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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 Subsidiary Examination
June 2014

Biology

BIO3X

Unit 3X AS Externally Marked Practical Assignment Written Test

For submission by 15 May 2014

For this paper you must have: <ul style="list-style-type: none"> the Task Sheet 2, your results and your graph 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 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 <ul style="list-style-type: none"> The marks for questions are shown in brackets. The maximum mark for this paper is 30. You will be marked on your ability to: <ul style="list-style-type: none"> use good English organise information clearly use scientific terminology accurately.

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Yes No

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Practical Skills Verification	Yes <input type="checkbox"/>
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Signature of teacher Date

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Section A

These questions relate to your investigation into water movement by capillary action. Use your copy of Task Sheet 2, your results and your graph to answer the questions. Answer **all** questions in the spaces provided.

9 **Table 2** shows how to make up 30 cm³ of one of the salt solutions you used.

Complete **Table 2** by giving all headings, units and the concentration of the salt solution produced.

[2 marks]

Table 2

Concentration of salt solution /	Volume of 1 mol dm ⁻³ salt solution / cm ³ /
.....	9	21

10 You were using the capillary tube as a model for water movement in a plant.

10 (a) Suggest **two** reasons why this is a good model for water movement in the xylem.

[2 marks]

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- 2
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10 (b) Suggest **two** reasons why this is a poor model for water movement in a plant. **[2 marks]**

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11 You were told to leave the capillary tubes for 30 seconds before measuring how far the coloured water had moved (step 4).
Why was this an appropriate length of time to leave the tubes? **[1 mark]**

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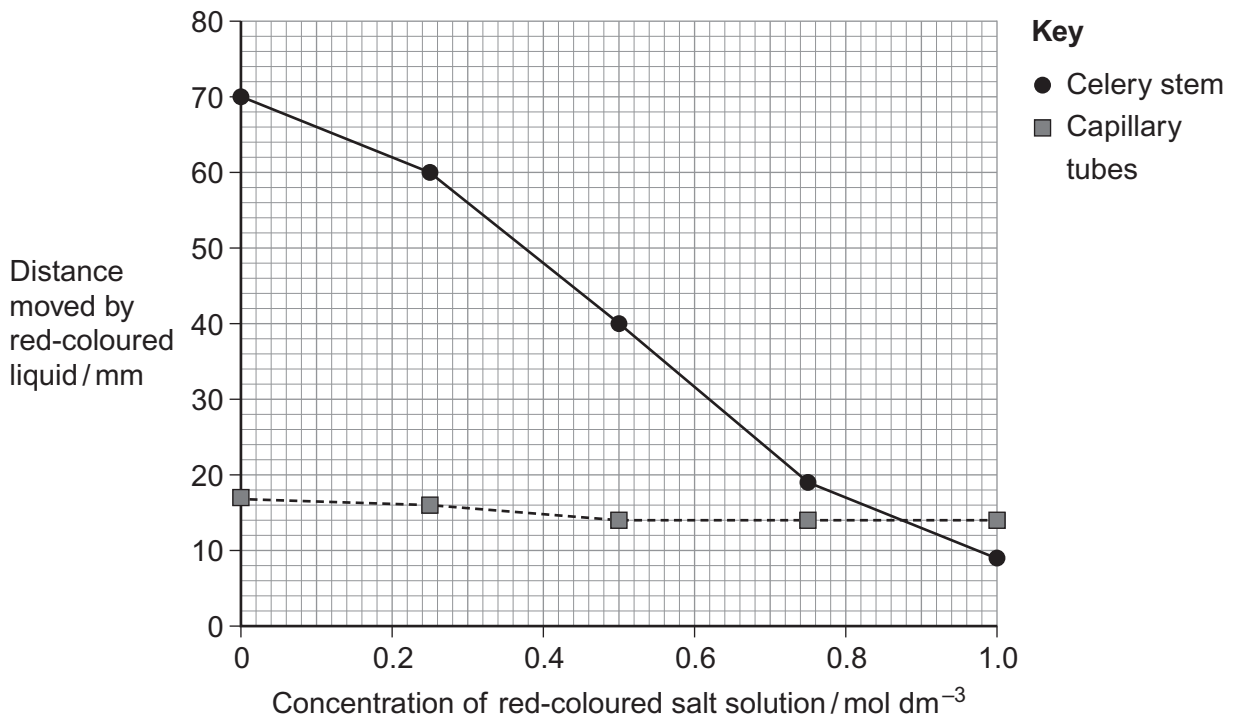
Turn over for the next question

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- 12** A student carried out a similar investigation to you. She used capillary tubes and celery stems. She placed capillary tubes and celery stems in red-coloured water and red-coloured salt solutions of different concentrations. After 5 minutes, she measured how far these liquids had moved up the capillary tubes and the xylem in the celery stem.

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

Figure 2



- 12 (a)** Her teacher advised her that she should join the points with straight lines rather than drawing lines of best fit. Explain why the teacher gave this advice.

[1 mark]

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12 (b) Compare the results obtained with capillary tubes and with celery stems.

[2 marks]

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13 Explain how movement in the xylem is an example of mass transport.

[2 marks]

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12

Turn over for the Resource Sheet

Turn over ►

Resource Sheet

Introduction

In many parts of the world, crops have to be watered to grow enough food but fresh water is often in short supply.

Resource A

Barley is a plant that grows a leafy shoot and then produces seed that is harvested for food.

Scientists investigated whether barley could be grown successfully using fresh water mixed with seawater. This would reduce the use of fresh water. However, seawater contains dissolved sodium chloride (salt).

The scientists grew barley in plots of equal size in the same large field. Each plot received one of four treatments.

- A. No watering.
- B. Watering with fresh water during growth and seed production.
- C. Watering with a 1:1 mix of fresh water and seawater during growth and seed production.
- D. Watering with fresh water during growth and with a 1:1 mix of fresh water and seawater during seed production.

At the end of the investigation, the scientists measured the concentration of salt in the soil in each plot and the yield of barley seed harvested from each plot.

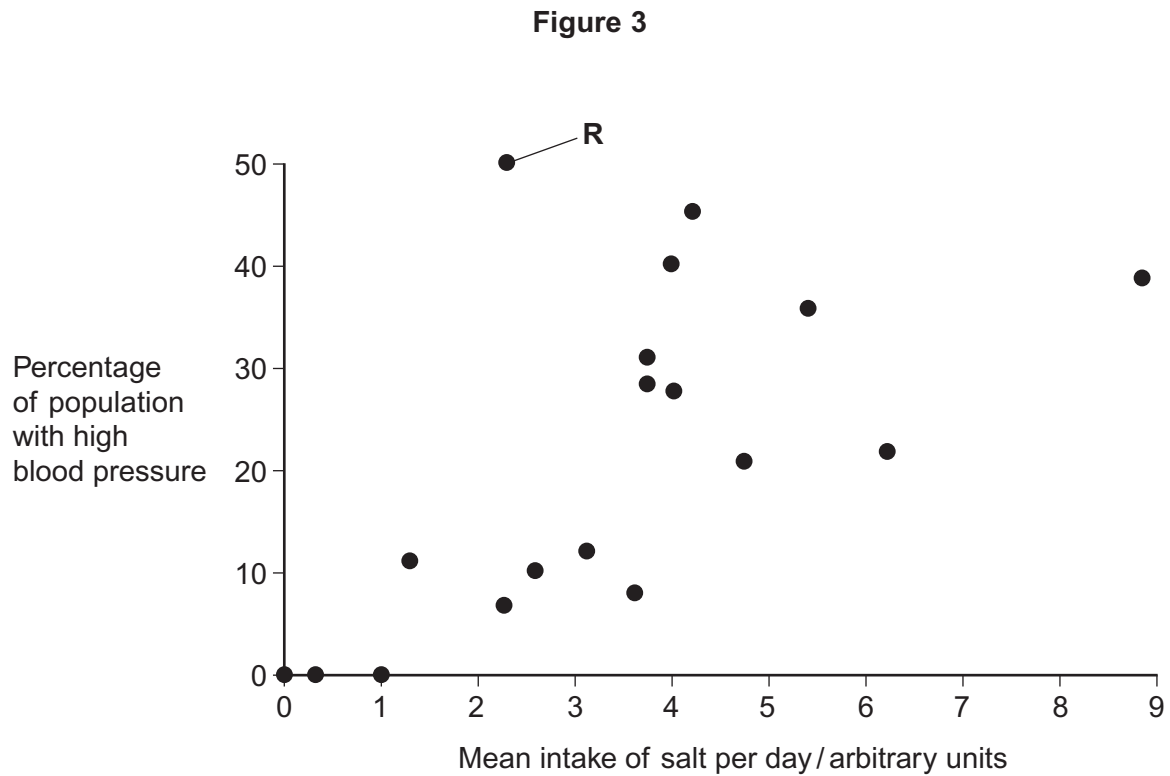
The scientists' results are shown in **Table 3**.

Table 3

Watering treatment	Mean concentration of salt in soil / arbitrary units	Mean yield of barley seed / g
A	10.1	346
B	9.7	804
C	13.5	538
D	11.6	695

Resource B

Many groups of researchers have investigated a possible link between the amount of salt in people's diet and high blood pressure. One scientist collected together their results and plotted them, as shown in **Figure 3**. Each point on **Figure 3** represents the result for one large population.



Turn over for the next question

Turn over ►

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 14 to 18**.

14 Watering treatment was the independent variable in this investigation.
Explain what is meant by the **independent** variable. **[1 mark]**

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15 The same variety of barley was used in all the plots. Why was this important? **[2 marks]**

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16 When barley plants are growing, the number of cells increases.
Name the process that increases the number of cells. **[1 mark]**

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17 What do the data in **Table 3** show about the effect of watering barley with a mixture of fresh water and seawater?

[2 marks]

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18 The scientists suggested that watering barley with diluted seawater might not be sustainable if repeated every year.
Do these data support this suggestion?

[3 marks]

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[Extra space]

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Turn over for the next question

Turn over ►

Use **Resource B** to answer **Questions 19 to 23**.

19 In order to calculate mean intake of salt per day for one of the populations, a measurement of each person's salt intake was taken for one 24-hour period. Why may this not give a reliable measurement for each person's salt intake?

[1 mark]

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20 The number of people in the sample was not the same for each population. Does this matter when comparing results for different populations? Explain your answer.

[1 mark]

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21 Can you conclude from these data that high salt intake increases a person's risk of high blood pressure? Explain your answer.

[3 marks]

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[Extra space]
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22 Although the population labelled **R** appears to be an anomalous result, the scientist included it in **Figure 3**.

22 (a) Explain why this was the correct thing to do.

[1 mark]

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22 (b) Suggest **one** reason when it might have been appropriate to discard the result for the population labelled **R**.

[1 mark]

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23 The British Heart Foundation recommends, 'To keep your heart healthy it's important that you don't eat too much salt each day'. Explain the reasons for this recommendation.

[2 marks]

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18

END OF QUESTIONS

There are no questions printed on this page

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ANSWER IN THE SPACES PROVIDED**