substrate.

4 When an enzyme has a high K_m value, the enzyme-catalysed reaction will proceed very slowly to its maximum rate.

A 1, 2 and 3 **B** 1, 2 and 4 **C** 1 and 3 only **D** 2 and 4 only

7. Nov/2023/Paper_ 9700/13/No.14

Which statements describe some enzyme actions?

1 Enzymes hold reacting molecules so that their reactive groups are close together.

2 In an enzyme-catalysed reaction, more molecules have sufficient energy to react than without the enzyme.

3 Reactions catalysed by enzymes take place at a lower temperature than they would without the enzyme.

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

8. Nov/2023/Paper_ 9700/13/No.15

Influenza virus has an enzyme called neuraminidase which breaks down glycoproteins in the surface membrane of the cell that the virus will infect. The glycoprotein binds to the active site of neuraminidase by induced fit.

Which statements about the induced fit hypothesis of enzyme action are correct?

1 The active site must have the same shape as the substrate for them to bind together.

2 This enzyme is less likely to be affected by non-competitive inhibitors than an enzyme working by the lock-and-key mechanism.

3 The substrate is converted to product by specific R-groups in the active site just like the lock-and-key mechanism.

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