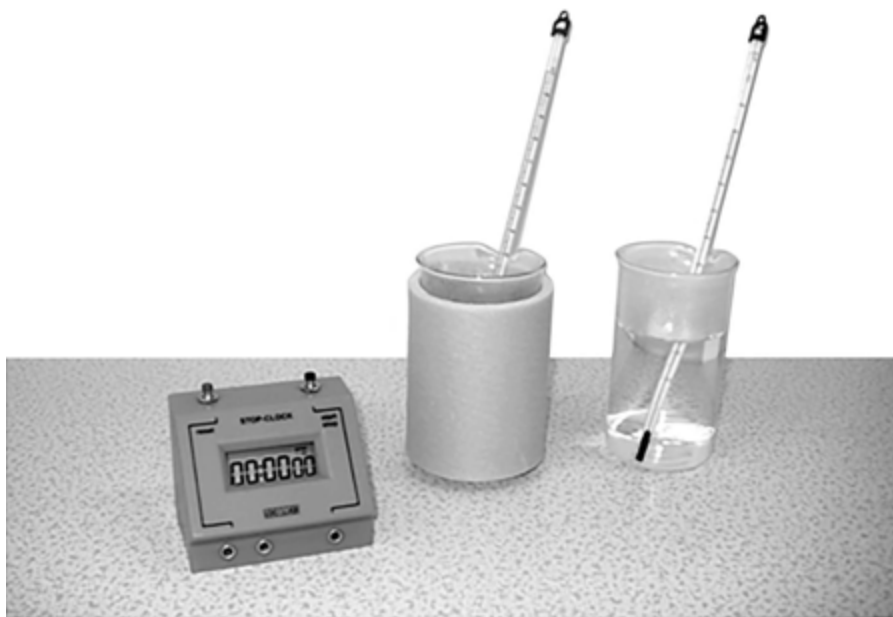


- 4 A student investigates how adding insulation to a beaker of hot water changes the rate at which the water cools down.



- (a) The student writes this plan for her investigation.

I will use five beakers of the same size.

I will wrap each beaker with a different number of layers of the same type of insulation.

I will pour  $300\text{ cm}^3$  of boiling water into each beaker and wait until the temperature of the water falls to  $85^\circ\text{C}$ .

I will then start a timer and record the final temperature of the water after 15 minutes.

- (i) State the independent variable in the student's investigation.

(1)

- (ii) State the dependent variable in the student's investigation.

(1)



(b) The table shows the student's results.

Number of layers of insulation	Final temperature in $^{\circ}\text{C}$	Temperature difference in $^{\circ}\text{C}$
0	43	42
1		38
2		35
3		35
4		35

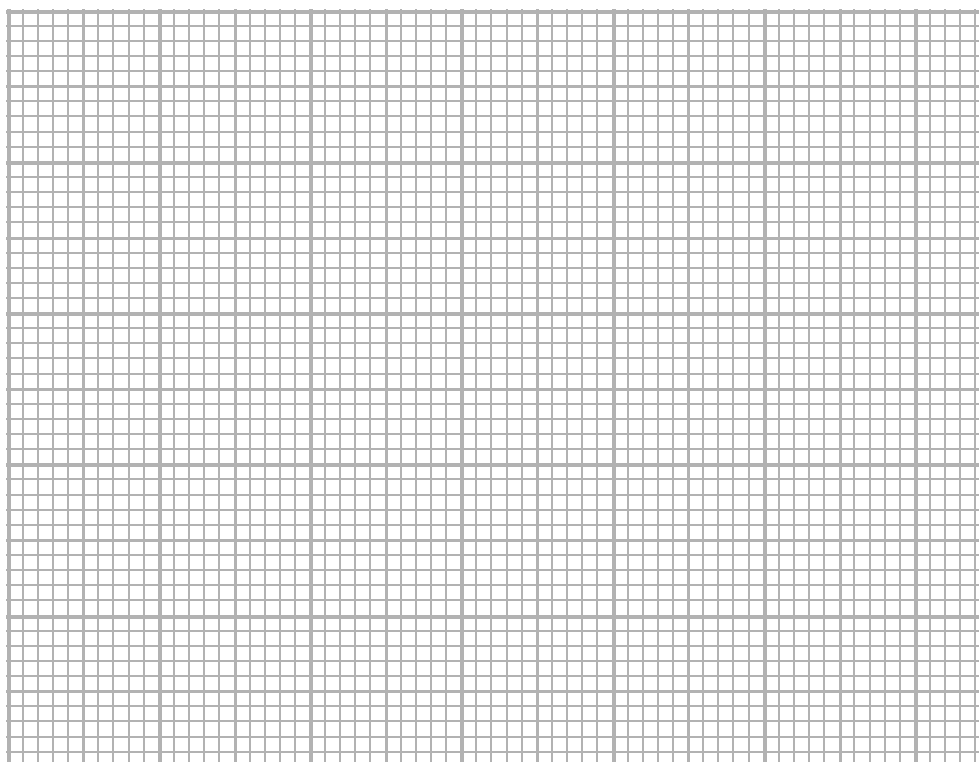
(i) Complete the table by calculating the final temperatures.

The first one has been done for you.

(2)

(ii) Draw a bar chart to show the relationship between number of layers of insulation and temperature difference.

(4)



(iii) Describe the relationship between the number of layers of insulation and the temperature difference.

(2)

(iv) Suggest how the student could improve the reliability of her results.

(1)

**(Total for Question 4 = 11 marks)**



P 4 8 3 9 4 A 0 9 1 6