3.1 Mode of Action of Enzymes

Question Paper

Course	CIE A Level Biology
Section	3. Enzymes
Topic	3.1 Mode of Action of Enzymes
Difficulty	Medium

Time allowed: 20

Score: /9

Percentage: /100

Question 1

Biological washing detergents use enzymes to efficiently break down food stains. They contain protease, carbohydrase and lipase. As the optimum temperatures for these enzymes is around 40°C, they allow washing to be conducted at lower temperatures and so are seen to be environmentally friendly.

Which of these would be the washing advice on a packet of biological detergent?

	wash silk clothing	90°C wash cycle	remove blood stains
A	yes	yes	Yes
B	yes	no	Yes
C	no	no	No
D	no	no	Yes

[1 mark]

Question 2

When investigating the rate of reaction of the enzyme lipase on the hydrolysis of triglycerides, the pH must be maintained to prevent the lipase denaturing.

What is the correct reason for this?

A hydrolysed products will decrease the pH

B lipase has a very low optimum pH

C hydrolysed products will increase the pH

D the addition of water molecules produced by hydrolysis decreases pH

[1 mark]

Question 3

The breakdown of hydrogen peroxide to water and oxygen is catalysed by the enzyme catalase. In an investigation into the effect of temperature on the rate of reaction of catalase, mashed liver (which contains catalase) was added to hydrogen peroxide.

What would the independent variable be in this experiment?

A The change in mass of the liver after a given time.

B The temperature of the solution.

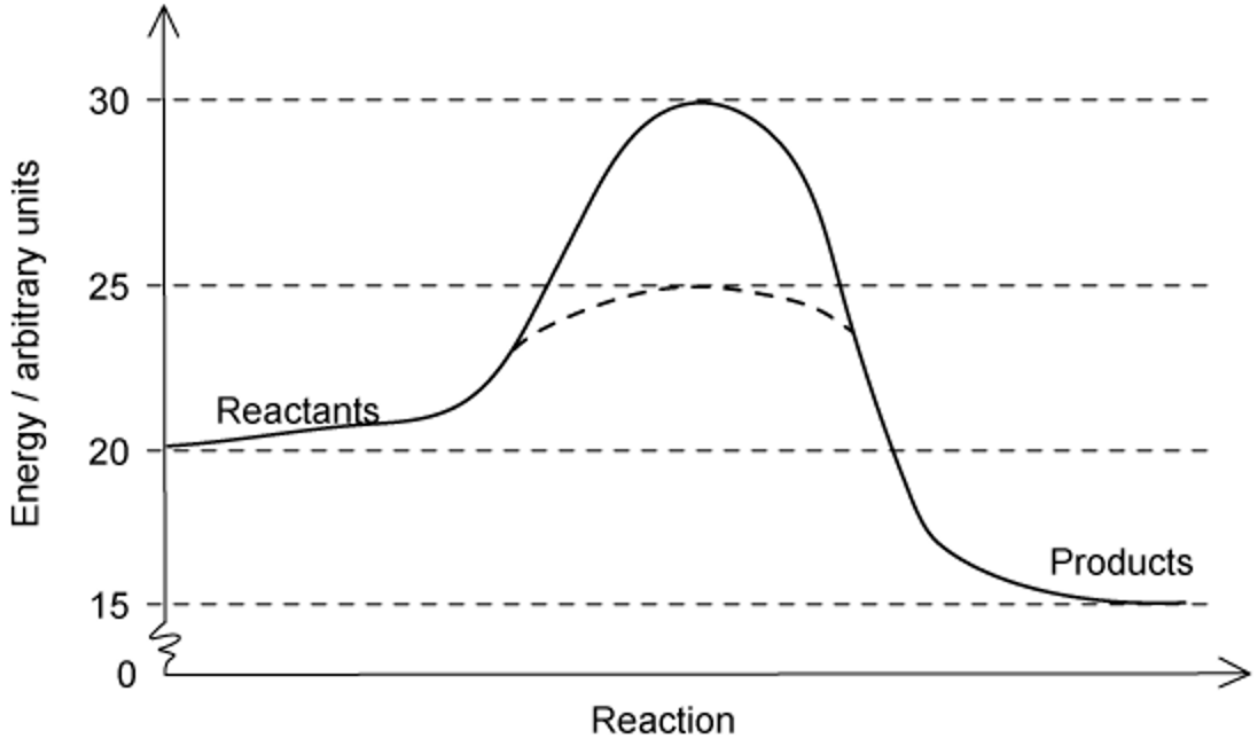
C The mass of liver added at the start.

D The volume of oxygen produced.

[1 mark]

Question 4

The graph below shows the activation energy of an enzyme-catalysed reaction, and the same reaction without a catalyst.



What is the activation energy of the catalysed reaction in arbitrary units?

A 0

B 5

C 20

D 25

[1 mark]

Question 5

Which levels of protein structure always determine the specificity of an enzyme?

1 Primary

2 Secondary

3 Tertiary

4 Quaternary

A 1, 2 and 3 only

B 3 and 4 only

C 2, 3 and 4 only

D All 4 statements

[1 mark]

Question 6

Which of the following statements about enzymes is not correct?

A They can have multiple active sites.

B They are comprised of one (or more) polypeptide chain(s).

C Ester bonds play an important role in maintaining shape.

D They catalyse both anabolic and catabolic reactions.

[1 mark]

Question 7

Which type of bonds would be the last to break when an enzyme is heated above its optimum temperature?

A Hydrogen

B Hydrophobic interactions

C Ionic

D Disulfide bridges

[1 mark]

Question 8

Why do large increases in temperature or pH reduce the rate of reaction in enzymes?

1 They disrupt ionic bonds.

2 They change the three-dimensional shape of the enzyme.

3 They increase hydrophobic interactions.

4 They cause changes in the hydrogen bonds.

A All 4 statements

B 1, 2 and 3 only

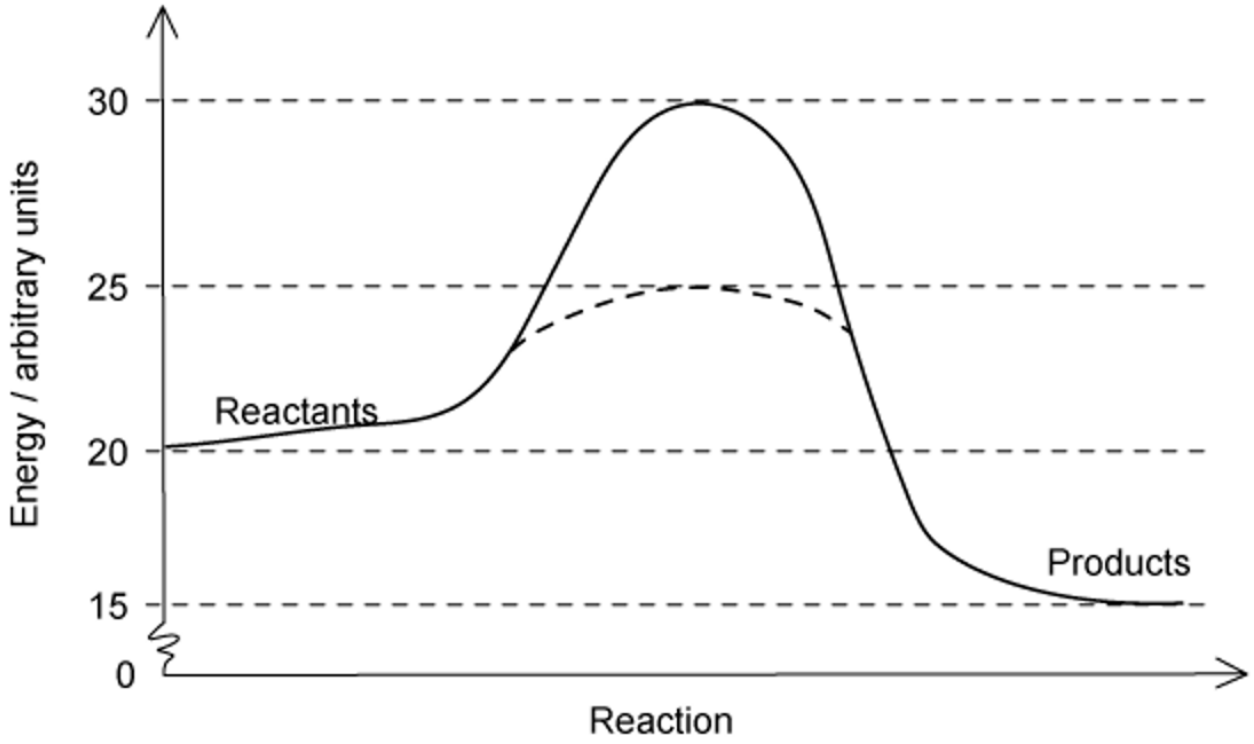
C 2, 3 and 4 only

D 1, 2 and 4 only

[1 mark]

Question 9

The graph below shows the activation energy of an enzyme-catalysed reaction and the same reaction without a catalyst.



Which values represent the activation energy of the uncatalysed reaction?

A 15 to 30

B 20 to 25

C 20 to 30

D 25 to 30

[1 mark]