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| Surname | | | | | | Other Names | | | | | |
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| Candidate Declaration. I have read and understood the Notice to Candidate and can confirm that I have produced the attached work without assistance other than that which is acceptable under the scheme of assessment. | | | | | | | | | | | |
| Candidate Signature | | | | | | Date | | | | | |

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



General Certificate of Education
Advanced Level Examination
June 2011

Biology

BIO6T/Q11/test

Unit 6T A2 Investigative Skills Assignment

For submission by 15 May 2011

| | |
|--|---|
| For this paper you must have: <ul style="list-style-type: none"> the task sheet, your results and your calculations 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. The maximum mark for this paper is 38. You will be marked on your ability to: <ul style="list-style-type: none"> use good English organise information clearly use scientific terminology accurately. |
| Details of additional assistance (if any). Did the candidate receive any help or information in the production of this work? If you answer yes give the details below or on a separate page. Yes <input type="checkbox"/> No <input type="checkbox"/> | |

Teacher Declaration:

I confirm that the candidate's work was conducted under the conditions laid out by the specification. I have authenticated the candidate's work and am satisfied that to the best of my knowledge the work produced is solely that of the candidate.

Signature of teacher Date

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Section A

These questions relate to your investigation of the effect of competition for oxygen on the growth of yeast.

Use your task sheet and your results to answer the questions.

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

5 The yeast cultures in the conical flasks were set up some time before you carried out your investigation. Explain why.

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(1 mark)

6 (a) The conical flasks were stoppered with cotton wool. Explain why the flasks were stoppered.

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(2 marks)

6 (b) The flasks were loosely stoppered with cotton wool rather than with rubber bungs. Explain why the flasks were loosely stoppered with cotton wool.

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(1 mark)

7 In step 3 you were instructed to add 200 cm³ sterile water to the yeast culture. Explain why you needed to do this.

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(2 marks)

8 In step 4 you were told to stir the mixture in the beaker containing the yeast culture and sterile water. Explain why you were told to do this.

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(1 mark)

9 In step 14 you were told to select the squares that were to be counted at random. Describe how you selected the squares at random.

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(2 marks)

Turn over for next question

Turn over ►

10 More oxygen entered the culture in the 250 cm³ flask than in the 25 cm³ flask.
Explain why.

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(2 marks)

11 Explain how the higher concentration of oxygen affects the growth of a population of yeast cells.

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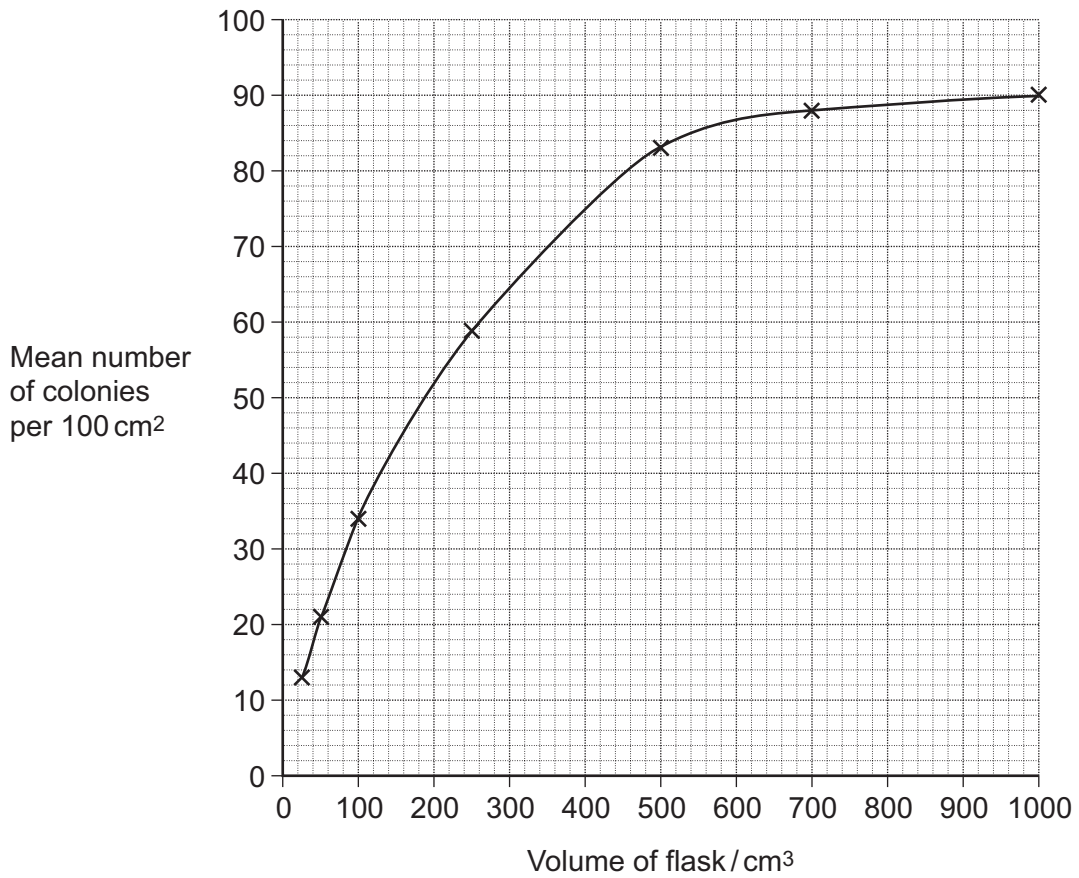
(3 marks)

(Extra space)

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12 A group of students carried out a similar investigation to yours but they used seven different sizes of conical flask. Their results are shown in the graph.



Use your knowledge of limiting factors to explain the shape of the curve.

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(3 marks)

(Extra space)

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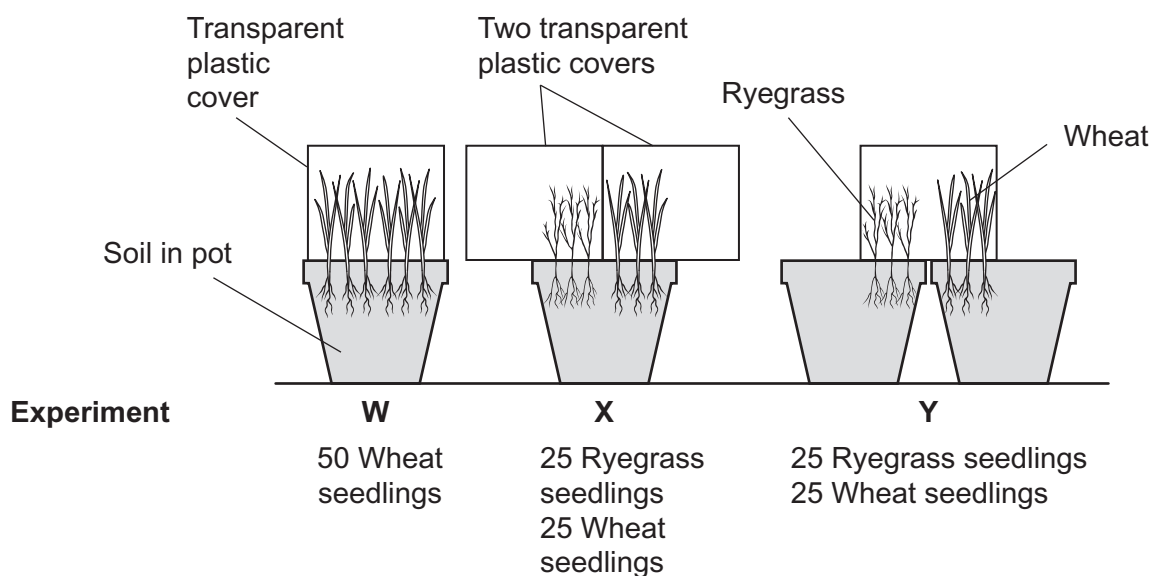
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RESOURCE SHEET

Resource A

Wheat is an important cereal crop. Ryegrass is a weed in wheat fields. Wheat and ryegrass belong to the grass family.

Scientists investigated competition between wheat and ryegrass seedlings. They set up three experiments **W**, **X**, and **Y** as shown in the diagram.



The table shows the mean dry mass of the wheat seedlings as a percentage of their dry mass when grown alone.

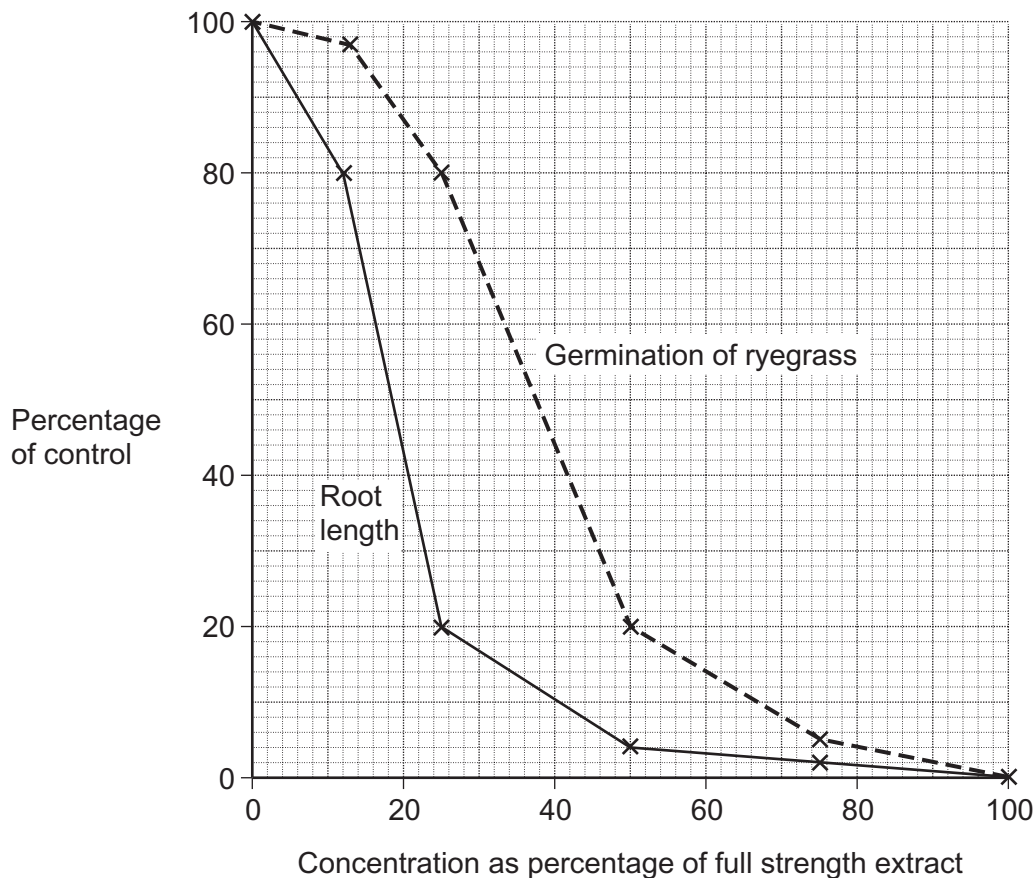
| | Experiment | | |
|---|------------|----|----|
| | W | X | Y |
| Mean dry mass of wheat seedlings as a percentage of their dry mass when grown alone | 100 | 76 | 46 |

Resource B

Australian scientists investigated one aspect of competition between wheat and ryegrass.

- They crushed up some wheat plants and mixed the crushed plants with distilled water.
- Water-soluble substances in the crushed plants dissolved in the distilled water. The scientists called this solution the *full-strength* extract.
- The scientists then made a series of dilutions of the full-strength extract.
- They put ryegrass seeds into each dilution and recorded how many seeds germinated (started to grow). If the seeds germinated, they measured the lengths of the roots of the seedlings.
- They presented their results as percentages of a control experiment.

The graph shows the effects of different concentrations of the extract on the germination of ryegrass and on the length of the roots of the seedlings that grew from them.



Turn over ►

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 **13** to **15**.

13 Experiment **W** was a control experiment. Explain the purpose of the control experiment in this investigation.

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(2 marks)

14 What can you conclude from this investigation about competition between wheat and ryegrass? Use the data in the table to support your answer.

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(4 marks)

(Extra space)

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15 Explain how a decrease in temperature could affect the outcome of this investigation.

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(2 marks)

Use **Resource B** to answer Questions **16** to **19**.

16 Describe the control that the scientists set up in this investigation.

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(1 mark)

17 The scientists found a positive correlation between the inhibition of germination and the concentration of the extract.

17 (a) Describe how they could find out whether this correlation was significant.

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(2 marks)

17 (b) Explain why a correlation does **not** mean that the extract caused inhibition of germination.

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(1 mark)

Turn over ►

18 The scientists concluded that wheat plants produce substances that help them to compete with ryegrass.

18 (a) Give evidence from the investigation to support this conclusion.

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(2 marks)

18 (b) Why might their conclusion **not** be valid?

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(3 marks)

(Extra space)

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19 The scientists who carried out this investigation found a variety of wheat that was very effective in competing with ryegrass.

19 (a) Describe and explain **one** way in which growing this variety of wheat would be an advantage to the environment.

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(2 marks)

19 (b) Describe and explain **one** disadvantage of growing only this variety of wheat.

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(2 marks)

END OF QUESTIONS

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| 21 |
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