Centre Number						Candidate Number				
Surname						Other Names				

Notice to Candidate. The work you submit for assessment must be your own. If you copy from someone else or allow another candidate to copy from you, or if you cheat in any other way, you may be disqualified.

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 Examiner's Use Total EMPA mark	
Examiner's Initials	
Section	Mark
Task 1	
Task 2	
Section A	
Section B	
TOTAL EMPA MARK	

General Certificate of Education
Advanced Level Examination
June 2012

Biology BIO6X

Unit 6X A2 Externally Marked Practical Assignment
Written Test

For submission by 15 May 2012

For this paper you must have:	**Time allowed**
• the Task Sheet 2, including your results and statistical calculations • a ruler with millimetre measurements • a calculator.	• 1 hour 15 minutes
Instructions:	**Information**
• 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.	• The marks for questions are shown in brackets. • The maximum mark for this paper is 34. • You will be marked on your ability to: – 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 ☐ 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** ☐

Signature of teacher ..... Date .....

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Section A

These questions are about your investigation of the effect of the height at which parsnip seeds are released on the distance they travel.

Use your copy of Task Sheet 2 and the results of your statistical analysis to answer them.

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

5 In **Task 2** you were told to standardise the way in which you released the parsnip seeds. Describe how you did this.

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(2 marks)

6 You used a plumb line in your investigation. Explain why using a plumb line would allow you to get reliable measurements.

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(1 mark)

7 In your investigation, wind speed was a confounding variable.
Would using a large number of seeds help to minimise the effect of wind speed?
Explain your answer.

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(2 marks)

Do not write outside the box

8 A student suggested that it would be better to release all 20 seeds together.

8 (a) Suggest **one** advantage of releasing the seeds together.

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(1 mark)

8 (b) Suggest **one** disadvantage of releasing the seeds together.

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(1 mark)

9 Hogweed is a common plant found on roadsides. Hogweed seeds are very similar to parsnip seeds. Suggest **two** ways in which passing vehicles may assist the dispersal of hogweed seeds.

1 .....

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2 .....

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(2 marks)

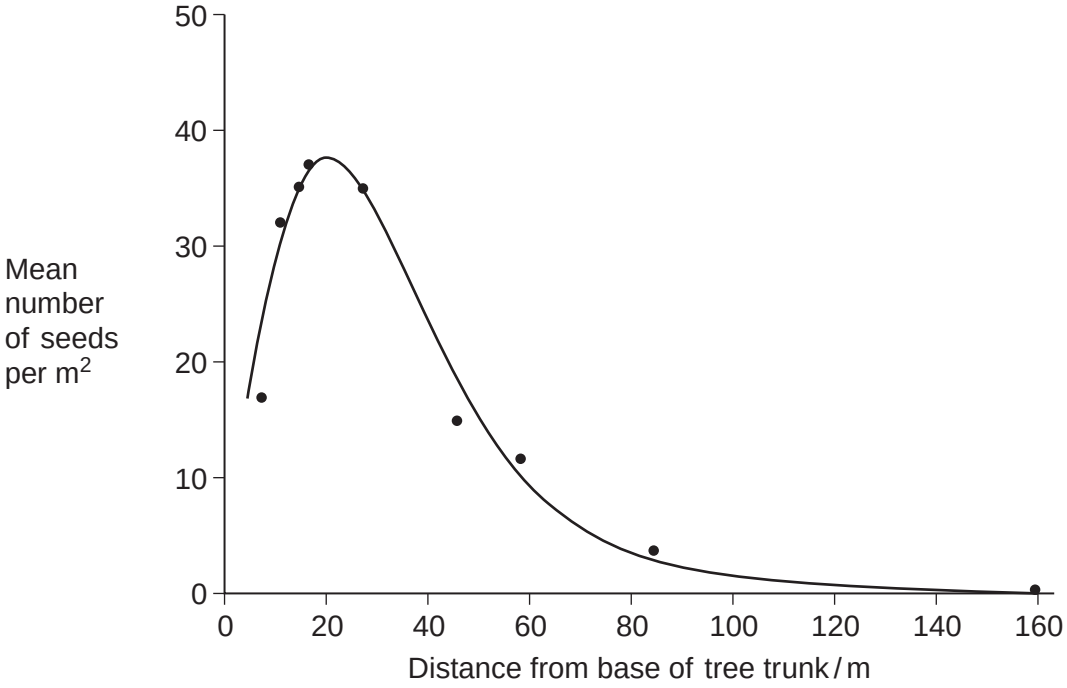
9

Turn over for the next question

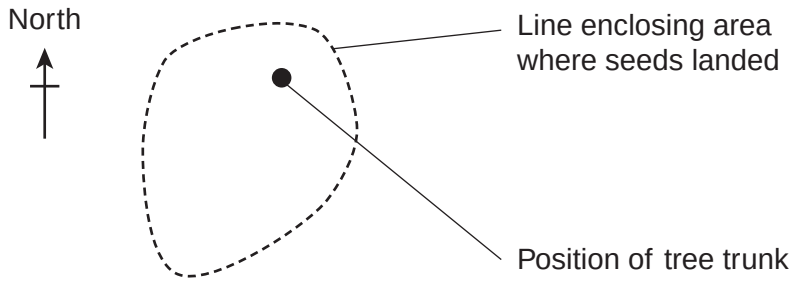
Resource Sheet

Resource A

A 75 m tall tree released very large numbers of small seeds. Ecologists used quadrats along a transect to measure the number of these seeds at different distances from the tree. Their results are shown on the graph.



The seeds of this tree are dispersed by wind. The diagram shows the pattern of seed dispersal from this tree.



Resource B

Agricultural scientists divided a field into a number of different plots. They planted soya bean seeds in these plots at different sowing densities. The diagram shows how these plots were arranged. The numbers show the sowing densities in seeds per m^2. The plots containing seeds sown at a density of 250 seeds per m^2 have been shaded.

250	500	1000	15	25	50	100
15	25	50	100	250	500	1000
25	50	100	250	500	1000	15
50	100	250	500	1000	15	25
1000	15	25	50	100	250	500
500	1000	15	25	50	100	250
100	250	500	1000	15	25	50

The scientists recorded the number of soya bean plants growing in each plot at different times after the start of the investigation. Their results are shown in the table.

Number of seeds planted per m^2	**Mean number of plants surviving per m^2 after**			
	22 days	**39 days**	**61 days**	**93 days**
15	15	15	15	15
25	24	24	24	23
50	47	46	46	41
100	98	96	96	87
250	246	242	204	196
500	492	486	313	124
1000	987	788	276	95

Do not write outside the box

Section B

Use the information in the **Resource Sheet** and your own knowledge to answer the questions.

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

Use **Resource A** to answer **Questions 10** to **12**.

10 Describe how the ecologists could have used quadrats and a transect to obtain the data from which the graph was drawn.

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(2 marks)

11 Look at the diagram showing the pattern of seed dispersal from this tree.

11 (a) Suggest an explanation for the shape of the line enclosing the area where the seeds landed.

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(2 marks)

11 (b) The line enclosing the area where the seeds landed would be different for trees of this species that were of a different height. Suggest why.

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(2 marks)

Do not write outside the box

12 In an ecological succession, trees that are pioneer species often have smaller seeds than those that are part of a climax community.

12 (a) The species of tree in this investigation is adapted to colonising areas that have been cleared of vegetation. Use information from **Resource A** to explain how.

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(2 marks)

12 (b) The seeds produced by this species of tree did **not** grow successfully in a climax community. Suggest why.

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(2 marks)

Use **Resource B** to answer **Questions 13** to **15**.

13 (a) In terms of rows and columns, describe how the plots containing seeds sown at a density of 250 m^2 were arranged.

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(1 mark)

13 (b) Explain the advantage of arranging the plots in this way.

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(2 marks)

Turn over ▶

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14 The scientists would have treated the plots in the same way. Suggest **two** ways in which the scientists would have treated the plots to ensure that confounding variables would **not** affect the results.

1 .....

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2 .....

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(2 marks)

15 (a) Describe the results of this investigation.

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(3 marks)

(Extra space) .....

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15 (b) Explain the results when 1000 seeds were planted per m^2.

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(2 marks)

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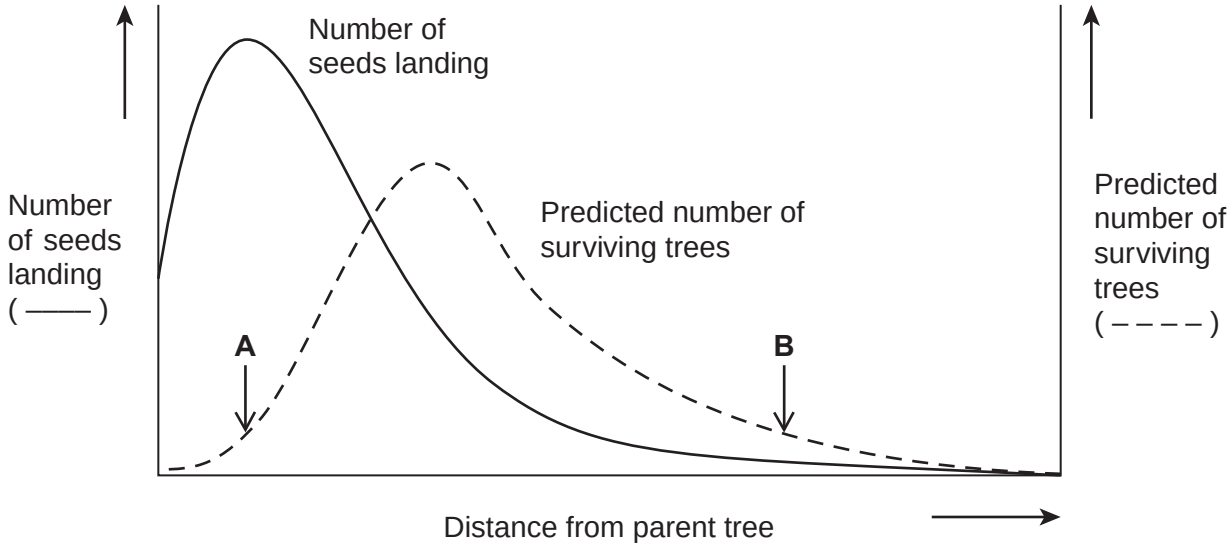
Use **Resources A** and **B** and your own knowledge to answer Question **16**.

16 A scientist measured the number of seeds landing at different distances from a parent tree. He then produced a theoretical model. He used this model to predict how the number of new trees that grew from the seeds and survived varied with distance from the parent tree. The scales used for the two vertical axes are different.

The predictions from this model are summarised in the graph.



16 (a) Explain why the model predicts a low number of surviving trees at point **A**

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(3 marks)

(Extra space) .....

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16 (b) Explain why the model predicts a low number of surviving trees at point **B**.

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(2 marks)

25

END OF QUESTIONS

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