Surname		Other Names	
Centre Number			Candidate Number				
Candidate Signature		Date	

Leave blank

General Certificate of Secondary Education
June 2008 / June 2009

SCIENCE / BIOLOGY **SCYC/BLYC/B1.3**
ISA B1.3 Microorganisms

ASSESSMENT and QUALIFICATIONS ALLIANCE

To be conducted before 4 May 2009
For submission in May 2008 or May 2009 or May 2010

For this paper you must have:
- results tables and charts or graphs from your own investigation.

You may use a calculator.

For Teacher's Use	
Section	Mark
1	
2	
Total (max 34)	

Time allowed: 45 minutes

Instructions
- Use blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions in **Section 1** and **Section 2**.
- Answer the questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The maximum mark for this paper is 34.
- The marks for questions are shown in brackets.
- You are reminded of the need for good English and clear presentation in your answers.

Did this candidate take part in the practical activity?	**YES / NO**

Signature of teacher marking this ISA ..... Date .....

LEAVE MARGIN BLANK

SECTION 1

These questions are about the investigation that **you** did.

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

1 What were you trying to find out in your investigation?

.....

.....

.....

.....

(2 marks)

2 (a) What was the **independent** variable in your investigation?

.....

(1 mark)

(b) What type of variable was the independent variable?

Put a tick (✓) in the box next to your choice.

Categoric ☐

Continuous ☐

Ordered ☐

(1 mark)

3 To make your investigation a fair test, you needed to control some variables.

(a) Name **one** of the variables that you needed to control.

.....

(1 mark)

(b) Explain why you needed to control this variable.

.....

.....

(1 mark)

4 Someone suggests that your results are not **reliable**.

How could you check the **reliability** of your results?

.....

.....

(1 mark)

5 All of your class tested the same sources of bacteria.
Other groups in your class may have obtained different results from yours.

Suggest **one** possible cause for these different results.

.....

.....

(1 mark)

6 When bacteria are grown in an incubator, it is necessary to *monitor* the temperature.

(a) What is meant by the term *monitor*?

.....

(1 mark)

(b) What could you have used to monitor the temperature?

.....

.....

(1 mark)

7 What did you find out from your investigation?

I found out that .....

.....

.....

.....

(2 marks)

8 Make sure that **your** results tables and charts or graphs are handed in with this paper.
You will be awarded up to 6 marks for these.

(6 marks)

18

SECTION 2

These questions are about an investigation that may be similar to the one that you did.

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

Bacteria are becoming more resistant to chemicals that are designed to kill them.

A company makes a new antiseptic hand-wash called 'Ger-off', to be used in hospitals.
'Ger-off' can be diluted with water to make different concentrations.

To test it, the company scientists dipped their hands into a culture of one type of a bacterium.
Then they rubbed their hands with different concentrations of 'Ger-off'.
Then they made thumbprints on sterile agar jelly.
After incubation, the number of colonies of bacteria that grew on the jelly was recorded.

Each test was carried out three times. The results are shown in **Table 1**.

Table 1

Percentage concentration of 'Ger-off'	Number of bacterial colonies			
	Test 1	Test 2	Test 3	Mean
0	47	51	48	49
20	42	45	43	43
40	38	35	37	
60	14	18	15	16
80	8	5	6	6
100	0	0	0	0

9 (a) Calculate the mean number of bacterial colonies that grew on the jelly with a 40 % concentration of 'Ger-off'.

.....

.....

Write your answer, to the nearest whole number, into the table. *(2 marks)*

(b) One of the concentrations of 'Ger-off' used was an experimental control.
Which one?

.....

(1 mark)

(c) What is the reason for using an experimental control?

.....

.....

(1 mark)

(d) Which **one** of the following was a **control** variable?

Put a tick (✓) in the box next to your choice.

Bacteria becoming resistant to chemicals designed to kill them	☐
Using different concentrations of 'Ger-off'	☐
The company scientists making thumbprints on agar jelly	☐
'Ger-off' being used in hospitals	☐

(1 mark)

10 A scientist examined the results in **Table 1** and decided that there were no anomalous results.

Explain why he came to this decision.

.....

.....

(1 mark)

11 'Ger-off' is expensive. A hospital needs to keep down its costs.
The hospital asks the makers of 'Ger-off' to carry out more tests to find the lowest concentration of 'Ger-off' that will kill all the bacteria.

(a) In which range of concentrations should the company carry out more tests?

Draw a ring around your answer.

0%–20% **20%–40%** **40%–60%** **60%–80%** **80%–100%**

(1 mark)

(b) Explain the reason for your choice.

.....

.....

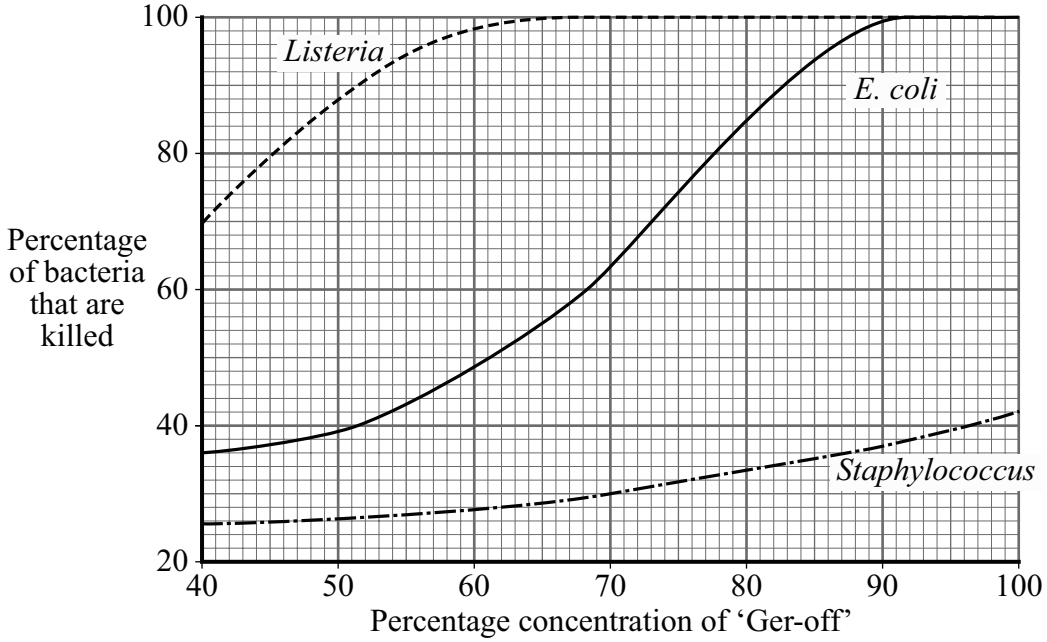
(1 mark)

Turn over ▶

12 The hospital decided to send a sample of 'Ger-off' to scientists in their own laboratories for further testing.
The scientists tested its effect on three different types of bacteria: *Listeria, E. coli* and *Staphylococcus*.

The results are shown in **Graph 1**.

Graph 1



To help you with these questions, **Table 1** is reprinted here.

Percentage concentration of 'Ger-off'	Number of bacterial colonies			
	Test 1	Test 2	Test 3	Mean
0	47	51	48	49
20	42	45	43	43
40	38	35	37	
60	14	18	15	16
80	8	5	6	6
100	0	0	0	0

(a) (i) Look at **Graph 1**.

Which type of bacterium do you think the makers of 'Ger-off' tested in their experiments?

.....

(1 mark)

(ii) Explain your answer.

.....

.....

.....

.....

(2 marks)

(b) What was the advantage of the scientists in the hospital carrying out more tests on 'Ger-off'?

.....

.....

(1 mark)

13 Use the graph and other information in **Section 2** to answer this question.

Suppose you are working in the hospital's laboratories.
Discuss whether the hospital scientists should recommend the use of 'Ger-off' at 100 % concentration or at 80 % concentration.

To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.

.....

.....

.....

.....

.....

.....

.....

.....

(4 marks)

16

END OF QUESTIONS

There are no questions printed on this page