2 A student investigates the cooling of hot water in a beaker.

The apparatus is shown in Fig. 2.1.

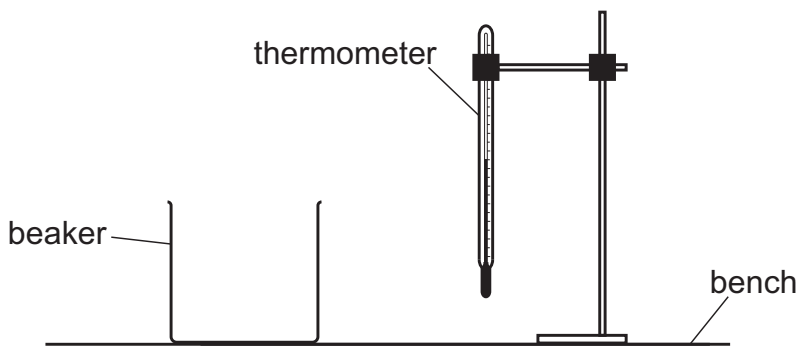

Fig. 2.1

(a) The student uses a thermometer to measure room temperature θ_R. Room temperature is 22 °C.

On Fig. 2.2, show clearly the reading θ_R.

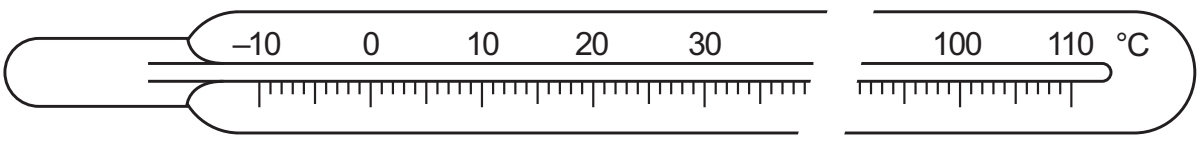

Fig. 2.2

[1]

(b) The student pours 100 cm^3 of hot water into an empty beaker. She records the temperature θ of the hot water in the V = 100 cm^3 row of Table 2.1, as shown.

Without delay, she pours 20 cm^3 of cold water into the beaker. She stirs the water and measures the temperature of the mixture of hot and cold water. She repeats the procedure until she has added a total of 100 cm^3 of cold water to the beaker.

All the readings are shown in Table 2.1. V is the total volume of water in the beaker.

Complete the column headings in Table 2.1. [1]

Table 2.1

V/	θ/
100	87
120	73
140	65
160	59
180	54
200	49

(c) Plot a graph of temperature θ (y-axis) against total volume of water V (x-axis). You do **not** need to start the axes at the origin (0, 0).

Draw the best-fit curve.

[4]

(d) In the experiment, the student aims to investigate the effect on the temperature of the hot water as cold water is added.

(i) Complete the sentence to explain why it is important to add the cold water without delay at each stage.

The cold water is added without delay .....

.....

..... [1]

(ii) Complete the sentence to explain the reason for stirring the water at each stage.

The student stirs the water before recording the temperature .....

.....

..... [1]

(e) Suggest **two** ways to minimise the loss of thermal energy from the beaker during the experiment.

1 .....

.....

2 .....

.....

[2]

(f) Name the apparatus that the student uses to measure the volume of water.

..... [1]

[Total: 11]