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For Teacher's Use	
Section	Mark
PSA	
Stage 1 Skills	
Stage 2 Skills	
Section A	
Section B	
TOTAL (max 50)	



General Certificate of Education
Advanced Subsidiary Examination
June 2013

Biology

BIO3T/P13/test

Unit 3T AS Investigative Skills Assignment

Written Test

For submission by 15 May 2013

For this paper you must have: <ul style="list-style-type: none"> the task sheet, your results and your graph a ruler with millimetre measurements a calculator. 	Time allowed <ul style="list-style-type: none"> 1 hour 15 minutes
Instructions: <ul style="list-style-type: none"> Use black ink or black ball-point pen. Fill in the boxes at the top of this page. Answer all questions. You must answer the questions in the space provided. Do not write outside the box around each page or on blank pages. Do all rough work in this book. Cross through any work you do not want to be marked. 	Information <ul style="list-style-type: none"> The marks for questions are shown in brackets. You are expected to use a calculator where appropriate. The maximum mark for this paper is 35. You will be marked on your ability to: <ul style="list-style-type: none"> use good English organise information clearly use scientific terminology accurately.

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Section A

These questions relate to your investigation into the effect of pH on the time taken by amylase to hydrolyse starch.

Use your Task Sheet, your results and your graph to answer the questions.

Answer **all** questions in the spaces provided.

1 In this investigation, you were given buffers with a pH range from 5 to 8.

Suggest why.

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(2 marks)

2 You were told to carry out the reaction in a water bath at 30 °C, rather than at room temperature.

Explain why the reaction would be faster at 30 °C than at room temperature.

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(2 marks)

3 You were told to decide for yourself when the blue-black colour failed to appear. What did you do to ensure your decision was consistent?

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(1 mark)

4 Apart from deciding when the blue-black colour failed to appear, give **three** limitations of the method you used that could have affected the reliability of your results.

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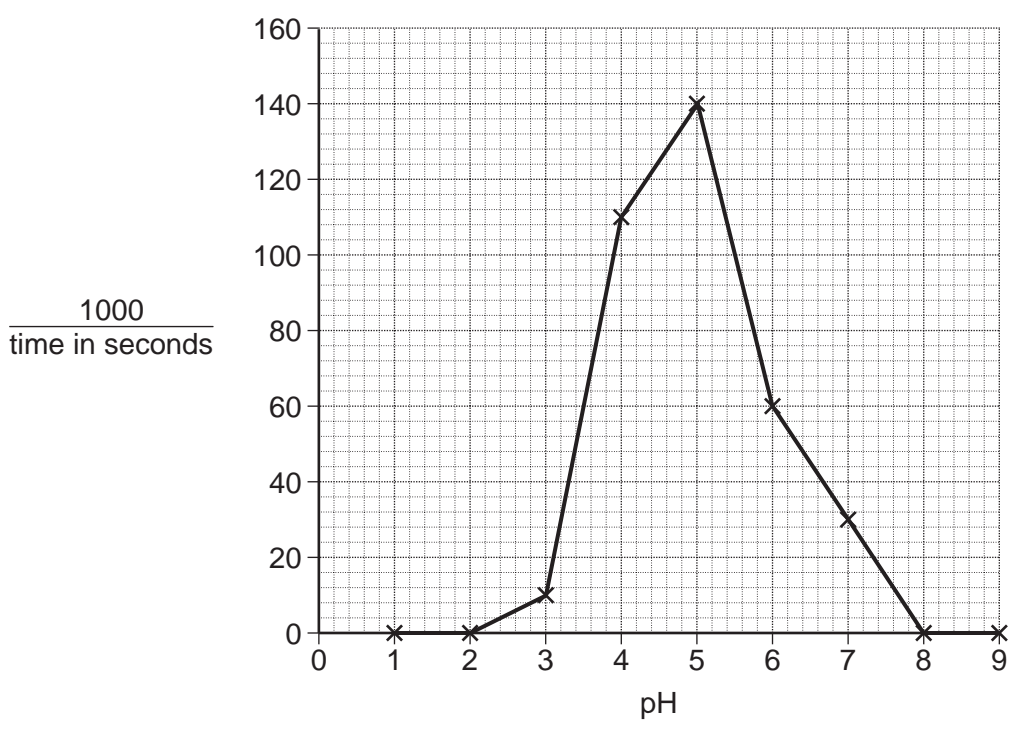
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(3 marks)

Turn over for the next question

Turn over ►

5 A student carried out a similar experiment to yours. The graph shows her results.



5 (a) Explain the difference in her results at pH3 and pH4.

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(3 marks)

(Extra space)

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5 (b) The student chose to join the points on the graph with straight lines, rather than drawing a line of best fit. Suggest why she did this.

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(1 mark)

6 (a) Name the disaccharide formed when starch is hydrolysed.

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(1 mark)

6 (b) In your investigation you tested for the disappearance of starch.

Describe a test you could have carried out to show that products of starch hydrolysis are present.

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(2 marks)

Turn over for the next question

15

Resource Sheet**Resource A**

Some people have a medical condition called pancreatitis. This can lead to their pancreatic duct becoming blocked. As a result, a high concentration of amylase is found in their blood.

At 12-hour intervals, a doctor measured the concentration of amylase in the blood of a person suffering from a blocked pancreatic duct. He also measured the concentration of amylase in the blood of a healthy person.

Figure 1 shows his results.

Figure 1

Time / hours	Concentration of amylase in the blood / arbitrary units	
	Person with blocked pancreatic duct	Healthy person
0	1800	800
12	2200	750
24	2500	700
36	2000	750
48	1400	800

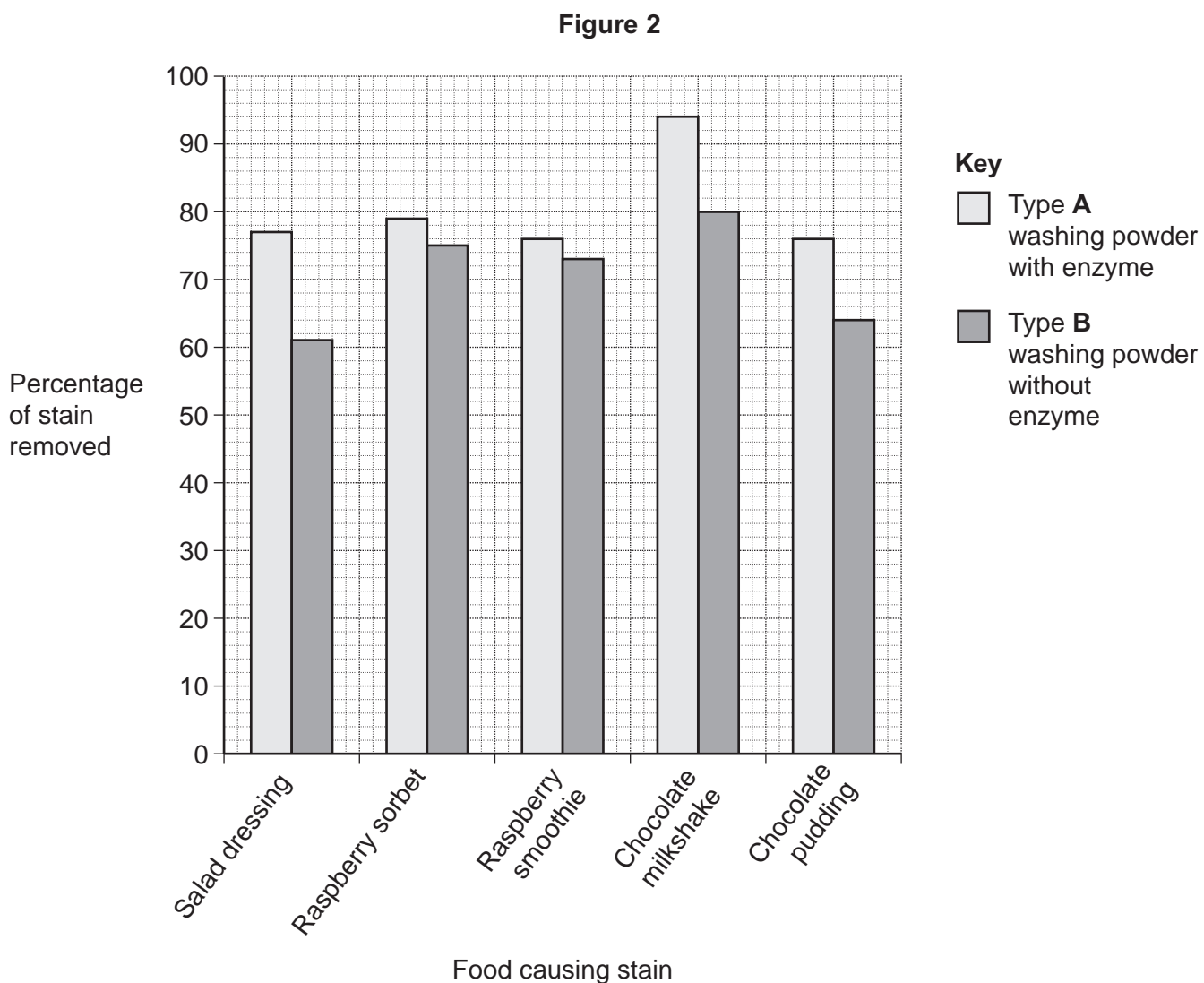
Resource B

Biological washing powders contain enzymes which hydrolyse substances that cause stains on clothes.

A manufacturer tested the ability of two types of the same brand of washing powder to remove different food substances that stain clothes.

- Type **A** contained an enzyme.
- Type **B** was identical to **A** except it did **not** contain the enzyme.

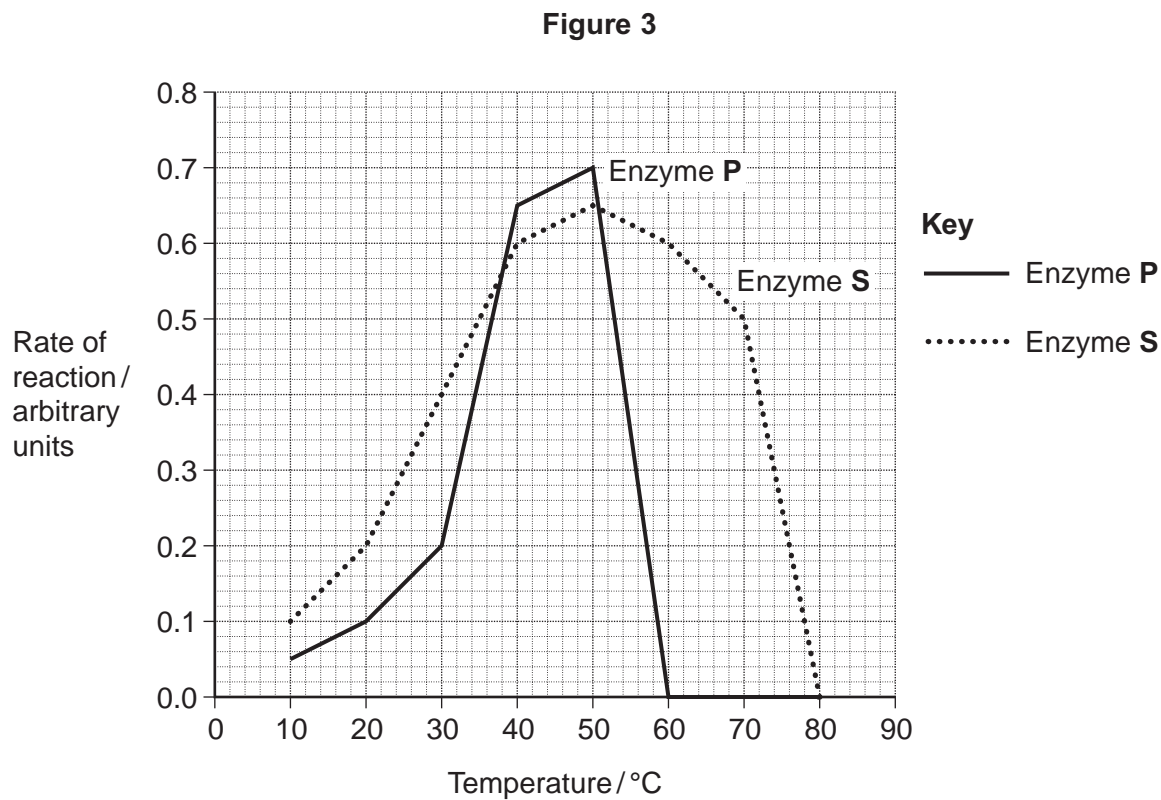
Figure 2 shows the results.



Turn over ►

A scientist worked for a company that wanted to develop a biological washing powder that was effective over a range of temperatures. He investigated the effect of temperature on the rates of the reaction catalysed by two enzymes, **P** and **S** used in biological washing powders.

Figure 3 shows his results.



Section B

Use the information in the **Resource Sheet** to answer the questions.

Answer **all** questions in the spaces provided.

Use **Resource A** to answer **Questions 7 to 9**.

7 (a) The changes in concentration of amylase in the blood of a person with a blocked pancreatic duct are different from those of a healthy person during the period shown in **Figure 1**.

Describe **two** of these differences.

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(2 marks)

7 (b) In a person with a blocked pancreatic duct, starch digestion is affected. Explain how.

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(2 marks)

8 Healthy people have amylase in their blood. This does not cause any harmful effects in the body.
Explain why.

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(2 marks)

9 Pancreatitis can lead to the release of protein-digesting enzymes into the blood. This is harmful to the body.
Suggest **one** reason why.

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(2 marks)

Use **Resource B** to answer **Questions 10 to 13**.

10 Many of the substances causing the food stains are large, insoluble proteins.
Suggest how a biological washing powder removes this type of stain.

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(2 marks)

11 The manufacturer of type **A** and type **B** washing powder claimed that these results showed that biological washing powders are better at removing stains from clothes.

Use the information in **Figure 2** to evaluate this claim.

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(4 marks)

(Extra space)

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Turn over for the next question

Turn over ►

12 Most customers want a washing powder which removes stains from clothes over a range of temperatures. After obtaining the results shown in **Figure 3**, which enzyme should the scientist recommend for use in a biological powder?

Give reasons for your answer.

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(3 marks)

(Extra space)
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13 Biological washing powders often contain a number of different enzymes. This enables them to remove a wider range of stains from clothes. Explain why a number of enzymes are required to remove a wider range of stains.

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(3 marks)

(Extra space)
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END OF QUESTIONS

20