The Properties and Temperature – 2022 June IGCSE 0625

1. June/2022/Paper_11/No.14

Two thermometers, P and Q, give the same reading at room temperature.

The bulb of thermometer Q is wrapped in gauze and dipped in a beaker of water at room temperature.

Air at room temperature is blown over the two thermometer bulbs.

Which statement correctly describes and explains what happens?

A P reads higher than Q because bulb P absorbs energy from the air.

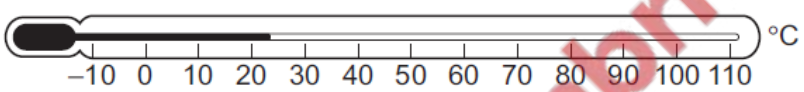
B P reads higher than Q because water evaporates from the gauze and cools bulb Q.

C P reads lower than Q because the wet gauze insulates bulb Q.

D P reads lower than Q because water evaporates from the gauze and warms bulb Q.

2. June/2022/Paper_11/No.16

The diagram shows a liquid-in-glass thermometer.



A student wishes to check the marking of the upper fixed point on this thermometer.

What should she do?

A Put the bulb in a beaker of boiling sea water.

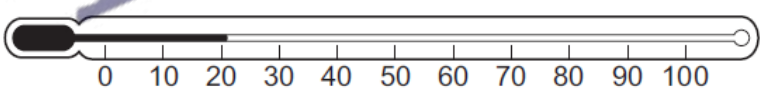
B Put the bulb in a beaker of boiling pure water.

C Put the bulb in a beaker of ice and salt.

D Put the bulb in a beaker of pure melting ice.

3. June/2022/Paper_12/No.15

The diagram shows a liquid-in-glass thermometer.



Which physical property of the thermometer is used to measure temperature?

A expansion of glass

B expansion of liquid

C mass of glass

D mass of liquid

4. June/2022/Paper_12/No.16

An engineer investigates the increase in temperature of the oil in a car engine when it is first switched on.

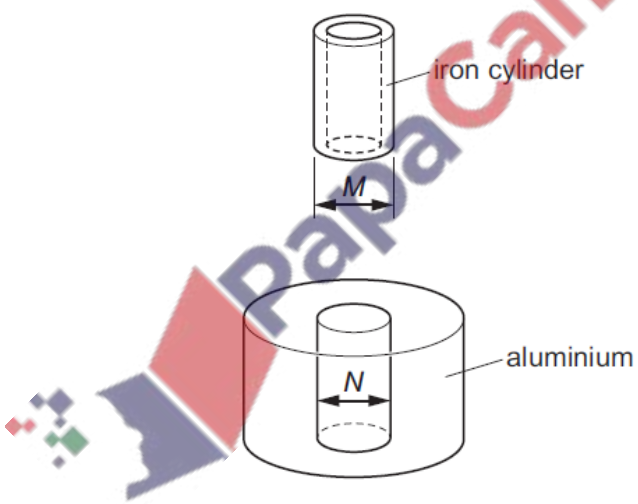
Which row is correct?

	change in internal energy	explanation
A	increase	The random kinetic energy of the particles increases.
B	increase	The oil evaporates when it is heated.
C	decrease	The potential energy of the particles increases.
D	decrease	The oil changes state to a gas when it is heated.

5. June/2022/Paper_13/No.15

The iron cylinder of an engine is to be fitted into a piece of aluminium.

The outside diameter *M* of the iron cylinder is slightly larger than the diameter *N* of the hole in the aluminium.



What is the best action to fit the cylinder into the aluminium?

A Cool the aluminium and cool the iron.

B Cool the aluminium and heat the iron.

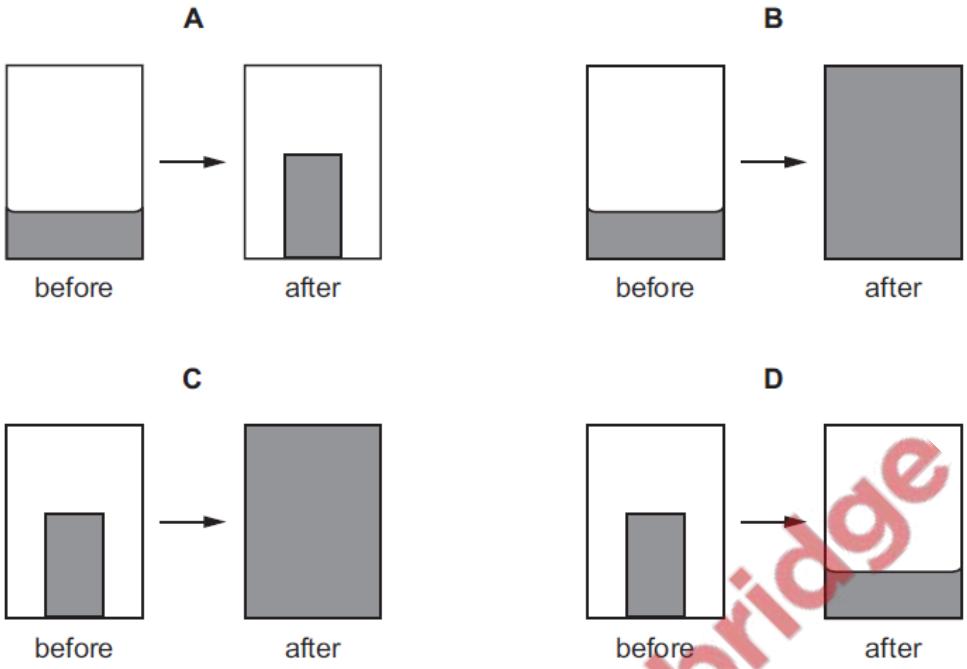
C Heat the aluminium and cool the iron.

D Heat the aluminium and heat the iron.

6. June/2022/Paper_13/No.16

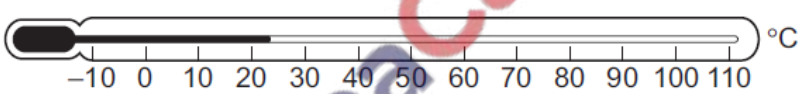
A solid in a closed container is heated until it completely melts.

Which diagram shows the shape and the volume of the solid before and after heating.



7. June/2022/Paper_21/No.16

The diagram shows a liquid-in-glass thermometer.



A student wishes to check the marking of the upper fixed point on this thermometer.

What should she do?

A Put the bulb in a beaker of boiling sea water.

B Put the bulb in a beaker of boiling pure water.

C Put the bulb in a beaker of ice and salt.

D Put the bulb in a beaker of pure melting ice.

8. June/2022/Paper_21/No.17

Water in a beaker gains thermal energy at a rate of 3000 W. The water is at its boiling point.

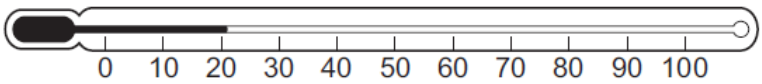
The specific latent heat of vaporisation of water is 2260 J/g.

How long does it take for 250 g of the water to vaporise?

A 12 s **B** 188 s **C** 332 s **D** 750 s

9. June/2022/Paper_22/No.16

The diagram shows a liquid-in-glass thermometer.



Which physical property of the thermometer is used to measure temperature?

A expansion of glass

B expansion of liquid

C mass of glass

D mass of liquid

10. June/2022/Paper_22/No.17

A block of lead of mass 500 g is at its melting point.

The specific latent heat of fusion of lead = 23 kJ / kg.

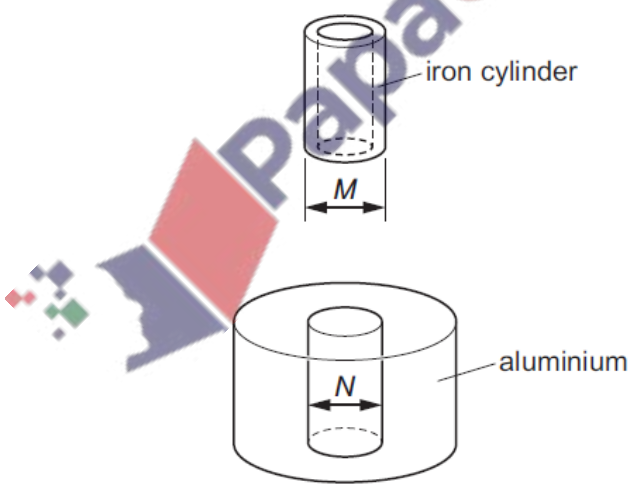
How much energy is required to completely melt the block?

A 46 J **B** 12 000 J **C** 46 000 J **D** 12 000 000 J

11. June/2022/Paper_23/No.16

The iron cylinder of an engine is to be fitted into a piece of aluminium.

The outside diameter *M* of the iron cylinder is slightly larger than the diameter *N* of the hole in the aluminium.



What is the best action to fit the cylinder into the aluminium?

A Cool the aluminium and cool the iron.

B Cool the aluminium and heat the iron.

C Heat the aluminium and cool the iron.

D Heat the aluminium and heat the iron.

12. June/2022/Paper_23/No.17

Four metal blocks at a temperature of 200 °C are left to cool down to the same temperature.

The table gives the mass of each block and the energy it transfers to the surroundings as it cools.

block	mass / g	energy transferred / J
1	100	16 200
2	150	16 200
3	200	32 400
4	200	8 100

Which two blocks are made of the same metal?

A 1 and 2 **B** 1 and 3 **C** 1 and 4 **D** 3 and 4

13. June/2022/Paper_41/No.5(a, b)

Fig. 5.1 shows a kitchen tap that supplies instant boiling water.

Fig. 5.1

Cold water passes over an electric immersion heater inside the tap.

The boiling point of water is 100 °C.

(a) State what is meant by boiling point.

.....

..... [2]

(b) The immersion heater is powered by the mains at a voltage of 230 V. When the tap is opened, the heater switches on and the current in the heater is 13 A.

(i) Calculate the thermal energy produced by the heater in 60 s.

thermal energy = ... [2]

(ii) The specific heat capacity of water is 4200 J/(kg °C). The cold water that enters the tap is at 22 °C.

Calculate the rate at which water at its boiling point emerges from the tap.

rate = ... [4]

14. June/2022/Paper_41/No.4

A thermocouple is a device that is used as a thermometer.

(a) Fig. 4.1 shows a beaker that contains molten sulfur at an initial temperature greater than 400 °C.

(i) On Fig. 4.1, sketch and label a diagram of a thermocouple that is used to determine the temperature of the sulfur as it cools to room temperature.

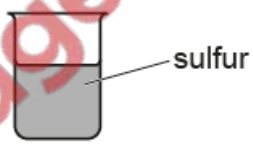


Fig. 4.1

[4]

(ii) Describe briefly how the temperature of the sulfur in the beaker is deduced.

.....

.....

..... [2]

(b) State **one** advantage of using a thermocouple to measure temperature rather than using a liquid-in-glass thermometer.

.....

..... [1]

[Total: 7]

15. June/2022/Paper_42/No.4

(a) State and explain the **two** features of a liquid-in-glass thermometer that are necessary for linearity.

statement 1 .....

explanation .....

statement 2 .....

explanation .....

[4]

(b) The value of the heat capacity of the hot junction of a thermocouple thermometer is important in ensuring that it can measure temperature changes very rapidly.

Explain why.

.....

.....

.....

..... [2]

(c) The hot junction of a thermocouple thermometer has a heat capacity of 0.11 J / °C.

Calculate the thermal energy required to increase the temperature of the hot junction from 20 °C to 345 °C.

energy = ... [3]

[Total: 9]

16. June/2022/Paper_43/No.5

(a) Define specific heat capacity.

.....

..... [2]

(b) A bowl contains 500 cm^3 of water at a temperature of 5.0 °C. The bowl of water is placed in a freezer for several hours. When the bowl is removed from the freezer, it contains ice at a temperature of –18.0 °C. The density of water is 1000 kg/m^3.

(i) Calculate the mass of water in the bowl when it is placed in the freezer.

mass = ... [2]

(ii) The specific heat capacity of water is 4200 J/(kg °C). The specific heat capacity of ice is 2100 J/(kg °C). The specific latent heat of fusion of water is 3.3×10^5 J/kg.

Calculate the energy given out as the water cools from 5.0 °C to ice at –18.0 °C.

energy = ... [5]

[Total: 9]