

8.1 Metabolism

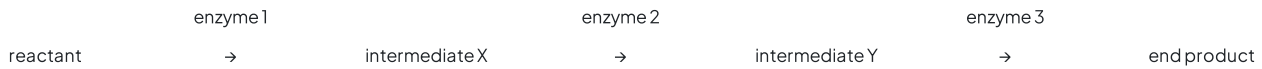
Question Paper

Course	DP IB Biology
Section	8. Metabolism, Cell Respiration & Photosynthesis (HL Only)
Topic	8.1 Metabolism
Difficulty	Hard

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

Question 1

This diagram shows a metabolic pathway occurring in an organelle. The speed of this metabolic pathway is self-regulating as the end product acts as a competitive inhibitor to enzyme 2.



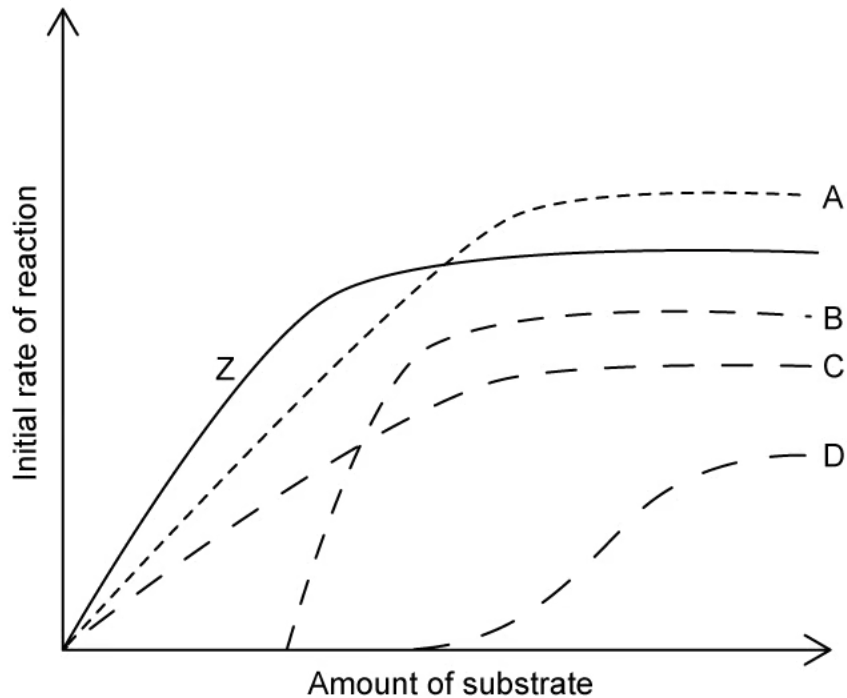
What would you expect **not** to occur when adding an additional end product to the organelle?

- A. Enzyme 2's activity will decrease
- B. The amount of intermediate Y would decrease
- C. The amount of reactant would increase
- D. The amount of intermediate X would increase

[1 mark]

Question 2

In the graph, **Z** represents the relationship between the initial rate of an enzyme-catalysed reaction and the concentration of its substrate under optimal conditions and without an inhibitor.



Which curve would represent the same experiment carried out in the presence of a low concentration of a non-competitive inhibitor?

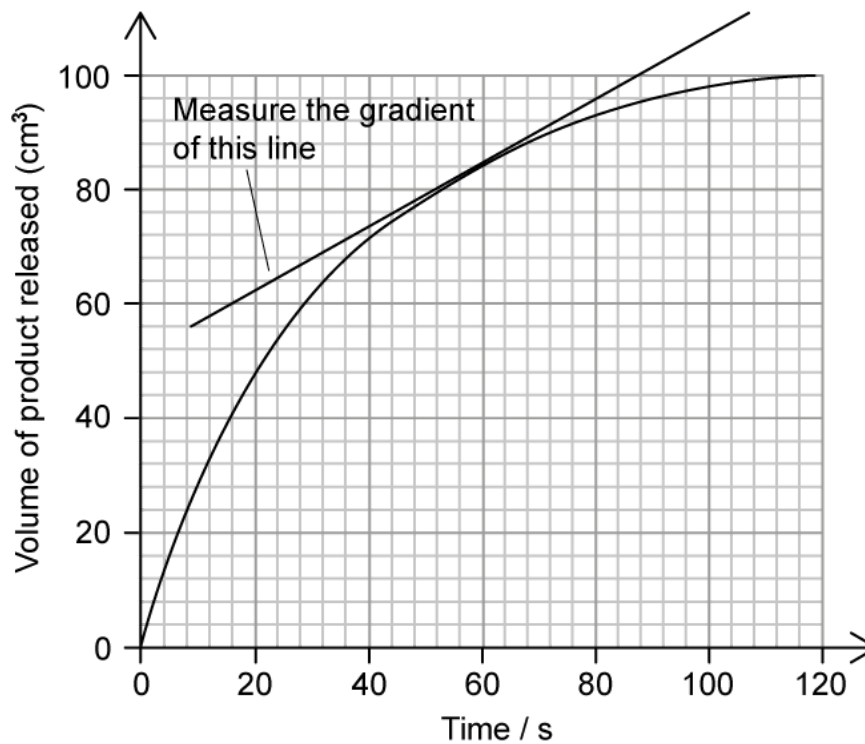
[1 mark]

Question 3

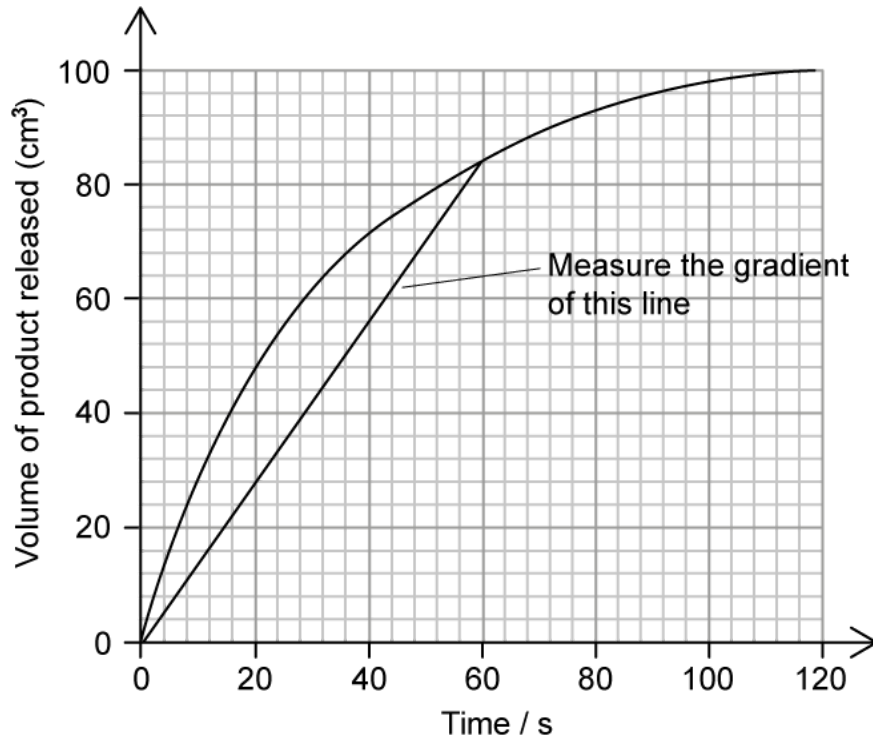
The graphs in **A - D** show the progress of an enzyme-catalysed reaction, measured by the volume of product released from the reaction mixture over time.

Which graph best depicts how a scientist would establish the average rate of reaction over the first minute of the reaction?

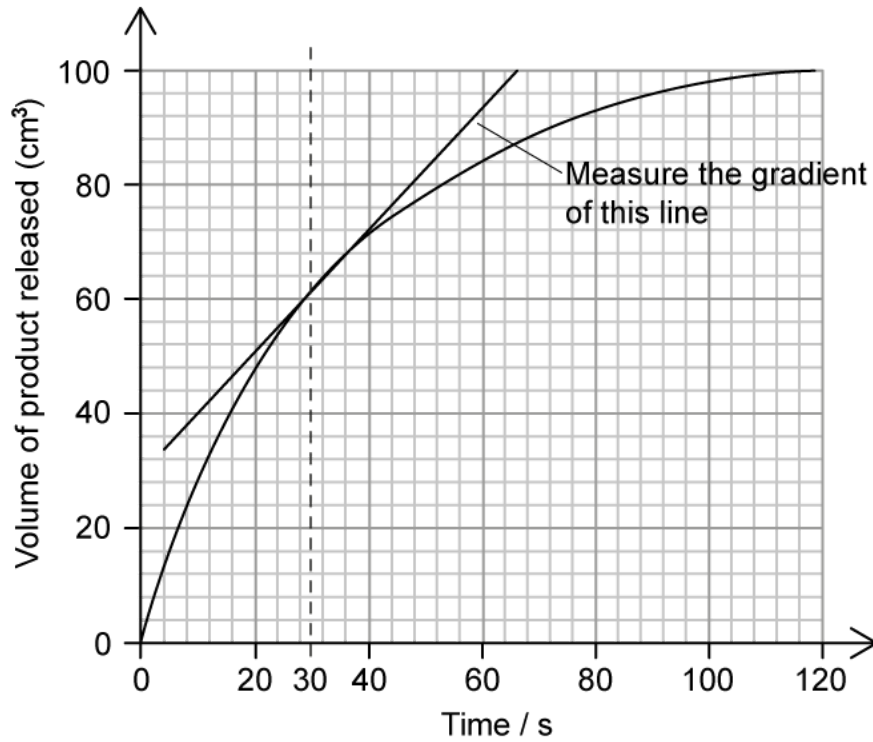
A.



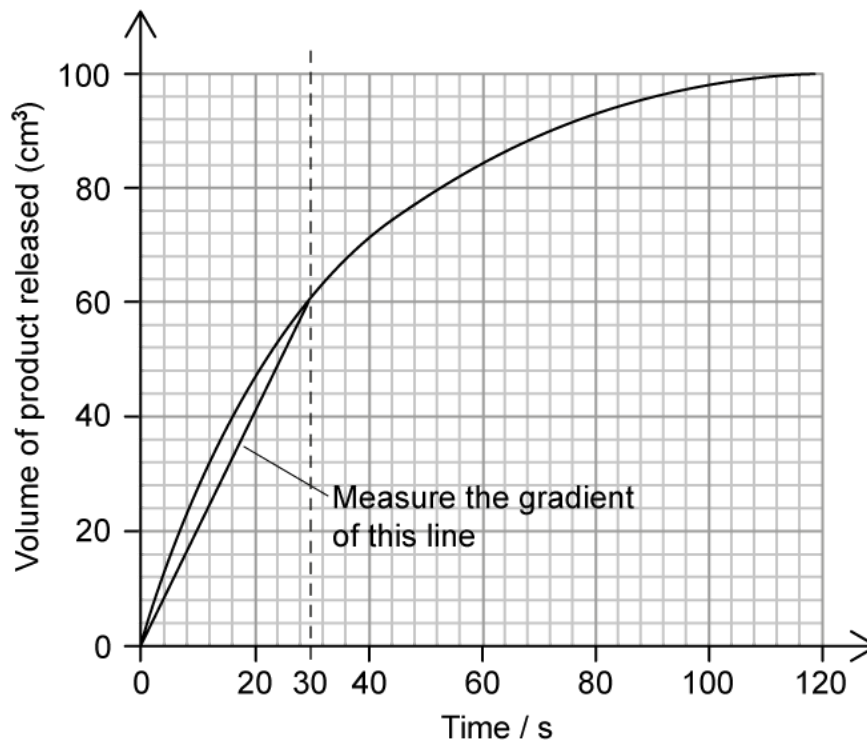
B.



C.



D.



[1 mark]

Question 4

The following six statements are steps in using bioinformatics to find potential cures for malaria, one of the most serious infectious diseases that humans face. The steps are not listed in the correct order below.

1. Computer modelling of candidate molecules to identify strong candidates
2. Determining the malaria parasite's proteome
3. Identifying candidate molecules that could inhibit malaria parasite enzymes
4. Sequencing the malaria parasite's genome
5. Drug trials to establish safety and efficacy
6. Identification of malaria parasite enzymes that could be targets

Which of **A - D** places the statements into chronological order?

- A. 4 → 2 → 6 → 3 → 1 → 5
- B. 2 → 4 → 3 → 5 → 6 → 1
- C. 4 → 2 → 3 → 5 → 1 → 6
- D. 2 → 6 → 4 → 5 → 3 → 1

[1 mark]

Question 5

The enzyme catalase was added to a large volume of hydrogen peroxide solution. The volume of oxygen produced in the first five seconds was measured at 250 cm^3 .

What is the initial rate of reaction in $\text{dm}^3 \text{ min}^{-1}$?

- A. $50 \text{ dm}^3 \text{ min}^{-1}$
- B. $3 \text{ dm}^3 \text{ min}^{-1}$
- C. $0.05 \text{ dm}^3 \text{ min}^{-1}$
- D. $3000 \text{ dm}^3 \text{ min}^{-1}$

[1 mark]