

AQA – Biological Molecules – AS Biology P11. **No.2**

0 2 . 1

Table 2 contains information on the digestion of two biological molecules.Complete **Table 2**.**[4 marks]****Table 2**

Biological molecule	Enzyme	Name of bond hydrolysed	Product of digestion
Starch			Maltose
Dipeptide	Dipeptidase		

A student investigated starch digestion by mixing starch with a solution of the enzyme used to digest starch.

The student did a biochemical test for **protein** when starch digestion was completed.

0 2 . 2

Describe a biochemical test to show the presence of protein.

[2 marks]

0 2 . 3 The student's test for protein was positive.

Explain why.

[2 marks]

0 2 . 4 An enzyme's turnover number (k_{cat}) is the number of substrate molecules converted into product molecules by one enzyme molecule in 1 second. It is determined using this equation.

$$k_{\text{cat}} = \frac{\text{Maximum rate of enzyme-controlled reaction} / \mu\text{mol dm}^{-3} \text{ s}^{-1}}{\text{Enzyme concentration} / \mu\text{mol dm}^{-3}}$$

A scientist investigated the action of a protease enzyme. The scientist prepared a reaction mixture with a protease concentration of $0.0118 \mu\text{mol dm}^{-3}$. The k_{cat} for the protease is 110 substrate molecules per second.

Use this information and the formula to calculate the maximum rate of the protease-controlled reaction.

Give your answer to 3 significant figures.

Show your working.

[2 marks]

Answer _____ $\mu\text{mol dm}^{-3} \text{ s}^{-1}$

2. No.8

08.1

A non-competitive inhibitor decreases the rate of an enzyme-controlled reaction.

Explain how.

[3 marks]

08.2

A scientist investigated the hydrolysis of the protein casein.

The scientist:

- mixed a solution of a protease enzyme with a solution of casein
- then measured the casein concentration in the mixture at intervals
- controlled all relevant variables appropriately.

For this investigation, identify:

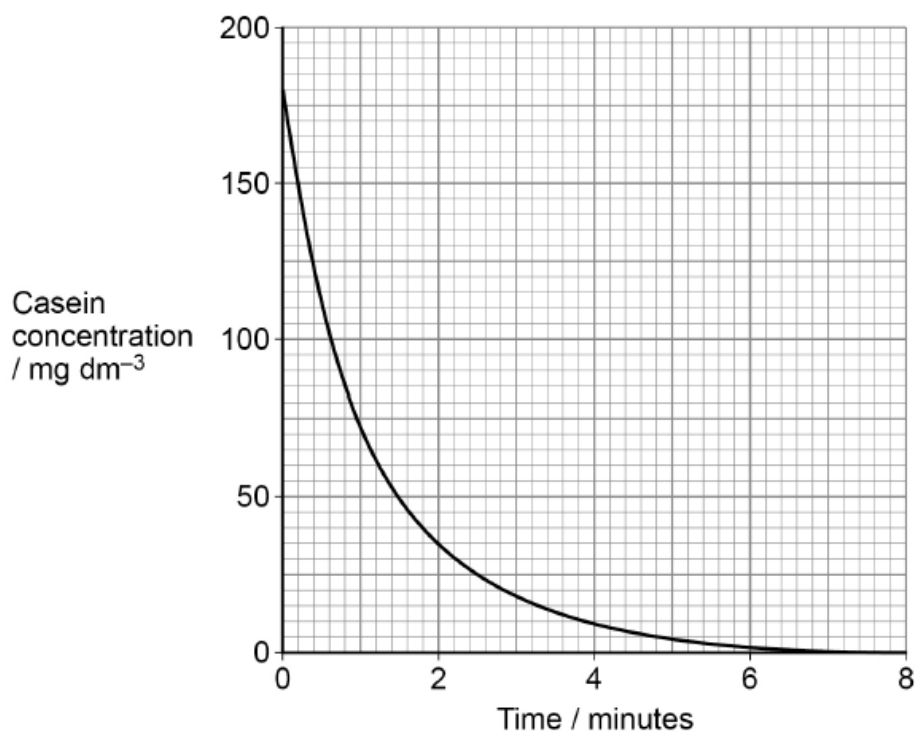
[2 marks]

the independent variable _____

the dependent variable _____

0 8 . 3 Figure 10 shows the scientist's results.

Figure 10



Use Figure 10 to determine the rate of casein hydrolysis at 2 minutes.

Show how you obtained your answer.

[2 marks]

Answer _____ $\text{mg dm}^{-3} \text{ minute}^{-1}$

0 8 . 4 The scientist repeated the investigation but increased the temperature to the optimum temperature for this protease.

Sketch a line on Figure 10 showing the results you predict if the investigation is repeated at the optimum temperature for the protease.

[2 marks]