Thermal Processes

Question Paper 1

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

Time allowed: **23 minutes**

Score: **/18**

Percentage: **/100**

Grade Boundaries:

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

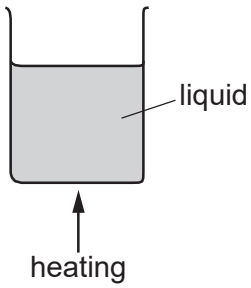
Question 1

Two otherwise identical cars, one black and one white, are at the same initial temperature. The cars are left in bright sunshine and their temperatures increase. During the night their temperatures decrease.

Which car shows the greater rate of temperature increase and which car shows the greater rate of temperature decrease?

	greater rate of temperature increase	greater rate of temperature decrease
A	black	black
B	black	white
C	white	black
D	white	white

A liquid is heated in a beaker.



The density of the liquid changes as its temperature increases. This causes energy to be transferred throughout the liquid.

How does the density change and what is this energy transfer process?

	density	energy transfer process
A	decreases	conduction
B	decreases	convection
C	increases	conduction
D	increases	convection

Which processes occur in a metal to cause thermal conduction?

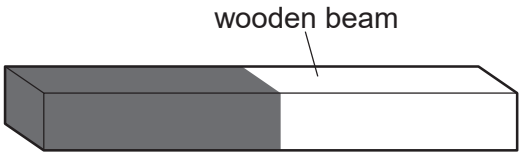
	electron transfer	proton transfer	lattice vibration
A	✓	✓	✓
B	✓	✓	✗
C	✓	✗	✓
D	✗	✓	✓

key

✓ = process occurs

X = process does not occur

A wooden beam is painted part black and part white. The beam absorbs infra-red radiation from the Sun during the day, and loses infra-red radiation to the surroundings at night.



Which part of the beam heats up more quickly during the day, and which part cools down more quickly at night?

	part heating up more quickly	part cooling down more quickly
A	black	black
B	black	white
C	white	black
D	white	white

Which row shows the surface that is the better absorber and the surface that is the better emitter of infra-red radiation?

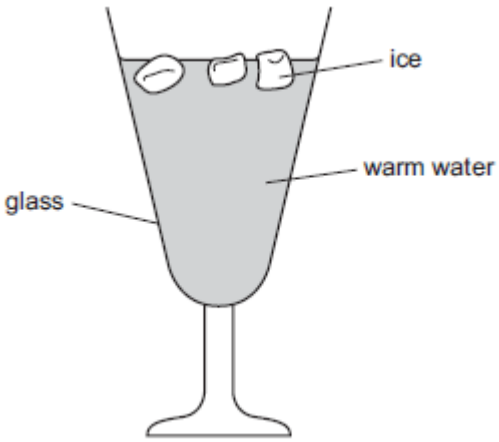
	better absorber	better emitter
A	black surface	black surface
B	black surface	white surface
C	white surface	black surface
D	white surface	white surface

A student suggests some uses for containers made from good thermal conductors and for containers made from poor thermal conductors.

In which row are both suggested uses correct?

	good thermal conductor	poor thermal conductor
A	keeping a cold liquid at a low temperature	transferring thermal energy quickly from a hot liquid
B	keeping a hot liquid at a high temperature	keeping a cold liquid at a low temperature
C	transferring thermal energy quickly from a hot liquid	transferring thermal energy quickly to a cold liquid
D	transferring thermal energy quickly to a cold liquid	keeping a hot liquid at a high temperature

The diagram shows some ice being used to lower the temperature of some warm water.



What is the main process by which the water at the bottom of the glass becomes cool?

A. condensation

B. conduction

C. convection

D. radiation

Thermal energy travels through space from the Sun to the Earth. Space is a vacuum.

How is thermal energy transferred from the Sun to the Earth?

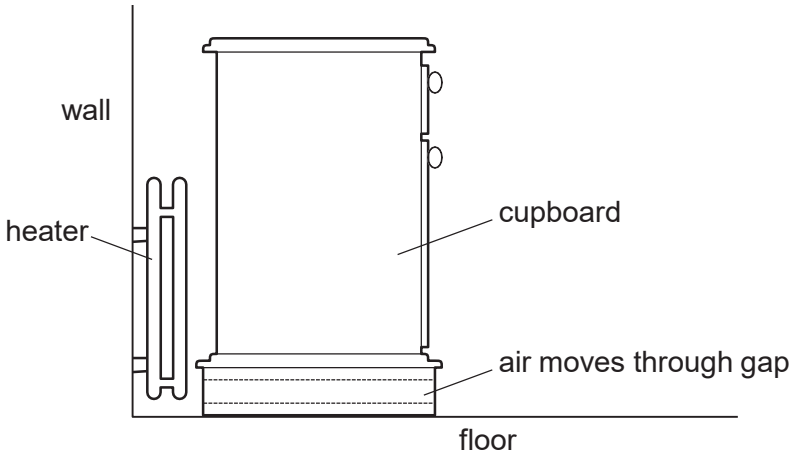
A by conduction only

B by convection only

C by radiation only

D by convection and radiation

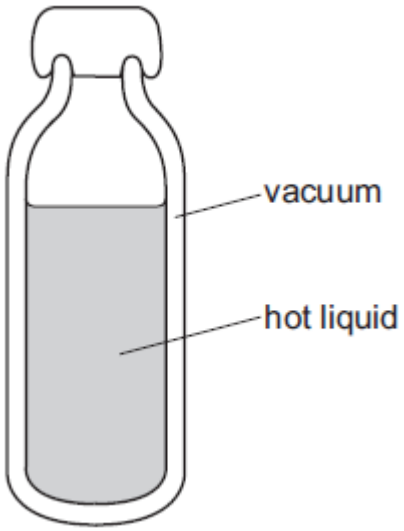
A cupboard is placed in front of a heater. Air can move through a gap under the cupboard.



Which row describes the temperature, and the direction of movement, of the air in the gap?

	air temperature	air direction
A	cool	away from the heater
B	cool	towards the heater
C	warm	away from the heater
D	warm	towards the heater

The diagram shows a vacuum flask used to keep liquid hot.



How does thermal energy pass through the vacuum?

A conduction only

B convection only

C radiation

D conduction and convection

One method of heat transfer involves the energy travelling at a much greater speed than in other methods.

What is the name of this method?

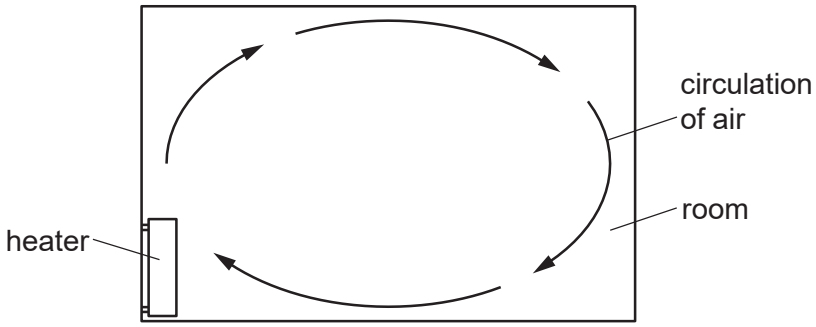
A conduction

B convection

C evaporation

D radiation

The air in a room is heated by a heater. The diagram shows the circulation of the air in the room.



Which statement about the air that is heated is correct?

A The air contracts and becomes less dense.

B The air contracts and becomes more dense.

C The air expands and becomes less dense.

D The air expands and becomes more dense.

Four rods are made from different metals P, Q, R and S. The rods have equal lengths and equal diameters. The rods are heated at one end, in the same way.

The table shows the time taken for the temperature at the other end of each rod to rise by 1.0 °C.

Which metal is the best conductor of thermal energy (heat)?

metal	time taken / s
P	35
Q	30
R	45
S	40

A metal P B metal Q C metal R D metal S

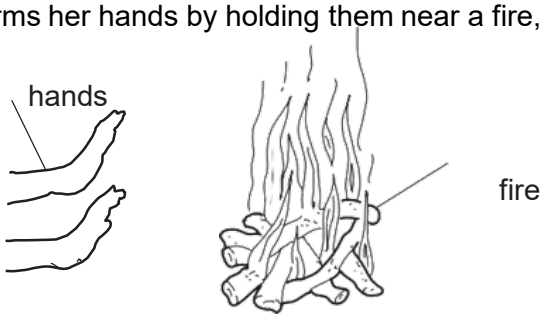
Question 14

In a refrigerator, the cooling unit can be fitted either at the top or at the bottom. In an oven, the heater can be fitted either at the top or at the bottom.

Which row shows the best position for the cooling unit and the best position for the heater?

	Cooling unit	heater
A	bottom	bottom
B	bottom	top
C	top	bottom
D	top	top

A girl is outdoors. She warms her hands by holding them near a fire, as shown.



How does the heat from the fire reach her hands?

A. conduction only

B. convection and conduction

C. convection and radiation

D. radiation only

A heating engineer fits a heater to the ceiling of an office so that workers in the office are kept warm.

How does thermal energy reach the workers below the heater?

A conduction and convection

B convection and radiation

C convection only

D radiation only

Which row shows how heating changes the density of air, and the name of the method of energy transfer caused by this density change?

	density	method of energy transfer
A	decreases	conduction
B	decreases	convection
C	increases	conduction
D	increases	convection

What is the name of the process of heat transfer using electromagnetic waves?

A conduction

B convection

C evaporation

D radiation