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Section	Mark
Task 1	
Task 2	
Section A	
Section B	
TOTAL EMPA MARK	



General Certificate of Education
Advanced Level Examination
June 2012

Human Biology

HBI6X

Unit 6X A2 Externally Marked Practical Assignment Written Test

For submission by 15 May 2012

For this paper you must have: • your Task Sheet 2, your results and your calculations • a ruler with millimetre measurements • a calculator.	Time allowed • 1 hour 15 minutes
Instructions: • 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 spaces 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 • The marks for questions are shown in brackets. • The maximum mark for this paper is 30. • You will be marked on your ability to: – use good English – organise information clearly – use scientific terminology accurately.

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Yes ☐ No ☐

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Practical Skills Verification	Yes ☐
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Section A

These questions relate to your investigation about vitamin C.

Use your Task Sheet 2, your results and your statistical calculation to answer the questions.

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

8 When making your potato solutions, suggest why it was necessary to

8 (a) peel the potato (step 3).

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(1 mark)

8 (b) use two halves of the same potato (step 4 and step 5).

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(1 mark)

8 (c) blend the contents of beaker **A** (step 6).

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(1 mark)

- 9** Other than those in Question 8, give **two** experimental variables that you controlled when making your potato solutions.

1.....

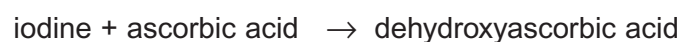
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2.....

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(2 marks)

- 10** Your investigation involved a reaction between iodine and vitamin C (ascorbic acid) in the potato solution. This reaction is shown by the equation



Use observations you made during your investigation to give the colour, if any, of a solution of dehydroxyascorbic acid.

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(1 mark)

- 11** What type of graph should you use to show a comparison of the mean mass of vitamin C in raw and cooked potato solutions? Explain your answer.

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(2 marks)

Turn over ►

- 12** A student carried out a similar investigation to you but there were some differences in the method used. The differences are shown in **Figure 1**. Complete **Figure 1** to suggest the effect, if any, of each of the changes in the method on their results.

Figure 1

Change in the method	Effect of change in the method on the result
Use a more dilute iodine solution	
Increase the number of drops of starch solution used	
Use 100 cm ³ of water to make the raw potato solution	

(3 marks)

- 13** A group of students investigated whether there was a correlation between the concentration of vitamin C in potatoes and how long they had been stored. They obtained potatoes which had been dug out of the ground on that day from a farm and kept them in the laboratory. On the first day and then at 7-day intervals, they found the mean concentration of vitamin C in five potatoes.

Their results are shown in **Figure 2**.

Figure 2

Time after potatoes were dug out of the ground / days	Mean concentration of vitamin C / mg 100g ⁻¹
0	3.5
7	3.1
14	2.5
21	1.8
28	1.6

13 (a) Suggest the null hypothesis for their investigation.

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(1 mark)

13 (b) Which statistical test should they use to analyse their results?

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(1 mark)

13 (c) One student realised that they knew when the potatoes were dug out of the ground but they did not know how old the plants were from which the potatoes came. Would this affect the reliability of their results? Explain your answer.

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(2 marks)

15

Turn over ►

Resource Sheet

Introduction

An allergy is an abnormal immune response to a specific substance. Hay fever is caused by an allergic reaction.

Resource A

During an allergic reaction, histamine is released. Histamine causes some symptoms associated with allergies such as hay fever. It has been discovered that people who suffer from hay fever have a lower mass of vitamin C in their blood than people who do not suffer from hay fever. This is especially true during summer.

Here are some facts about vitamin C.

- 500 mg tablets of vitamin C can be bought from health food shops.
- The body cannot store excess vitamin C. The excess is lost in the urine.
- An excessive intake of vitamin C can cause diarrhoea.
- The recommended safe upper limit for vitamin C intake is 2000 mg per day.
- The recommended daily intake for adults is 75 mg for females and 90 mg for males.
- Vitamin C acts by blocking histamine receptors.
- Some doctors recommend that hay fever sufferers take between 1000 mg and 3000 mg of vitamin C per day.

Resource B

A researcher investigated the effect of taking different doses of vitamin C on symptoms of sufferers from hay fever. Six volunteers were asked to take different doses of vitamin C and record any effects on their symptoms. The researcher also measured the mass of vitamin C lost in the volunteers' urine before and one day after receiving a 100 mg dose of vitamin C.

A healthy person loses between 30 mg and 50 mg of vitamin C in the urine each day.

The results of the investigation are shown in **Figure 3** in the form in which the researcher presented them.

Figure 3

Volunteer	Vitamin C loss in urine / mg day ⁻¹		Effect of dose of vitamin C on symptoms of hay fever recorded by volunteers		
	Before dose of vitamin C	One day after dose of vitamin C	One week after receiving a 100 mg dose	One week after receiving a 200 mg dose	After receiving a 500 mg dose
1	43	91	No relief	Slight relief	No hay fever after 4 days
2	21	36	Some relief	Clear relief	Little hay fever after 2 days
3	11	72	No relief	No relief	Still suffering from hay fever
4	17	105	No relief	(not recorded)	Feeling better after 3 days
5	9	104	Some relief	(not recorded)	(not recorded)
6	62	117	No relief	(not recorded)	No relief by 3 days later

Turn over ►

Section B

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

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

Use the information provided in **Resource A** to answer **Questions 14 to 17**.

- 14** Vitamin C can be bought as 500 mg tablets.
Give **two** reasons why buying tablets containing 250 mg of vitamin C might be more appropriate.

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(2 marks)

- 15** Vitamin C acts by blocking histamine receptors. These receptors are proteins on the surface of target cells.
Suggest how vitamin C prevents histamine binding to its receptor.

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(2 marks)

- 16** Suggest why there is a difference in the recommended daily intake of vitamin C for adult females and for adult males.

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(2 marks)

- 17** Some doctors suggest hay fever sufferers take between 1000 mg and 3000 mg of vitamin C per day. Suggest **one** reason why this may **not** be an advantage to hay fever sufferers.

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(1 mark)

Use the information provided in **Resource B** to answer **Questions 18 to 20**.

- 18** The amount of vitamin C that a healthy person loses in urine varies between 30 mg and 50 mg per day. Suggest **one** reason for this variation.

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(1 mark)

Turn over ►

19 One effect of taking vitamin C on hay fever as recorded by volunteers was 'Some relief'.
Suggest why

19 (a) this may be an appropriate way to record the effect of taking vitamin C.

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(1 mark)

19 (b) this may **not** be an appropriate way to record the effect of taking vitamin C.

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(1 mark)

20

A health food company produced 500 mg tablets of vitamin C. They produced an advertisement for their tablets based on the data presented in **Figure 3**. The advertisement stated that, “Scientists have proved that our vitamin C tablets ease suffering caused by hay fever.”

Explain why the data in **Figure 3** do **not** support this statement.

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(Extra space)

(5 marks)

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END OF QUESTIONS

15

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ANSWER IN THE SPACES PROVIDED**