Leave blank

4. A teacher heats some water in a cubic metal container.
Each vertical side of the container is painted a different colour: black, blue, white and silver.
A student decides to investigate whether the heat radiated from each side depends on its colour.
She places a thermometer 5 cm from the white surface as shown in Figure 1.

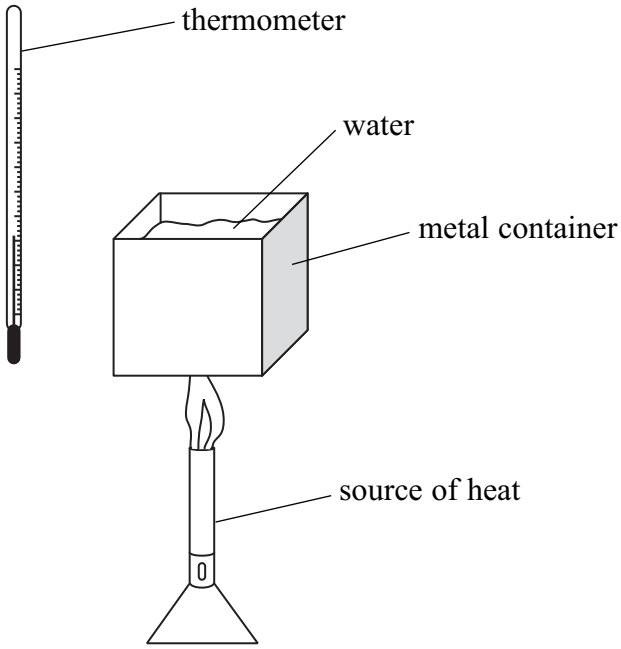


Figure 1

(a) Figure 2 shows a section of the thermometer

Record the reading.

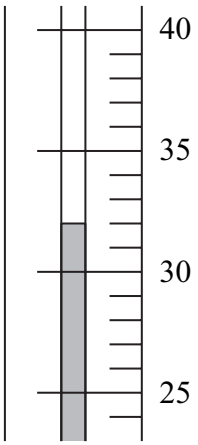
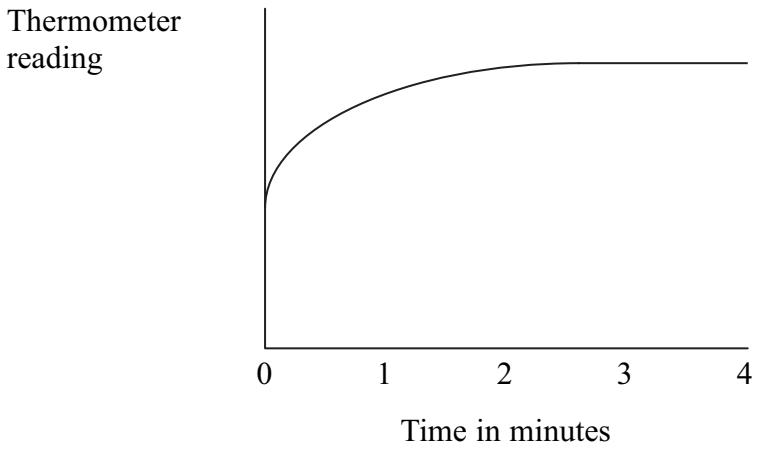


Figure 2

..... °C
(1)

Leave blank

(b) The student finds out how long it takes the thermometer to reach its maximum reading. To do so she takes a reading every 30 s for 4 minutes. The graph shows her readings.



(i) How long in minutes does it take to reach the maximum reading?

Time = ... minutes
(1)

(ii) Why should she not use a thermometer reading before this time?

.....

.....

.....
(1)

(c) Describe how you would use the apparatus to find out which of the colours radiates most heat.
In your account you should:

- state two items of equipment required in addition to those shown in Figure 1
- state two factors that should stay constant throughout
- describe your method.

(i) Equipment

1 .....

2 .....
(2)

Leave blank

(ii) Constant factors

1 .....

2 .....

(2)

(iii) Method

.....

.....

.....

.....

.....

.....

(3)

(d) (i) The student's results show no difference in the amount of heat radiated from the four sides of the container.
With reference to Figure 1, suggest why this might be the case.

.....

.....

(1)

(ii) Suggest an improvement to this experiment to get more meaningful results.

.....

.....

(1)

Q4

(Total 12 marks)