1 Some students wanted to find the effect of sugar solution on onions.

They cut slices of onion 2 mm thick from a whole onion as shown in Fig. 1.1A. One ring was separated and cut into two equal pieces as shown in Fig. 1.1B.

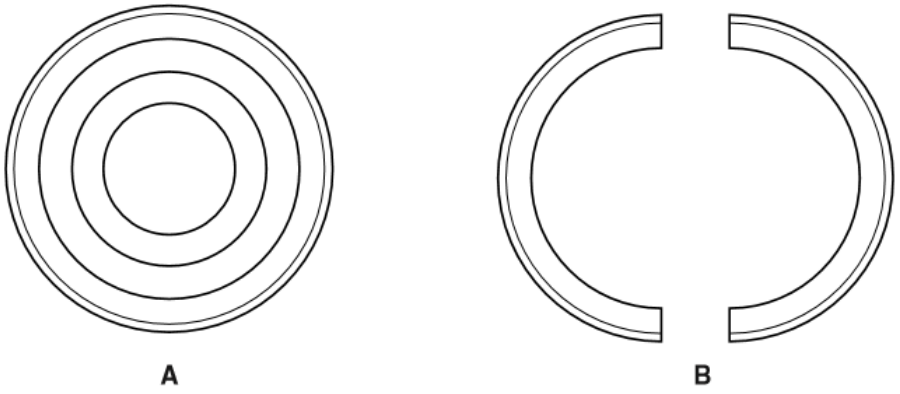

Fig. 1.1

One half of this onion ring was immersed in distilled water in a dish and the other half in a sugar solution in another dish.
The shape of these two pieces at the start was recorded in Table 1.1.

The dishes were left for 30 minutes under the same conditions and then the piece of onion ring in each dish was observed and its shape drawn in Table 1.1.

Table 1.1

	shape of the piece of onion ring	
	in distilled water	in sugar solution
at the start		
after 30 minutes		

(a) (i) Describe the changes that are visible in the two pieces of onion after 30 minutes.

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..... [3]

(ii) Explain what has happened to cause the changes in the two pieces of onion.

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..... [5]

(b) (i) State **one** factor that was kept the same in this investigation and explain why it was kept the same.

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..... [2]

(ii) Some students decided to find out the effect of using a range of different concentrations of sugar solution on pieces of onion.

Describe **two** other factors that would need to be controlled.

1 .....

2 .....

[2]

(iii) Explain how you could **measure** the effect of using a range of different concentrations.

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..... [1]

(c) In one of the sugar concentrations the shape of the onion remained unchanged.

Suggest an explanation for this.

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..... [2]

[Total: 15]

1 **(a)** Describe how you would safely test a sample of milk for the presence of each of the following substances:

(i) reducing sugars

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.....[4]

(ii) proteins.

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.....[2]

(b) Fromase® is an enzyme that is used in the production of cheese. It causes the proteins in milk to coagulate (clot) to form a solid 'curd'.

A student investigated the time taken for milk to coagulate using Fromase® in the presence of calcium chloride solution. She used a range of concentrations of calcium chloride solution that were each added to 10 cm^3 of milk and 1 cm^3 of Fromase®.

For each concentration of calcium chloride solution, she recorded the time taken for the milk to coagulate.

Her record of results is shown below.

0.0 g per dm^3, 230 seconds; 0.2 g per dm^3, 200 seconds; 0.4 g per dm^3, 150 seconds; 0.6 g per dm^3, 50 seconds; 0.8 g per dm^3, 30 seconds

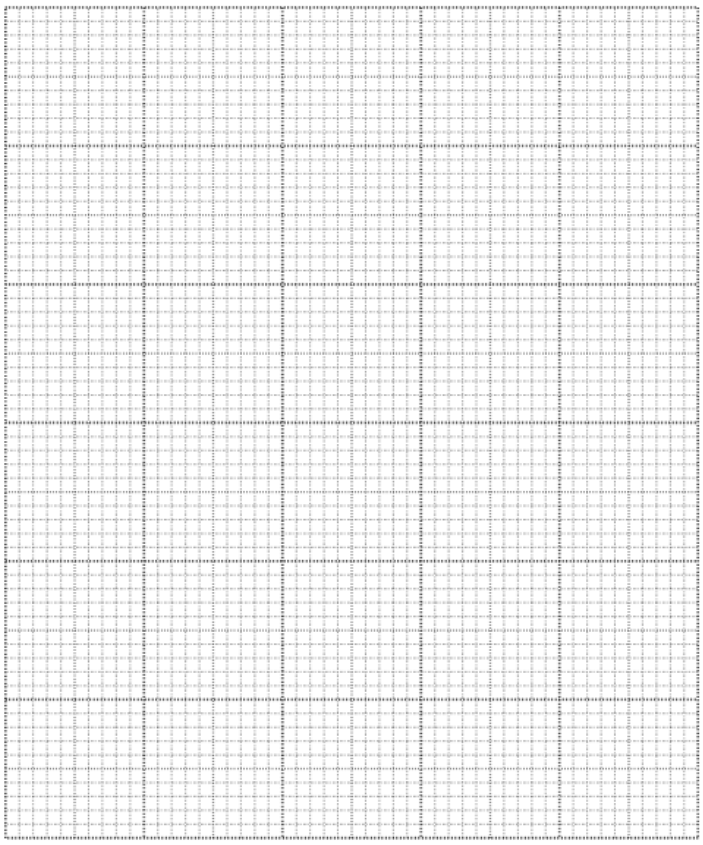
(i) Use these results to complete Table 1.1.

Table 1.1

concentration of calcium chloride solution/g per dm^3	time taken for milk to coagulate /seconds

[2]

(ii) On the grid below, construct a line graph of the data in Table 1.1.
Join your points with ruled, straight lines.



[4]

(iii) Use your graph to find the time it will take for milk to coagulate in calcium chloride solution of concentration 0.7 g per dm^3.

..... seconds [1]

(iv) Describe the relationship between the concentration of calcium chloride solution and the time taken for the milk to coagulate.

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.....[1]

(v) During this experiment, the student kept the test-tubes at a constant temperature of 40 °C.

Suggest how she kept the temperature constant.

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.....[2]

(c) Design an experiment you could carry out in the laboratory to investigate the effect of pH on the time taken for milk to coagulate using Fromase®.

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[Total: 20]