

1 - (0625-S 2012-Paper 1 (Core)/3-Q10) - THERMAL EFFECTS

Which pair contains **only** physical quantities that vary with temperature and so could be used in making a thermometer?

- A** activity of a radioactive source, volume of a gas
- B** mass of a liquid, volume of a liquid
- C** activity of a radioactive source, mass of a solid
- D** volume of a gas, volume of a liquid

2 - (0625-S 2012-Paper 1 (Core)/2-Q13) - THERMAL EFFECTS

On a warm day, a swimmer climbs out of a swimming pool into the open air and water evaporates from his skin.

As the water evaporates, which molecules escape into the air first and what happens to the average speed of the remaining water molecules?

	first molecules to escape	average speed of the remaining molecules
A	least energetic	decreases
B	least energetic	increases
C	most energetic	decreases
D	most energetic	increases

3 - (0625-S 2012-Paper 1 (Core)/1-Q14) - THERMAL EFFECTS

The molecules of a substance become more closely packed and move more quickly.

What is happening to the substance?

- A** A gas is being heated and compressed.
- B** A gas is being heated and is expanding.
- C** A liquid is boiling.
- D** A liquid is evaporating at room temperature.

4 - (0625-S 2012-Paper 1 (Core)/2-Q15) - THERMAL EFFECTS

A solid object has a very large thermal capacity.

What does this mean?

- A** A large amount of energy is needed to make the object become hot.
- B** A large amount of energy is needed to make the object melt.
- C** A small amount of energy is needed to make the object become hot.
- D** A small amount of energy is needed to make the object melt.

5 - (0625-S 2012-Paper 1 (Core)/1-Q16) - THERMAL EFFECTS

A heater supplies 80 J of energy to a block of metal. The temperature of the block rises by 20°C .

What happens to the block of metal when its temperature falls by 10°C ?

- A** Its internal energy decreases by 40 J.
- B** Its internal energy decreases by 160 J.
- C** Its internal energy increases by 40 J.
- D** Its internal energy increases by 160 J.

6 - (0625-S 2012-Paper 1 (Core)/2-Q16) - THERMAL EFFECTS

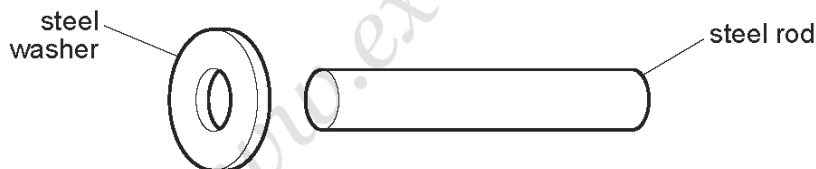
A hot drink is left in a room that is at a temperature of 20°C .

What has happened to the drink after ten minutes?

- A** Its density is lower.
- B** Its internal energy is lower.
- C** Its particles have equal energies.
- D** Its particles move more quickly.

7 - (0625-S 2012-Paper 1 (Core)/1-Q17) - THERMAL EFFECTS

An engineer wants to fix a steel washer on to a steel rod. The rod is just too big to fit into the hole of the washer.



How can the engineer fit the washer on to the rod?

- A** Cool the washer and put it over the rod.
- B** Cool the washer and rod to the same temperature and push them together.
- C** Heat the rod and then place it in the hole.
- D** Heat the washer and then place it over the rod.

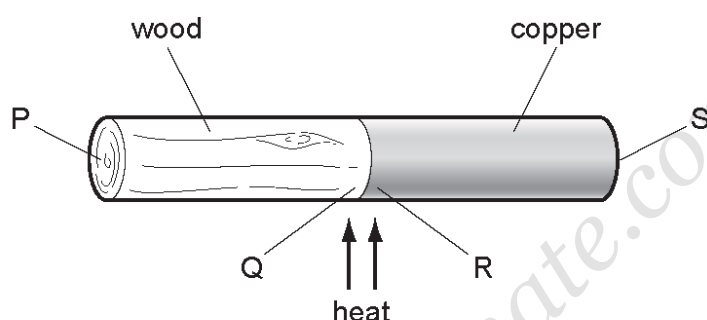
8 - (0625-S 2012-Paper 1 (Core)/1-Q18) - THERMAL EFFECTS

Why does convection take place in a liquid when it is heated?

- A** Liquids expand when they are heated.
- B** Liquids start to bubble when they get close to boiling point.
- C** Molecules in the liquid expand when they are heated.
- D** Molecules near to the surface of the liquid escape into the air.

9 - (0625-S 2012-Paper 1 (Core)/2-Q18) - THERMAL EFFECTS

A rod is made of copper and wood joined together.



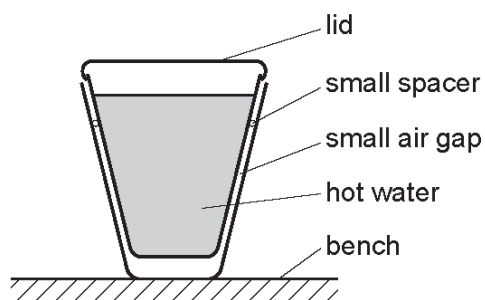
The rod is heated at the join in the centre for about a minute.

At which labelled point will the temperature be lowest, and at which point will it be highest?

	lowest temperature	highest temperature
A	P	Q
B	P	R
C	S	P
D	S	R

10 - (0625-S 2012-Paper 1 (Core)/1-Q19) - THERMAL EFFECTS

Two plastic cups are placed one inside the other. Hot water is poured into the inner cup and a lid is put on top, as shown.



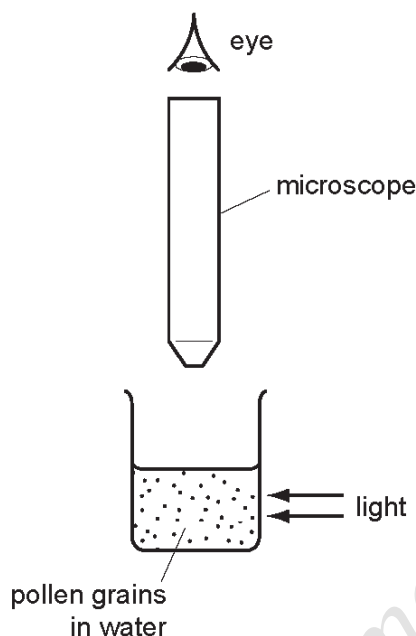
Which statement is correct?

- A** Heat loss by radiation is prevented by the small air gap.
- B** No heat passes through the sides of either cup.
- C** The bench is heated by convection from the bottom of the outer cup.
- D** The lid is used to reduce heat loss by convection.

11 - (0625-W 2012-Paper 1 (Core)/2-Q10) - THERMAL EFFECTS

Very small pollen grains are suspended in water. A bright light shines from the side.

Looking through a microscope, small specks of light are seen to be moving in a random, jerky manner.



What are the moving specks of light?

- A** pollen grains being hit by other pollen grains
- B** pollen grains being hit by water molecules
- C** water molecules being hit by other water molecules
- D** water molecules being hit by pollen grains

12 - (0625-W 2012-Paper 1 (Core)/3-Q14) - THERMAL EFFECTS

A car tyre contains a constant volume of air.

During use, the air gets hotter and the air pressure increases.

What explains this increase in pressure in terms of the motion of air molecules?

	number of air molecules in tyre	force between air molecules and tyre wall	number of collisions per second between air molecules and tyre wall
A	increased	increased	decreased
B	increased	unchanged	decreased
C	unchanged	increased	increased
D	unchanged	unchanged	increased

13 - (0625-W 2012-Paper 1 (Core)/1-Q15) - THERMAL EFFECTS

A swimmer feels cold after leaving warm water on a warm, windy day.

Why does she feel cold even though the air is warm?

- A The less energetic water molecules on her skin escape quickly.
- B The more energetic water molecules on her skin do not escape quickly.
- C The water on her skin does not evaporate quickly enough to keep her warm.
- D The water on her skin evaporates quickly and cools her skin.

14 - (0625-W 2012-Paper 1 (Core)/2-Q15) - THERMAL EFFECTS

Which physical property is used to measure temperature in a liquid-in-glass thermometer?

- A the length of the thermometer
- B the thickness of the glass bulb
- C the volume of the glass bulb
- D the volume of the liquid

15 - (0625-W 2012-Paper 1 (Core)/3-Q15) - THERMAL EFFECTS

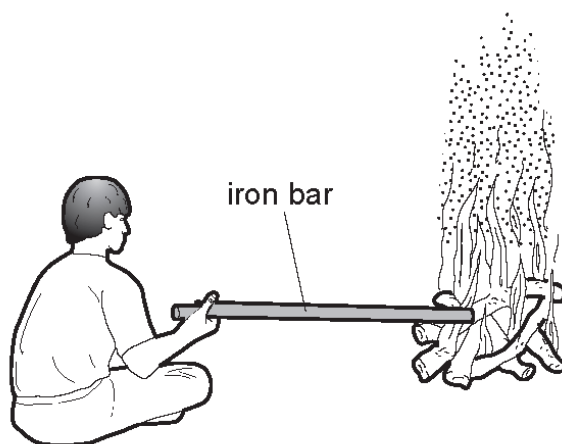
The table lists the melting points and the boiling points of four different substances.

Which substance is a liquid at 0 °C?

	melting point / °C	boiling point / °C
A	-219	-183
B	-7	58
C	98	890
D	1083	2582

16 - (0625-W 2012-Paper 1 (Core)/2-Q16) - THERMAL EFFECTS

A boy sits near a campfire. He pokes the fire with an iron bar. His hand becomes hot.



In which ways does thermal energy (heat) from the fire reach his hand?

- A conduction and convection only
- B conduction and radiation only
- C convection and radiation only
- D conduction, convection and radiation

17 - (0625-W 2012-Paper 1 (Core)/3-Q16) - THERMAL EFFECTS

A student wishes to calibrate a mercury-in-glass thermometer with a $^{\circ}\text{C}$ scale.

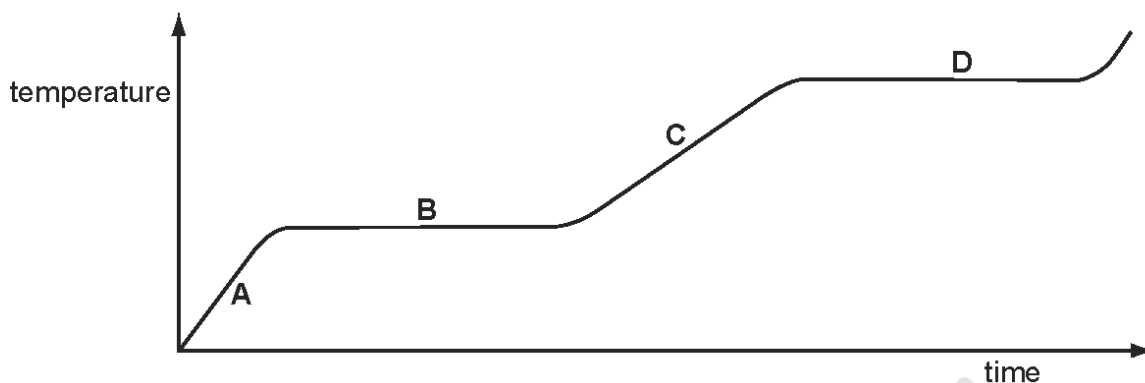
Which values should she use for the lower fixed point and for the upper fixed point?

	lower fixed point	upper fixed point
A	freezing point of mercury	boiling point of mercury
B	freezing point of mercury	boiling point of water
C	freezing point of water	boiling point of mercury
D	freezing point of water	boiling point of water

18 - (0625-W 2012-Paper 1 (Core)/1-Q17) - THERMAL EFFECTS

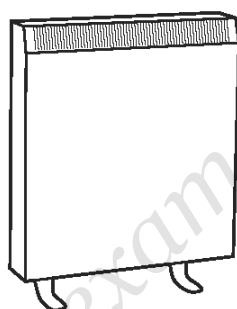
The graph shows the temperature of a substance as it is heated steadily.

In which part of the graph is the substance boiling?



19 - (0625-W 2012-Paper 1 (Core)/1-Q18) - THERMAL EFFECTS

A night storage heater contains a large block of material that is heated electrically during the night. During the day the block cools down, releasing thermal energy into the room.



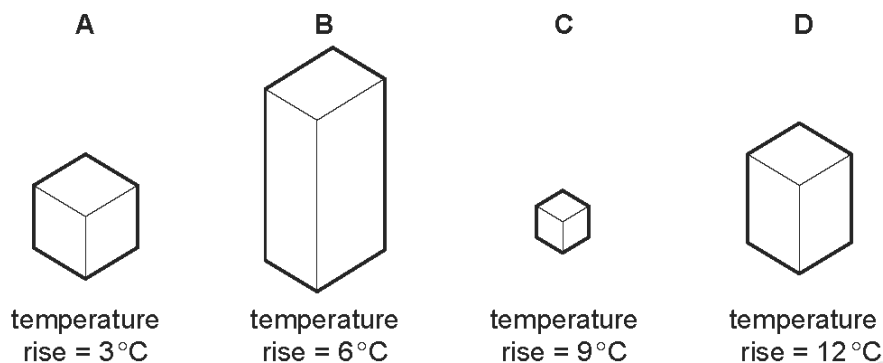
Which thermal capacity and which night-time temperature increase will cause the most energy to be stored by the block?

	thermal capacity of block	night-time temperature increase
A	large	large
B	large	small
C	small	large
D	small	small

20 - (0625-W 2012-Paper 1 (Core)/3-Q18) - THERMAL EFFECTS

Four blocks, made from different materials, are each heated so that they have the same increase in internal energy.

Which block has the smallest thermal capacity?



21 - (0625-W 2012-Paper 1 (Core)/1-Q19) - THERMAL EFFECTS

After a sheep has its wool cut off, it is harder for it to stay warm when the air temperature falls.

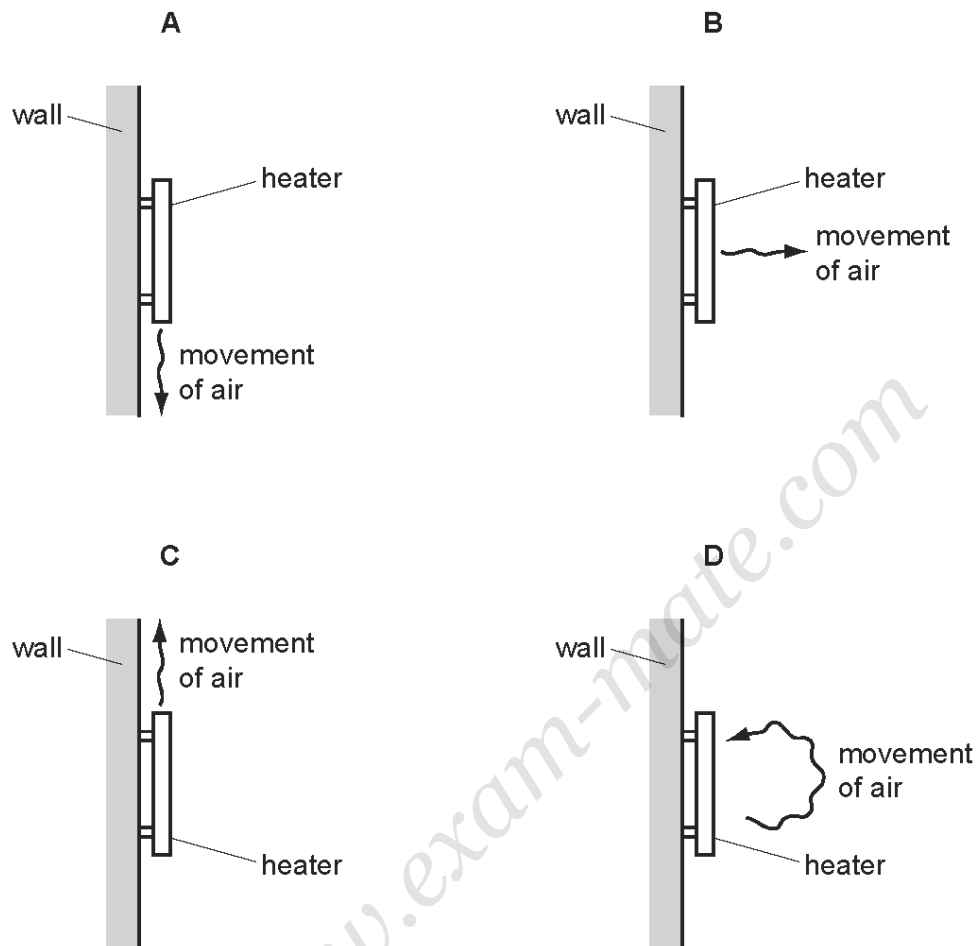
How does the wool help the sheep to stay warm?

- A Air can circulate between the wool fibres and heat up the skin by convection.
- B Air trapped by the wool fibres reduces heat losses from the skin by convection.
- C The wool fibres are curly so it takes longer for heat to be conducted away from the skin.
- D The wool fibres conduct heat to the skin from the air outside.

22 - (0625-W 2012-Paper 1 (Core)/3-Q19) - THERMAL EFFECTS

A convector heater is fixed to a wall.

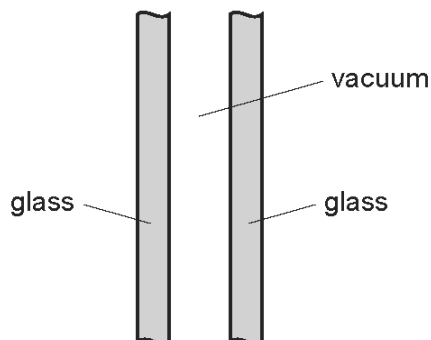
Which diagram shows how warm air near the heater moves because of convection in the air?



23 - (0625-W 2012-Paper 1 (Core)/3-Q20) - THERMAL EFFECTS

A double-glazed window consists of two panes of glass with a vacuum between them.

The vacuum reduces the amount of thermal energy transferred through the window.

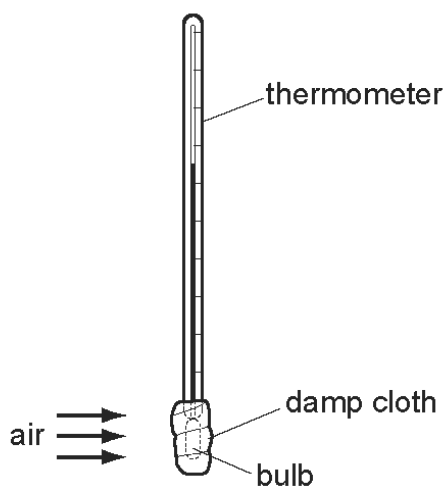


Which row shows how much thermal energy is transferred through the vacuum by conduction, by convection and by radiation?

	conduction	convection	radiation
A	none	none	some
B	none	some	some
C	some	none	none
D	some	some	none

24 - (0625-S 2013-Paper 1 (Core)/1-Q13) - THERMAL EFFECTS

A thermometer bulb is covered by a piece of damp absorbent cloth.



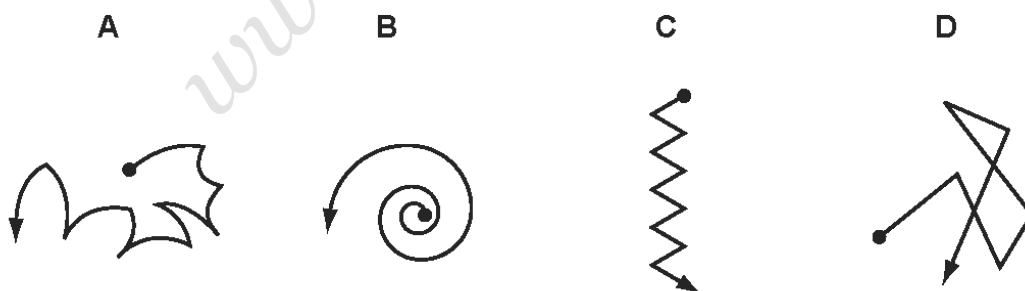
Air at room temperature is blown across the damp cloth.

What happens to the thermometer reading?

- A It remains constant.
- B It rises.
- C It rises then falls.
- D It falls.

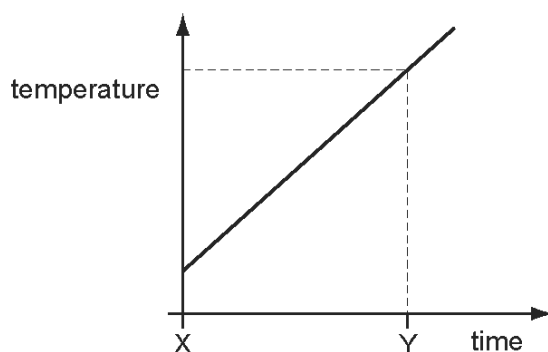
25 - (0625-S 2013-Paper 1 (Core)/2-Q13) - THERMAL EFFECTS

Which diagram best shows the path of a gas molecule?



26 - (0625-S 2013-Paper 1 (Core)/2-Q14) - THERMAL EFFECTS

A gas storage tank has a fixed volume. The graph shows how the temperature of the gas in the tank varies with time.



At time Y, the gas molecules are

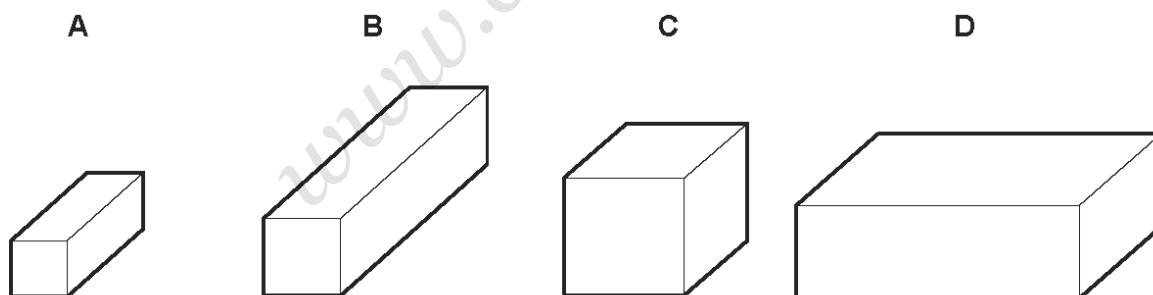
- A** closer together than at time X.
- B** hitting the sides of the tank harder than at time X.
- C** larger in size than at time X.
- D** moving more slowly than at time X.

27 - (0625-S 2013-Paper 1 (Core)/3-Q14) - THERMAL EFFECTS

The diagrams show four blocks of steel. The blocks are all drawn to the same scale.

The same quantity of thermal energy (heat) is given to each block.

Which block shows the greatest rise in temperature?

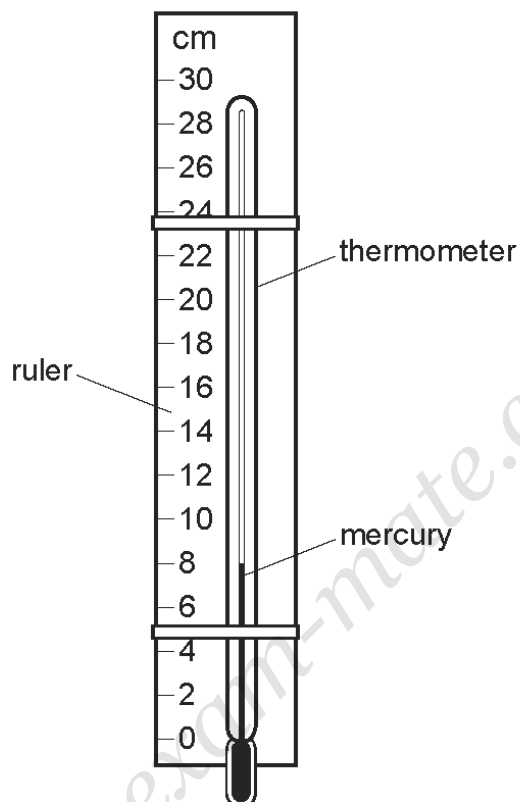


28 - (0625-S 2013-Paper 1 (Core)/1-Q16) - THERMAL EFFECTS

A mercury thermometer with no scale is taped to a ruler as shown.

When the thermometer is placed in steam, the mercury level rises to 22.0 cm.

When the thermometer is placed in pure melting ice, the mercury level falls to 2.0 cm.



Which temperature is shown by the mercury level in the diagram?

A 6 °C

B 8 °C

C 30 °C

D 40 °C