1. The three states of matter are solid, liquid and gas.

(a) Lithium reacts with water to produce lithium hydroxide solution and hydrogen.

Use the correct state symbols from the box to complete the chemical equation.

aq	g	l	s

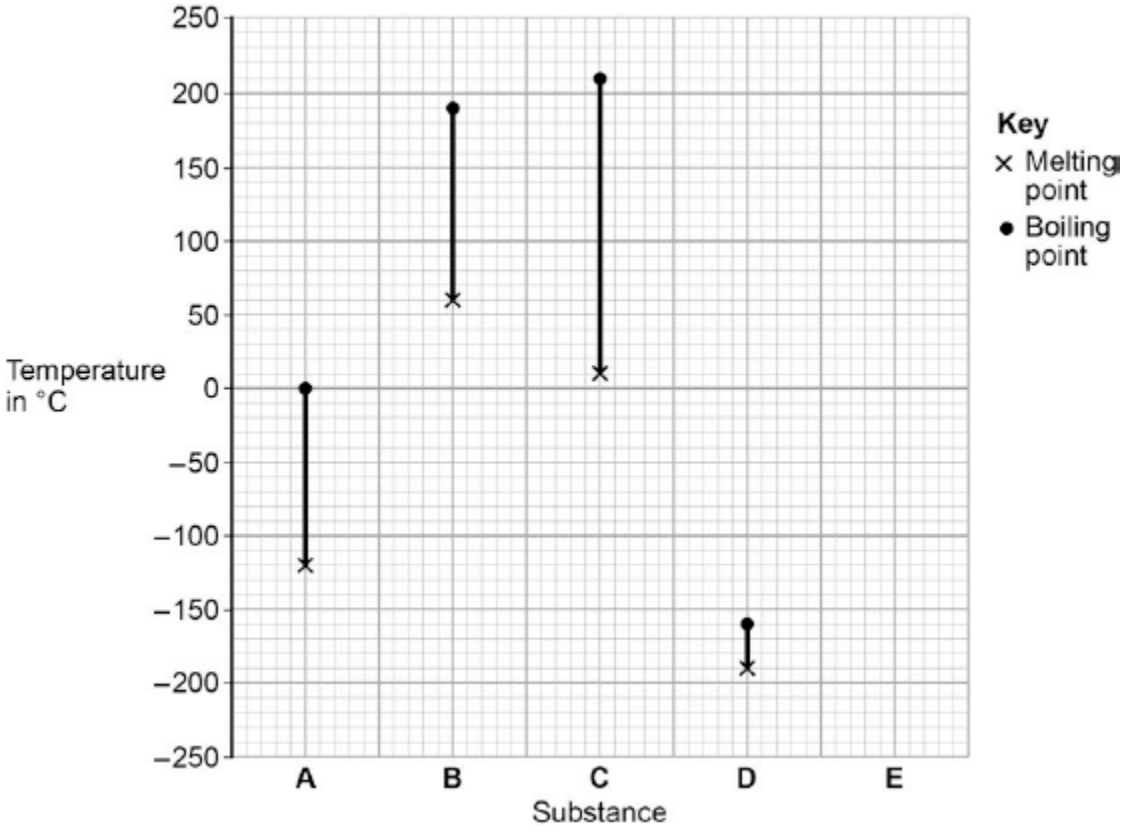
$2Li(s) + 2H_2O(l) \rightarrow 2LiOH(\_\_\_\_) + H_2(\_\_\_\_)$

lithium + water → lithium hydroxide + hydrogen

(2)

(b) **Figure 1** shows the melting points and the boiling points of four substances, **A**, **B**, **C** and **D**.

Figure 1



Which substance is liquid over the greatest temperature range?

Tick **one** box.

A ☐

B ☐

C ☐

D ☐

(1)

(c) Which **two** substances are gases at 50 °C?

Tick **one** box.

A and **B** ☐

B and **C** ☐

C and **D** ☐

A and **D** ☐

(1)

(d) A different substance, **E**, has:

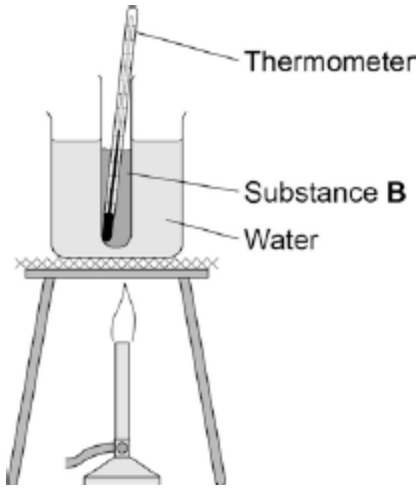
- a melting point of −50 °C
- a boiling point of +120 °C

Plot these two values on **Figure 1**.

(2)

(e) **Figure 2** shows the apparatus a student used to determine the melting point and the boiling point of substance **B** in **Figure 1**.

Figure 2



Explain why the student could not use this apparatus to determine the boiling point of substance **B**.

_____

_____

_____

_____

(2)

(f) Suggest **one** reason why the student could not use this apparatus to determine the exact melting point of substance **B**.

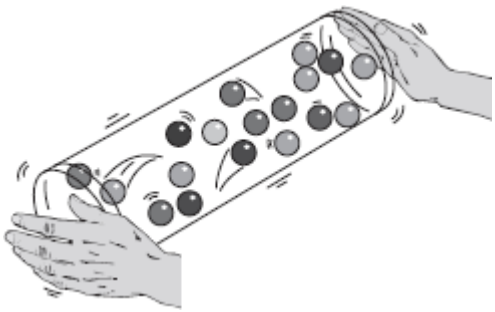
_____

_____

(1)

(Total 9 marks)

2. A student shakes a tube containing small balls to model the movement of particles in a gas.



(a) Why is this a good model for the movement of particles in a gas?

Tick (✓) **two** boxes.

The balls move slowly.	☐
The balls are far apart from each other.	☐
The balls are different colours.	☐
The balls move randomly.	☐

(2)

(b) For a given material, in which state of matter:

are the particles in a regular arrangement?

_____

do the particles have the most kinetic energy?

_____

(2)

(Total 4 marks)