Name of the Student:_____
Max. Marks : 17 Marks **Time : 17 Minutes**

Q1.

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

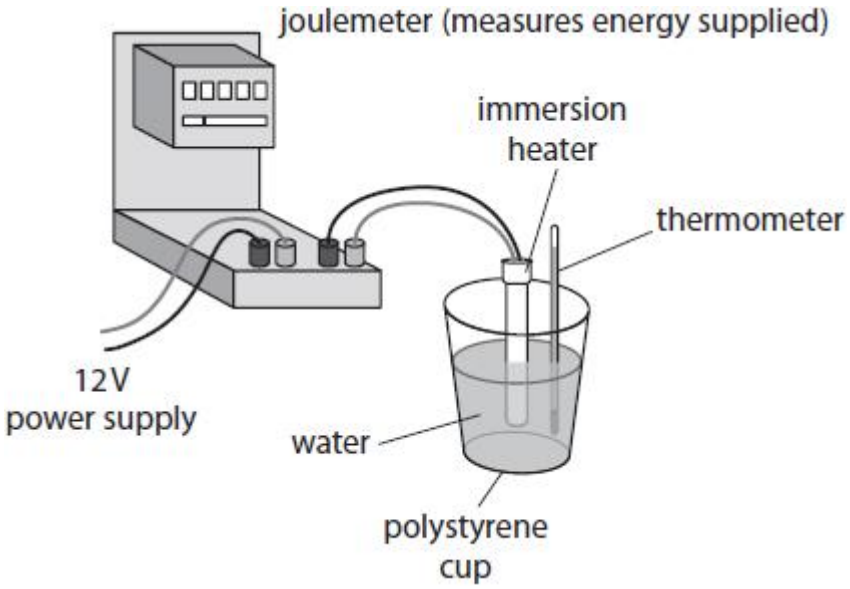

Figure 3

(i) State the measurements needed to calculate the specific heat capacity of water.

(4)

.....
.....
.....
.....
.....
.....
.....
.....

(ii) State **two** ways that the apparatus could be adapted to improve the procedure.

(2)

1 .....
.....
2 .....
.....

(Total for question = 6 marks)

Q2.

A student wants to determine the specific heat capacity of copper.

Figure 2 shows a piece of copper, with a thread tied around it, in a glass beaker of boiling water.

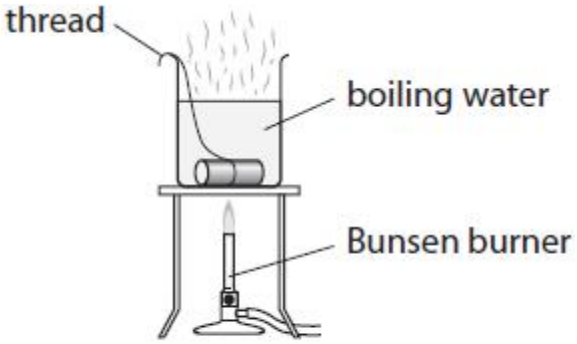

Figure 2

The student leaves the piece of copper in the boiling water so that the copper reaches a temperature of 100 °C.

The student uses the thread to take the piece of copper out of the boiling water.

The student puts the hot piece of copper into a different beaker of cold water at 20 °C.

The apparatus is shown in Figure 3.

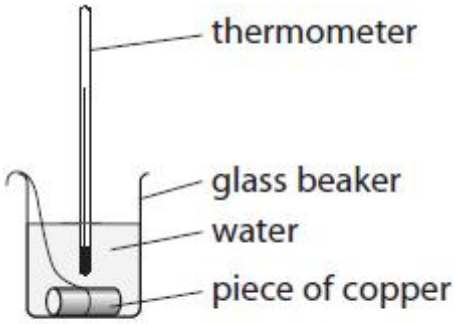

Figure 3

The student assumes that the thermal energy gained by the water equals the thermal energy lost by the piece of copper.

The water and copper both reach a temperature of 22 °C.

The cold water gains 1050 J of energy.

The mass of the piece of copper is 0.058 kg.

(i) Calculate a value for the specific heat capacity of copper, using these results.

Use the equation

change in thermal energy = mass × specific heat capacity × change in temperature

$$\Delta Q = m \times c \times \Delta\theta$$

(2)

specific heat capacity of copper from these results = ... J/kg°C

(ii) The value for the specific heat capacity of copper obtained from the student's results is lower than the correct value.

State **two** ways that the experiment could be improved to give a value that is closer to the correct value.

(2)

1 .....

.....

2 .....

.....

(Total for question = 4 marks)

Q3.

Aluminium has a melting point of 660 °C.

The absolute zero of temperature is −273 °C.

(i) Calculate the melting point of aluminium in kelvin.

(1)

melting point of aluminium = ... K

(ii) Describe the motion of particles in liquid aluminium (above 660 °C).

(2)

.....

.....

.....

(Total for question = 3 marks)

Q4.

Figure 13 shows a storage heater.

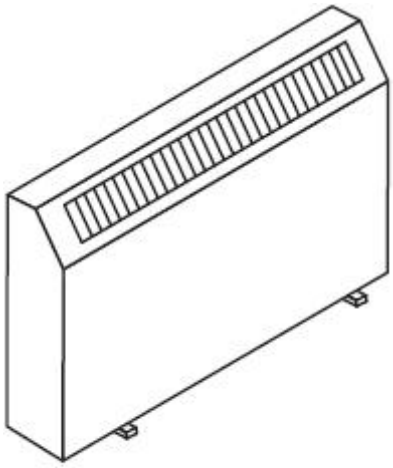

Figure 13

The storage heater contains bricks.

The bricks are heated electrically.

The electrical heater supplies 210 kJ of energy to each brick in the storage heater.

One brick has a mass of 5.8 kg.

The specific heat capacity for the brick is 860 J/kg K.

(i) Use this data to calculate the increase in temperature of the brick.

(2)

temperature increase = ... °C

(ii) The actual temperature increase will be smaller than you calculated in (i).

Explain why the actual temperature increase will be smaller than the value in (i).

(2)

.....

.....

.....

.....

(Total for question = 4 marks)