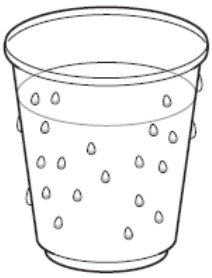
Thermal Processes – 2022 June IGCSE 0625

1. June/2022/Paper_11/No.17

A glass contains an iced drink on a warm and humid day. Water starts to form on the outside of the glass.



What is the name of the effect by which the water forms?

A condensation

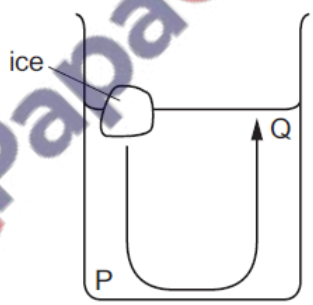
B conduction

C convection

D evaporation

2. June/2022/Paper_11/No.18

The diagram shows a convection current caused by a piece of ice placed in a beaker of water at room temperature.



Which row correctly compares the temperatures and densities at water points P and Q?

	temperature at P	density at P
A	higher than at Q	higher than at Q
B	higher than at Q	lower than at Q
C	lower than at Q	higher than at Q
D	lower than at Q	lower than at Q

3. June/2022/Paper_11/No.19

The outside of one of two identical shiny metal containers is painted dull black. The containers are filled with equal masses of hot water at the same temperature.

Why does the dull black container cool more quickly?

A Black surfaces are better conductors than shiny surfaces.

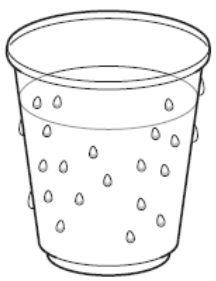
B Black surfaces are better emitters of radiation than shiny surfaces.

C Black surfaces are better reflectors of radiation than shiny surfaces.

D Black surfaces are worse absorbers of radiation than shiny surfaces.

4. June/2022/Paper_12/No.17

A glass contains an iced drink on a warm and humid day. Water starts to form on the outside of the glass.



What is the name of the effect by which the water forms?

A condensation

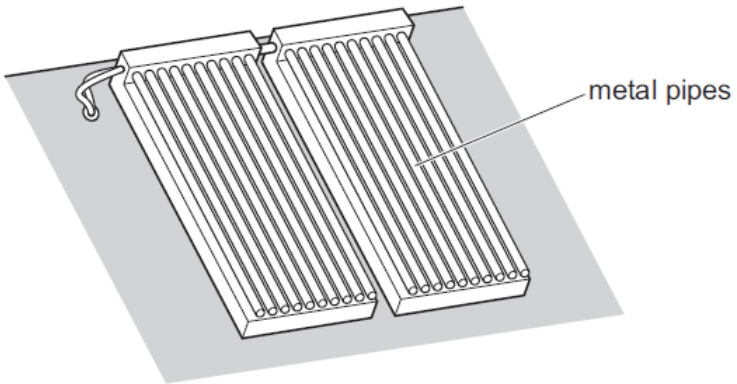
B conduction

C convection

D evaporation

5. June/2022/Paper_12/No.18

The diagram shows solar water panels on the roof of a house. The panels absorb energy from the Sun to heat up the water in the metal pipes.



Which row describes how energy is transferred from the Sun and through the metal of the pipes?

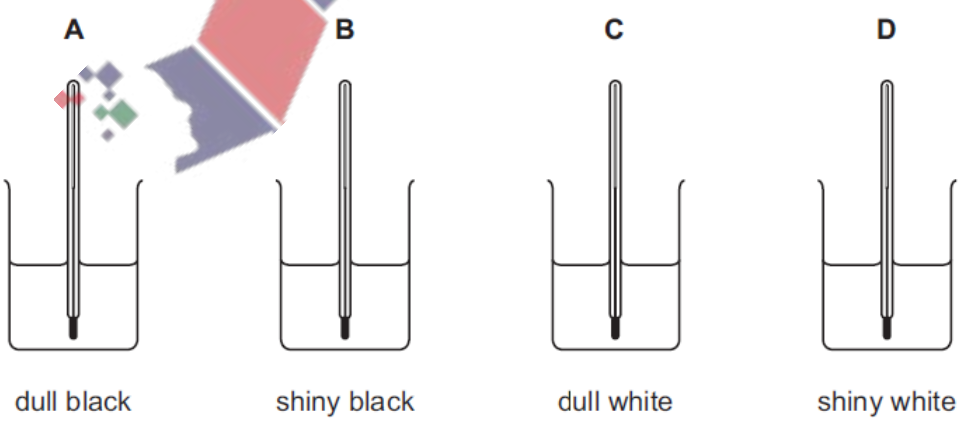
	from the Sun	through the metal of the pipes
A	conduction	conduction
B	conduction	convection
C	radiation	conduction
D	radiation	convection

6. June/2022/Paper_12/No.19

Four beakers containing equal volumes of water at 10 °C are placed outside in full sunshine on a hot day.

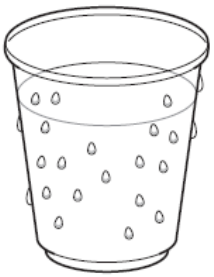
The four beakers are identical except for their surface colour and texture.

Which beaker will heat up the quickest?



7. June/2022/Paper_13/No.17

A glass contains an iced drink on a warm and humid day. Water starts to form on the outside of the glass.



What is the name of the effect by which the water forms?

A condensation

B conduction

C convection

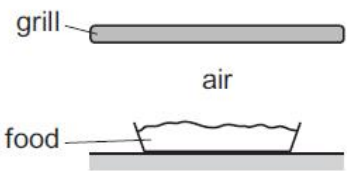
D evaporation

8. June/2022/Paper_13/No.18

In which situation is the main transfer of thermal energy by convection?

A

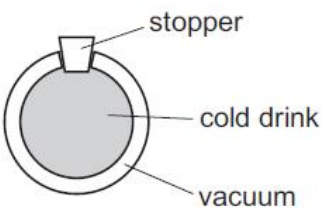
food cooked under a grill



transfer from grill to food

B

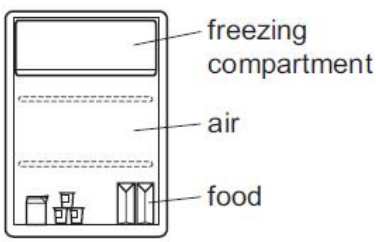
a cold drink stored in a vacuum flask



transfer from air to drink

C

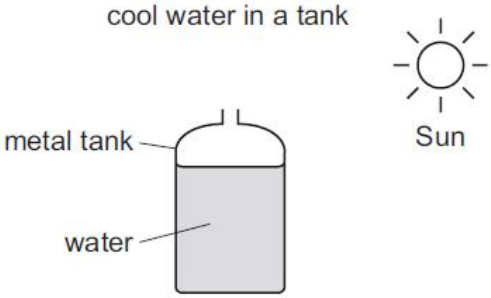
food cooled in a freezer



transfer from food to freezing compartment

D

cool water in a tank



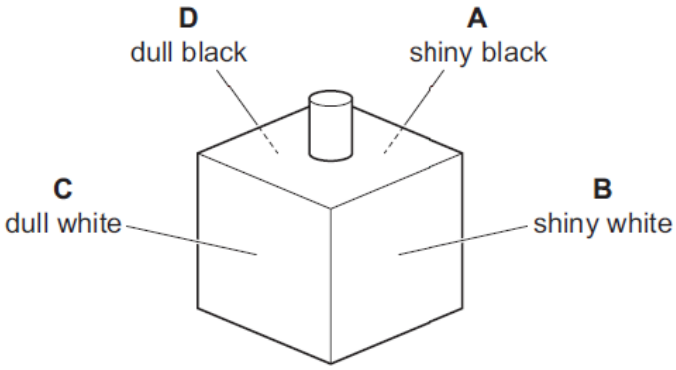
transfer from the Sun to water

9. June/2022/Paper_13/No.19

A metal container is the shape of a hollow cube.

The four sides of the container have different surface finishes.

Which side is the best emitter of radiation?



10. June/2022/Paper_21/No.18

A glass contains an iced drink on a warm and humid day. Water starts to form on the outside of the glass.

What is the name of the effect by which the water forms?

A condensation

B conduction

C convection

D evaporation

11. June/2022/Paper_21/No.19

One end of a copper bar is heated to a high temperature.

Which mechanism is responsible for the transfer of thermal energy to the other end of the copper bar?

A the lattice vibrations of copper ions only

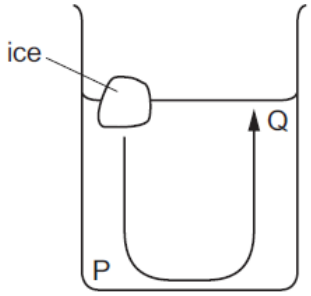
B the lattice vibrations of copper ions and the movement of high energy electrons along the bar

C the movement of high energy copper ions along the bar

D the movement of high energy electrons along the bar only

12. June/2022/Paper_21/No.20

The diagram shows a convection current caused by a piece of ice placed in a beaker of water at room temperature.



Which row correctly compares the temperatures and densities at water points P and Q?

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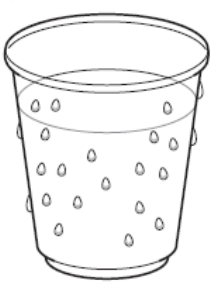
13. June/2022/Paper_22/No.18

A glass contains an iced drink on a warm and humid day. Water starts to form on the outside of the glass.



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14. June/2022/Paper_22/No.19

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B the lattice vibrations of copper ions and the movement of high energy electrons along the bar

C the movement of high energy copper ions along the bar

D the movement of high energy electrons along the bar only

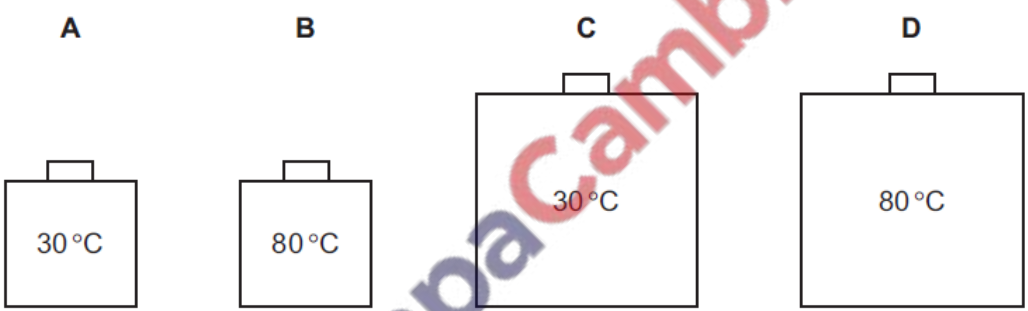
15. June/2022/Paper_22/No.20

Four cubic copper containers are filled with water. The surfaces of all the containers are painted black.

Two of the containers have sides of length 20 cm and the other two containers have sides of length 40 cm.

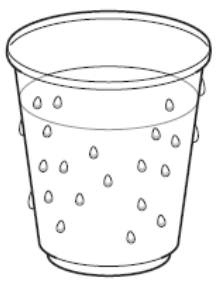
Two of the containers contain water at 80 °C and the other two contain water at 30 °C.

Which container radiates energy at the lowest rate?



16. June/2022/Paper_23/No.18

A glass contains an iced drink on a warm and humid day. Water starts to form on the outside of the glass.



What is the name of the effect by which the water forms?

A condensation

B conduction

C convection

D evaporation

17. June/2022/Paper_23/No.19

One end of a copper bar is heated to a high temperature.

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A the lattice vibrations of copper ions only

B the lattice vibrations of copper ions and the movement of high energy electrons along the bar

C the movement of high energy copper ions along the bar

D the movement of high energy electrons along the bar only

18. June/2022/Paper_23/No.20

An object emits infrared radiation.

Which two properties of the object determine the rate of radiation of thermal energy from the object?

A the density and the surface area of the object

B the density and the surface temperature of the object

C the mass and the surface area of the object

D the surface area and the surface temperature of the object

19. June/2022/Paper_31/No.6(a)

A teacher fills a copper can with solid wax and heats the can. She measures the temperature of the wax every minute. She continues heating once the wax has melted and stops heating when the wax is boiling.

(a) (i) State the term used for the process that transfers thermal energy through the copper.

..... [1]

(ii) Fig. 6.1 shows how the temperature of the wax changes as it is heated.

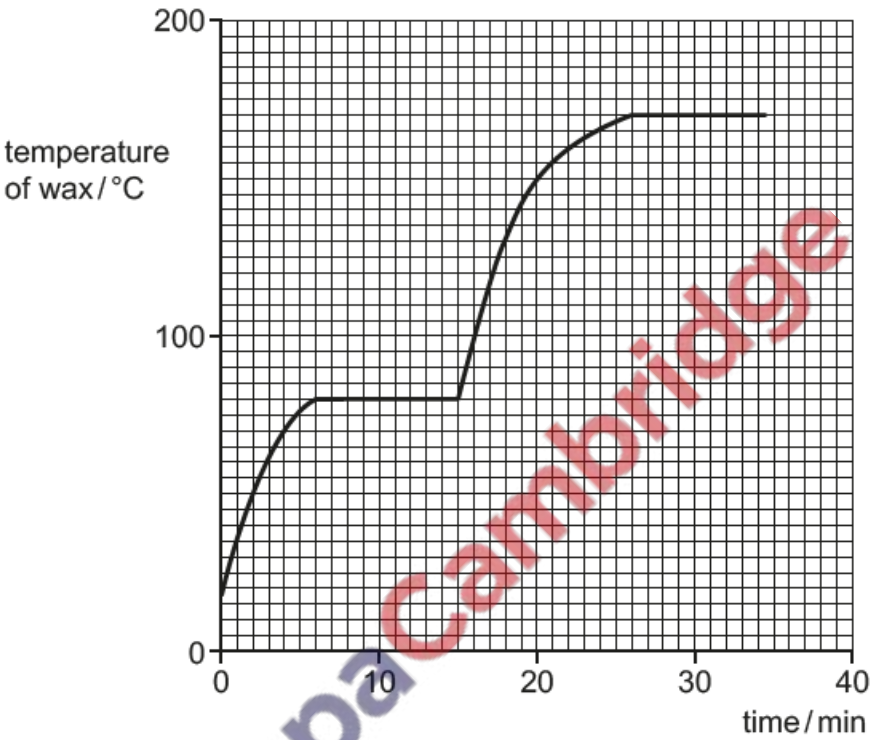

Fig. 6.1

Using the graph in Fig. 6.1, determine:

1. the melting point of the wax ..... °C [1]
2. the boiling point of the wax ..... °C [1]
3. the time at which the wax starts to boil. ..... min [1]

20. June/2022/Paper_32/No.5(a, b)

Fig. 5.1 shows a cross-section of a flask. The flask is used to keep a liquid hot. The flask has two glass walls with a vacuum between them. The surfaces of the glass walls are shiny.

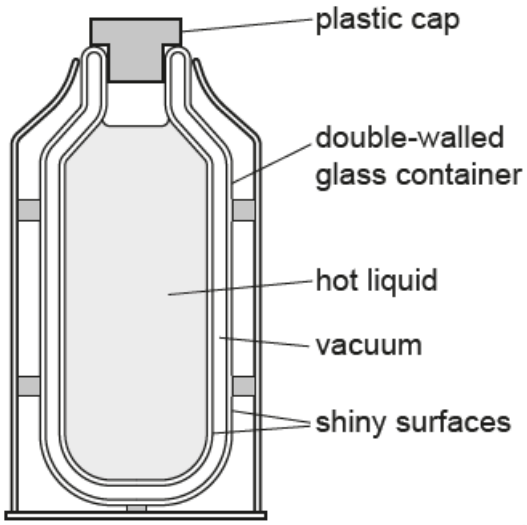

Fig. 5.1

(a) **(i)** Explain how the shiny surfaces reduce the transfer of thermal energy from the hot liquid.

.....

..... [2]

(ii) Explain how the vacuum reduces the transfer of thermal energy from the hot liquid.

.....

..... [2]

(b) Some of the hot liquid is poured out of the flask into a shallow dish.

Explain how evaporation causes the liquid to cool.

.....

.....

..... [3]

21. June/2022/Paper_33/No.5

An engineer makes a device that absorbs thermal energy from the Sun. The absorbed energy heats water.

In the device, cold water flows slowly from an upper tank, through a white plastic pipe, to a lower tank. Energy from the Sun heats the water as it flows, as shown in Fig. 5.1.

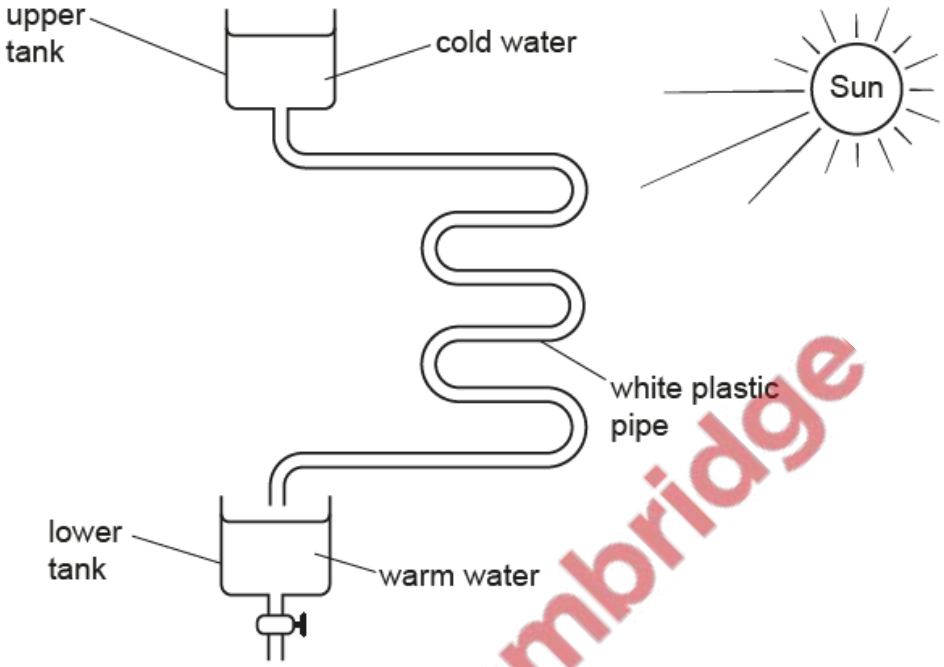

Fig. 5.1

(a) The engineer measures the temperature of the water in each tank.

State the name of the instrument used for measuring temperature.

..... [1]

(b) **(i)** State the name of the process that transfers thermal energy from the Sun to the white plastic pipe.

..... [1]

(ii) State the name of the process that transfers thermal energy through the plastic wall of the pipe to the water inside the pipe.

..... [1]

(c) The engineer wants to increase the thermal energy absorbed by the water in the pipe.

Suggest **two** improvements he can make to increase the thermal energy absorbed.

In each case, explain why the suggestion increases the thermal energy absorbed.

improvement 1 .....

.....

explanation .....

.....

improvement 2 .....

.....

explanation .....

.....

[4]

[Total: 7]

22. June/2022/Paper_41/No.3

During a picnic on a warm, dry day, a metal can of lemonade is wrapped in a damp cloth.

Evaporation cools the water in the cloth.

(a) Explain, in terms of molecules, how evaporation cools the water in the cloth.

.....

.....

.....

..... [3]

(b) As the water in the cloth cools, so does the lemonade.

Explain how electrons transfer thermal energy through the metal of the can.

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.....

.....

..... [3]

[Total: 6]

23. June/2022/Paper_41/No.6

Fig. 6.1 shows a road next to the sea.

Fig. 6.1

(a) On a sunny day, the Sun warms the road.

Describe how energy from the Sun reaches the Earth and warms the road.

.....

.....

.....

..... [3]

(b) The temperature of the road is greater than the temperature of the sea.

The surface of the road is black.

Suggest **one** reason why the temperature of the road is greater than that of the sea.

.....

..... [1]

(c) The air above the road is heated by the warm road.

(i) Describe how this affects the molecules of the air.

.....

.....

..... [2]

(ii) A cyclist travelling along the road notices that a cool breeze is blowing from the sea to the land.

Explain how convection produces this breeze. You may include a diagram if it helps your answer.

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.....

.....

..... [3]

[Total: 9]