For this paper you must have:
- the task sheet, your results and your graph
- a ruler with millimetre measurements.
- a calculator.

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 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
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 34.
- You will be marked on your ability to:
  - 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 [ ]  No [ ]

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 are about your investigation of the effect of sucrose concentration on cells from a plant stalk.

Use your Task Sheet and your results table and graph to answer them.

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

<table>
<thead>
<tr>
<th>Question</th>
<th>Description</th>
<th>Answer</th>
</tr>
</thead>
</table>
| 1        | You were told to put the lids on the Petri dishes before leaving them (step 7). Explain why it was necessary to put the lids on the Petri dishes. | ..........................................................................................................................................
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(2 marks) |
| 2        | The cells of different species of plant contain different concentrations of sugars. Use this information to explain why you might get different results if you used another species of plant. | ..........................................................................................................................................
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(2 marks) |
| 3        | You were told to put thin strips from the stalk into the solutions (step 7). Would the stalk curve if you put uncut stalks into the solutions? Explain your answer. | ..........................................................................................................................................
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(1 mark)  |
4 (a) Explain why it was important that all the strips were the same length.

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(2 marks)

4 (b) Explain why it was important that the strips of stalk were not shorter than the length you were told (step 5).

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(1 mark)

5 Look at your results. Use your knowledge of water potential to explain what happened when you left the strip of stalk in 1.0 mol dm$^{-3}$ sucrose solution.

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(3 marks)
6. You could use your graph to estimate the concentration of sucrose that had the same water potential as the cells on the inside of the stalk. Describe how.

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(1 mark)

7. Suppose you left a strip of stalk overnight in the air. Describe and explain what you would expect to happen to the strip.

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(3 marks)

(Extra space) .................................................................................................................
Resource Sheet

Resource A

Strawberries may be dehydrated by removing most of the water they contain. Dehydrated strawberries have many different uses in the food industry.

Food scientists investigated the effect of using osmosis to dehydrate strawberries.

1. The scientists weighed a sample of strawberries and then cut them into 10 mm thick slices.
2. They put the strawberry slices into a 1.2 mol dm\(^{-3}\) solution of sucrose at a temperature of 25\(^\circ\)C.
3. After 1 hour, they removed the slices from the sucrose solution and washed them in water. They dried the slices by blotting them and then weighed them.
4. They also measured the texture of the strawberry slices.
5. The scientists repeated steps 1 to 4, but they left the strawberry slices in the sucrose solution for different amounts of time.

The results of the investigation are shown in the table.

<table>
<thead>
<tr>
<th>Length of time in sucrose solution / hours</th>
<th>Percentage loss in mass</th>
<th>Texture / arbitrary units</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Not applicable</td>
<td>1.2</td>
</tr>
<tr>
<td>1</td>
<td>15.96</td>
<td>0.9</td>
</tr>
<tr>
<td>2</td>
<td>22.88</td>
<td>0.7</td>
</tr>
<tr>
<td>4</td>
<td>32.36</td>
<td>0.7</td>
</tr>
<tr>
<td>6</td>
<td>38.78</td>
<td>0.7</td>
</tr>
</tbody>
</table>
Resource B

Turkey meat can dry out when it is cooked in an oven. One way to overcome this is to soak the meat in a salt solution before cooking it. This is called brining.

A food writer organised a demonstration. He treated three similar pieces of turkey in different ways.

- Piece A was untreated.
- Piece B was soaked overnight in a 6% solution of salt. A 6% solution of salt has a greater solute concentration than the cells in turkey meat.
- Piece C was soaked overnight in water.

He put all three pieces in an oven at 150 °C. He left each piece until it was cooked and the temperature in its centre was 65 °C. The writer weighed each piece at different stages in the demonstration. The graph shows his results.

Key
- A Untreated
- B Soaked in salt solution (brined)
- C Soaked in water

![Graph showing mass as percentage of original mass before and after treatment and cooking.](image-url)
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 8 to 11.

8 (a) In this investigation, the scientists cut the strawberries into slices (step 1). Explain the advantage of this.

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(2 marks)

8 (b) The scientists blotted the strawberry slices dry before weighing them (step 3). Explain why.

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(2 marks)

9 In the second column of the table, the percentage loss in mass for one of the values has been recorded as not applicable. Explain why.

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(1 mark)
10 Use the table to describe how the length of time in the sucrose solution affected the strawberries.

(3 marks)

(Extra space)

11 You could use the data in the table to predict the time that strawberries should be left in sucrose solution to dehydrate them fully. Describe how you could use a graph to do this.

(3 marks)

(Extra space)
12 (a) Explain the advantage of using percentage change in mass in this investigation.

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(2 marks)

12 (b) The pieces of turkey meat were cooked. Explain the advantage of leaving them in the oven until the temperature in the centre of each piece was 65 °C.

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(2 marks)

12 (c) Recording mass is a valid way to measure the dependent variable in this investigation. Evaluate this statement.

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(2 marks)

Turn over for the next question
Students suggested that osmosis resulted in cooked brined turkey meat containing more water than cooked untreated meat.

Use your knowledge of water potential and the data in the graph to explain why this suggestion could not be correct.

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(2 marks)

END OF QUESTIONS