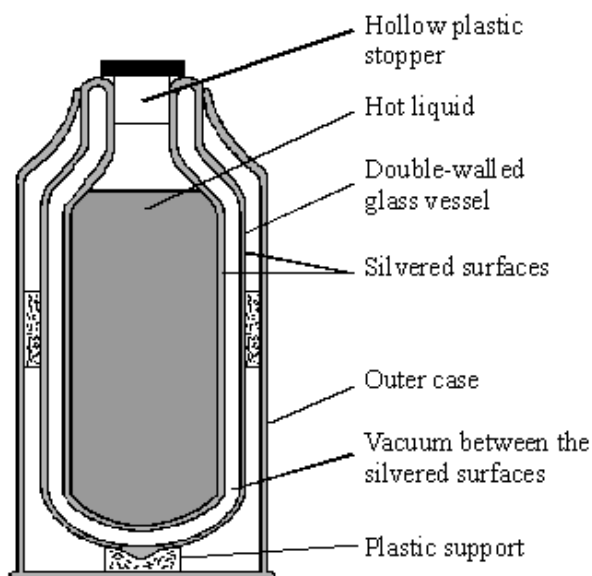


Q1. The drawing shows a section of a vacuum flask.



- (a) Heat is slowly “lost” from the hot liquid in the closed flask. It may be transferred by:

conduction	convection	evaporation	radiation
------------	------------	-------------	-----------

Choose from the words above to complete the following sentences. You may use a word once, more than once or not at all.

- (i) The vacuum between the glass walls reduces

..... and

(2)

- (ii) The silvered surfaces of the glass walls reduce

.....

(1)

- (iii) The stopper in the opening of the flask reduces

..... and

(2)

- (iv) Heat is transferred by the air molecules, away from the vacuum flask, by

.....

(1)

- (v) The plastic of the plastic stopper is preferred to metal because it cuts down

.....

(1)

- (b) Mark **X** on the diagram of the vacuum flask where the liquid in the flask is hottest.

(1)

- (c) Explain, in terms of particles, how heat is conducted through a glass wall of the vacuum flask.

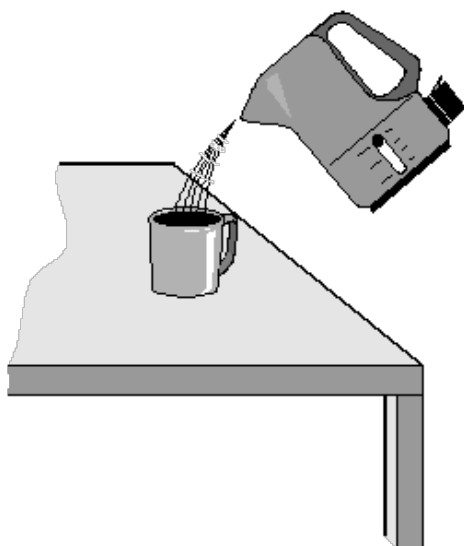
.....

.....

.....

(2)
(Total 10 marks)

- Q2.** (a) The diagram shows hot water being poured into a mug.



- (i) Complete the sentence by choosing the correct words from the box. Each word may be used once or not at all.

air	mug	table	water
-----	-----	-------	-------

Heat energy is being transferred from the to
the

(1)

- (ii) When will this transfer of heat energy stop?

.....

.....

(1)

- (b) In the box are the names of four types of fuel used to heat homes.

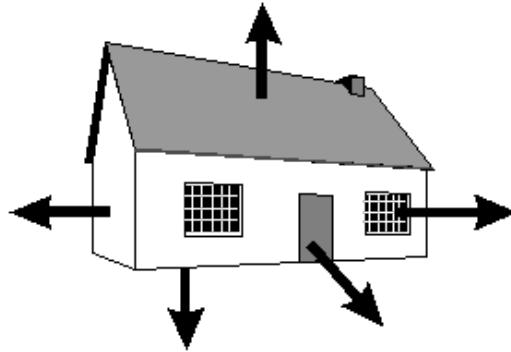
coal	gas	oil	wood
------	-----	-----	------

Which **one** of these types of fuel is renewable?

.....

(1)

- (c) The diagram shows where heat energy is lost from a house.



- (i) Complete the sentences by choosing the correct words from the box. Each word may be used once or not at all.

conduction	conductor	convection	electric	evaporation	insulator
------------	-----------	------------	----------	-------------	-----------

The amount of heat energy lost through the windows by

..... can be reduced by using thick curtains. The curtains trap a layer of air and air is a good

The curtains will also stop currents pulling cold air into the room through small gaps in the window.

(3)

- (ii) Write down **one** other way of reducing heat loss from a house.

.....

.....

(1)

(Total 7 marks)

- Q3.** Many people use a sleeping bag when they sleep in a tent. Sleeping bags, designed to keep a person warm, have a fibre filling.



- (i) Complete the sentence by choosing the correct words from the box.

conduction	convection	radiation
------------	------------	-----------

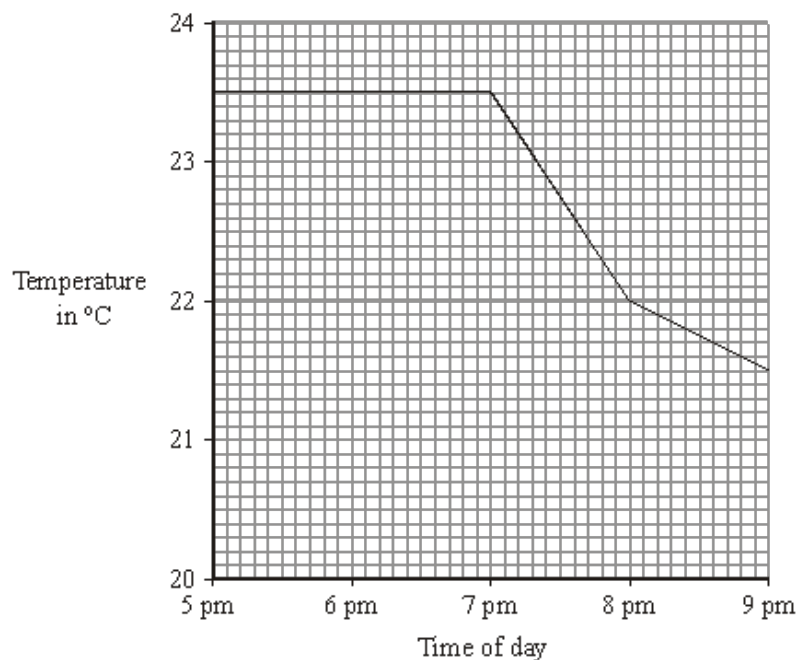
The fibre is designed to reduce heat transfer by and

- (ii) Explain why the fibre is good at reducing heat loss from a person sleeping in the bag.

.....

(Total 3 marks)

- Q4.** (a) The graph shows the temperature inside a flat between 5 pm and 9 pm. The central heating was on at 5 pm.



(i) What time did the central heating switch off?

.....

(1)

(ii) Closing the curtains reduces heat loss from the flat.

What time do you think the curtains were closed?

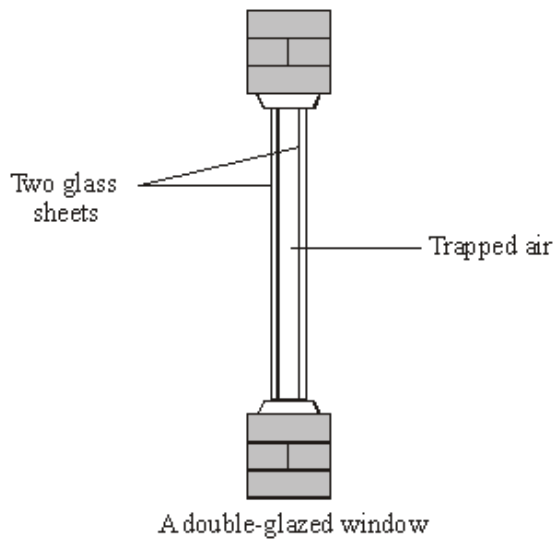
.....

Give a reason for your answer.

.....

(2)

(b) Less heat is lost through double-glazed windows than through single-glazed windows.



Complete the following sentences by choosing the correct words from the box. Each word may be used once or not at all.

conduction conductor convection evaporation insulator radiation
--

Air is a good When trapped between two sheets of glass it reduces heat loss by and

(3)

- (c) The table gives information about three types of house insulation.

Type of insulation	Cost to install	Money save each year on heating bills	Payback time
Double glazing	£4000	£200	20 years
Loft insulation	£300	£100	3 years
Cavity wall insulation	£600	£150	

- (i) Use the information in the table to calculate the payback time for cavity wall insulation.

.....

(1)

- (ii) Explain why people often install loft insulation before installing double glazing or cavity wall insulation.

.....

.....

.....

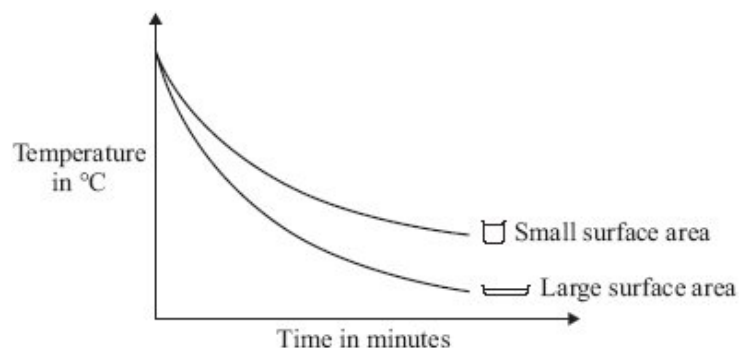
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(2)

(Total 9 marks)

- Q5.** (a) The graph compares how quickly hot water cooled down in two glass beakers with different surface areas.

The volume of water in each beaker was the same.



Describe how the surface area of the water affected how fast the water cooled down.

.....

.....

(1)

- (b) Some foxes live in a hot desert environment.



This type of fox has very large ears.

Explain how the size of the fox's ears help it to keep cool in a hot desert.

.....

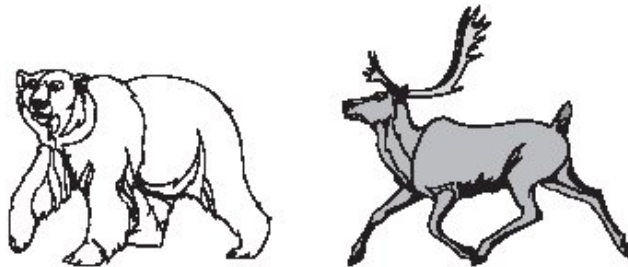
.....

.....

.....

(2)

- (c) Polar bears and reindeer are adapted to live in cold environments.



Use the words in the box to complete the following sentences.

conduction	convection	radiation
-------------------	-------------------	------------------

- (i) The white colour of a polar bear's fur helps to keep the polar bear warm by reducing the heat lost by

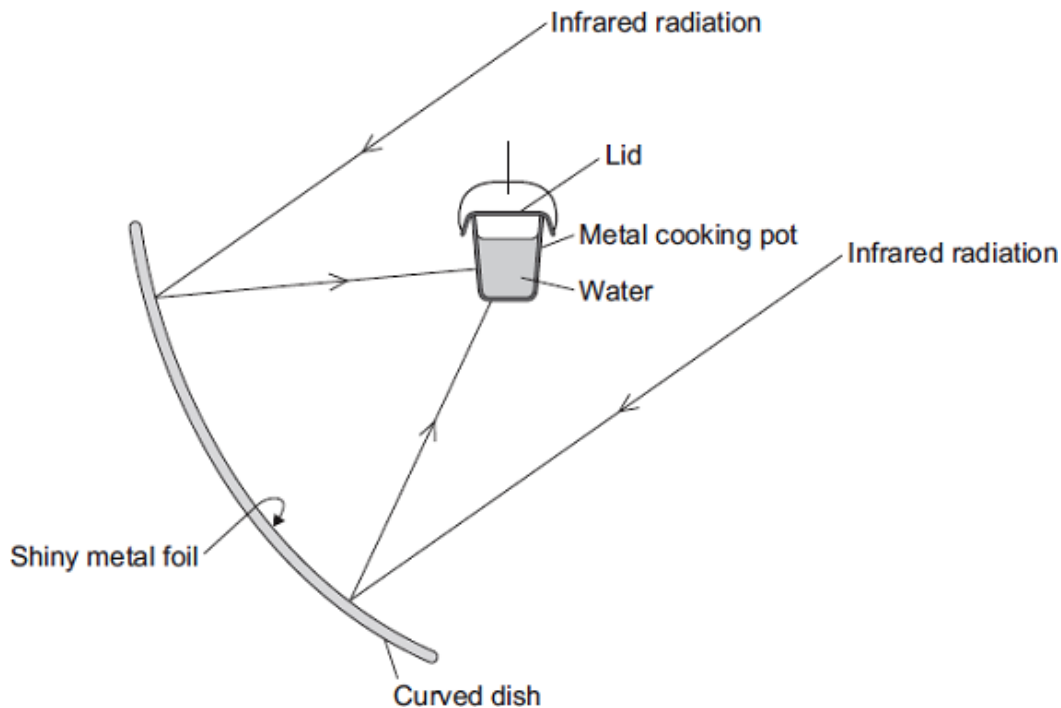
(1)

- (ii) The hairs of a reindeer are hollow. The air trapped inside the hairs reduces the heat lost by

(1)

(Total 5 marks)

- Q6.** The diagram shows the design of a solar cooker. The cooker heats water using infrared radiation from the Sun.



- (a) Why is the inside of the large curved dish covered with shiny metal foil?

.....
.....

(1)

- (b) Which would be the best colour to paint the outside of the metal cooking pot?

Draw a ring around the correct answer.

black

silver

white

Give a reason for your answer.

.....
.....
.....

(2)

- (c) Why does the cooking pot have a lid?

.....
.....

(1)

- (d) Calculate how much energy is needed to increase the temperature of 2 kg of water by 80 °C.

The specific heat capacity of water = 4200 J/kg °C.

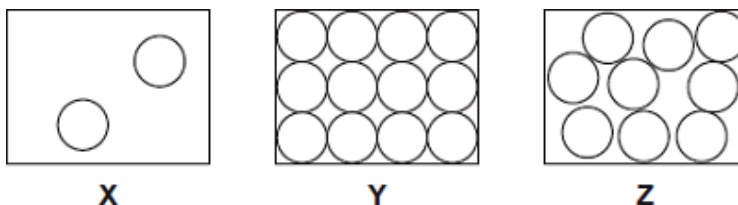
Use the correct equation from the Physics Equations Sheet.

.....

Energy = J

(2)
 (Total 6 marks)

- Q7.** (a) The diagrams, **X**, **Y** and **Z**, show how the particles are arranged in the three states of matter.



- (i) Which **one** of the diagrams, **X**, **Y** or **Z**, shows the arrangement of particles in a liquid?

Write the correct answer in the box.

(1)

- (ii) Which **one** of the diagrams, **X**, **Y** or **Z**, shows the arrangement of particles in a gas?

Write the correct answer in the box.

(1)

- (b) Draw a ring around the correct answer in each box to complete each sentence.

- (i) In a gas, the particles are

vibrating in fixed positions.

moving randomly.

not moving.

(1)

(ii) In a solid, the forces between the particles are

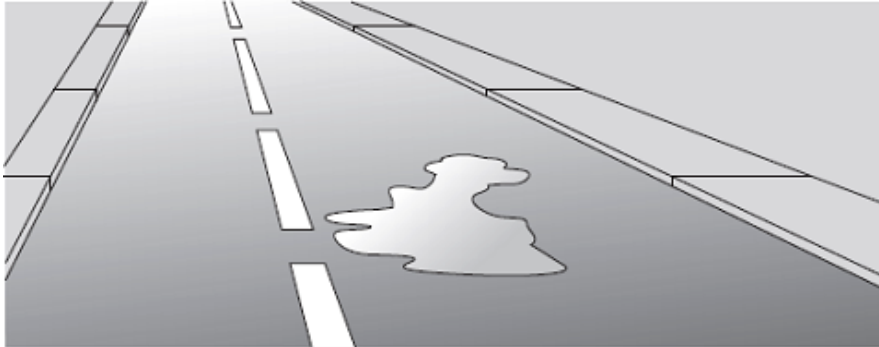
stronger than
equal to
weaker than

the forces between

the particles in a liquid.

(1)

(c) The picture shows a puddle of water in a road, after a rain shower.



(i) During the day, the puddle of water dries up and disappears. This happens because the water particles move from the puddle into the air.

What process causes water particles to move from the puddle into the air?

Draw a ring around the correct answer.

condensation

evaporation

radiation

(1)

(ii) Describe **one** change in the weather which would cause the puddle of water to dry up faster.

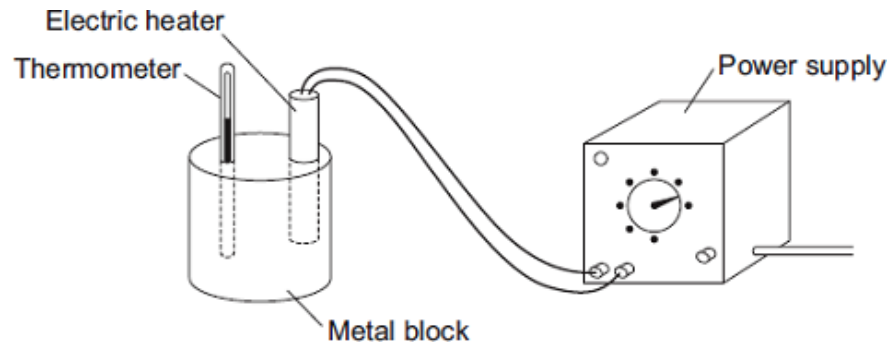
.....

.....

(1)

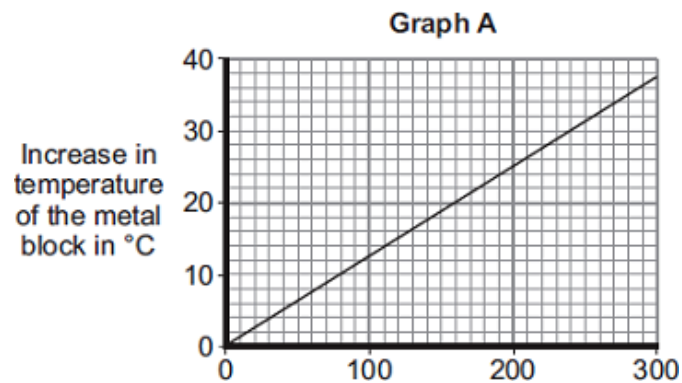
(Total 6 marks)

- Q8.** (a) A student used the apparatus drawn below to investigate the heating effect of an electric heater.



- (i) Before starting the experiment, the student drew **Graph A**.

Graph A shows how the student expected the temperature of the metal block to change after the heater was switched on.



Describe the pattern shown in **Graph A**.

.....

.....

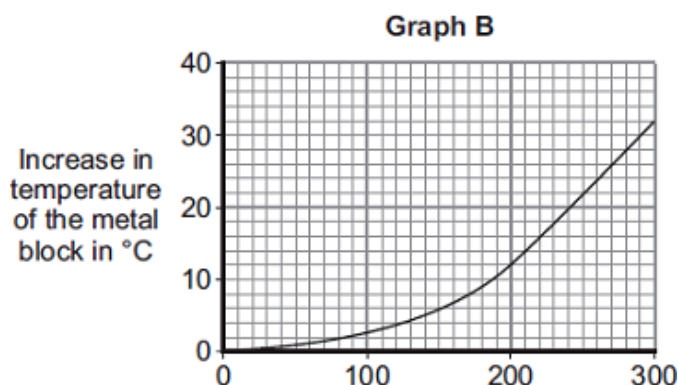
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.....

(2)

- (ii) The student measured the room temperature. He then switched the heater on and measured the temperature of the metal block every 50 seconds.

The student calculated the increase in temperature of the metal block and plotted **Graph B**.



After 300 seconds, **Graph B** shows the increase in temperature of the metal block is lower than the increase in temperature expected from **Graph A**.

Suggest **one** reason why.

.....

.....

(1)

- (iii) The power of the electric heater is 50 watts.

Calculate the energy transferred to the heater from the electricity supply in 300 seconds.

Use the correct equation from the Physics Equations Sheet.

.....

.....

.....

Energy transferred = J

(2)

- (b) The student uses the same heater to heat blocks of different metals. Each time the heater is switched on for 300 seconds.

Each block of metal has the same mass but a different specific heat capacity.

Metal	Specific heat capacity in J/kg°C
Aluminium	900
Iron	450
Lead	130

Which **one** of the metals will heat up the most?

Draw a ring around the correct answer.

aluminium

iron

lead

Give, in terms of the amount of energy needed to heat the metal blocks, a reason for your answer.

.....

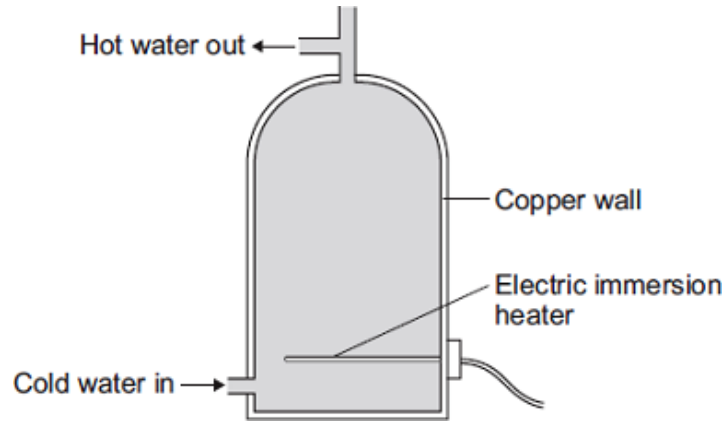
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.....

.....

(2)

- (c) A homeowner uses an electric immersion heater to heat the water in his hot water tank. The hot water tank has no insulation.



- (i) Draw a ring around the correct answer to complete each sentence.

Energy is transferred through the water by

conduction.
convection.
evaporation.

Energy is transferred through the copper wall of the hot water tank by

conduction.
convection.
evaporation.

(2)

- (ii) To keep the water in the tank hot for longer, the homeowner fits an insulating jacket around the tank. The insulating jacket costs £12 to buy.

The homeowner expects to save £16 each year from reduced energy bills.

Calculate the pay-back time for the insulating jacket.

.....

.....

Pay-back time = years

(2)

(Total 11 marks)

