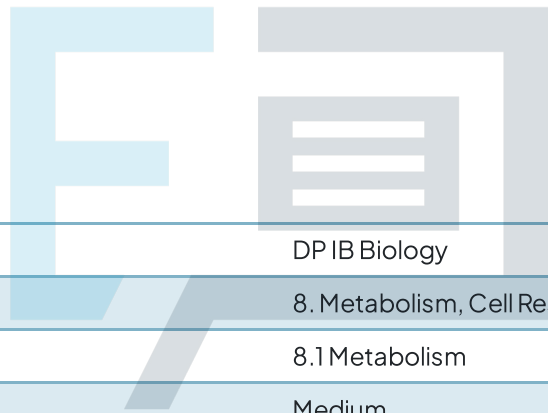




8.1 Metabolism

Mark Schemes



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

Exam Papers Practice

To be used by all students preparing for DP IB Biology HL
Students of other boards may also find this useful

1

The correct answer is **D**.

Metabolism can involve the breakdown molecules but **also** the formation of new ones.

2

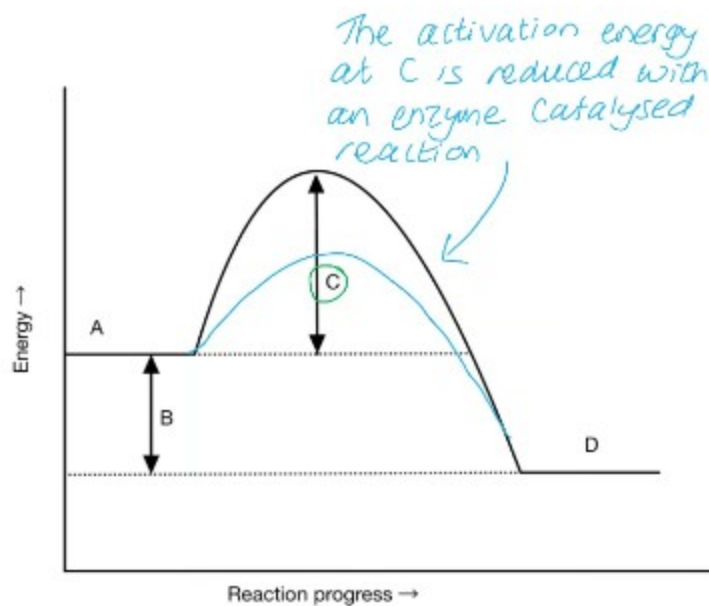
The correct answer is **B**.

When a substrate binds to an enzyme's active site, forming an enzyme-substrate complex, it is altered and said to be in a transition state. This transitional state is unstable and ends at the point at which the products are formed.

3

The correct answer is **C**.

An enzyme lowers the activation energy required for a reaction (C). The energy of the reactants (A) and products (D) remain unchanged, so the difference in energy between A and D (B) would also remain the same.



4

The correct answer is **A**.

A competitive inhibitor changes or blocks the active site so a substrate is competing with the inhibitor, while a non-competitive inhibitor binds to an alternative site on the enzyme and causes the active site to change shape, preventing the substrate from binding.

Inhibitors only change the enzyme and do not alter the substrate.

5

The correct answer is **B**

An allosteric inhibitor is a non-competitive inhibitor that binds to an alternative/allosteric site away from the active site and not to the active site itself.

6

The correct answer is **D**

Isoleucine is the end product of a reaction in which the enzyme threonine deaminase has a role in converting the amino acid threonine into the amino acid isoleucine. Isoleucine is a non-competitive inhibitor to threonine deaminase, binding to an allosteric site in order to alter its active site.

7

The correct answer is **A**.

This question assesses the Nature of Science (NOS) aspect of this topic.

Identifying enzyme inhibitors means that metabolic pathways involving that enzyme can be blocked by inhibitors and potentially halt the parasite's metabolism.

8

The correct answer is **B**

You can tell that this is a competitive inhibitor because the rate of reaction eventually reaches the same rate as the enzyme in the absence of an inhibitor once the substrate concentration exceeds that of the inhibitor.

9

The correct answer is **D**.

$$3.7 \times 10^7 = 37\,000\,000$$

Answers **A**, **B** and **C** give smaller numbers when you convert from standard form.

Converting from standard form

Move the decimal to the right
the same number of times as the
power

$$\begin{aligned} & 5.2 \times 10^3 \\ = & 5.2 \quad \text{Step 1: Move the decimal.} \\ = & 5.200 \quad \text{Step 2: Add in zeros in the gaps.} \\ = & \underline{5200} \quad \text{Step 3: Remove the decimals.} \end{aligned}$$

Extra tip - if it was a negative power, you'd move the decimal to the left!

10

The correct answer is **A**.

A tangent drawn through the origin that matches the gradient of the initial part of the curve will enable calculation of the initial rate of reaction while a tangent that matches the gradient part way along the curve will give the rate at a later stage in the reaction.

Note that rate is calculated by dividing volume by time, and not the other way around; a rate is an amount of something per unit time.



Exam Papers Practice