

Thermal Properties & Temperature

Question Paper 1

Level	IGCSE
Subject	Physics (0625/0972)
Exam Board	Cambridge International Examinations (CIE)
Topic	General Physics
Sub-Topic	Thermal Properties & Temperature
Booklet	Question Paper 1

Time allowed: 24 minutes

Score: /19

Percentage: /100

Grade Boundaries:

9	8	7	6	5	4	3	2	1
>85%	75%	68%	60%	55%	50%	43%	35%	<30%

Question 1

A beaker contains 0.500 kg of water at a temperature of 3.0 °C. The beaker is heated, and the internal energy of the water increases by 21.0 kJ.

The specific heat capacity of water is 4200 J/(kg °C).

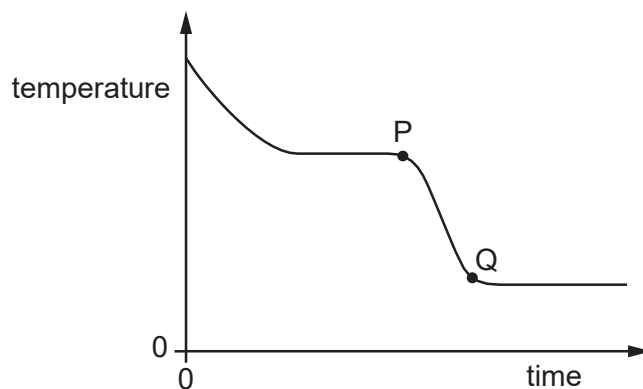
What is the temperature of the water after it has been heated?

- A 5.5 °C B 10.0 °C C 13.0 °C D 31.5 °C

Question 2

A substance loses thermal energy (heat) to the surroundings at a steady rate.

The graph shows how the temperature of the substance changes with time.

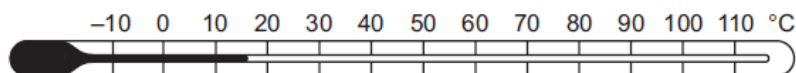


What could the portion PQ of the graph represent?

- A. gas condensing
- B. gas cooling
- C. liquid cooling
- D. liquid solidifying

Question 3

A student wishes to check the upper and the lower fixed points on a Celsius scale thermometer.



She has four beakers P, Q, R and S.

Beaker P contains a mixture of ice and salt.

Beaker Q contains a mixture of ice and water.

Beaker R contains boiling salt solution.

Beaker S contains boiling water.

Which two beakers should she use to check the fixed points?

- A P and R B P and S C Q and R D Q and S

Question 4

Which statement describes what happens as ice at 0 °C starts to melt to become water?

- A. Energy is absorbed and the temperature remains constant.
- B. Energy is absorbed and the temperature rises.
- C. Energy is released and the temperature remains constant.
- D. Energy is released and the temperature rises.

Question 5

5.0 g of water at 25 °C is dropped onto a large block of ice at 0 °C. The water cools to 0 °C and some of the ice melts.

Assume that all the energy lost by the water is gained by the ice.

What is the mass of ice that melts?

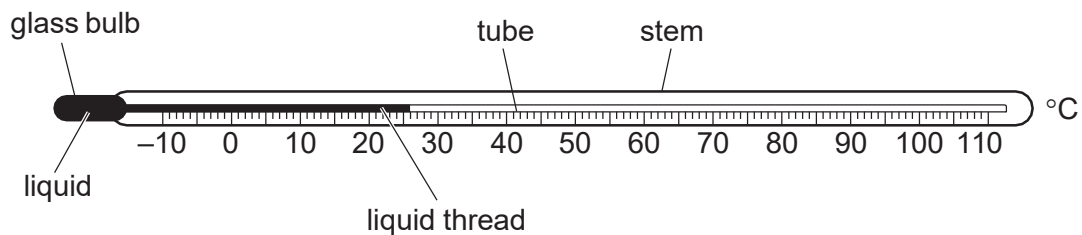
The specific heat capacity of water is 4.2 J/(g °C).

The specific latent heat of fusion of ice is 340 J/g.

- A 0.062g B 0.087g C 1.5g D 10g

Question 6

The diagram shows a liquid-in-glass thermometer.



How can the thermometer be made more sensitive?

- A. increase the internal diameter of the tube containing the liquid thread
- B. increase the internal volume of the glass bulb and the volume of the liquid
- C. increase the length of the tube and stem
- D. increase the thickness of the glass in the glass bulb

Question 7

In an experiment to measure specific heat capacity, a block of aluminium is heated and its rise in temperature is measured.

The amount of energy gained by the block is E . The mass of the block is m . The rise in temperature of the block is ΔT .

Which expression gives the specific heat capacity of aluminium?

A $\frac{m}{E\Delta T}$

B $\frac{m\Delta T}{E}$

C $\frac{E}{m\Delta T}$

D $\frac{E\Delta T}{m}$

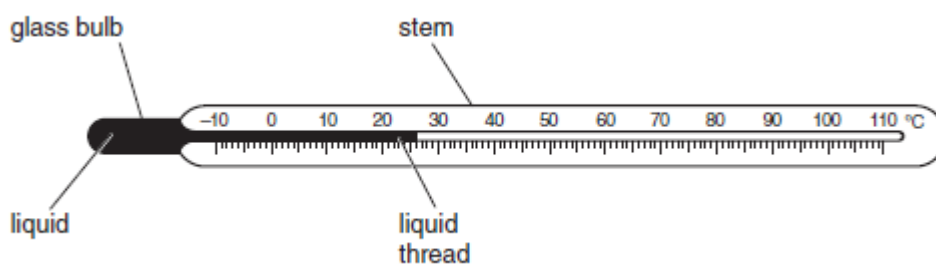
Question 8

Which line in the table shows the relative expansion of the three states of matter from the most expansion to the least expansion?

	most expansion			least expansion		
A	solids	>	liquids	>	gases	
B	solids	>	gases	>	liquids	
C	gases	>	liquids	>	solids	
D	gases	>	solids	>	liquids	

Question 9

The diagram shows a liquid-in-glass thermometer.



Which two features both affect the sensitivity of the thermometer?

- A. mass of liquid and diameter of liquid thread
- B. mass of liquid and length of stem
- C. thickness of glass bulb and diameter of liquid thread
- D. thickness of glass bulb and length of stem

Question 10

A student wishes to calculate the specific heat capacity of copper.

He has a block of copper and an electrical heater. He knows the power of the heater.

Which other apparatus does he need?

	balance	stop watch	thermometer
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

key

✓ = needed

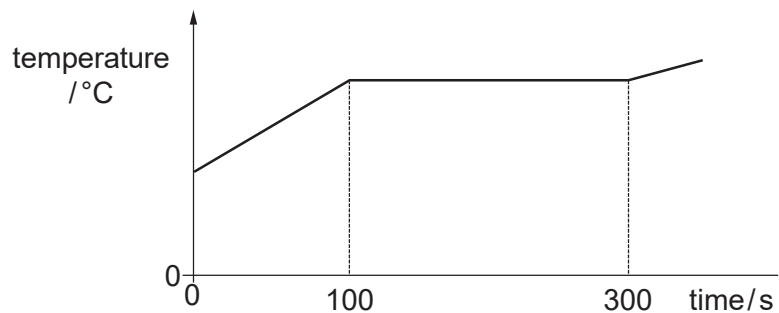
✗ = not needed

Question 11

A mass of 0.20 kg of a substance is initially solid.

It is heated at a steady rate of 500 W.

The graph shows how the temperature of the substance changes with time.

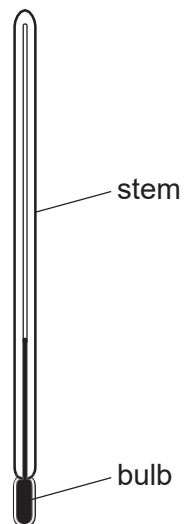


What is the specific latent heat of fusion of the substance?

- A 20000 J/kg
- B 30000 J/kg
- C 500000 J/kg
- D 750000 J/kg

Question 12

The thermometer in the diagram has no scale.



Where must the bulb be placed so that $0\text{ }^{\circ}\text{C}$ can be marked on the stem?

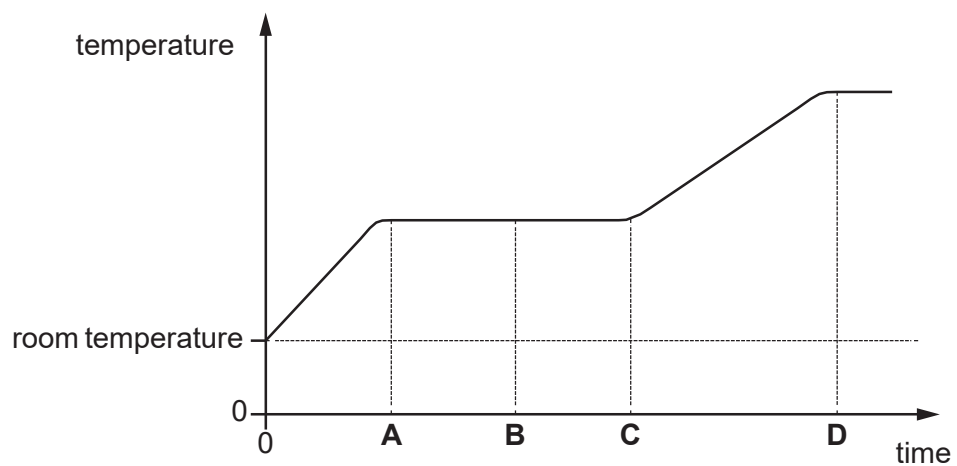
- A. in a freezer
- B. in pure boiling water
- C. in pure cold water
- D. in pure melting ice

Question 13

A solid is heated from room temperature.

The graph shows how its temperature changes with time as it is heated constantly.

At which time has it just become **completely** liquid?



Question 14

Two metal blocks X and Y are at room temperature. Each block is heated so that its temperature rises by 10°C .

The blocks are now allowed to cool back to room temperature.

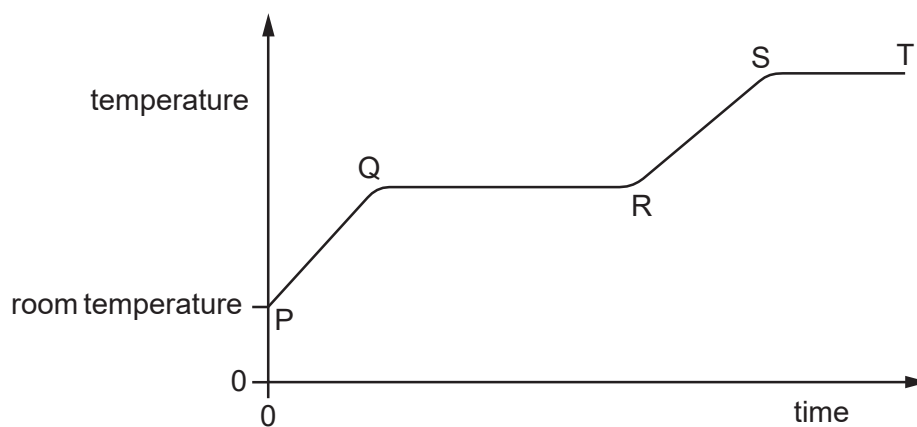
Block Y has a greater thermal capacity than block X.

Which block needs more thermal (heat) energy to heat it up by 10°C and which block loses more thermal (heat) energy as it cools back to room temperature?

	more energy	
	heating	cooling
A	X	X
B	X	Y
C	Y	X
D	Y	Y

Question 15

A solid is heated from room temperature. The graph shows how its temperature changes with time as it is heated constantly.



Between which labelled points on the graph is the substance partly solid and partly liquid?

- A between P and Q
- B between Q and R
- C between R and S
- D between S and T

Question 16

A circular metal disc is heated.

Which quantity decreases?

- A its density
- B its diameter
- C its thickness
- D its volume

Question 17

The same quantity of thermal (heat) energy is given to two objects X and Y. The temperature rise of object X is less than the temperature rise of object Y.

What accounts for this difference?

- A X has a larger thermal capacity than Y.
- B X is a better thermal conductor than Y.
- C Y has a larger thermal capacity than X.
- D Y is a better thermal conductor than X.

Question 18

A block of copper and a block of lead are heated. The internal energy of each block increases by the same amount.

The block of copper has a lower thermal capacity than the block of lead.

Which conclusion can be made from this information?

- A. The temperature increase of the copper is greater than the temperature increase of the lead.
- B. The temperature increase of the copper is the same as the temperature increase of the lead.
- C. The temperature increase of the copper is less than the temperature increase of the lead.
- D. The melting point of copper is lower than the melting point of lead.

Question 19

The diagram shows a mercury-in-glass thermometer. The scale of the thermometer has not been marked.



The length l increases uniformly with temperature.

The length l is measured when the thermometer bulb is placed in water at $0\text{ }^{\circ}\text{C}$, and also when it is in water at $100\text{ }^{\circ}\text{C}$. The table shows the results.

temperature/ $^{\circ}\text{C}$	length l /cm
0	2.0
100	26.0

What is the value of l when the bulb is placed in water at $50\text{ }^{\circ}\text{C}$?

- A 12.0 cm B 13.0 cm C 14.0 cm D 16.0 cm