

9 Which statement correctly describes a change of state?

- A** A gas condenses to form a liquid.
- B** A liquid melts to form a solid.
- C** A solid condenses to form a liquid.
- D** A solid boils to form a gas.

12 When pollen grains in water are viewed through a microscope, they are seen to be in continuous, rapid, random motion.

What causes a pollen grain to move in this way?

- A** convection currents in the water
- B** bombardment by a single molecule of water
- C** uneven bombardment on different sides by water molecules
- D** collision with another pollen grain

14 Matter consists of very small particles in a continual state of motion.

Which row describes the behaviour of particles in a liquid?

	force between particles	motion of particles
A	strong	move randomly at high speed
B	strong	vibrate, but change positions
C	weak	vibrate in fixed positions
D	weak	move randomly at high speed

- 3 (a) A car has a weight of 13000N. The car is supported by 4 tyres. The area of each tyre in contact with the road is 0.016m^2 .
- (i) Calculate the pressure on the road due to the weight of the car.

pressure = [2]

- (ii) Explain, in terms of particles, why the air pressure in the tyres increases when the car travels along the road.

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..... [4]

- (b) A gas cylinder contains helium gas at a pressure of $2.0 \times 10^6\text{Pa}$. A volume of 0.026m^3 of the compressed gas is released from the cylinder into balloons. Each balloon contains 0.015m^3 of helium at atmospheric pressure ($1.0 \times 10^5\text{Pa}$). The temperature remains constant.
- Calculate the maximum number of balloons that can be filled.

maximum number of balloons = [3]

[Total: 9]

4 Fig. 4.1 shows a metal pan on an electric hotplate. The pan contains 200 cm³ of water.

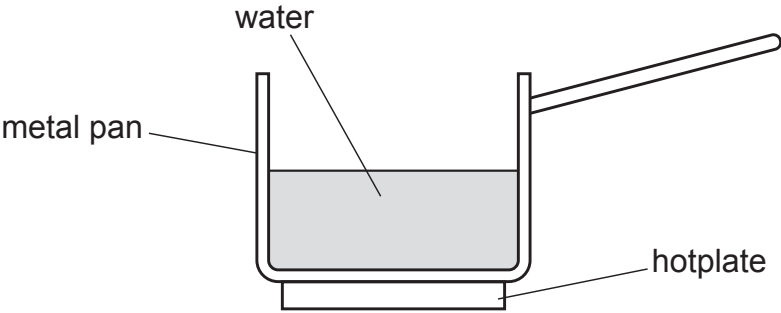


Fig. 4.1

The pan is heated. The temperature of the water in the pan increases.

(a) Thermal energy is transferred through the metal pan by conduction.

State and explain the **two** ways that thermal energy is conducted in a metal.

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..... [3]

(b) (i) The water boils and leaves the liquid as a gas.

Explain, in terms of forces and distances between particles, why the gas occupies a much greater volume than it does as a liquid.

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..... [2]

(ii) State **two** ways in which boiling differs from evaporation.

1

2

[2]

(c) The water is replaced with 200 cm³ of milk.

The initial temperature of the milk is 20.0 °C. The boiling point of milk is 95.0 °C.

The milk starts to boil when 60 700 J of thermal energy has been transferred to it. The density of milk is 1.03 g/cm³.

Calculate the value of the specific heat capacity of milk. Give your answer to 3 significant figures.

specific heat capacity = [4]

[Total: 11]