AQA Examination-style questions

1 **Figure 1** represents an enzyme molecule and three other molecules that could combine with it.

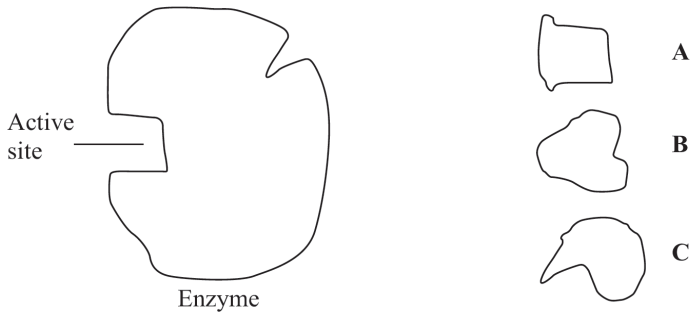

Figure 1

(a) Which molecule is the substrate for the enzyme? Give a reason for your answer. *(1 mark)*

(b) Use the diagram to explain how a **non-competitive** inhibitor would decrease the rate of the reaction catalysed by this enzyme. *(3 marks)*

(c) Lysozyme is an enzyme. A molecule of lysozyme is made up of 129 amino acid molecules joined together. In the formation of its active site, the two amino acids that are at positions 35 and 52 in the amino acid sequence need to be close together.

(i) Name the bonds that join amino acids in the primary structure.

(ii) Suggest how the amino acids at positions 35 and 52 are held close together to form the active site. *(3 marks)*

AQA, 2006

2 A student carried out an investigation into the mass of product formed in an enzyme-controlled reaction at three different temperatures. Only the temperature was different for each experiment. The results are shown in **Figure 2**.

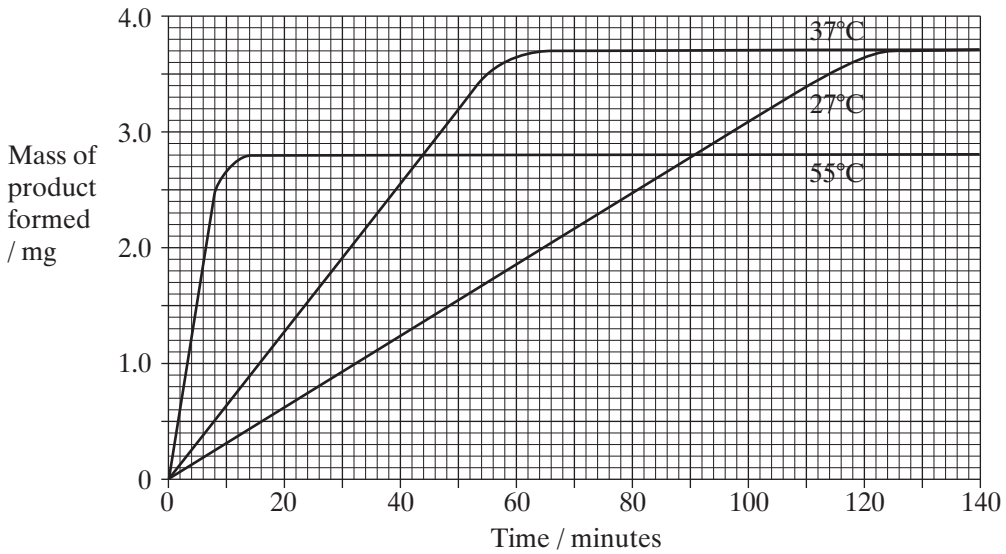

Figure 2

(a) Use your knowledge of enzymes to explain:

(i) why the initial rate of reaction was highest at 55 °C;

(ii) the shape of the curve for 55 °C after 20 minutes. *(5 marks)*

(b) Explain why the curves for 27 °C and 37 °C level out at the same value. *(2 marks)*

AQA, 2006

3 (a) Many reactions take place in living cells at temperatures far lower than those required for the same reactions in a laboratory.

Explain how enzymes enable this to happen. *(3 marks)*

(b) **Figure 3** shows the results of tests to determine the optimum temperature for the activity of this amylase.

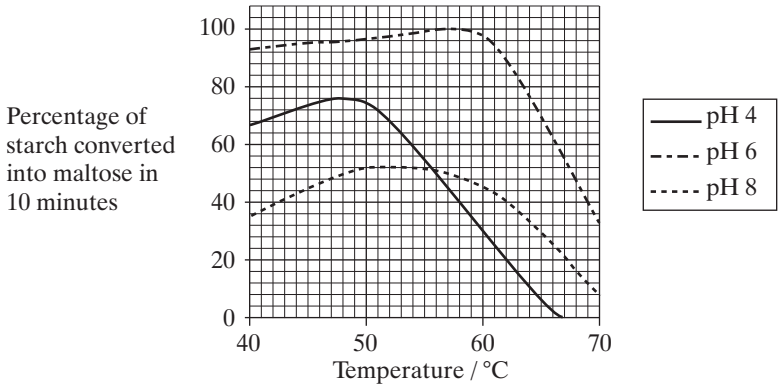

Figure 3

(i) Copy and complete the table with the optimum temperature for the activity of amylase at each pH value.

(ii) Describe and explain the effect of temperature on the rate of reaction of this enzyme at pH 4. *(7 marks)*

	pH		
	4	**6**	**8**
Optimum temperature / °C			

AQA, 2004

4 In an investigation, the rate at which phenol was broken down by the enzyme phenol oxidase was measured in solutions with different concentrations of phenol. The experiment was then repeated with a non-competitive inhibitor added to the phenol solutions. **Figure 4** shows the results.

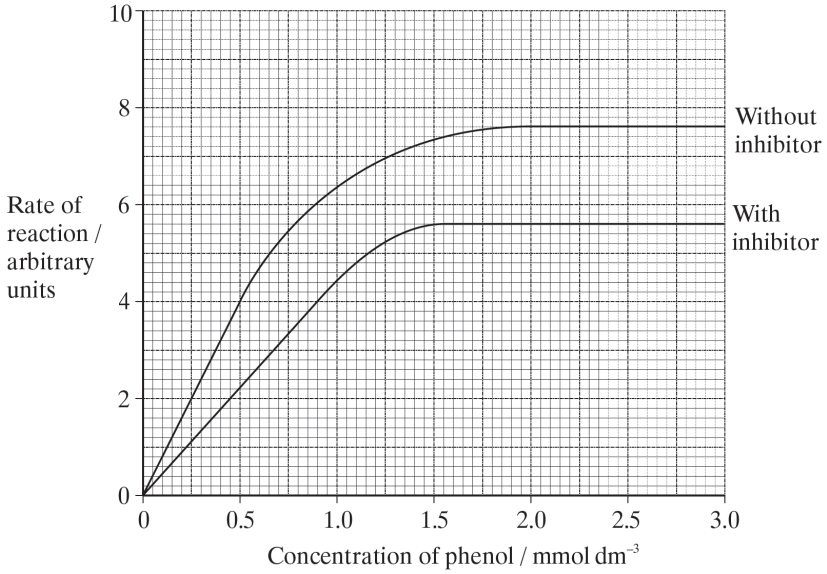

Figure 4

(a) Explain why an increase in concentration of phenol solution from 2.0 to 2.5 mmol dm^{-3} has no effect on the rate of the reaction without the inhibitor. *(2 marks)*

(b) Explain the effect of the non-competitive inhibitor. *(2 marks)*

(c) Calculate the percentage decrease in the maximum rate of the reaction when the inhibitor was added. Show your working. *(2 marks)*

(d) Make a copy of the graph and draw a curve on it to show the results expected if a competitive inhibitor instead of a non-competitive inhibitor had been used. *(1 mark)*

AQA, 2005