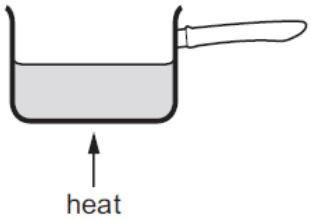
Thermal Processes – 2020 IGCSE 0625

1. Nov/2020/Paper_11/No.19

The diagram shows a pan of water being heated.

After a short time, all the water in the pan begins to boil.



What is the main process by which thermal energy is transferred through the water?

A conduction

B convection

C evaporation

D radiation

2. Nov/2020/Paper_12/No.19

A scientist measures the air temperature at different heights from the floor in a cave. The results are recorded in the table.

height / m	temperature / °C
0	10
10	11
20	13
30	14
40	16

Why does altering the height affect the temperature of the air?

A The molecules in warm air have less energy than the molecules in cool air.

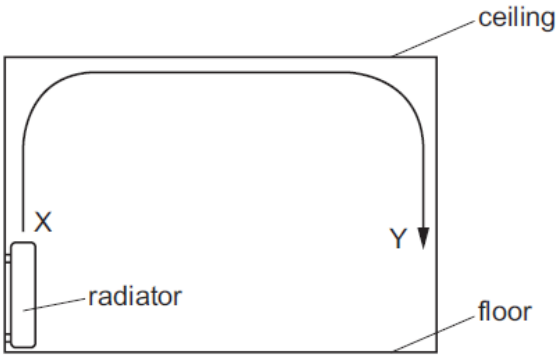
B The molecules in cool air are further apart than the molecules in warm air.

C Warm air is less dense than cool air.

D Cool air rises above warm air.

3. Nov/2020/Paper_13/No.18

The diagram shows the view of a room heated by a radiator. The arrowed line from X to Y is the path of the convection current in the air.



Which row about the air temperature and the air density at X and at Y is correct?

	air temperature	air density
A	higher at X	higher at X
B	higher at X	higher at Y
C	higher at Y	higher at Y
D	higher at Y	higher at X

4. Nov/2020/Paper_13/No.19

Which thermal process can transfer energy through a vacuum?

A conduction

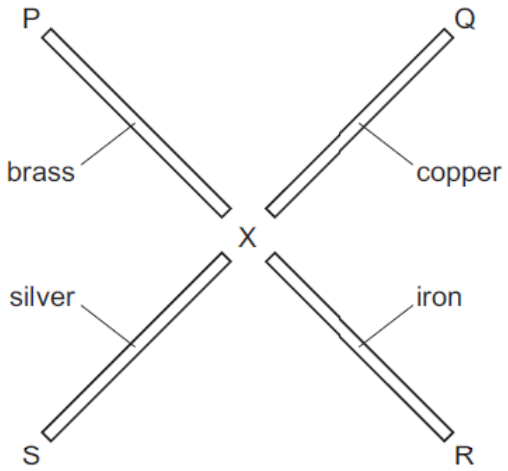
B convection

C evaporation

D radiation

5. Nov/2020/Paper_21/No.19

The diagram shows four rods. Each rod is made of a different metal.



Wax is used to attach small metal balls at the rod ends P, Q, R and S.

Each rod is the same size. They are heated uniformly by a Bunsen burner at point X.

As the rods warm up, the wax melts and the balls fall off.

Why does the ball on the silver rod fall first?

A Silver is the best conductor of heat.

B Silver is the worst conductor of heat.

C Silver is the best radiator of heat.

D Silver is the worst radiator of heat.

6. Nov/2020/Paper_21/No.20

Four cups **A**, **B**, **C** and **D** contain hot coffee.

Which cup keeps the coffee warm the longest?

	the outside surface of the cup	the top of the cup
A	black	covered with a lid
B	black	no lid
C	white	covered with a lid
D	white	no lid

7. Nov/2020/Paper_22/No.19

A scientist measures the air temperature at different heights from the floor in a cave. The results are recorded in the table.

height / m	temperature / °C
0	10
10	11
20	13
30	14
40	16

Why does altering the height affect the temperature of the air?

A The molecules in warm air have less energy than the molecules in cool air.

B The molecules in cool air are further apart than the molecules in warm air.

C Warm air is less dense than cool air.

D Cool air rises above warm air.

8. Nov/2020/Paper_22/No.20

Four solid spheres made of the same metal are heated to the same temperature.

Which sphere initially loses thermal energy by radiation at the greatest rate?

A diameter of 10 cm with a dull surface

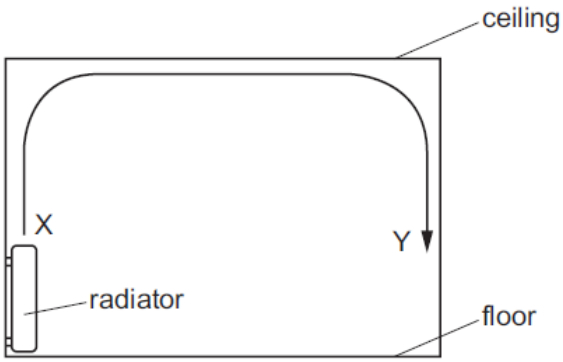
B diameter of 10 cm with a shiny surface

C diameter of 5 cm with a dull surface

D diameter of 5 cm with a shiny surface

9. Nov/2020/Paper_23/No.19

The diagram shows the view of a room heated by a radiator. The arrowed line from X to Y is the path of the convection current in the air.



Which row about the air temperature and the air density at X and at Y is correct?

	air temperature	air density
A	higher at X	higher at X
B	higher at X	higher at Y
C	higher at Y	higher at Y
D	higher at Y	higher at X

10. Nov/2020/Paper_23/No.20

A warm dark-coloured surface emits radiation. It is decided to increase the amount of radiation produced.

Three suggestions are made.

1 Make the surface hotter.

2 Colour the surface white.

3 Increase the area of the surface.

Which suggestions are correct?

A 1 only **B** 1 and 2 only **C** 1 and 3 only **D** 1, 2 and 3

11. Nov/2020/Paper_32/No.6

Fig. 6.1 shows equipment used to demonstrate convection in air. A burning candle is placed beneath glass tube A.

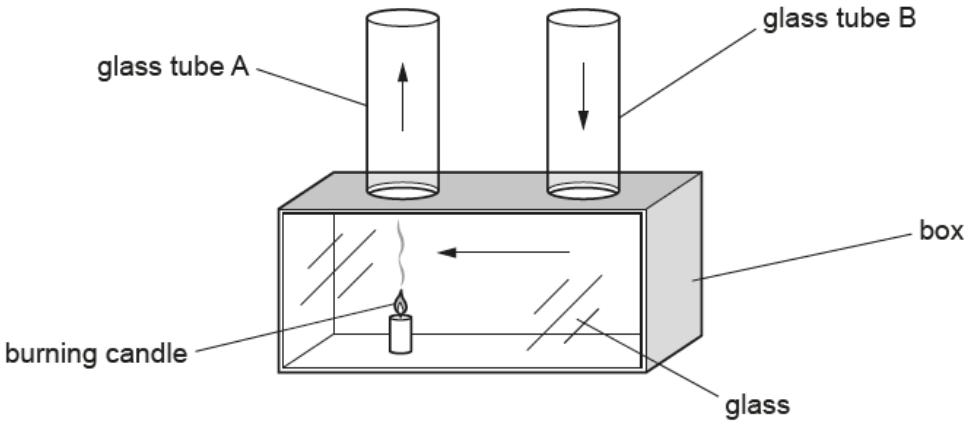


Fig. 6.1

(a) The arrows in Fig. 6.1 show the directions in which air moves.

Explain why the air moves as shown in Fig. 6.1.

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..... [3]

(b) A student has four rods of identical size. The rods are made of copper, brass, iron and glass.

Describe an experiment to compare thermal conduction along the rods.

You may draw a labelled diagram to help with your answer.

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[Total: 6]

12. Nov/2020/Paper_33/No.6

(a) Fig. 6.1 shows an electric kettle containing cold water.

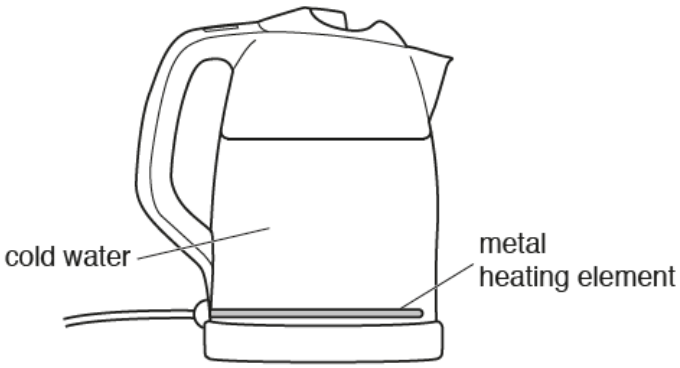

Fig. 6.1

The metal heating element heats the water.

Explain how thermal energy from the heating element is transferred to all the water in the kettle.

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(b) Fig. 6.2 shows two similar metal cans. The only difference is the surface. Can A has a dull black surface and can B has a shiny white surface.

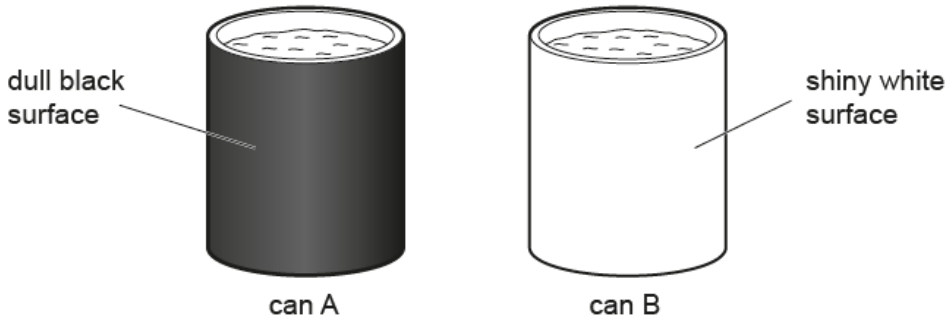

Fig. 6.2

(i) A student fills each can with hot water. The initial temperature of the water is 85 °C.

The student records the temperature of the water in each can every 30 seconds for 10 minutes.

Suggest which can of water will cool more quickly. Give a reason for your answer.

suggestion .....

reason .....

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[2]

(ii) Suggest and explain **two** changes to can B that reduce thermal energy loss to the surroundings.

change 1 .....

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change 2 .....

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[4]

[Total: 10]

13. Nov/2020/Paper_41/No.5

A metal container is used to cook food. The metal container has thick walls. Hot cooking oil at a temperature of 120 °C is poured into the container.

(a) The outside surface of the container gets hot. Some thermal energy passes through the metal because vibrating atoms in the metal collide with neighbouring atoms and transfer energy to them.

Explain how the rest of the thermal energy is conducted through the metal container to the outside surface by another process.

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(b) The outside surface of the container is brightly polished and shiny.

Explain how this reduces the power that needs to be supplied to keep the oil at the correct temperature.

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(c) The metal container is spherical. The spherical container has a smaller surface area than a long, thin container of the same volume.

Explain the advantage of using a spherical container.

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[Total: 7]

14. Nov/2020/Paper_43/No.5

Fig. 5.1 shows two metal plates A and B with a radiant heater placed midway between them.

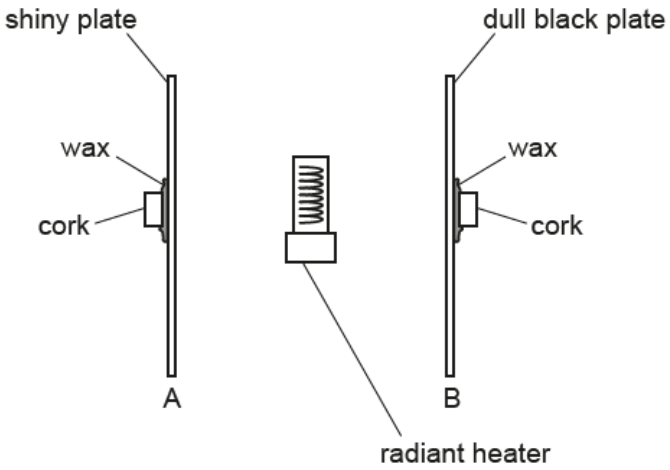

Fig. 5.1

Metal plate A is shiny. Metal plate B is dull black. A piece of cork is attached to each plate using wax. The wax is a solid at room temperature and has a melting point of 37 °C.

(a) State and explain what happens to the pieces of cork a few minutes after the heater is switched on.

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(b) Give the name of the method of transfer of thermal energy in solid metals.

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[Total: 5]