

CHANGES OF HEAT: SPECIFIC LATENT HEAT

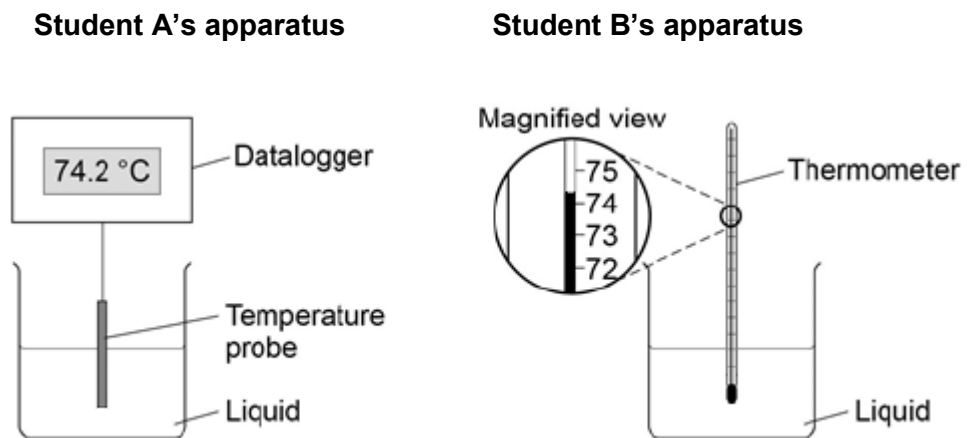
Q1.

Two students investigated the change of state of stearic acid from liquid to solid.

They measured how the temperature of stearic acid changed over 5 minutes as it changed from liquid to solid.

Figure 1 shows the different apparatus the two students used.

Figure 1



- (a) Choose **two** advantages of using student **A**'s apparatus.

Tick **two** boxes.

Student **A**'s apparatus made sure the test was fair.

Student **B**'s apparatus only measured categoric variables.

Student **A**'s measurements had a higher resolution.

Student **B** was more likely to misread the temperature.

(2)

- (b) Student **B** removed the thermometer from the liquid each time he took a temperature reading.

What type of error would this cause?

Tick **one** box.

A systematic error

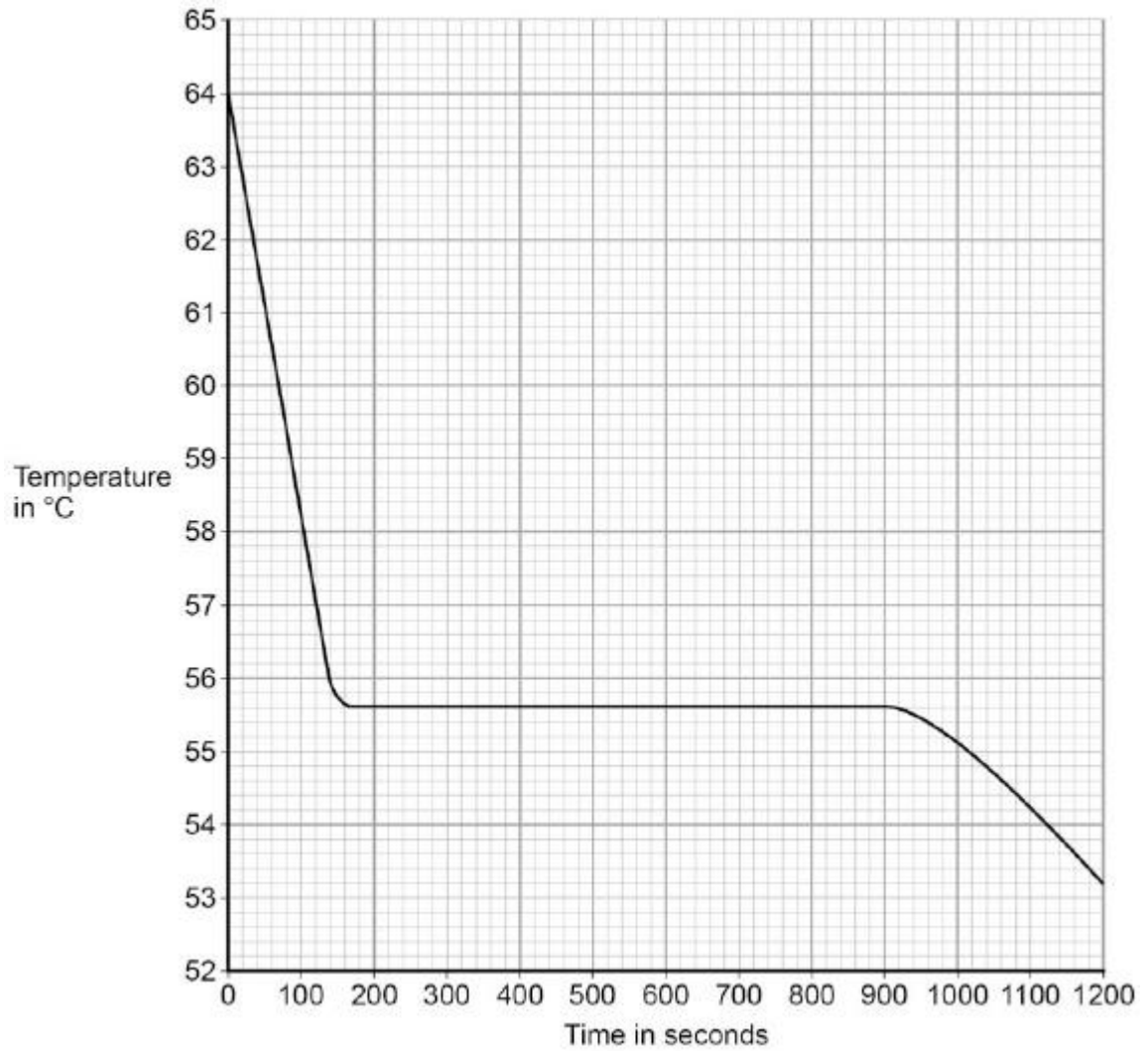
A random error

A zero error

(1)

(c) Student **A**'s results are shown in **Figure 2**.

Figure 2



What was the decrease in temperature between 0 and 160 seconds?

Tick **one** box.

8.2 °C

8.4 °C

53.2 °C

55.6 °C

(1)

(d) Use **Figure 2** to determine the time taken for the stearic acid to change from a liquid to a solid.

Time = _____ seconds

(1)

- (e) Calculate the energy transferred to the surroundings as 0.40 kg of stearic acid changed state from liquid to solid.

The specific latent heat of fusion of stearic acid is 199 000 J / kg.

Use the correct equation from the Physics Equations Sheet.

Energy = _____ J

(2)

- (f) After 1200 seconds the temperature of the stearic acid continued to decrease.

Explain why.

(2)

(Total 9 marks)

Q2.

Solid, liquid and gas are three different states of matter.

- (a) Describe the difference between the solid and gas states, in terms of the arrangement and movement of their particles.

(4)

(b) What is meant by 'specific latent heat of vaporisation'?

(2)

(c) While a kettle boils, 0.018 kg of water changes to steam.

Calculate the amount of energy required for this change.

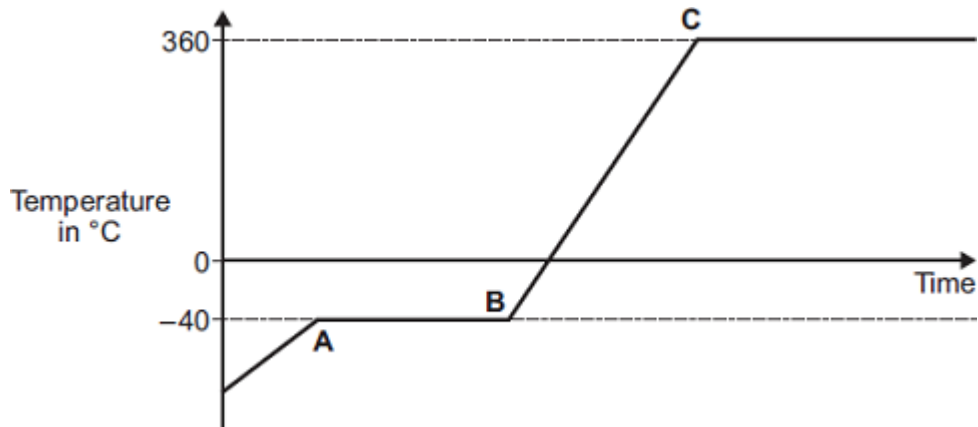
Specific latent heat of vaporisation of water = 2.3×10^6 J / kg.

Energy required = _____ J

(2)

(d) The graph shows how temperature varies with time for a substance as it is heated.

The graph is **not** drawn to scale.



Explain what is happening to the substance in sections **AB** and **BC** of the graph.

Section **AB** _____

Section **BC** _____

(4)
(Total 12 marks)

