

Particle Model and Changes of State

Q1. (2018) – 6c

(c) The particles in the ink in the flask can be shown as in Figure 10.

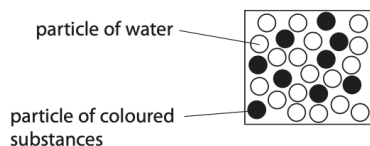
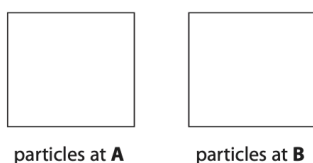


Figure 10

In the boxes below, draw the arrangement of particles that would be expected at **A** and **B** shown in Figure 9.

(2)



Q2. (2018) – 6d

(d) Changes of state between the three states of matter are shown in Figure 11.



Figure 11

The changes shown are physical changes.

Explain why these changes are called physical changes rather than chemical changes.

(2)

Q3. (2019)

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

(a) What is the name of the change of state when a liquid changes into a solid?

(1)

- ☐ **A** condensation
- ☐ **B** evaporation
- ☐ **C** freezing
- ☐ **D** melting

Q4. (2019) – 1b

(b) A gas was left to cool to form a liquid.

Figure 1 shows how the temperature of the substance changed with time.

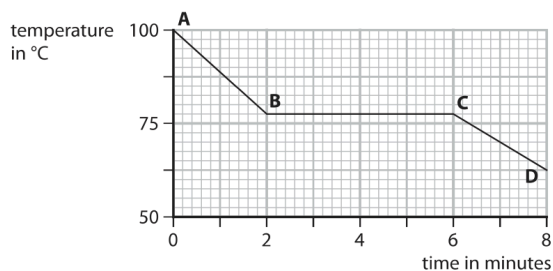


Figure 1

From **A** to **B** the substance is a gas.

From **C** to **D** the substance is a liquid.

A)

(i) State the time when the gas first started to form a liquid.

(1)

B)

(ii) Calculate the number of minutes it took from the gas first starting to form a liquid until the substance was completely liquid.

(1)

Q5. (2019) – 1c

(c) Figure 2 shows the melting points and boiling points of four substances, **W**, **X**, **Y** and **Z**.

substance	melting point in °C	boiling point in °C
W	–220	–188
X	–101	–34
Y	–7	59
Z	114	184

Figure 2

Using the information in Figure 2

A)

(i) give the letter of the substance that is a solid at 20°C

(1)

B)

(ii) give the letter of a substance that is a liquid at 50°C

(1)

Q6. (2020)

1 (a) When solid sodium chloride is mixed with water, sodium chloride solution forms.

What name is given to the process of mixing a solid with water to form a solution?

(1)

- ☐ **A** crystallising
- ☐ **B** diluting
- ☐ **C** dissolving
- ☐ **D** melting

Q7. (2020) – 4d

(d) Figure 5 shows the changes of state for gallium and the arrangement of particles in liquid gallium.

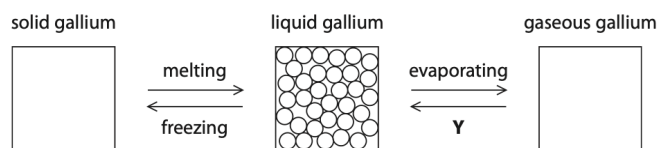


Figure 5

A)

- (i) Complete the boxes for solid gallium and gaseous gallium by drawing the arrangement of the particles in each of these physical states.

(2)

B)

- (ii) Give the name of the change of state labelled Y in Figure 5.

(1)

Q8. (2021)

A)

2 If liquid water is cooled below 0°C it turns into the solid, ice.

- (a) (i) Give the name for the change of state from liquid to solid.

(1)

B)

- (ii) Here are five statements about ice and water.

Place ticks in boxes by the **two** statements that are correct.

(2)

the molecules move faster in water than in ice	
the molecules are more randomly arranged in ice than in water	
the molecules start moving when water becomes ice	
the molecules are arranged regularly in ice but not in water	
the molecules have more energy in ice than in water	

Q9. (2022)

- 2 Figure 3 shows a metal spoon and two test tubes being heated in a water bath.

One test tube contains a piece of chocolate, the other some liquid egg white.

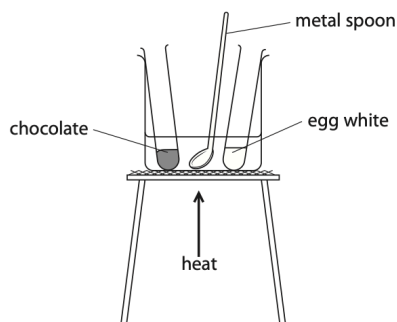


Figure 3

After heating, the spoon, the chocolate and the egg white are allowed to cool to room temperature.

Figure 4 shows the state of the three different substances before heating, when hot and after cooling.

substance	before heating	when hot	after cooling
metal spoon	solid	solid	solid
chocolate	solid	liquid	solid
egg white	liquid	solid	solid

Figure 4

A)

- (a) Describe the differences in the arrangement and movement of the particles in a solid and in a liquid.

(2)

difference in arrangement of particles

.....

.....

.....

difference in movement of particles

.....

.....

.....

B)

- (b) What name is given to the process when the chocolate changes from a solid to a liquid?

(1)

- ☐ A condensing
- ☐ B evaporating
- ☐ C freezing
- ☐ D melting

Q10. (2023) – 1b

- (b) The substance used as the solvent in the chromatography was heated for 8 minutes.

Figure 2 shows how the temperature of the substance changed with time.

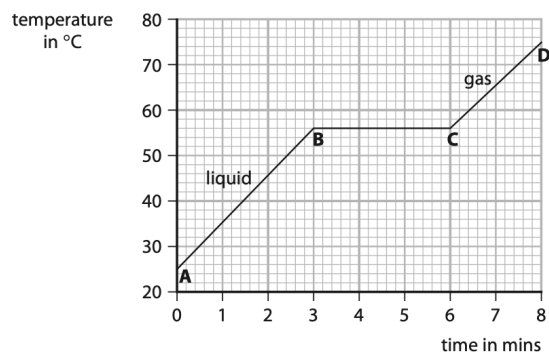


Figure 2

From **A** to **B** the substance was a liquid.

From **C** to **D** the substance was a gas.

A)

- (i) Give the name of the change when a liquid becomes a gas.

(1)

B)

- (ii) Use Figure 2 to give the temperature of the substance at 4 minutes.

(1)

C)

- (iii) Use Figure 2 to give the time when the substance has completely changed into a gas.

(1)

Q11. (2024)

- 1 Figure 1 shows a test tube being heated in a beaker of water.

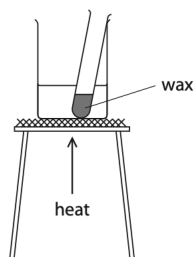


Figure 1

The test tube contains solid wax.

As the test tube was heated, the solid wax changed to liquid wax.

After heating, the wax was allowed to cool to room temperature.

A)

- (a) Figure 2 shows the arrangement of particles in liquid wax.

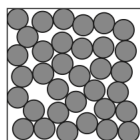


Figure 2

Draw the arrangement of particles in solid wax in the box in Figure 3.

(1)



Figure 3

B)

- (b) When the wax cools, it changes from a liquid back to a solid.
This change is a **physical change**.

- (i) What name is given to the change of a liquid to a solid?

(1)

- ☒ A condensing
☒ B evaporating
☒ C freezing
☒ D melting

C)

- (c) Another physical change is when a liquid changes into a gas.

- (i) Which row shows the movement and arrangement of the particles in a gas?

(1)

	movement of particles	arrangement of particles
☒ A	slow	regular
☒ B	slow	random
☒ C	fast	regular
☒ D	fast	random

D)

- (ii) Suggest why the wax did **not** change into a gas when the test tube was heated in the beaker of water.

(1)