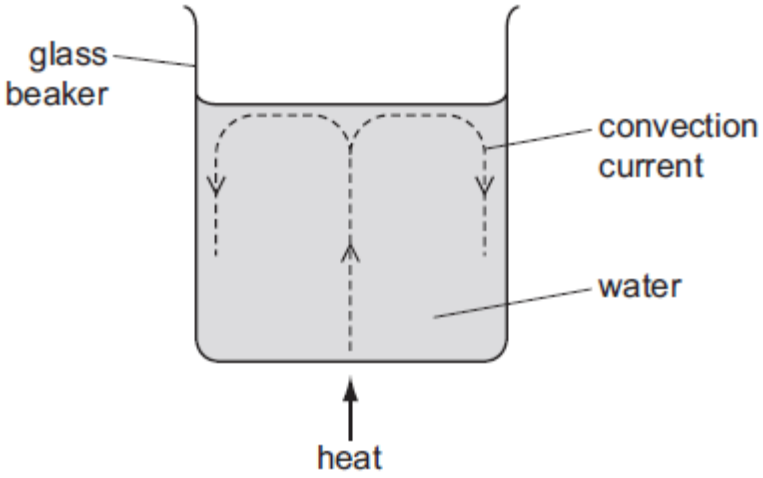
NAME: .....

HEAT TRANSFER

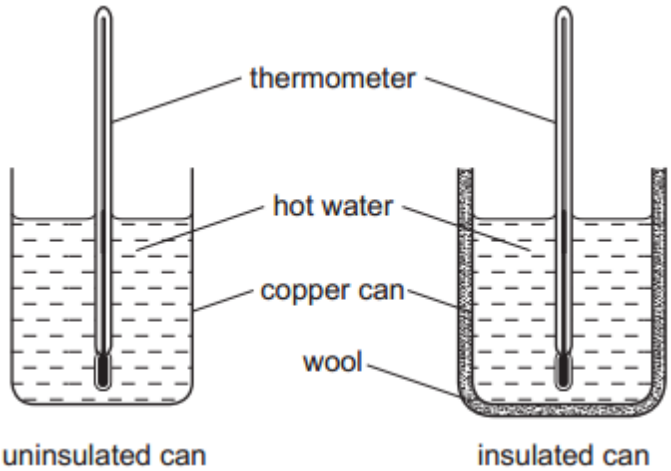
1. A glass beaker contains water. When the centre of the base of the beaker is heated, a convection current is set up.



Which statement explains this?

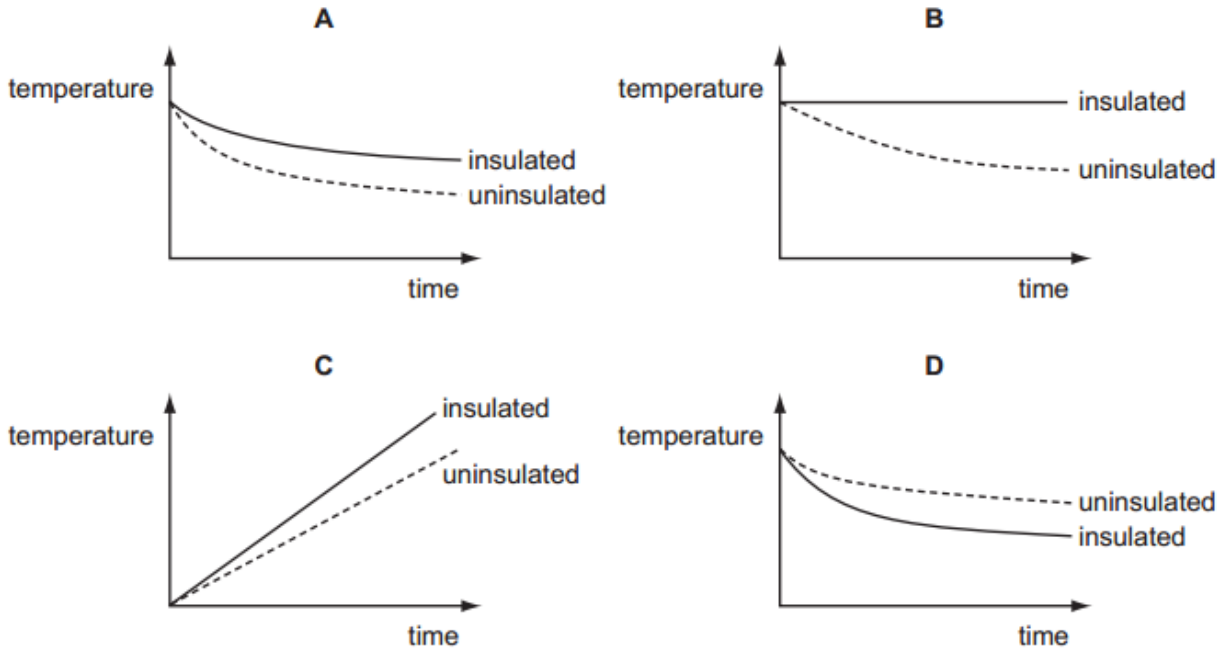
A. The evaporation of water causes water molecules to rise to the surface.
B. The expansion of water molecules causes them to rise to the surface.
C. The water above the heat source rises because it becomes less dense.
D. The water at the sides sinks because it becomes less dense.

2. Two identical copper cans are filled with boiling water.



One can is insulated with wool. The temperature of the water in each can is taken every minute for several minutes. Graphs of the results are plotted.

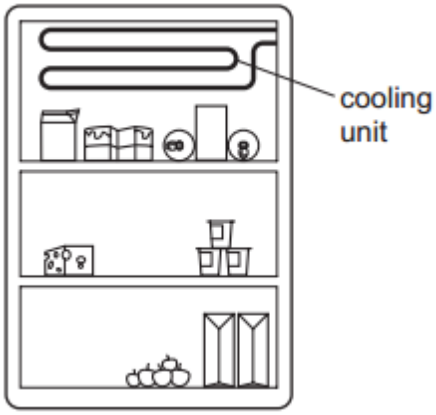
Which graph shows the results obtained?



3. In a vacuum flask, which methods of heat transfer are prevented by the vacuum?

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

4. The diagram shows a cooling unit in a refrigerator.



Why is the cooling unit placed at the top?

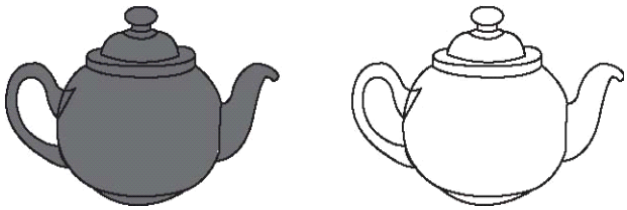
A. Cold air falls and warm air is displaced upwards.

B. Cold air is a bad conductor so heat is not conducted into the refrigerator.

C. Cold air is a good conductor so heat is conducted out of the refrigerator.

D. Cold air remains at the top and so prevents convection.

5. Two metal teapots are identical except that one is black on the outside and the other is white on the outside, as shown below.



The teapots each contain the same amount of hot water.

State and explain which teapot will cool down more quickly.

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[3]
[Total3m]

6. Logs of wood are burning in a camp-fire on the ground. A person is sitting nearby.

(a) (i) State two types of energy that the burning logs possess.

1. .....

2. .....

(ii) State the main method of heat transfer by which energy from the fire reaches the person sitting nearby.

.....

[3]

(b) A spark jumps out of the fire.
(i) State the name of the type of energy that the spark possesses due to its movement.

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(ii) The spark lands on the person's hand.

State which method of heat transfer causes the person to feel the spark.

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(iii) The pain caused by the spark makes the person stand up.

1. State the type of energy that has increased, now that he is standing.

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2. State the type of energy stored in his body that enabled him to stand.

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[4]

7. The main parts of a cold store are shown in Fig. 4.1.

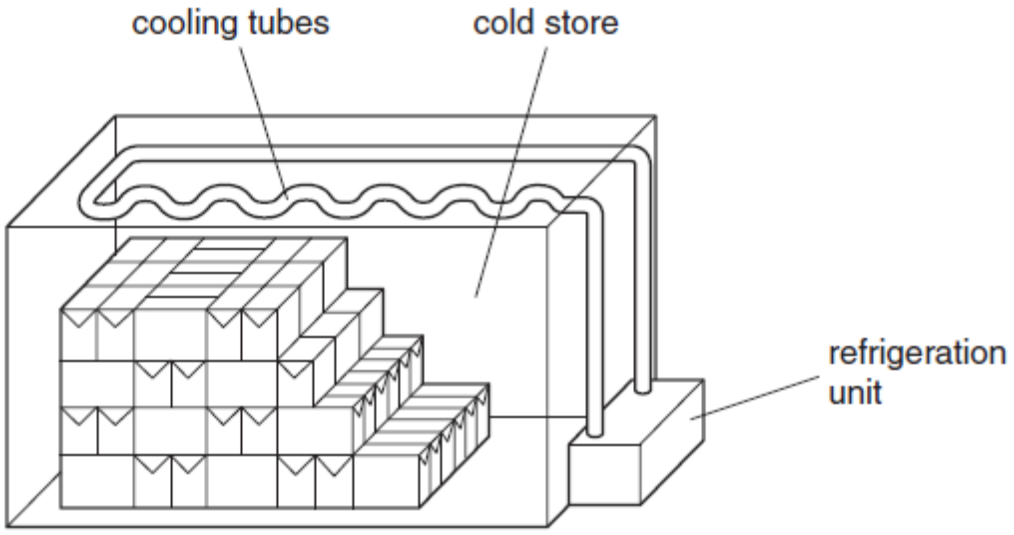

Fig. 4.1

(a) Explain why the cooling tubes are positioned at the top of the store.

[1]

(b) Suggest why the refrigeration unit is outside the cold store.

[2]

(c) The walls are made of thick thermally-insulating material.
Why is it important to have the walls made like this?

[2]

(d) Even when the refrigeration unit is running continuously, there comes a time when the temperature in the store stops falling, and remains constant.
Explain why this happens.

[2]
[Total: 7]

8. Fig. 7.1 shows a refrigerator in which a liquid absorbs thermal energy from the cold compartment and evaporates. As the vapour is compressed by the pump, work is done on it. The vapor condenses, giving out thermal energy to the surroundings through the cooling fins on the back of the refrigerator.

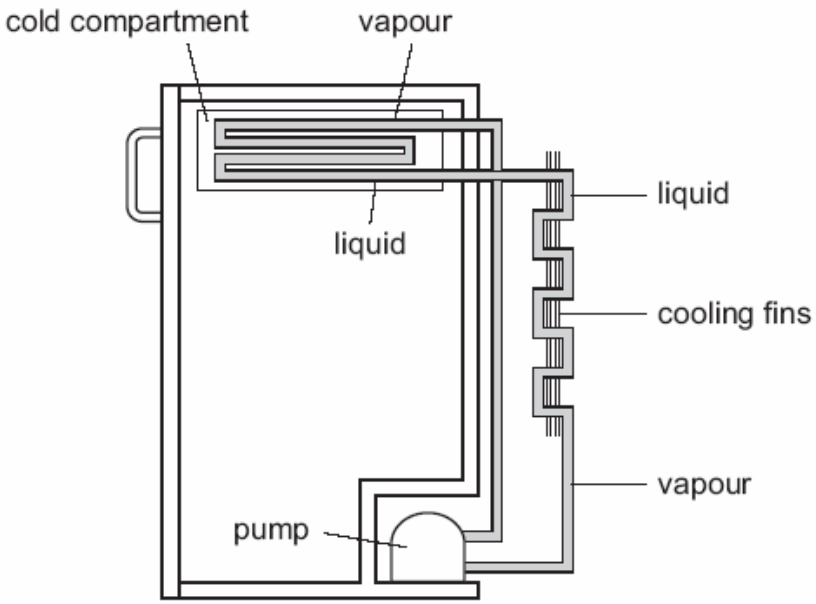

Fig. 7.1

(a) Explain the difference between boiling and evaporation.

[3]

(b) Explain why the pump compresses the vapour much more than it could compress a liquid.

[2]

(c) Explain the effect that a refrigerator has on the temperature of the air surrounding it.

[1]

(d) The pump is rated at 220 V, 110W.
(i) Calculate the working current of the pump.
Show your working.

[3]

(ii) Calculate the working resistance of the pump.

[2]
[Total 11m]

9. Three horizontal rods are placed with one end just above a Bunsen flame. The other end of each rod is coated with wax, as shown in Fig. 3.1.

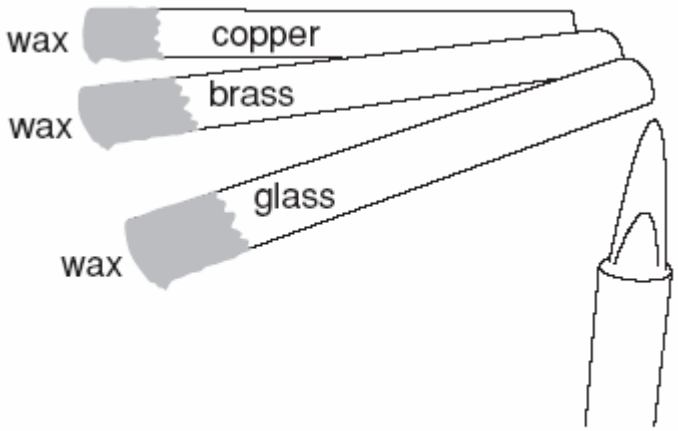

Fig. 3.1

Describe how you would use the apparatus to discover which rod is the best conductor of heat.

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[2]