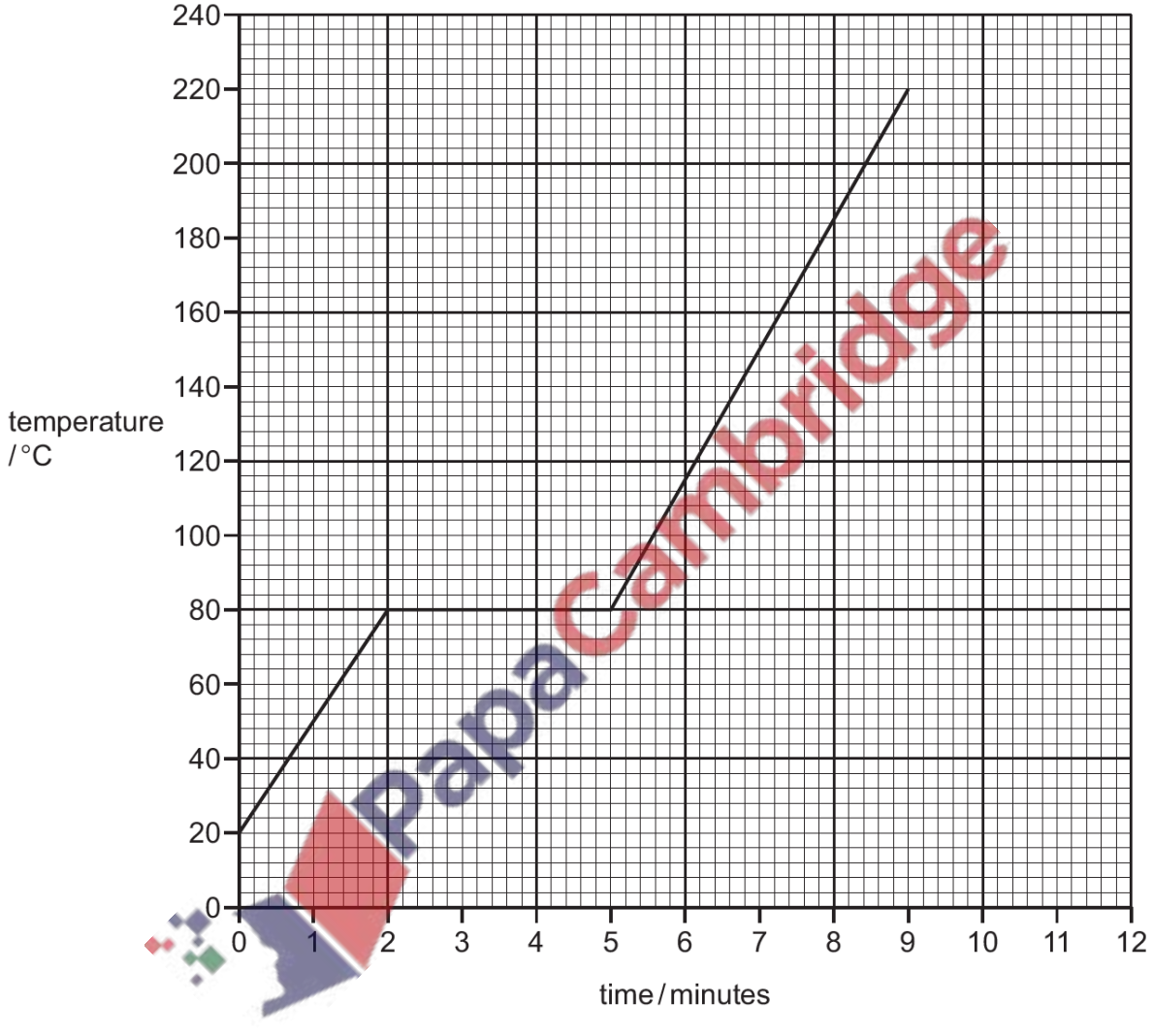
The Particulate nature of matter – 2019 June

1. 0620/41/M/J/19/No.2

Z is a covalent substance. In an experiment, a sample of pure solid **Z** was continually heated for 11 minutes.

The graph shows how the temperature of the sample of pure **Z** changed during the first 9 minutes.



(a) What is the melting point of pure **Z**?

..... °C [1]

(b) The sample of pure **Z** began to boil at 9 minutes. It was boiled for 2 minutes.

Use this information to sketch on the grid how the temperature of the sample of pure **Z** changed between 9 minutes and 11 minutes. [1]

(c) The sample of pure **Z** was continually heated between 2 minutes and 5 minutes.

Explain, in terms of attractive forces, why there was no increase in the temperature of the sample of pure **Z** between 2 minutes and 5 minutes.

.....

.....

..... [2]

(d) Describe how the motion of particles of pure **Z** changed from 0 minutes to 2 minutes.

.....

..... [2]

(e) The experiment was repeated using a solid sample of **impure Z**.

Suggest the differences, if any, in the melting point and boiling point of the sample of impure **Z** compared to the sample of pure **Z**.

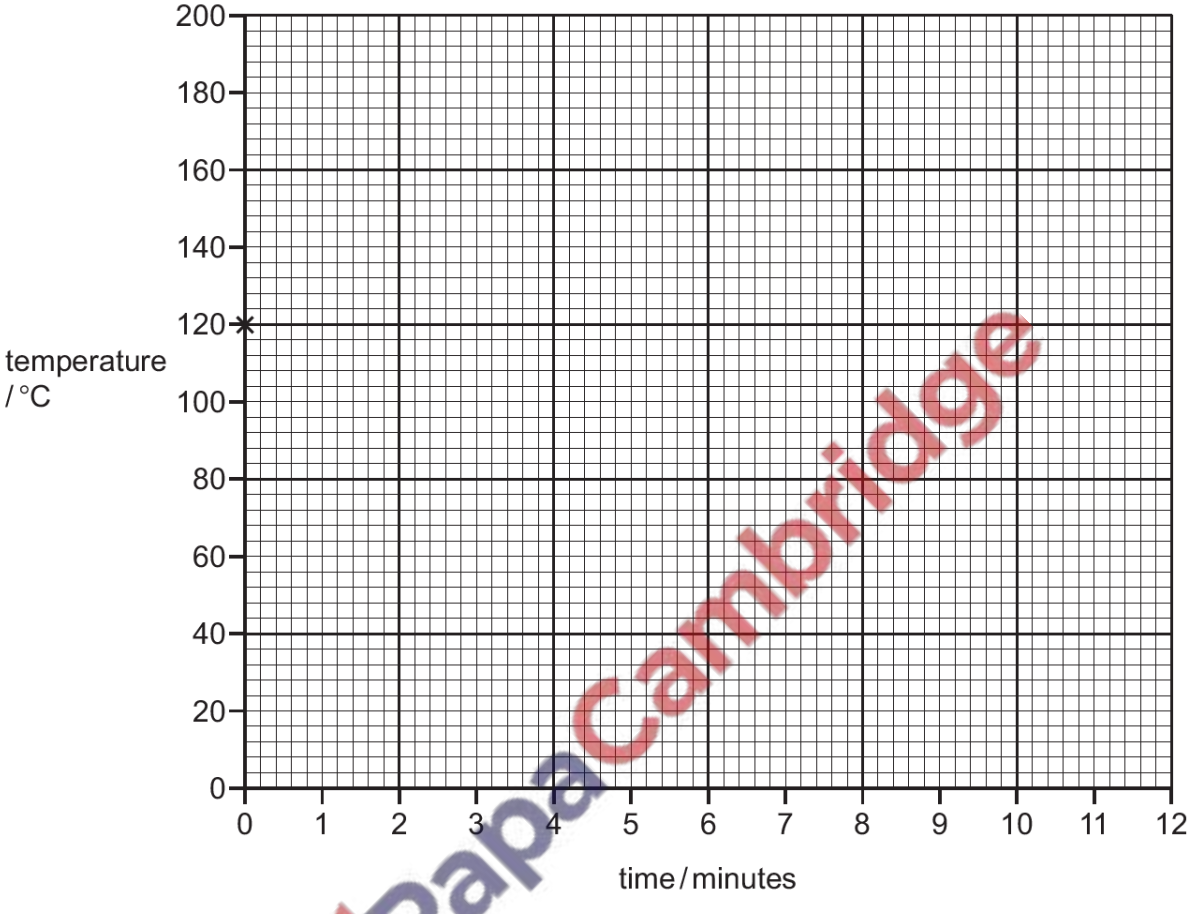
melting point .....

boiling point .....

[2]

(f) A sample of pure **Z** was allowed to cool from 120 °C to 20 °C. The total time taken was 8 minutes.

Starting from point ×, sketch on the grid how the temperature of the sample of pure **Z** changed between 0 minutes and 8 minutes.



[2]

[Total: 10]

2. 0620/42/M/J/19/No.1

The names of eight substances are given.

aluminium oxide	**calcium oxide**	**ethanol**	**nitrogen**
iron(III) oxide	**methane**	**oxygen**	**silicon(IV) oxide**

Answer the following questions about these substances.
Each substance may be used once, more than once or not at all.

State which substance is:

(a) the main constituent of natural gas

..... [1]

(b) a reactant in respiration

..... [1]

(c) the main constituent of bauxite

..... [1]

(d) a product of photosynthesis

..... [1]

(e) a greenhouse gas

..... [1]

(f) a macromolecular solid.

..... [1]

[Total: 6]