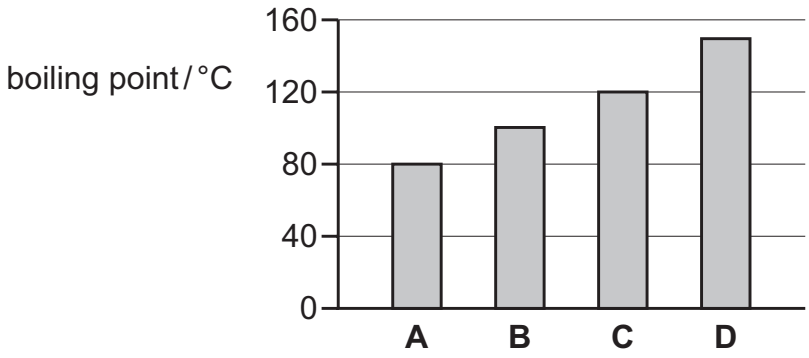
Name:

IGCSE Physics: **w25 12**

1 The chart shows the boiling points for four different liquids at standard atmospheric pressure.

Which liquid is water?



IGCSE Physics: **w25 11**

2 A substance is heated. The substance changes state from a liquid to a gas.

When the gas is cooled, it first becomes a liquid and finally a solid.

What is the order of changes of state for this substance?

A condensation → melting → freezing

B vaporisation → condensation → melting

C vaporisation → condensation → freezing

D melting → vaporisation → freezing

IGCSE Physics: **w25 11**

3 One end of a shiny metal rod is heated, and the other end quickly gets hot.

Which statement describes why the other end quickly gets hot?

A Metals are good thermal conductors.

B Metals are poor thermal conductors.

C Shiny surfaces are good emitters of infrared radiation.

D Shiny surfaces are poor emitters of infrared radiation.

4 **(a)** A teacher shows the class a demonstration about heat energy and states of matter.

The teacher heats a substance. A heater supplies thermal energy at a steady rate. The students measure the temperature of the substance every minute for 30 minutes.

Fig. 4.1 shows the graph of their results.

At point A, the substance is solid.

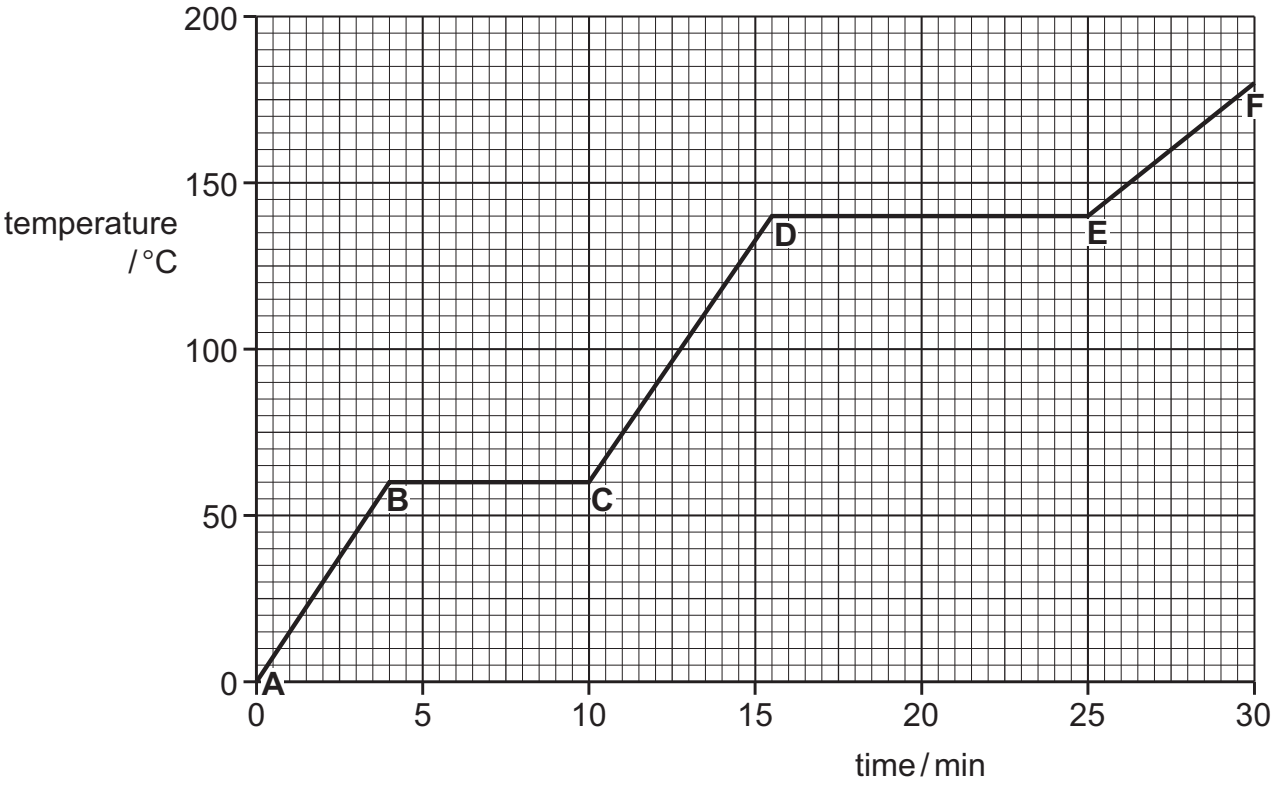


Fig. 4.1

(i) Describe the effect of the thermal energy input in section AB of the graph.

..... [1]

(ii) Describe the effect of the thermal energy input in section BC of the graph.

..... [1]

(iii) Determine the temperature at which the substance boils.

..... [1]

(iv) Deduce the state of matter of the substance in section EF of the graph.

..... [1]

(b) Evaporation is the name of a process that causes puddles of water to dry gradually.

(i) Describe the process of evaporation. Use your ideas about particles.

.....

.....

.....

.....

..... [3]

(ii) Describe another effect that evaporation has on the remaining water in the puddle.

..... [1]

[Total: 8]

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

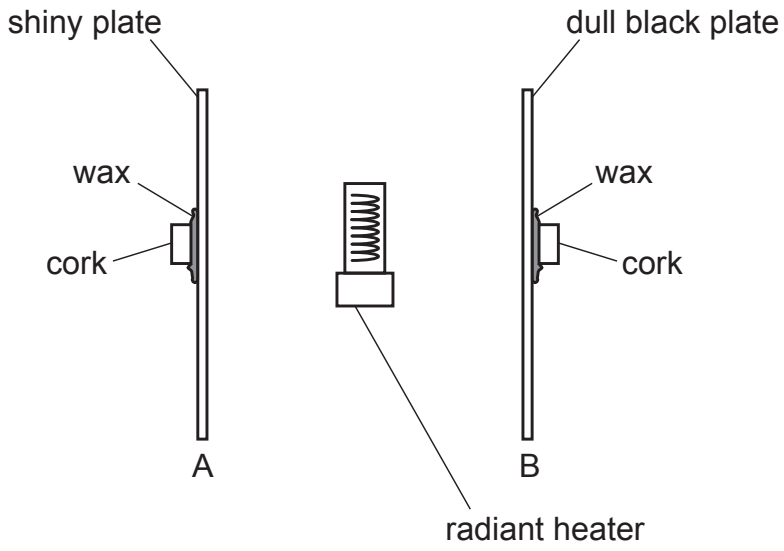


Fig. 5.1

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.

.....

.....

.....

.....

..... [4]

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

..... [1]

[Total: 5]

6 Fig. 4.1 shows gas trapped in a cylinder by a piston.

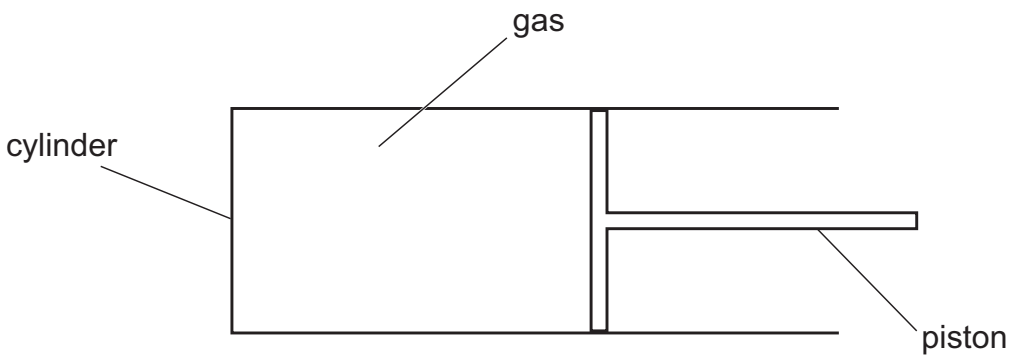


Fig. 4.1

(a) The volume of gas is 240 cm^3.
The piston is pushed to the left and is held in its new position.

(i) The pressure of the gas increases from 1.0×10^5 Pa to 1.4×10^5 Pa.

The temperature of the gas remains constant.

Calculate the volume of the gas when the piston is in its new position.

volume = ... cm^3 [3]

(ii) The area of the piston in contact with the gas is 1.9×10^{-3} m^2.

Calculate the force exerted on the piston by the gas when the piston is held in its new position.

force = ... [2]

(iii) The distance moved by the piston is 0.036 m. The average force exerted by the piston as it moves is 220 N.

Calculate the mechanical work done by the piston. State the equation you use.

work done = ... [2]

(b) Explain, in terms of particles, why gases can be compressed but liquids cannot.

.....

.....

..... [1]

[Total: 8]

7 Fig. 5.1 shows a metal box. The air in the box is at room temperature, 20 °C.
Air cannot leave or enter the box.

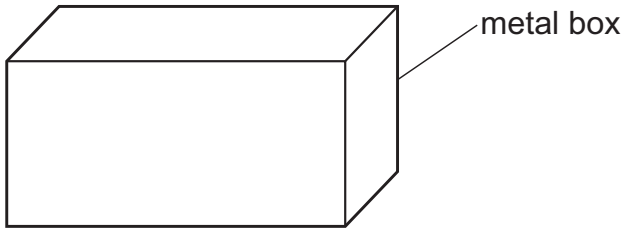


Fig. 5.1

(a) Describe the motion, separation and arrangement of the air particles in the metal box.

.....

.....

..... [3]

(b) A student puts the box in a freezer. The temperature of the air in the box decreases.

Describe the changes in the motion of the air particles in the box when the temperature decreases.

.....

..... [2]

[Total: 5]

8 **(a)** A 12 V, 50 W immersion heater is used to heat 0.15 kg of water in a beaker. The water is initially at a room temperature of 20 °C. The specific heat capacity of water is 4200 J/(kg °C).

Calculate the energy supplied to raise the temperature of the water from 20 °C to 58 °C.

energy = ... [3]

(b) The immersion heater is removed from the beaker.

One metal rod and one plastic rod are placed in the beaker of hot water as shown in Fig. 4.1. The rods are at room temperature (20 °C) before they are placed into the beaker.

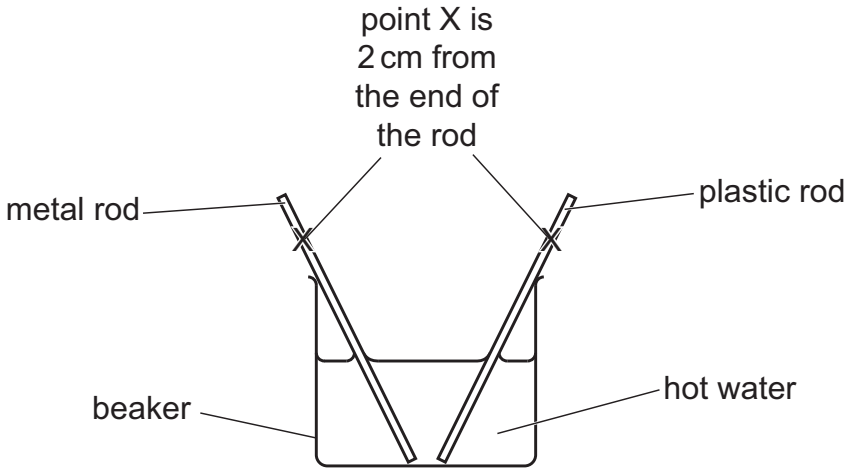


Fig. 4.1

Describe how the temperature of point X on each rod changes after the rods are placed in the beaker. Explain your answer.

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.....

.....

..... [4]

[Total: 7]

9 **(a)** There is a large puddle of water on a road. The water in the puddle evaporates.

(i) Describe how evaporation from the puddle occurs. Use ideas about particles in your answer.

.....

.....

..... [2]

(ii) State and explain **one** change in the weather that causes a faster rate of evaporation.

Statement .....

Explanation .....

.....

.....
[2]

(b) A car travels on a dry road. The driver presses the brakes. The car travels a distance before it comes to rest. This distance is called the braking distance.

State and explain how the braking distance changes when the road is wet.

.....

.....

..... [1]

[Total: 5]

10 (a) A student uses the apparatus in Fig. 5.1 to compare how different surfaces absorb infrared radiation.

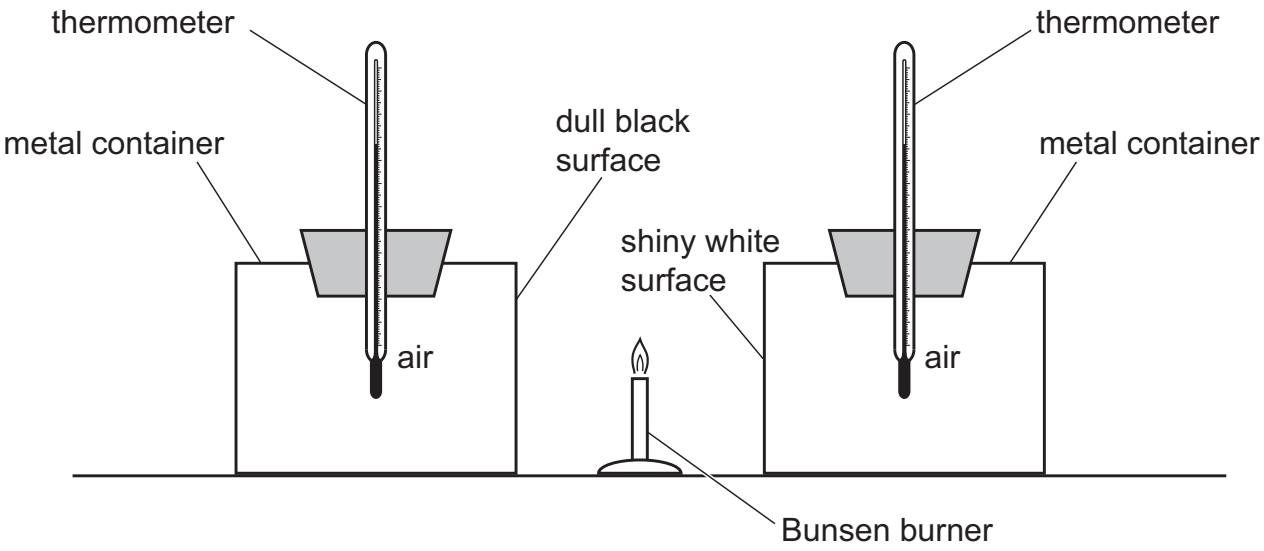


Fig. 5.1

There are two metal containers. One has a dull black surface and the other has a shiny white surface.

Before heating, the air inside the metal containers is at the same temperature.

The Bunsen burner flame is the same distance from each metal container. The Bunsen burner flame emits infrared radiation and heats the metal containers for three minutes.

Explain the difference between the temperatures of the air inside the two metal containers after heating for three minutes.

.....

.....

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..... [2]

(b) A teacher has some equipment for comparing thermal conductivity. The teacher has four metal rods and one glass rod. The metals are brass, copper, iron and steel. All five rods are the same size and shape.

Describe how the teacher may use the rods to compare the thermal conductivity of the five materials.

You may draw a labelled diagram as part of your answer.

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..... [4]

[Total: 6]