

2 (a) The enzyme pectinase is used in the production of apple juice.

In an experiment, a student investigated the production of apple juice using five different concentrations of pectinase solution.

For each concentration, the student:

- put 100g of crushed apple into a beaker
- added 10 cm³ of the pectinase solution to the crushed apple
- left the crushed apple and enzyme mixture for 30 minutes at 40 °C
- filtered the apple juice from the mixture
- measured the volume of apple juice produced.

(i) The temperature was maintained at 40 °C.

Describe how the student could maintain the crushed apple and enzyme mixture at a constant temperature.

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 [1]

(ii) State **two other** variables that were kept constant in this investigation.

1

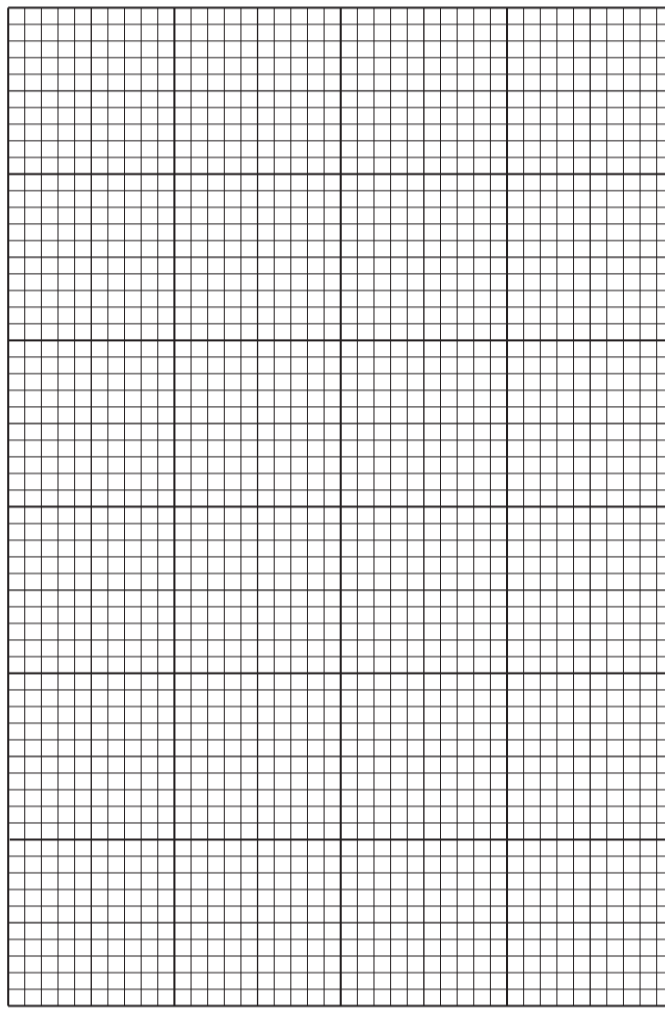
 2
 [2]

(b) The results of this investigation are shown in Table 2.1.

Table 2.1

percentage concentration of the pectinase solution	volume of apple juice produced / cm ³
0.1	4
0.2	6
0.4	12
0.8	22
1.6	22

(i) Plot a line graph on the grid of the data in Table 2.1.



[4]

(ii) Use your graph to estimate the volume of apple juice produced with a 0.5% pectinase solution.

Show on your graph how you obtained your answer.

..... cm³
 [2]

(iii) Describe the effect of pectinase solution concentration on apple juice production.

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 [1]

(iv) Pectinase is used to produce apple juice commercially.

Suggest what extra data would be required to determine if a 0.8% pectinase solution is the optimum concentration for the production of apple juice.

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 [1]

(v) Draw and label the apparatus the student could use to filter **and** measure the volume of apple juice produced.

[3]

[Total: 14]