

Thermal Properties & Temperature

Question Paper

Course	CIE IGCSE Physics
Section	2. Thermal Physics
Topic	Thermal Properties & Temperature
Difficulty	Easy

Time Allowed	50
Score	/37
Percentage	/100

Question 1a

Equal volumes of steel, oil and hydrogen are heated from 20 °C to 60 °C.

Their volumes increase by thermal expansion.

State which of these substances has the greatest increase in volume.

[1 mark]

Question 1b

Fig. 7.1 shows a liquid-in-glass thermometer.

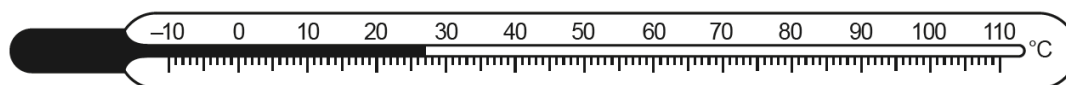


Fig. 7.1

- (i) State the temperature **reading** on the thermometer.
- (ii) State the temperature **range** of the thermometer.
- (iii) State the values of the fixed points of the Celsius scale of temperature.

[1]

[1]

[1]

[3 marks]

Question 1c

The liquid-in-glass thermometer uses the thermal expansion of mercury.

State and explain one other application or consequence of thermal expansion.

[3 marks]

Question 2a

Describe, in terms of molecules, what happens when a liquid evaporates.

[4 marks]

Question 2b**Extended**

Fig. 4.1 shows wet clothes drying on a washing line in an outside area.

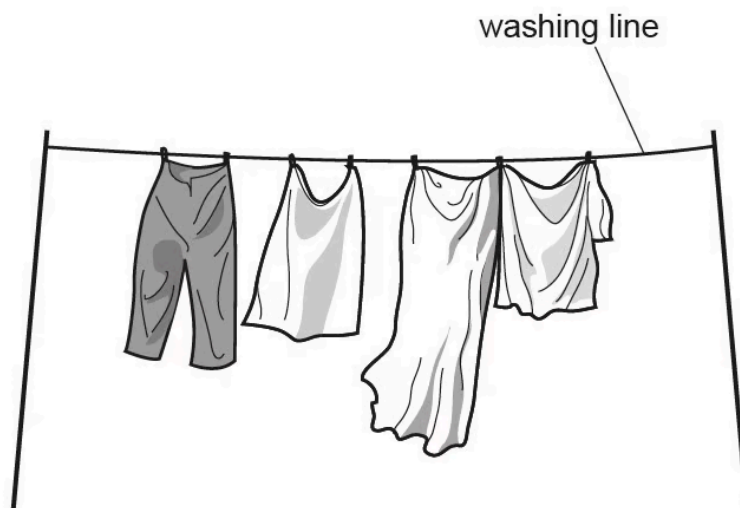


Fig. 4.1

State two changes in the weather that help the wet clothes to dry more quickly.

[2 marks]

Question 3a**Extended Tier Only**

Liquids and gases are two states of matter.

In both boiling and evaporation, a liquid changes into a gas.

- (i) State two ways in which boiling differs from evaporation. [2]
- (ii) Before injecting a patient, a doctor wipes a small amount of a volatile liquid on to the patient's skin.

Explain, in terms of molecules, how this procedure cools the patient's skin.

[4]

[6 marks]**Question 3b****Extended**

Gases can be compressed but liquids are incompressible.

Explain, in terms of molecules, why liquids are incompressible.

[2 marks]

Question 4a

Explain, in terms of molecules, how thermal expansion takes place in a liquid.

[2 marks]**Question 4b**

Table 1.1 shows the relative expansion of solids and gases for equal volumes at equal pressures for equal temperature rises, when compared to a liquid.

state of matter	expansion compared to liquids
solid	
gases	

Table 1.1

Complete the table choosing words from the following list:

much less
slightly less
slightly more
much more

[2 marks]**Question 4c**

State **one** use of thermal expansion.

[1 mark]

Question 4d

Metal railway tracks, road surfaces and bridges can all suffer thermal expansion in high temperatures.

State one way that engineers minimise this issue in their design of such structures.

[1 mark]

Question 5a**Extended**

State what is meant by *specific heat capacity*.

[2 marks]

Question 5b**Extended**

A student uses the equipment shown in Fig. 1.1 to determine the specific heat capacity of aluminium.

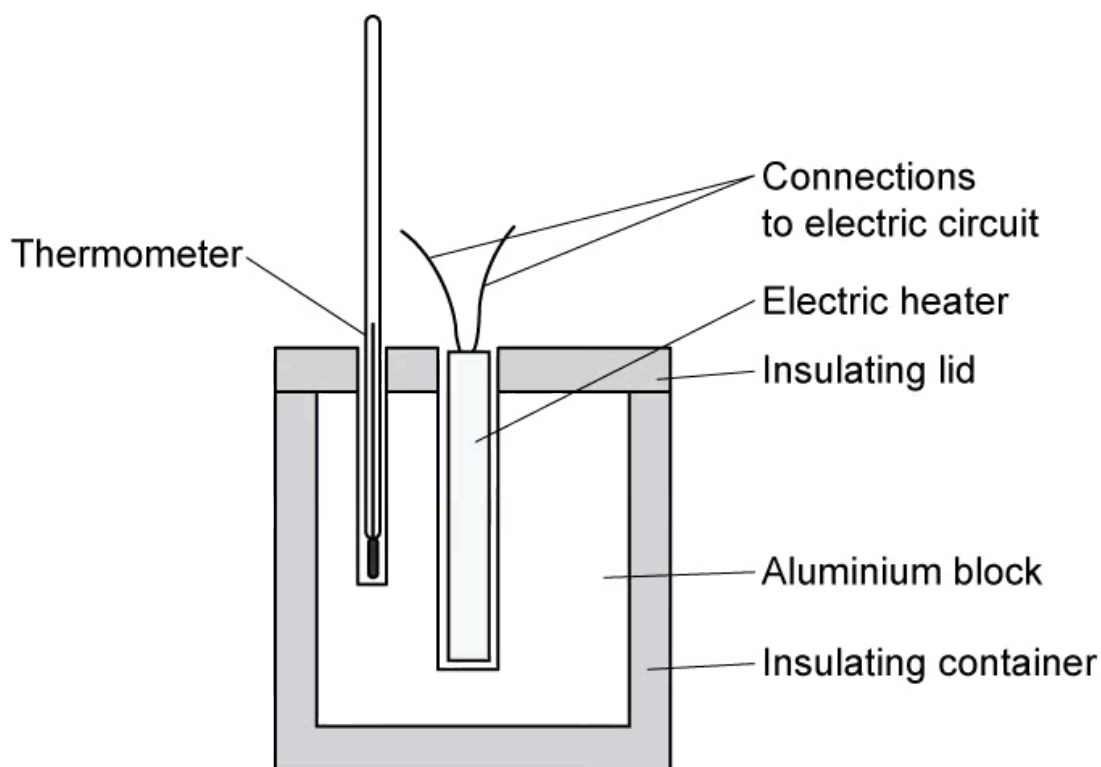


Fig. 1.1

The student took the following readings:

mass of aluminium block = 0.796 kg

energy supplied = 18 792 J

State the other readings that the student needs to take.

[1 mark]

Question 5c

Extended

Fig. 1.2 shows the reading before the heater was switched on. Fig. 1.3 shows the reading at the end of the investigation.

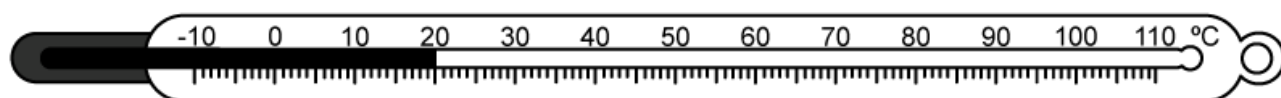


Fig. 1.2

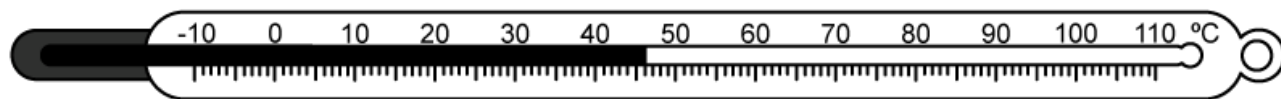


Fig. 1.3

Calculate the change in temperature.

change in temperature =

[3 marks]

Question 5d**Extended**

Use the information from parts (b) and (c) to calculate the specific heat capacity of aluminium.

Give the correct units in your answer.

specific heat capacity =
[4 marks]