

Paper 1

Questions are applicable for both core and extended candidates

- 1 Which statement about a solid, a liquid or a gas is correct?
- A A solid has a fixed shape and can be compressed.
 - B A liquid takes the shape of the container it is in and can be compressed.
 - C A solid has no fixed shape and cannot be compressed.
 - D A gas takes the shape of the container it is in and can be compressed.

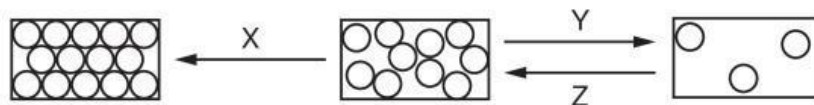
- 2 The arrangements of particles in solids, liquids and gases are different.

Which statement about the molecules in ice, water or steam is correct?

- A The H_2O molecules are on average closest together in steam.
 - B The H_2O molecules are on average furthest apart in water.
 - C The H_2O molecules in steam have the second highest average velocity.
 - D The H_2O molecules in ice are able to vibrate.
- 3 Which statement about liquids and gases is correct?
- A 1 cm^3 of gas contains more particles than 1 cm^3 of liquid.
 - B A given mass of liquid has a fixed volume at room temperature.
 - C Particles in a liquid can easily be forced closer together.
 - D Particles in a liquid have fixed positions.

- 4 The three rectangles show the arrangements of the particles in each of the three states of matter.

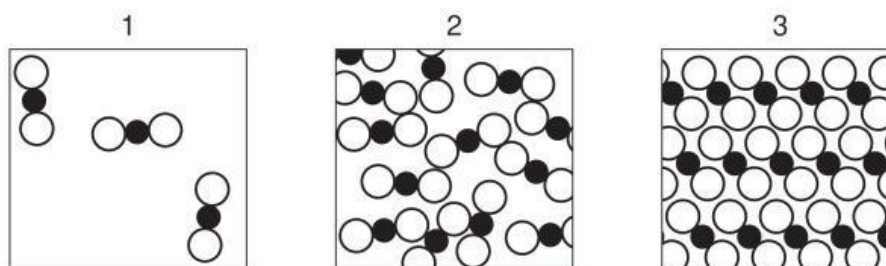
X, Y and Z represent the processes needed to change from one state to another.



What are the processes X, Y and Z?

	X	Y	Z
A	melting	condensing	evaporating
B	evaporating	melting	freezing
C	melting	freezing	condensing
D	freezing	evaporating	condensing

- 5 Diagrams of the three states of matter for carbon dioxide are shown.



Which two diagrams show the states of matter before and after the sublimation of carbon dioxide?

- A** 2 to 1 **B** 2 to 3 **C** 3 to 1 **D** 3 to 2

- 6 Which row describes the spacing and arrangement of particles in a solid, a liquid and a gas?

	solid	liquid	gas
A	close together and randomly arranged	close together and regularly arranged	far apart and randomly arranged
B	close together and randomly arranged	far apart and randomly arranged	close together and randomly arranged
C	close together and regularly arranged	close together and randomly arranged	far apart and randomly arranged
D	close together and regularly arranged	close together and regularly arranged	close together and randomly arranged

- 7 The melting points and boiling points of three elements, at 1 atm pressure, are shown.

	melting point /°C	boiling point /°C
argon	−189	−186
nitrogen	−210	−196
oxygen	−218	−183

Separate samples of argon, nitrogen and oxygen are stored at −200 °C and at 1 atm pressure.

How many samples are liquids?

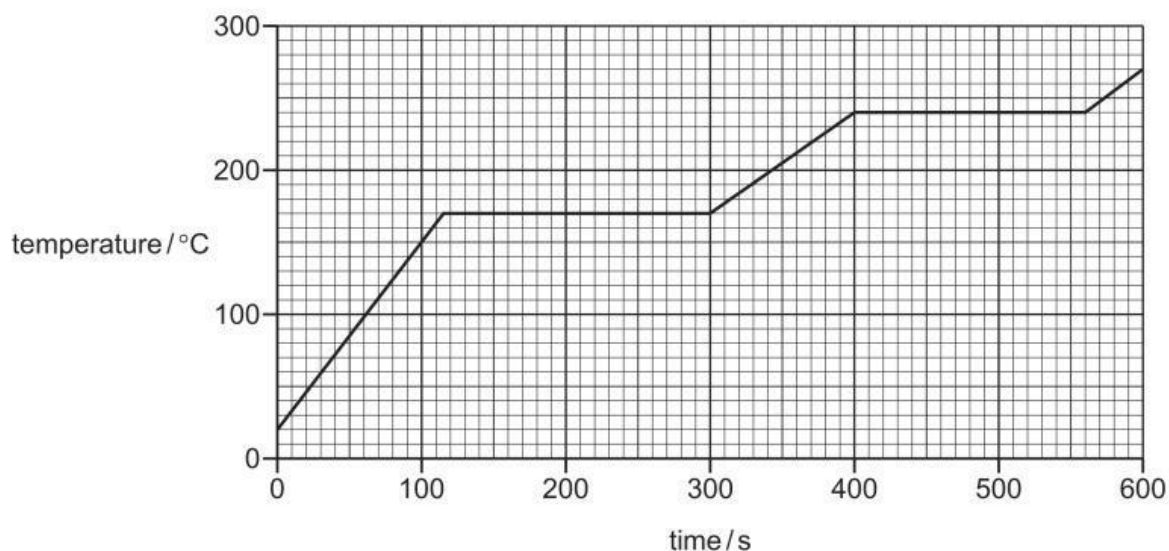
- A** 0 **B** 1 **C** 2 **D** 3

Paper 2

Questions are applicable for both core and extended candidates
unless indicated in the question

- 8 Solid X is heated for 600 seconds.

The graph shows the heating curve that is obtained. (extended only)



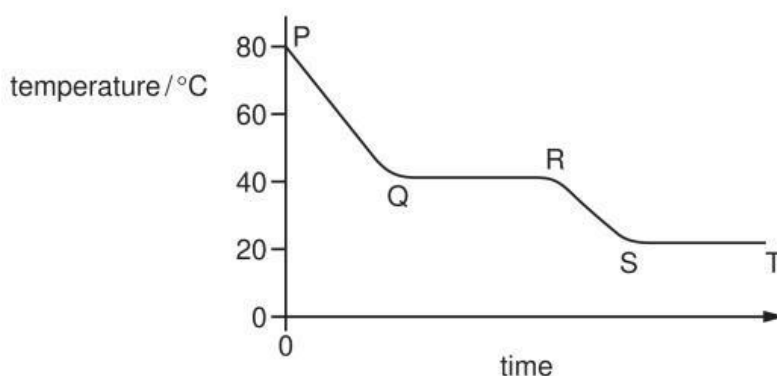
What is the melting point of X? (extended only)

- A 20 °C B 170 °C C 240 °C D 270 °C

- 9 Substance M is a solid at 30 °C. (extended only)

The substance is heated to 80 °C and its temperature measured as it cools down to room temperature.

The cooling curve is shown.



Between which times is substance M freezing? (extended only)

- A P to Q B Q to R C R to S D S to T

- 10 A gas is placed in a sealed container. The gas has a pressure of one atmosphere and a temperature of 50°C .

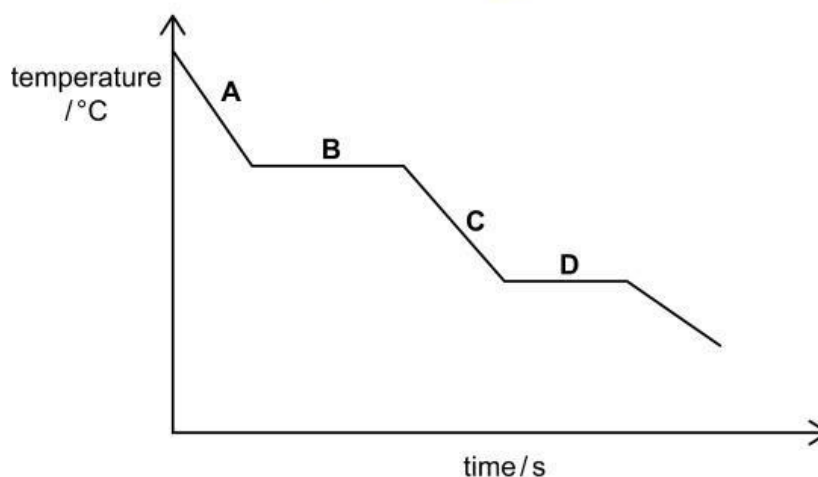
It is heated to 100°C .

Which row describes the cause of the pressure of the gas and the effect of increasing the temperature of the gas? **(extended only)**

	cause of gas pressure	the effect of increased temperature of the gas
A	collisions between gas particles	collisions become less frequent
B	collisions between gas particles	the average speed of the gas particles increases
C	collisions between gas particles and the container	collisions become less frequent
D	collisions between gas particles and the container	the average speed of the gas particles increases

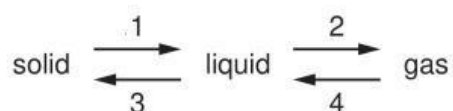
- 11 A gaseous substance is slowly cooled and the temperature recorded every second.

The results are shown on the graph. **(extended only)**



At which point is the substance a solid? **(extended only)**

- 12** The diagram shows the changes of state between a solid, a liquid and a gas.



In which changes of state is energy being given out?

- A** 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4