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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 2013

Human Biology

HBI6X

Unit 6X A2 Externally Marked Practical Assignment Written Test

For submission by 15 May 2013

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 ☐

Teacher Declaration:

I confirm that the candidate has met the requirements of the practical skills verification (PSV) in accordance with the instructions and criteria in section 3.8 of the specification.

Practical Skills Verification	Yes ☐
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Signature of teacher Date

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Section A

These questions relate to your investigation into the effect of antiseptic on respiration in yeast. Use your Task Sheet 2, your results and your statistical calculation to answer them.

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

- 7** You measured carbon dioxide production by measuring bubble length. Another student used a gas syringe to collect the gas produced. Suggest **one** advantage of using a gas syringe.

.....

.....

.....

(1 mark)

- 8** Another student carried out the same experiment as you. He found that the higher the concentration of antiseptic solution, the greater the effect on yeast. Skin cleansers that people buy do not contain very high concentrations of antiseptic. Suggest **two** reasons why the manufacturers do not put high concentrations of antiseptic in their skin cleansers.

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(2 marks)

- 9** Adding antiseptic lowers the pH of the yeast suspension. A decrease in pH could lead to a fall in carbon dioxide production.

Explain why the decrease in pH could have this effect.

.....

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(3 marks)

- 10** A student carried out a similar investigation to you. She compared the effects of two different antiseptics on carbon dioxide production by yeast. She carried out ten repeats with each type of antiseptic.

- 10 (a)** State her null hypothesis.

.....

.....

.....

(1 mark)

- 10 (b)** She carried out a statistical test to find out if the difference between her results for the two antiseptics was significant. She chose a different test from yours. Suggest which test she chose and explain why she chose this.

Choice of test

Reason for choice

.....

.....

.....

(2 marks)

Turn over ►

- 11** One student suggested that the antiseptic you used works by damaging the plasma membrane of yeast cells. Methylene blue is a dye. If methylene blue is added to a suspension of yeast cells, only cells with damaged plasma membranes take up the dye and turn blue. Yeast cells can be seen using a light microscope. Describe how you could use methylene blue and a microscope to show that this antiseptic damages plasma membranes.

.....

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(2 marks)

(Extra space)

.....

- 12** Another antiseptic is tea tree oil which contains a chemical called terpinen-4-ol. Scientists think that terpinen-4-ol affects cells in two different ways.

- It inhibits respiration.
- It increases the permeability of membranes.

- 12 (a)** Suggest how inhibition of respiration might affect the size of a yeast population.

.....

.....

(1 mark)

- 12 (b)** Suggest **two** ways in which an increase in membrane permeability could harm cells.

1

.....

2

.....

(2 marks)

Resource Sheet

Introduction

The bacterium responsible for acne is commonly found on skin but only causes acne in some people. Many companies produce spot creams for the treatment of acne. There are many different creams with different ingredients and different modes of action.

Resource A

Phycosaccharides are a type of carbohydrate. Scientists investigated the effect of a phycosaccharide on acne. They recruited 45 volunteers who were all men with acne. The scientists gave the volunteers a new spot cream containing a phycosaccharide. The men applied the cream to new acne spots.

The results are shown in the table.

Time after applying cream to new spots / hours	Number of volunteers reporting those spots appeared to be smaller	Number of volunteers reporting those spots became less red
2	0	7
4	5	15
24	34	36

Turn over ►

Resource B

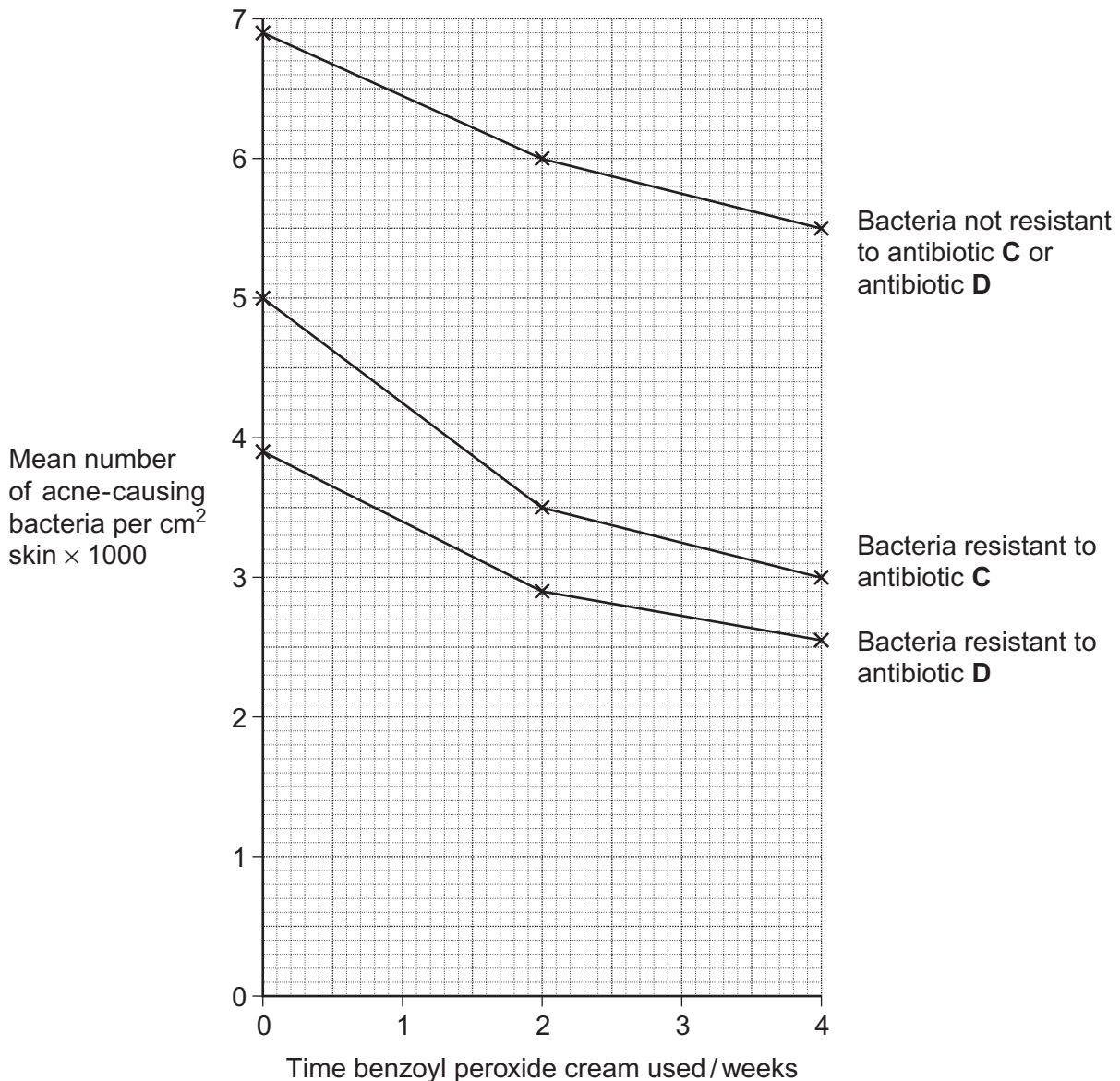
Antibiotics can be used to treat people with severe acne. Some doctors think that using a spot cream at the same time as antibiotics reduces the chances of acne-causing bacteria becoming resistant to antibiotics.

Benzoyl peroxide is a chemical found in some over-the-counter spot creams. It removes dead skin cells from the surface of the skin and reduces inflammation. Benzoyl peroxide can have side-effects. It can cause skin peeling and skin irritation.

Scientists investigated the effect of benzoyl peroxide on the development of antibiotic resistance in acne-causing bacteria. They recruited 30 volunteers. All of the volunteers had acne-causing bacteria on their skin. When scientists tested samples of these bacteria, they found some bacteria resistant to two antibiotics, **C** and **D**.

The scientists asked the volunteers to spread a spot cream containing benzoyl peroxide on their skin twice a day. Swabs were used to obtain samples of acne-causing bacteria from the skin of volunteers after 2 weeks and 4 weeks. The samples were tested for the number of bacteria that were not resistant to antibiotics **C** or **D**. They were also tested for the number of bacteria that were resistant to antibiotics **C** or **D**.

The graph shows the results of the investigation.



Section B

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

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

Use **Resource A** to answer **Questions 13 and 14**.

13 Name the bacterium that causes acne.

.....
(1 mark)

14 The company that produces the spot cream containing the phycosaccharide claims that the cream has been shown to be effective in scientific tests. Do the data in the table support this claim? Explain your answer.

.....
.....
.....
.....
.....
(2 marks)

Use **Resource B** to answer **Questions 15 to 18**.

15 (a) Which of the antibiotic-resistant bacteria are most affected by benzoyl peroxide? Use evidence from the graph to support your answer.

.....
.....
(1 mark)

15 (b) Suggest why using benzoyl peroxide leads to fewer antibiotic-resistant bacteria being present.

.....
.....
(1 mark)

Turn over ►

- 16 What percentage of all the bacteria present in Week 2 are resistant to antibiotic **C**?

..... %
(2 marks)

- 17 Scientists concluded that benzoyl peroxide reduced the number of antibiotic-resistant bacteria on skin. Do the data support this conclusion?
Explain your answer.

.....
.....
.....
.....
.....
(2 marks)

- 18 Benzoyl peroxide is an effective acne treatment. It is not given to all acne sufferers. Suggest **one** type of health condition that would mean that an acne sufferer would not be given benzoyl peroxide.
Explain your answer.

Type of health condition

.....

Explanation

.....
(2 marks)

19 A website claimed that using benzoyl peroxide cream and antibiotics together is the most effective treatment for acne sufferers.
Evaluate this claim.

[illegible]

(5 marks)

[illegible]

16

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