Q1.

A student uses the apparatus in Figure 3 to determine the specific heat capacity of water.

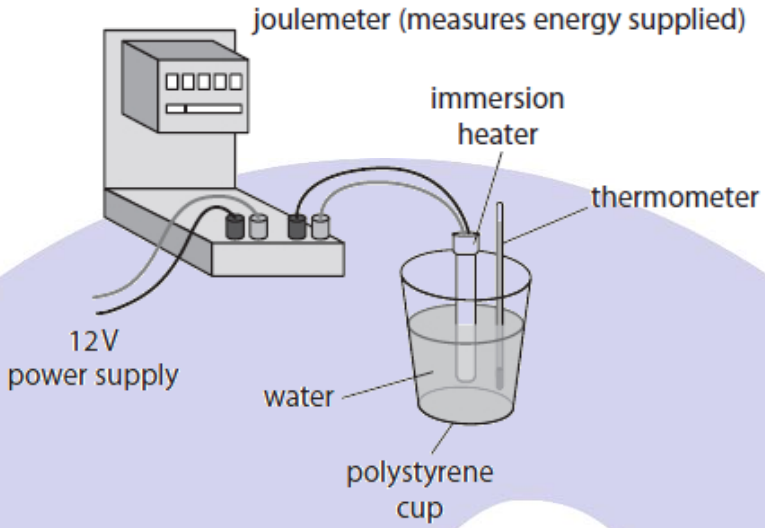

Figure 3

The student decides to measure the temperature of the water every minute while it is being heated.

Figure 4 shows a graph of the student's results.

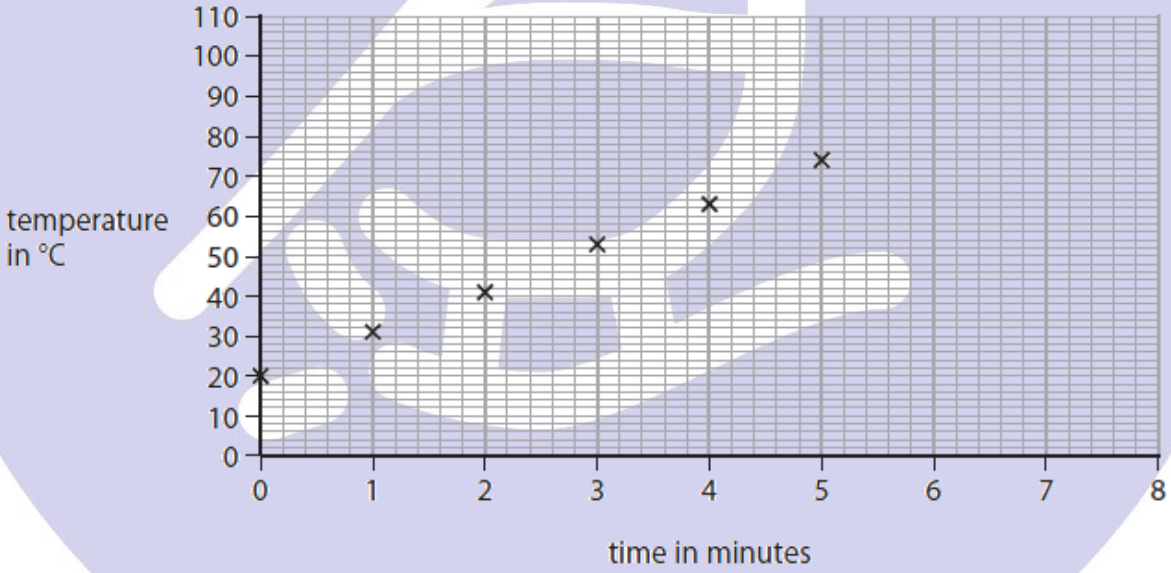

Figure 4

Predict the temperature of the water if the heating continues up to 8 minutes.

(1)

temperature of the water = ... °C

(Total for question = 1 mark)

Q2.

As part of the testing of different types of steel, a steelworker needs to obtain a temperature-time graph for **solidifying** molten steel.

Figure 9 shows an arrangement the steelworker could use.

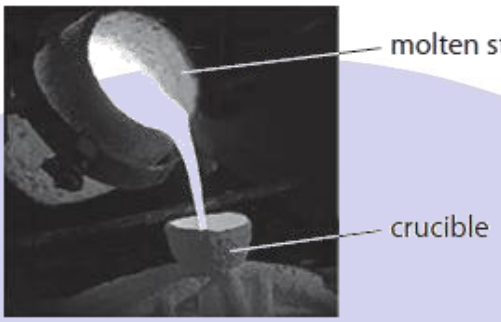

Figure 9

The following devices are available to the steel worker.
The melting point of these steels is between 1425 and 1540 °C

device	range of temperatures	other notes
Thermocouple thermometer	−50 to 1800 °C	Fast response time Probe inserted into melt
Infrared thermometer (pyrometer)	1200 to 2000 °C	Remotely read, using infrared radiation, measures the temperature of the surface it is aimed at
Platinum resistance thermometer	−200 to 850 °C	The most accurate of thermometers based on how resistance changes with temperature

Describe how the steelworker could obtain a temperature-time graph for steel as it goes from the liquid to the solid state.

(4)

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(Total for question = 4 marks)

Q3.

A student is investigating the melting of ice.

The student has some crushed ice in a beaker at a temperature of −20 °C.

The student heats the beaker and its contents for 20 minutes.

Figure 14 is a graph of the student's results.

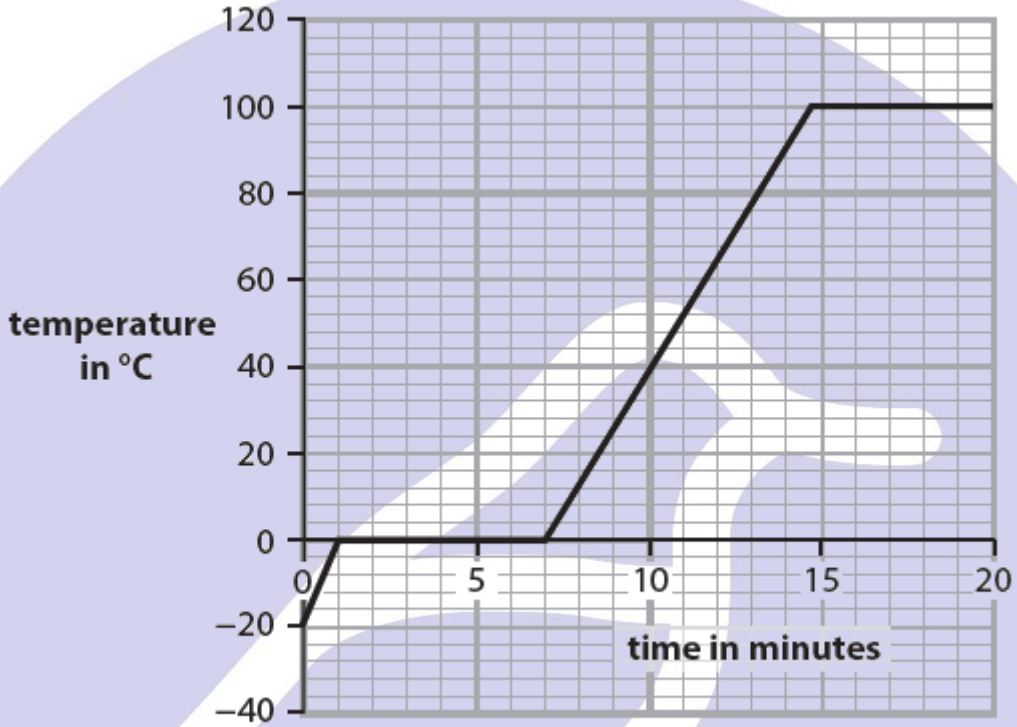

Figure 14

Using information from the graph, describe the changes that take place in the 20 minutes shown on the graph.

Your answer should refer to

- data from the graph
- the state (solid, liquid or gas) of the contents of the beaker.

(6)

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(Total for question = 6 marks)